Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

FREEDOM OF INFORMATION ACT/PRIVACY PROGRAM

Dcember 28, 2020

In reply refer to: FOIA #BPA-2020-00933-F

Peter J. Hess
Christina Alves
Hess Law Office, PLCC
415 North Second Avenue
Walla Walla, WA 99362
Email: christina@hesslawoffice.com

Dear Mr. Hess and Ms. Alves,

This communication is the Bonneville Power Administration's (BPA) response to your request for agency records made under the Freedom of Information Act, 5 U.S.C. § 552 (FOIA). BPA received your FOIA request on July 7, 2020, and formally acknowledged your request on July 21. 2020.

Request
"…Request … for the following … records:

- Subject: Rotary Screw Trap. AKA: "Basel Cellars Screw Trap"
- Subject Location: Walla Walla River, abutting Basel Cellars Estate Winery, 2901 Old Milton highway, Walla Walla, WA 99362.
- Date Range: Approximately 2000 to present. (Please note: the exact date range is currently unknown, as we are not sure of the date upon which the Rotary Screw trap was first installed.)

… any and all records for the above named subject, specifically including but not limited to:

1. Installation
   A. Identity of the person(s) or entity(ies) responsible for installing the rotary screw trap, and the date on which is was installed.
   B. Identity of the person(s) or entity(ies) responsible for funding installation of the rotary screw trap.
   C. Any records pertaining to installation applications, permits, registration, contractual agreement, etc.

2. Maintenance
   A. Identity of the person(s) or entity(ies) responsible for maintenance and upkeep of the rotary screw trap.
   B. Identity of the person(s) or entity(ies) responsible for funding maintenance and of the rotary screw trap.
   C. Records of Maintenance schedules, safety inspections, and/or audits.
   D. Any documents outlining safety protocols and standards of use or maintenance for the rotary screw trap, or screw traps in general.

3. Permits, Agreements, Conditions
   A. Identity of the person(s) or entity(ies) leasing, renting, or otherwise in custody of any permit, license or agreement regarding use and maintenance of the rotary screw trap, including the identity of the person(s) and/or entity(ies) and/or agency(ies) providing any such permit, lease, rental agreement, etc.
   B. Any records of special permits required to operate this kind of rotary screw trap, including any which pertain to permanent or semi-permanent installation.
   C. Any documents which outline specific ownership, partial or otherwise, of this rotary screw trap, including any conditions or agreements between multiple owners, if applicable, and any documents which describe the relationship of invested parties involved in the maintenance, use, installation, or control of the screw trap.

4. Design
   A. Any records or documents describing design standards for rotary screw traps in Washington State.
   B. Any records relating to the person(s) or entity(ies) responsible for designing the screw trap, including any updated design standards which have been released since the installation of the screw trap which is the subject of this investigation.
   C. Any records describing the construction of rotary screw traps, including the identity of the person(s), entity(ies), and/or agency(ies) responsible for the production of materials used in manufacturing screw traps in Washington State, as well as the identity of the person(s), entity(ies), and/or agency(ies)~responsible for constructing and/or transporting the screw traps.

Please note that these requests are intended to include the screw trap as well as all anchoring devices and/or any external accessories to the screw trap."

Response
BPA has searched for and collected responsive records from its Montana/Idaho Implementation office. BPA is herein releasing 536 pages of responsive records, with no redactions applied.

Fee
There are no fees applicable to the agency's response to your FOIA request.

Certification
Pursuant to 10 C.F.R. § 1004.7(b)(2), I am the individual responsible for the records search and release described above. Your FOIA request is now closed with all available responsive agency records provided.

Appeal
The adequacy of the search may be appealed within 90 calendar days from your receipt of this letter pursuant to 10 C.F.R. § 1004.8. Appeals should be addressed to:

Director, Office of Hearings and Appeals
HG-1, L'Enfant Plaza
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585-1615

The written appeal, including the envelope, must clearly indicate that a FOIA appeal is being made. You may also submit your appeal by e-mail to OHA.filings@hq.doe.gov, including the phrase "Freedom of Information Appeal" in the subject line. (The Office of Hearings and Appeals prefers to receive appeals by email.) The appeal must contain all the elements required by 10 C.F.R. § 1004.8, including a copy of the determination letter. Thereafter, judicial review will be available to you in the Federal District Court either (1) in the district where you reside, (2) where you have your principal place of business, (3) where DOE's records are situated, or (4) in the District of Columbia.

You may contact BPA's FOIA Public Liaison, Jason Taylor, at 503.230.3537, jetaylor@bpa.gov, or the address on this letter header for any further assistance and to discuss any aspect of your request. Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows:

Office of Government Information Services
National Archives and Records Administration
8601 Adelphi Road-OGIS
College Park, Maryland 20740-6001
E-mail: ogis@nara.gov
Phone: 202-741-5770
Toll-free: 1-877-684-6448
Fax: 202-741-5769

Questions about this communication may be directed to James King, CorSource Technology Group LLC, at jjking@bpa.gov or 503.230.7621.

Sincerely,

Candice D. Palen
Freedom of Information/Privacy Act Officer

Responsive agency records accompany this communication.

ANNUAL PROGRESS REPORT 2019

WALLA WALLA RIVER SUB-BASIN SALMONID MONITORING AND EVALUATION PROJECT

Project Number 2000-039-00
Report covers work performed under BPA contract 73982 REL 14 and 73982 REL 45
Report was completed under BPA contract 73982 REL 45 and 73982 REL 73
Report covers work performed from Jan 1, 2019-Dec. 31, 2019

by

Robert Hogg, Travis Olsen, Craig Contor, June Johnson, Travis Sproed, Brock Startzel-Holt, Naomi Moss, and David Wolf Jr.

March 2020

Confederated Tribes of the Umatilla Indian Reservation
Department of Natural Resources
Fisheries Program
46411 Timine Way
Pendleton, OR 97801
Report Created: January 2020

This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION ADMINISTRATIVE SUMMARY

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Suggested Citation

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Executive Summary

Low summer flows and water temperatures in the Walla Walla Basin above Milton-Freewater are relatively better than many locations in the region. However, extensive channelization and loss of floodplain function in the upper main stem of the Walla Walla and the lower South Fork has impacted the suitability of the watershed to rear juvenile salmon and steelhead. Summer rearing conditions further deteriorate below Milton-Freewater with extensive channelization, diversion dams, low stream flows and related elevated water temperatures. Above Milton-Freewater adult spring Chinook holding and spawning habitat is good to excellent and pre-spawning mortality is low.

We observed 113 adult spring Chinook at Nursery Bridge during 2019. Adult returns have declined from 1,186 in 2010. Only 41 redds were observed in 2019 compared to 437 in 2010. The average natural Chinook smolt production from the upper Walla Walla is 38,041 (2009-2019) with an estimate of 10,109 ± 1,902 (95% CI) for 2019. Chinook smolt survival estimates to McNary Dam were below the average of 34% for natural origin and 27% for hatchery origin during 2019. We estimated 23% ± 8% (95% CI) survival for natural origin smolts and 15% ± 4% for hatchery origin smolts. Smolt-to-adult returns (SAR) to McNary Dam have averaged 0.30% for natural origin and 0.10% for hatchery origin adults. The last complete adult return group was from the 2016 out-migration year with 0 returns of PIT-tagged natural origin adults, and only 0.02% SAR for hatchery origin adults.

Steelhead adult returns were the lowest on record since 1992-1993 with only 214 observed at Nursery Bridge during the 2018-19 season. The smolt production estimate was 61,527 ± 12,349 (95% CI) for 2019 and above the 49,029 average for the period of record (2009-2019). Smolt survival to McNary Dam was below the 31% long term average at 25.4% ± 8.8% (95% CI) for 2019. The most recent complete adult return cohort is from the 2016 out-migration year with an estimated SAR to McNary Dam of 0.0%, which is likely a function of the low number of trapped individuals (245) available for PIT-tagging in concert with low adult returns to the Columbia Basin. For the period of record (2002-2016), the average PIT tag based SAR to McNary Dam was 1.31% (with a range of 0.00-3.52%).

Upstream migrating bull trout observations averaged 113 at Nursery Bridge since 2000 with 106 in 2019. There has been a general decrease in bull trout observations since 2011.

Acknowledgments

We would like to acknowledge the many contributions of Gary James, Gene Shippentower, Julie Burke, Celeste Reeves, and Dora Sigo of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). This project is funded by Bonneville Power Administration as a collaborative endeavor between CTUIR. We would like to thank Tracey Yerxa, Timothy Ludington and Peter Lofy of BPA for their guidance and assistance. Additional support was also received from, the Walla Walla Subbasin Watershed Counsel, United States Army Corps of Engineers, U.S. Fish and Wildlife Service, and the U.S. Forest Service.

Introduction

This project monitors population status and trend metrics for endemic summer steelhead, and reintroduced spring Chinook salmon in the Walla Walla River Basin. The purpose is to provide ecological information to decision makers in support of adaptive management for Endangered Species Act (ESA) recovery, population restoration, conservation, and the preservation of cultural, social, and economic salmonid resources. Key metrics include adult returns and natural juvenile outmigration as measures of salmonid population viability. We monitor spring Chinook redd abundance and distribution. We also collaborate with the watershed council with their monitoring of stream flow and water temperatures. Flow and temperatures affect fish distribution and survival. Flows are directly influenced by water management operations. Summer steelhead and bull trout in the watershed are listed as threatened under the ESA. Spring Chinook have been reintroduced into the watershed, but like bull trout and summer steelhead, their abundance remains depressed relative to historic levels. Bull trout are not a primary target for our monitoring, but we report bull trout observations from video monitoring at Nursery Bridge Dam (Figure 1).

Simultaneously with salmon reintroduction, managers have made initial efforts to address deficiencies in fish passage, stream flow, and habitat issues throughout the basin. Restoration efforts have been developed by those recognizing the importance of healthy, viable aquatic and terrestrial communities (Jones 2008). Minimum instream flows of 18 and 25 cubic feet per second (cfs) are now required to be maintained in the mid- and upper main stem Walla Walla River as part of the U.S. Fish and Wildlife Service (USFWS) Amended Civil Penalty Agreement in 2001 with basin irrigation districts (CTUIR 2008). Passage improvements ongoing since 1997 include removing two large decommissioned diversion structures, constructing or improving fish screens, bypass facilities, and fish ladders. A wide variety of habitat improvement projects have been implemented by various agencies throughout the basin (SRSRB 2011, CTUIR 2013).

This project is funded through the Northwest Power and Conservation Council's Fish and Wildlife Program and the Columbia Basin Fish and Wildlife program and is in alignment with their monitoring strategies listed below:

- Assess the status and trend of adult natural and hatchery origin salmon and steelhead abundance at various life stages.
- Assess the status and trend of juvenile abundance and productivity of natural origin fish populations.
- Are hatchery improvement programs and actions achieving the expected biological performance objectives?
- What effects do artificial production have on natural populations of anadromous fish?
- To what extent are hatchery programs meeting mitigation production requirements and operational objectives in the Watershed Restoration Master Plan, Hatchery Genetics Management Plan (HGMP, CTUIR 2009), and the Research, Monitoring, and Evaluation Plan (RM&E)?

These fish monitoring strategies are addressed by providing data for viable salmonid population (VSPs) metrics listed below:

- The status and trend of abundance of natural and hatchery origin fish population;
- The status and trend of juvenile abundance and productivity of fish populations;
- The status and trend of diversity of natural and hatchery origin fish populations.

Project work emphasizes Mill Creek, and the Walla Walla watersheds. (Figure 1), and is coordinated with stakeholders including: ODFW, USFWS, USACE, USFS, and the Walla Walla Subbasin Watershed Council. Project data and previous reports (Mendel et al. 2014. Mahoney et al. 2009, 2011, 2012, 2013, and 2014. Olsen et al. 2018) may be found at http://data.umatilla.nsn.us/, https://data.ctuir.org/cdms/index.html, http://wdfw.wa.gov/publications) and https://www.cbfish.org/PiscesPublication.mvc/SearchByTitleDescriptionAuthorOrDate Similar work in the Touchet River drainage is currently conducted independently by the Washington Department of Fish and Wildlife through a separate project.

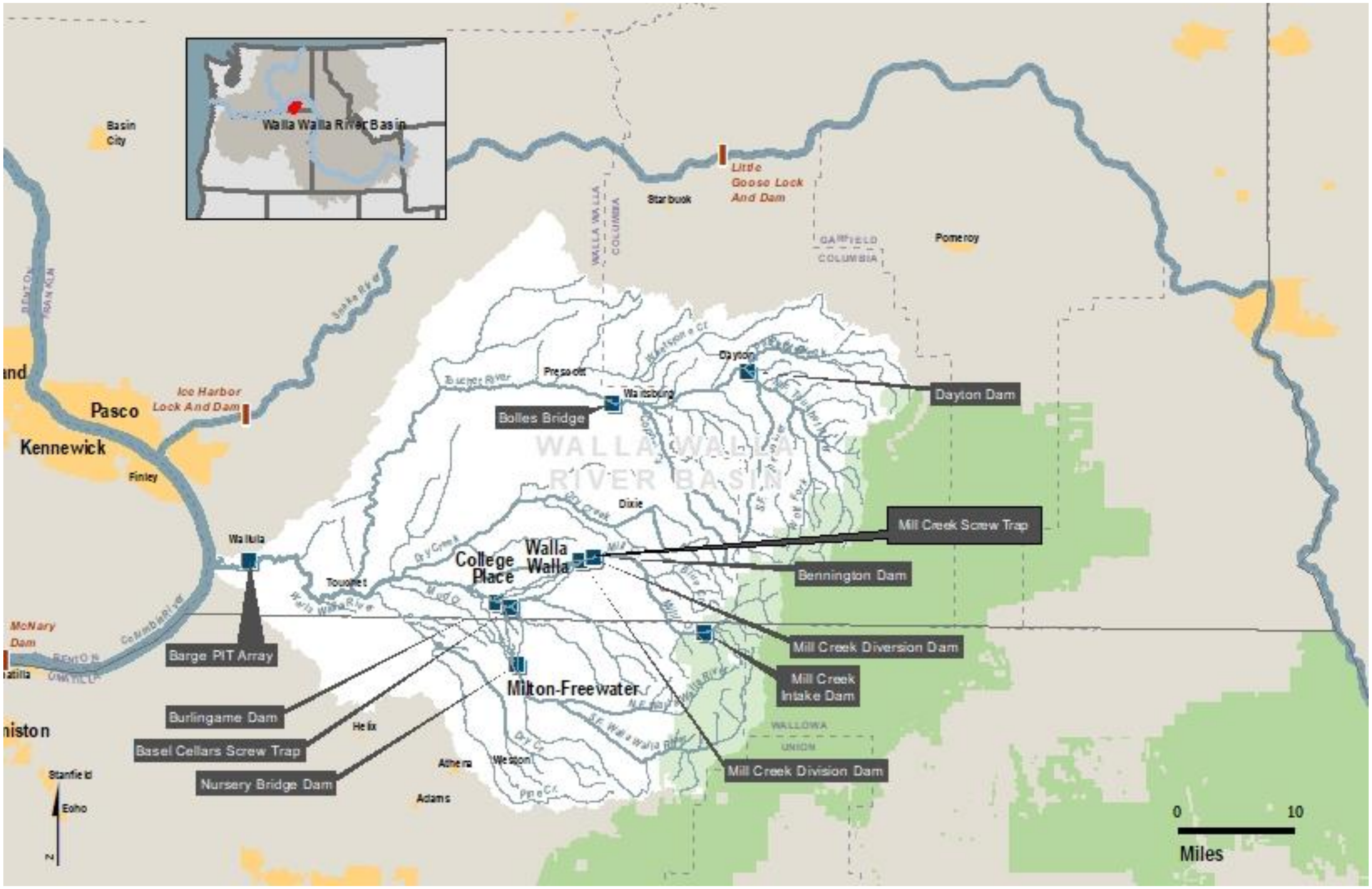

Figure 1. Notable landmarks, sampling locations and major tributaries in the Walla Walla Subbasin.

Methods

Formal monitoring methods for this project are well developed. However, they were removed from the annual report and were compiled in the BPA methods review and standardization processes: https://www.monitoringresources.org/Document/Protocol/Details/107. The Monitoring Resources web site has frequent updates and restructuring events that have removed detailed methods submitted by this and other projects. This disruptive pattern has occurred several times. We cannot reliably expect that an interested reader could locate specific methods related to this project at monitoringresources.org. To avoid multiple rounds of duplication of effort, we summarize methods briefly in this section in case monitoring resource.org is not functioning.

The primary methods employed by this project during 2019 are consistent with methods used during the last two decades. Methods were documented in more detail in earlier annual reports prior to monitoring reources.org. Methods included continuous video monitoring of adult salmon and steelhead at the Nursery Bridge Dam fish ladder. Juvenile production was estimated by using PIT tags and mark-recapture methods from fish collected at rotary screw traps when flows and conditions allowed. Confidence intervals for smolt production estimates were derived through classic bootstrapping methods. Survival to main stem Columbia River Dams was estimated using PitPro (version 4.19.8) on data queried through PTAGIS. One trap was in Mill Creek upstream from the town of Walla Walla and the other was in the main stem Walla Walla River six river miles downstream from Nursery Bridge Dam. This project operated 7 PIT tag detectors in Mill Creek and the Walla Walla River. Spawning surveys documented the number and distribution of spring Chinook redds in Mill Creek, the main stem of the Walla Walla River, and the South Fork of the Walla Walla River. Surveyors covered each reach three to five times each year. Redds and carcasses were recorded and georeferenced. Several reaches were not surveyed because access was denied by some landowners. This project also funded a portion of the stream flow and water temperature monitoring conducted by the Walla Walla Basin Watershed Council using standard methods. Historic and real-time water temperature and flow data are available online (http://wwbwc.org/monitoring/surfacewater.html).

Results

Spring Chinook

Adult Spring Chinook Returns

During 2019, 115 adult spring Chinook salmon (and two jacks) were observed ascending the fish ladder at Nursery Bridge Dam (Figure 2). The overall trend shows the stock building until 2010 and declining during the last nine years. Low jack returns to Nursery Bridge Dam (less than 10) have been associated with a wide range of adult returns the following year (0 to 498) suggesting that jack return numbers are a weak predictor of returning adults (Figure 3). The relationship of jack and adults the following year in Figure 3 is disproportionality influenced by the high number of jacks that returned in 2009. Adult spring Chinook return to NBD between April and June and peak migration coincides with a strong decline in the hydrograph (Figure 4).

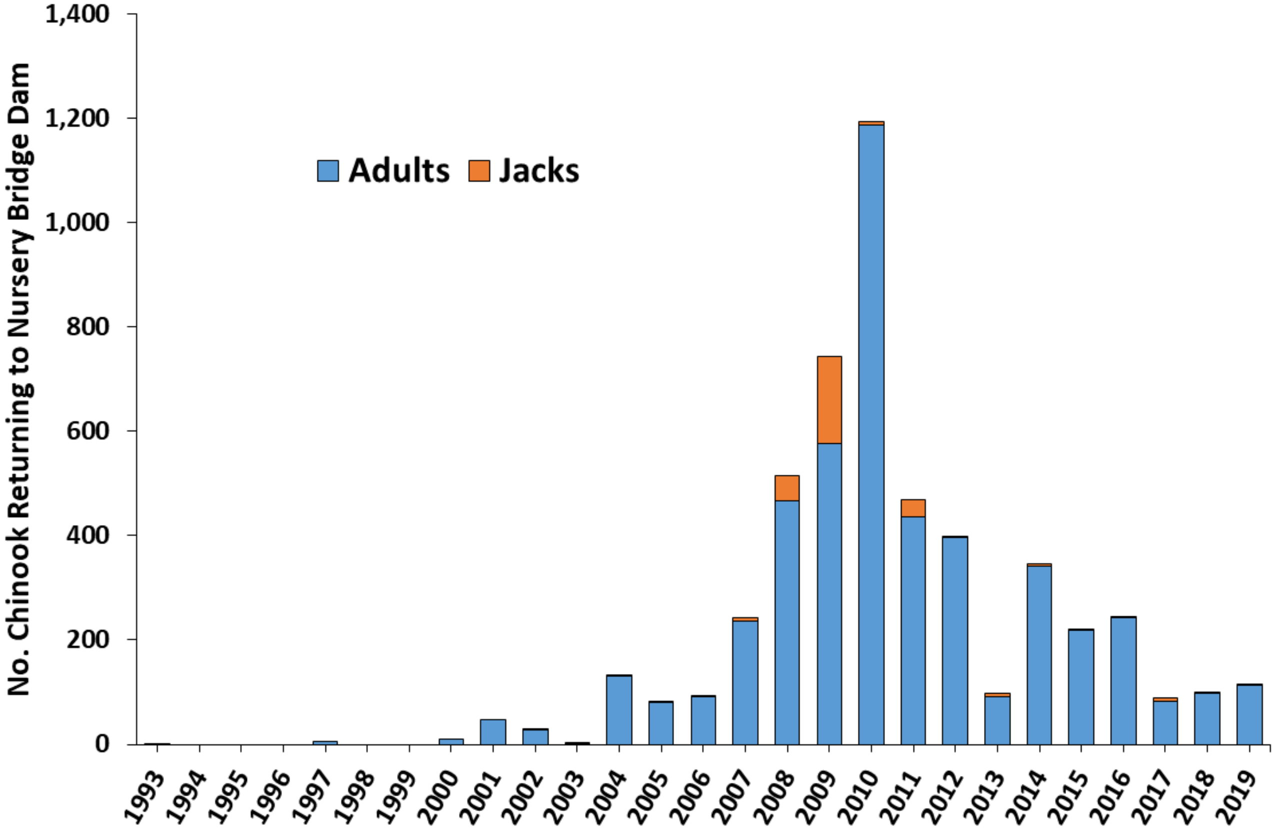

Figure 2. Spring Chinook returns to Nursery Bridge Dam in the upper Walla Walla River, 1993-2019.

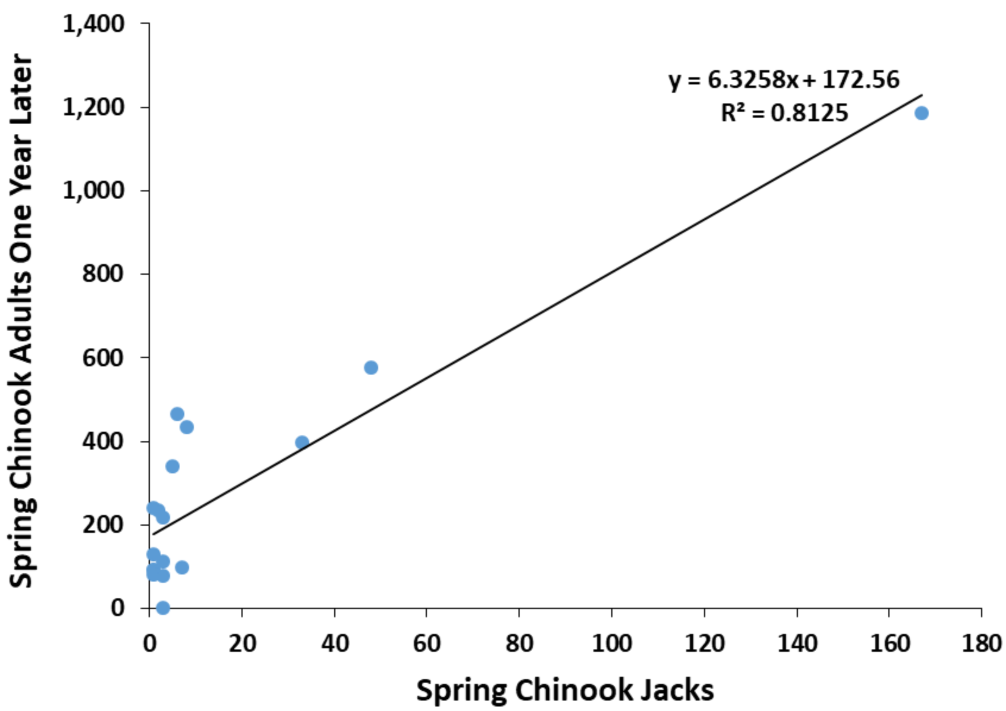

Figure 3. The relationship between spring Chinook adult returns and jack returns the previous year to Nursery Bridge Dam in the upper Walla Walla River, 2003-2019 (the relationship is disproportionally influenced by the single high data point).

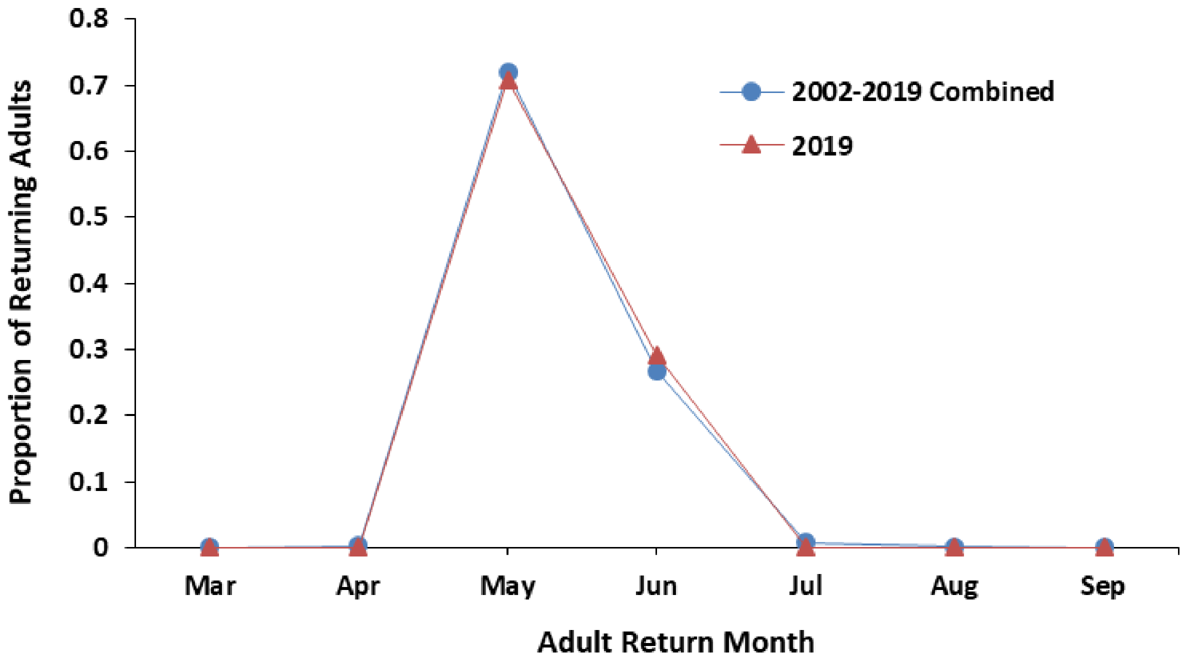

Figure 4. Average run timing of spring Chinook adult returns to Nursery Bridge Dam, 2002-2019 combined and 2019.

Spawner Distribution

Spawning surveyors documented 41 redds above NBD during 2019 with 2.8 spawners per redd (Figure 5). Spring Chinook redds are typically observed between early August and mid-September in the South Fork Walla Walla River and upper Mill Creek. Spring Chinook occupy a total spawning reach of about 69 km with a simple spatial structure in three sections (Figure 6). Redds have been documented in the Touchet River, Mill Creek, and the mainstem of the Walla Walla River. The highest densities of spring Chinook redds in the Walla Walla basin occur in the South Fork Walla Walla above the end of the road at Harris Park (Figures 7 and 8). Spring Chinook spawners and redd abundance were correlated in the South Fork Walla Walla (Figure 9).

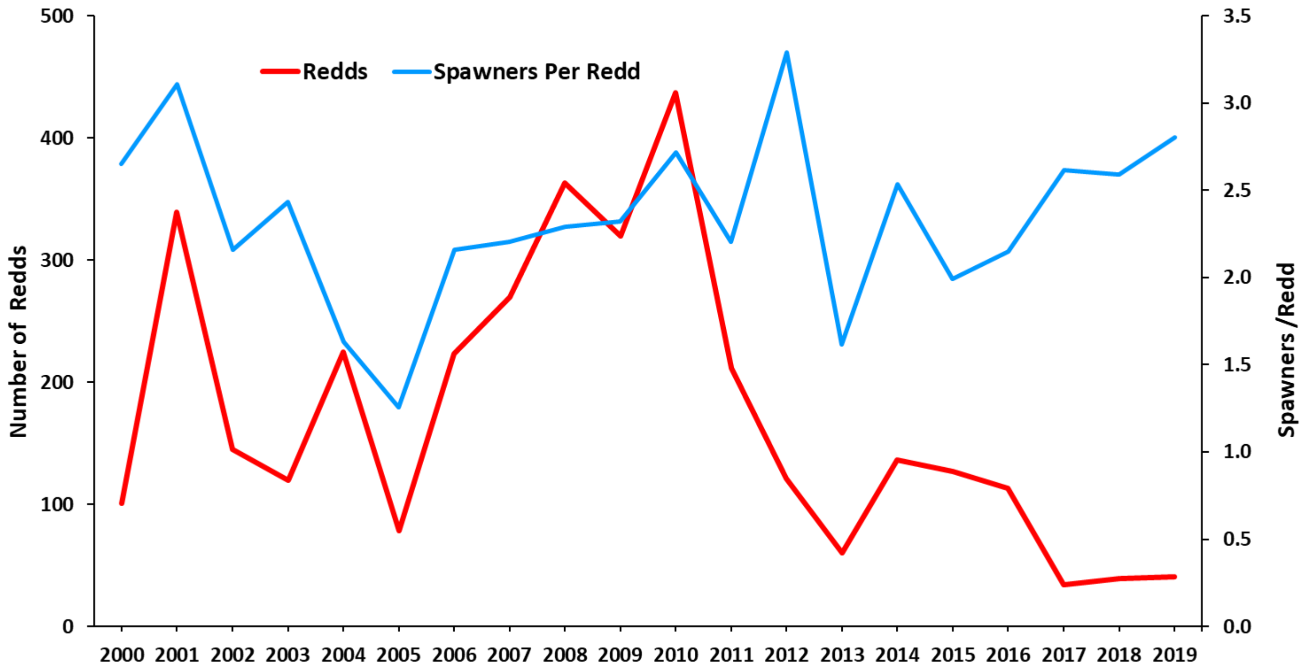

Figure 5. Annual spring Chinook redd abundance and fish-per-redd for the South Fork of the Walla Walla River, 2000-2019.

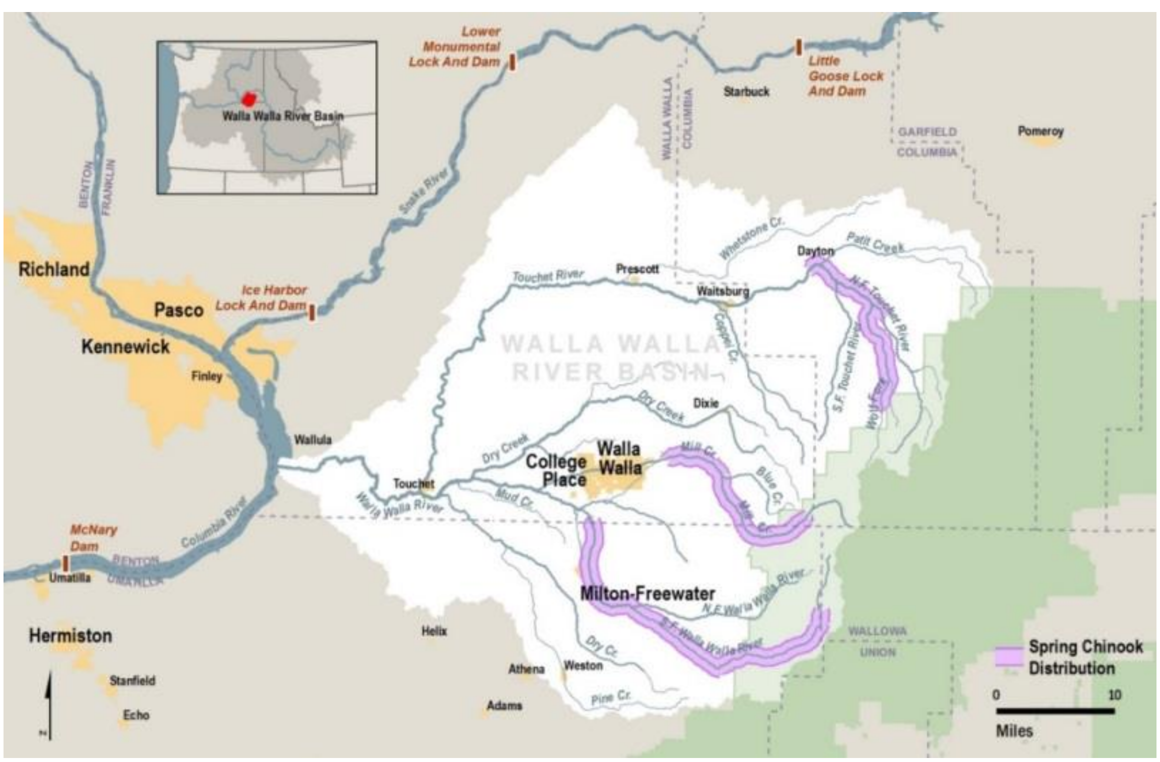

Figure 6. Primary spring Chinook spawning distributions in the Walla Walla Subbasin.

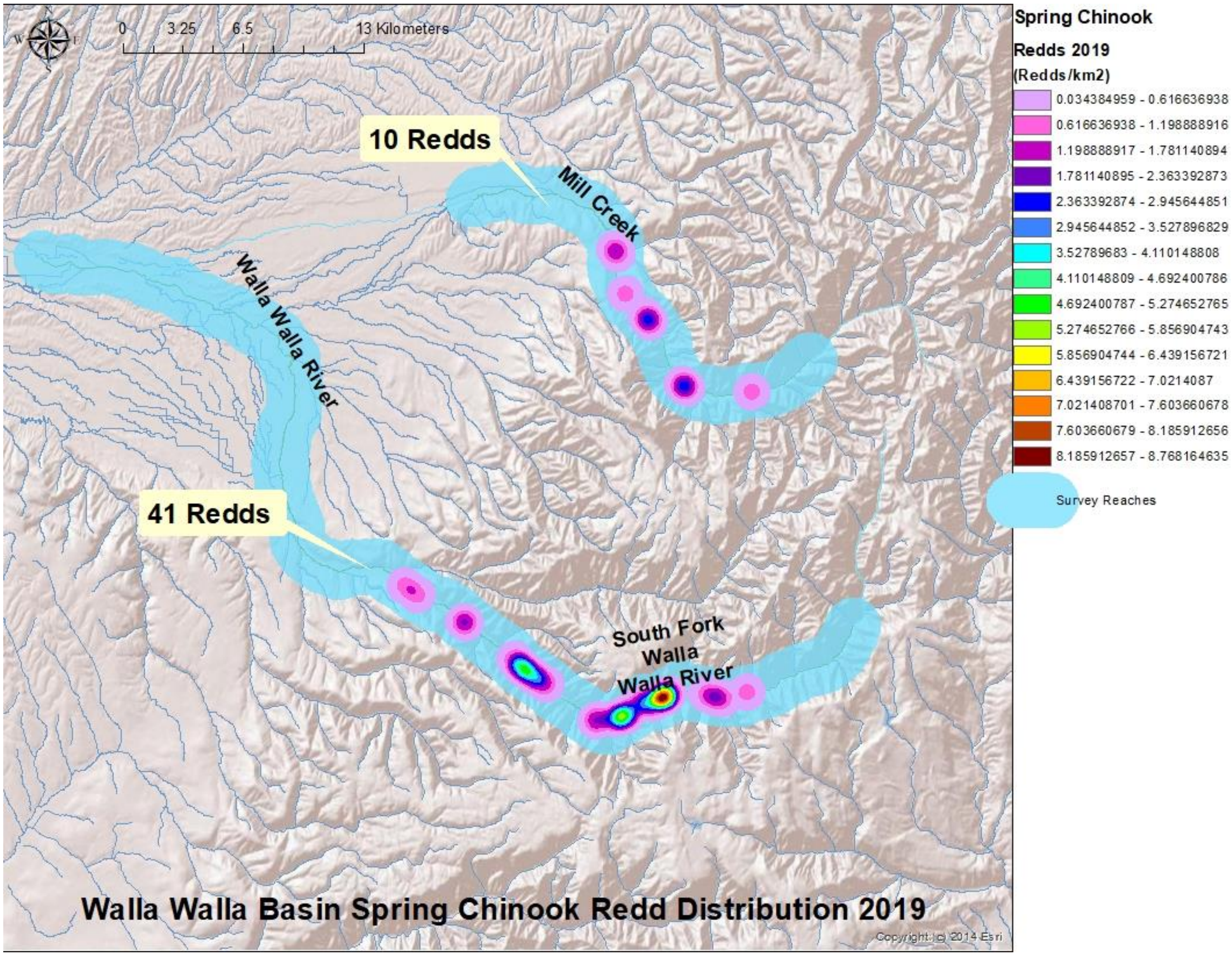

Figure 7. Spring Chinook redd densities, 2019.

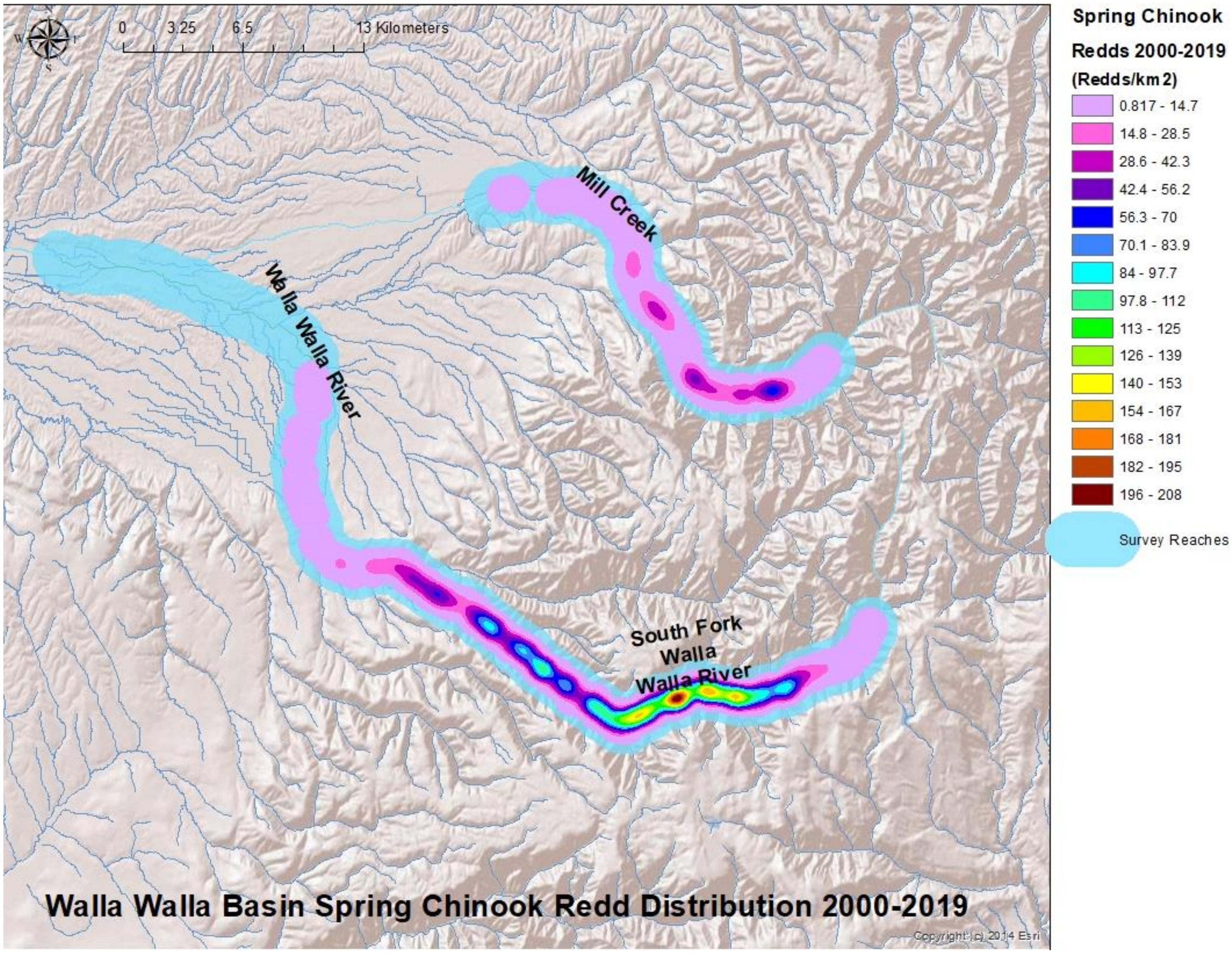

Figure 8. Spring Chinook redd densities, 2000-2019.

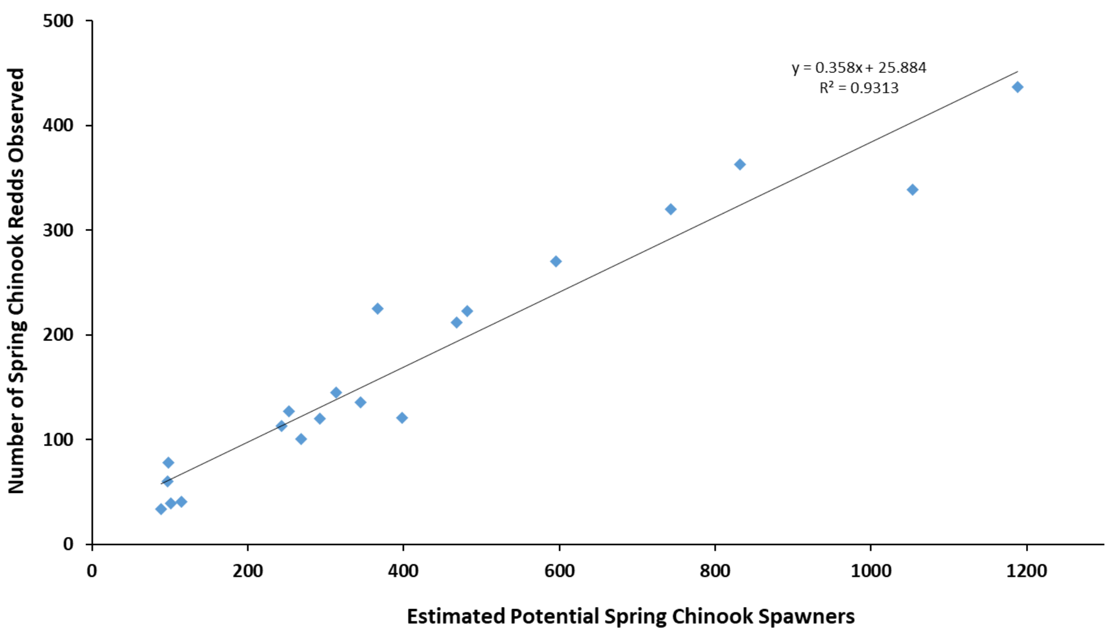

Figure 9. Annual spring Chinook redds observed in the South Fork Walla Walla River plotted against adults passing above Nursery Bridge Dam, 2000-2019.

Spring Chinook Smolt Production

Smolt monitoring from 2009-2019 has been inconsistent to some extent in regard to location and number of days of fishing effort because of changes in personnel, access, stream channel morphology, and regulatory permitting. The variation in results are a combination of variability in fish production and logistical constraints. Mark-recapture subsample estimates have been expanded to larger and smaller degrees depending on the year. The overall trend in smolt production does not track well with redd observations (Figures 5 and 10). The 11-year average natural Chinook smolt production from the upper Walla Walla is 38,041 (2009-2019) with the second lowest estimate in the time series of 10,109 ± 1,902 (95% CI) for 2019. We have observed considerable annual variability and a decreasing trend in natural smolt production from the basin (Figure 10).

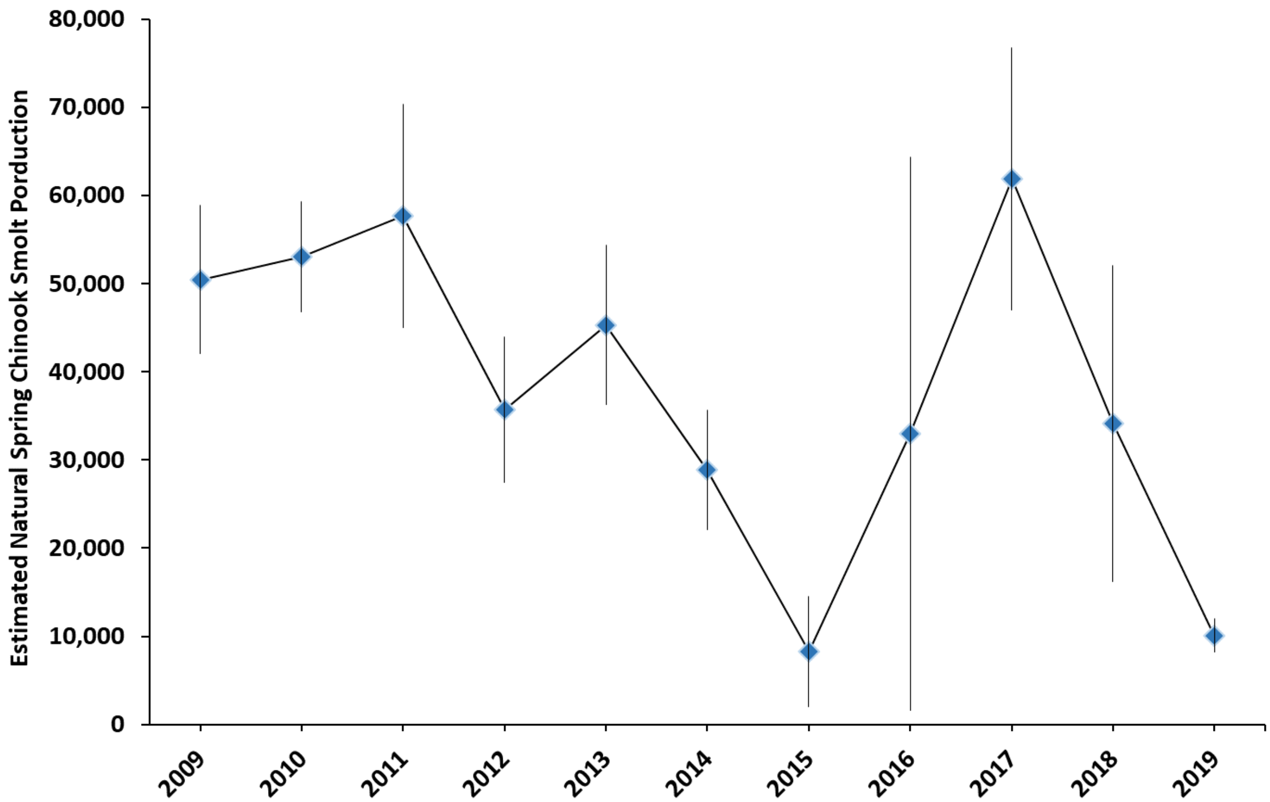

Figure 10. Annual estimates and 95% confidence intervals of natural spring Chinook smolts emigrating from the upper Walla Walla River Basin (2009-2019).

Juveniles use the mainstem and tributaries of the Walla Walla River during their first 14-18 months of rearing and then migrate out of the basin as smolts during their second spring. Based on out-migrant trap data and PIT tag detections, some juvenile Chinook disperse downstream to the lower Walla Walla to overwinter (Figure 11). Natural origin out-migrants reach McNary Dam between April and early July. PIT-tagged hatchery out-migrants tend to reach McNary Dam about a week sooner than their natural cohorts.

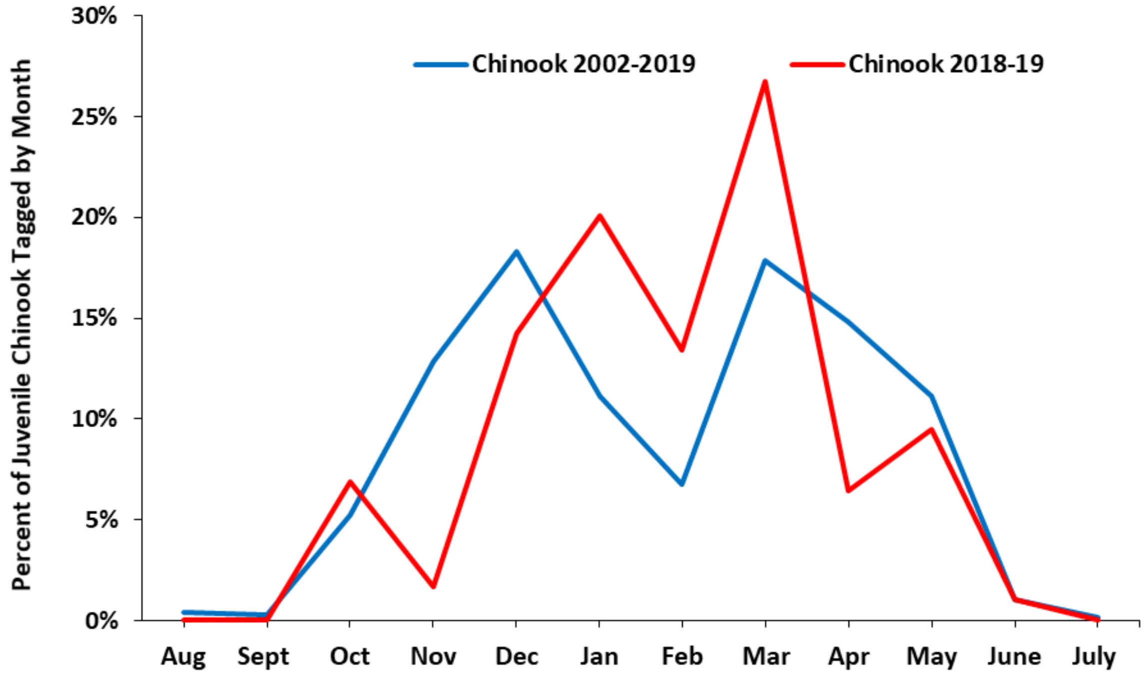

Figure 11. The percentage of juvenile spring Chinook PIT-tagged by month during 2018-19 and the percentage PIT-tagged by month from 2002 through 2019 combined.

Spring Chinook Smolt Survival

The annual survival probability estimates of natural and hatchery smolts (2005-2019) to McNary Dam generally range from 20 to 50 percent. The mean survival for natural and hatchery smolts for the period of record was 34% and 27%, respectively (Figure 12). During 2019, Chinook smolt survival to McNary Dam was estimated at 23% ± 8% (95% CI) for natural origin smolts and 15% ± 4% for hatchery origin smolts.

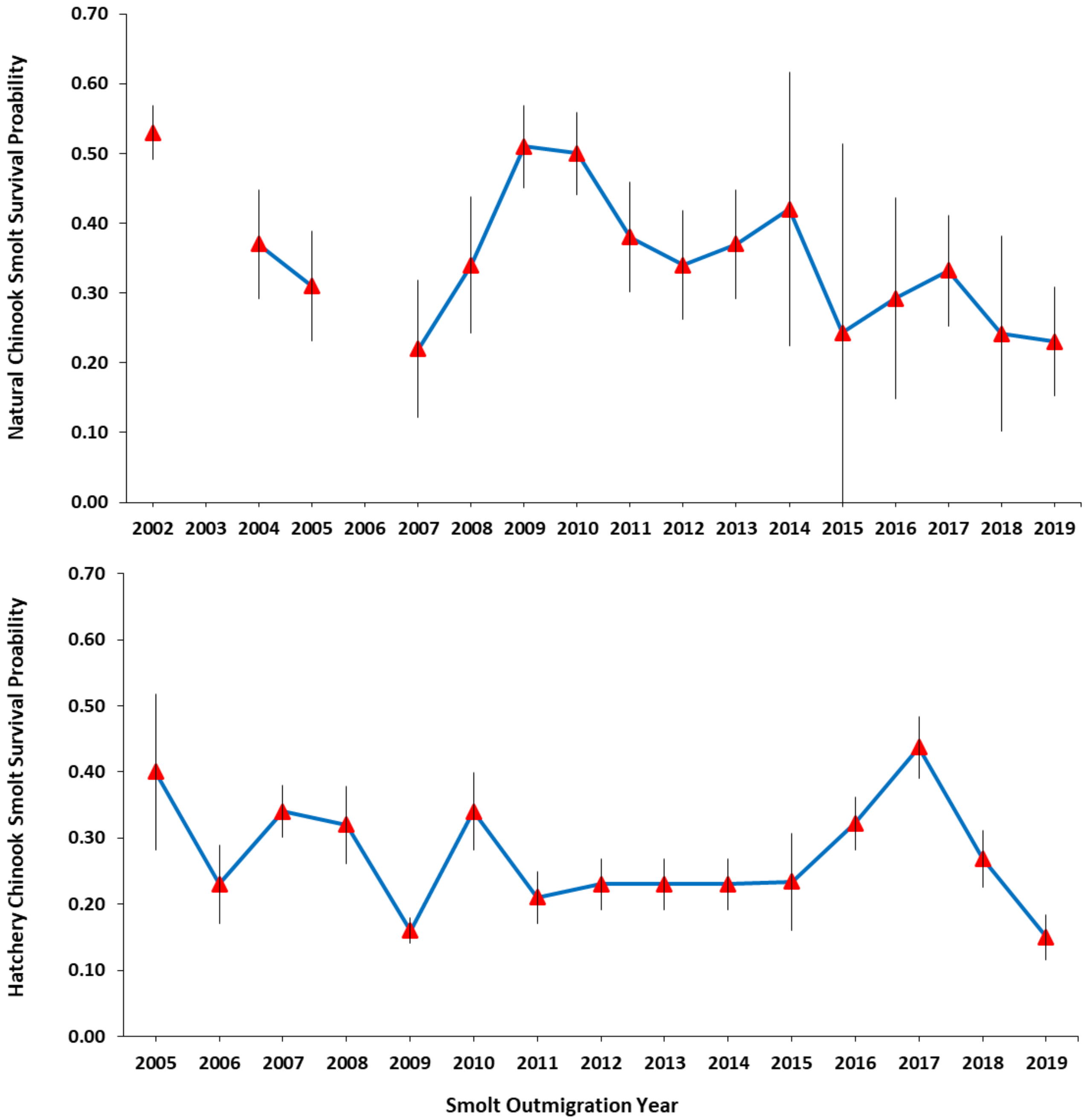

Figure 12. Annual smolt survival probabilities with 95% CI for natural (top graph) and hatchery (bottom graph) spring Chinook out-migrants from the upper Walla Walla River to McNary Dam, 2002-2019. No survival estimates were made for natural out-migrants in 2002, 2003 and 2006 because of low PIT-tag detections and the time series begins in 2005 for hatchery cohorts.

Spring Chinook Smolt to Adult Return Ratios

Overall smolt to adult returns (SAR) have been low and ranged from 0.0 to 0.75% since 2002. Natural returns to McNary Dam (mean of 0.30%) were higher than hatchery returns (0.10%; Figure 13). Hatchery origin Chinook SARs have been below 0.10% percent in all but two years (2005 and 2008 outmigration years). The last complete adult return group was from the 2016 out-migration year with 0.0% returns of natural origin adults but only 0.04% returns for hatchery origin adults.

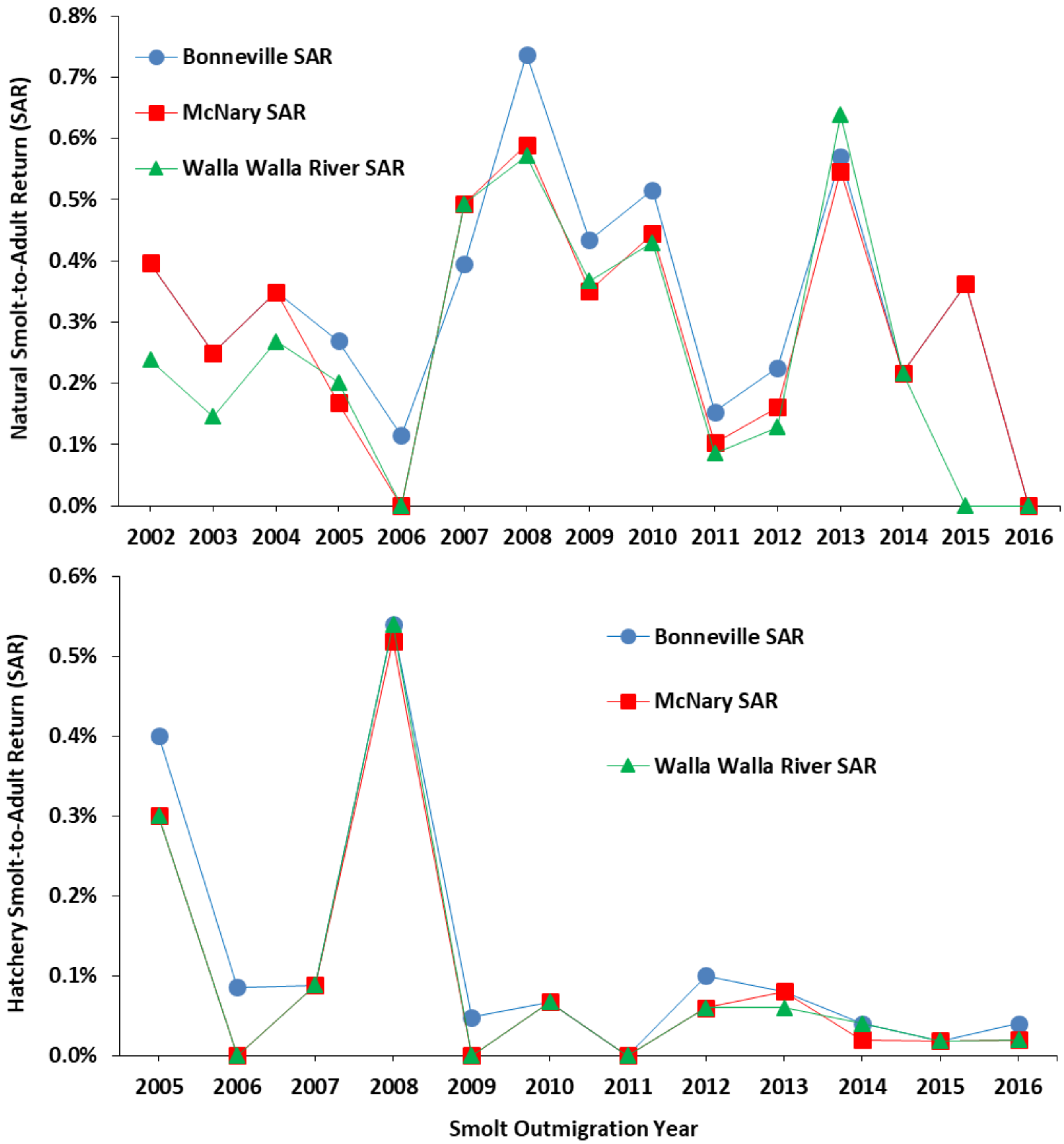

Figure 13. Estimated smolt-to-adult return (SAR) rates for natural (top) and hatchery reared (bottom) spring Chinook returning to Bonneville and McNary dams, and to the Walla Walla River (based on smolt PIT tag releases and adult PIT tag detections).

Summer Steelhead

Adult Steelhead Returns

The average of adult steelhead returns to NBD since the 2001-02 run is 591 and has ranged from 214 to 1,205 with a time series low of 214 adult steelhead observed during the 2018-19 return year (Figure 14). In the past, when the adult trap was operated at Nursery Bridge Dam the proportion of the run of hatchery origin has been small. Currently the trap is not operated and we cannot validate the designation of hatchery or natural origin with video alone. Past evaluations by CTUIR Fish Passage Project personnel demonstrated that hatchery origin designations based on videotaping alone was unreliable. (Brian Zimmerman, personal communication, 2018). Most steelhead observations at NBD occur from February through May (Figure 15).

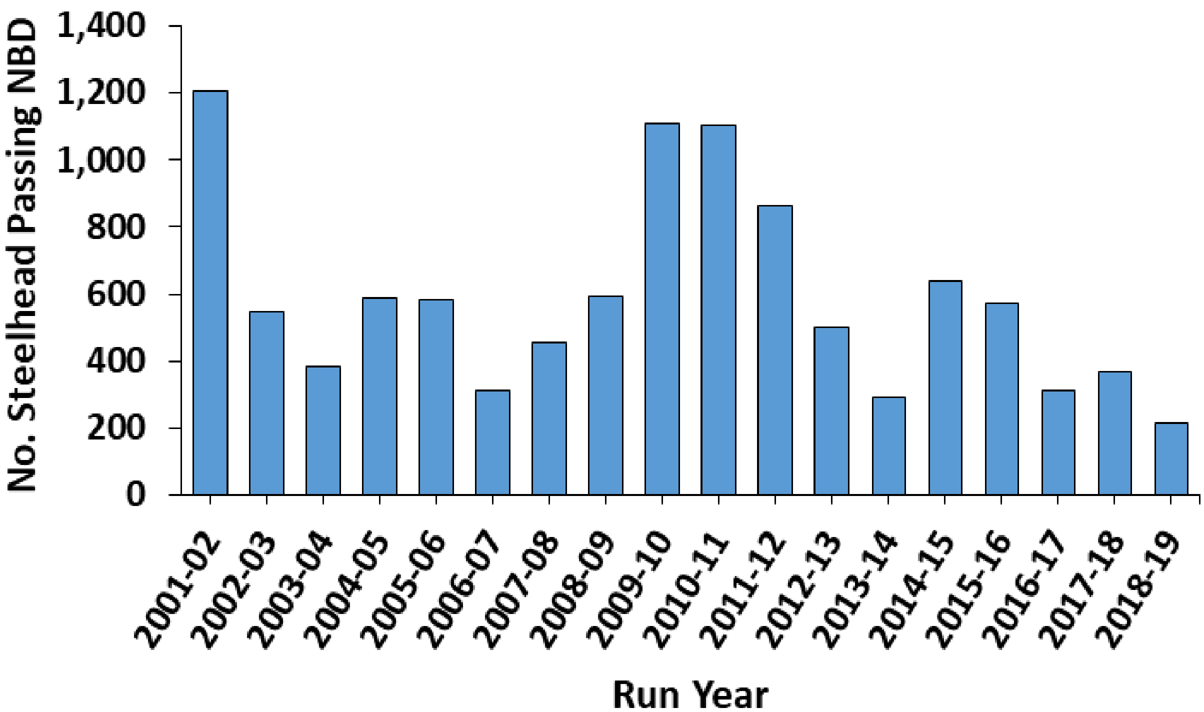

Figure 14. Adult steelhead counts at Nursery Bridge Dam (NBD), run years 2001-02 through 2018-19.

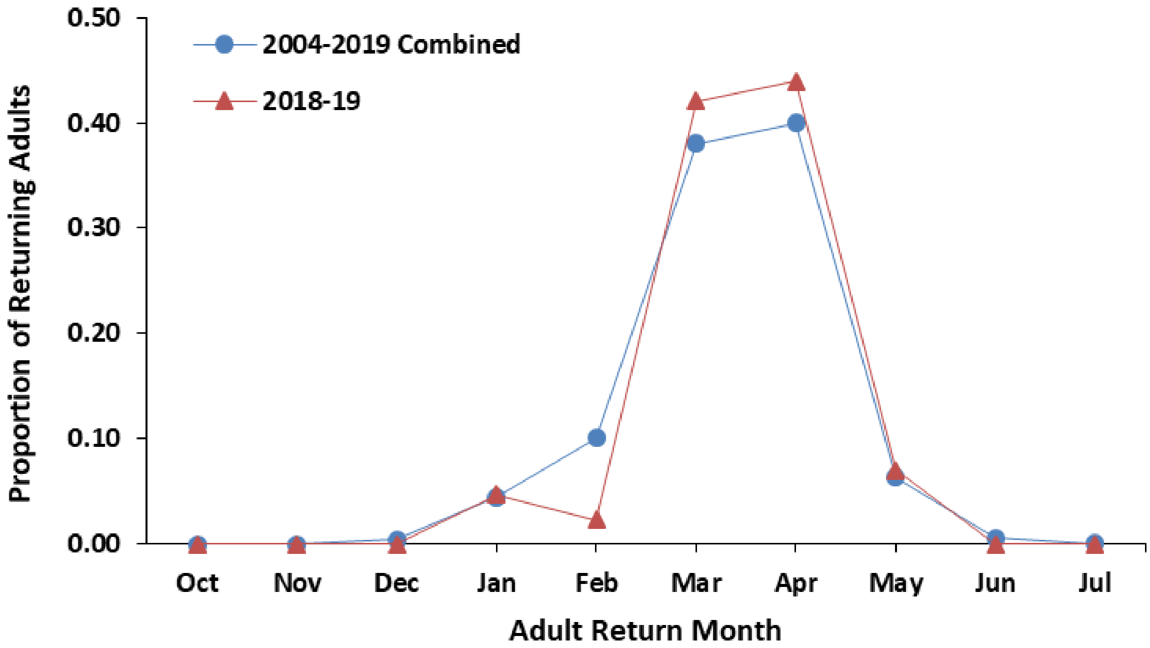

Figure 15. Proportion of adult steelhead returns observed by month at Nursery Bridge Dam, run year 2018-19 and 2004 through 2019 combined.

Steelhead Smolt Production

The 11-year average (2009-2019) of summer steelhead smolt production estimates using mark-recapture operations at smolt traps is 49,029 from the upper Walla Walla and Mill Creek (range 13,263 to 99,245 (Figure 16). The most recent natural smolt production estimate is 61,257 ± 12,349 (95% CI) juveniles in 2019. Smolt outmigration timing is often bimodal and variable from year to year and is somewhat dependent on flow events. It is common to observe a substantial number of fish migrating in the fall and then again in the spring (Figure 17).

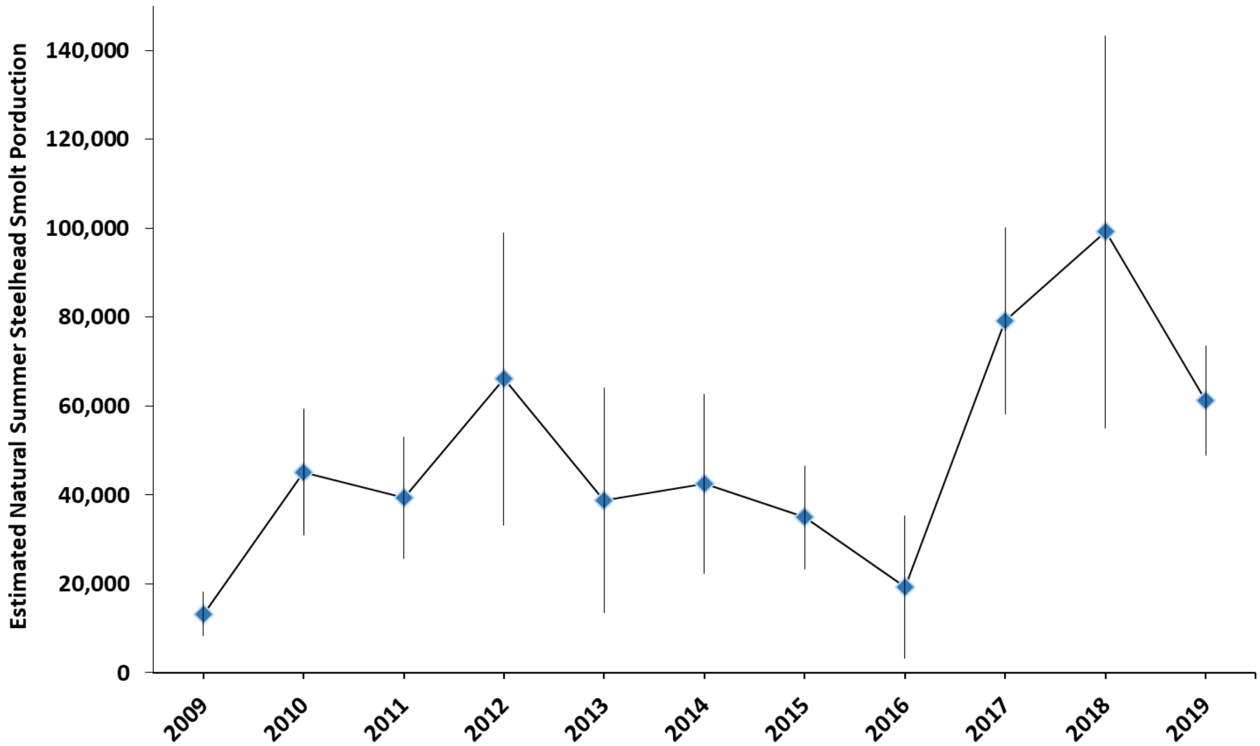

Figure 16. Annual estimates with 95% confidence intervals of natural summer steelhead smolts emigrating from the upper Walla Walla River Basin (2009-2019).

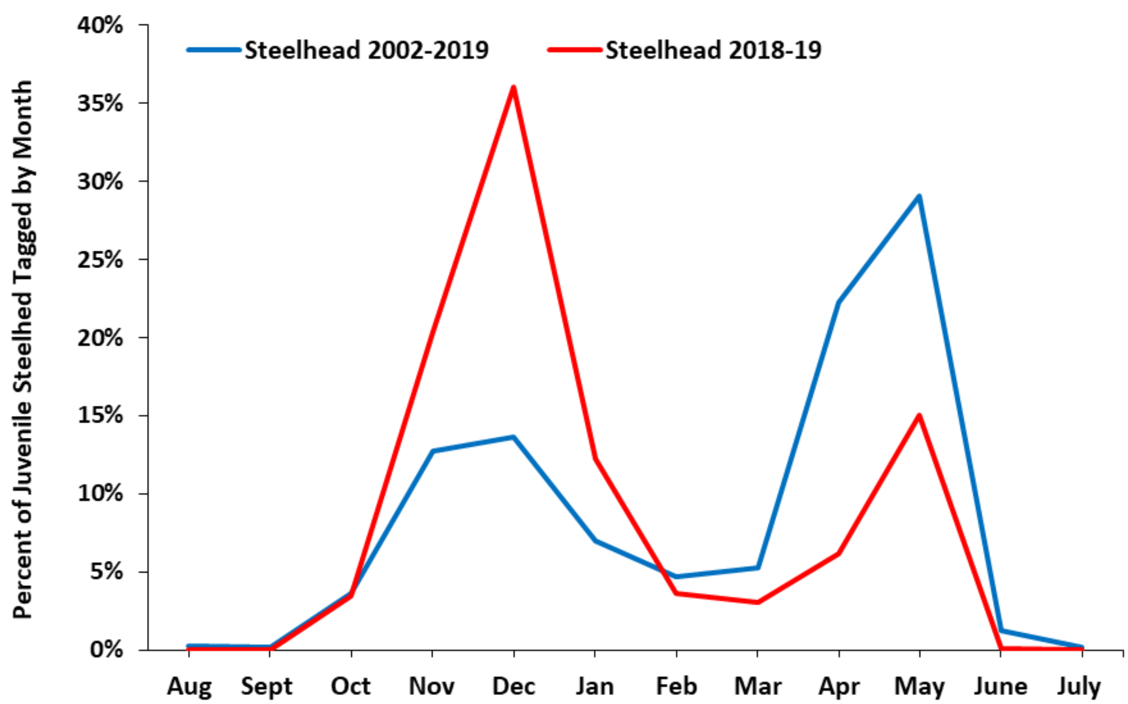

Figure 17. The percentage of juvenile steelhead PIT-tagged by month during 2018-19 and the percentage PIT-tagged by month from 2002 through 2019 combined.

Steelhead smolt survival

The most recent estimate of steelhead smolt survival to McNary Dam rebounded from the time series low of 10.6% estimated in 2018 (Figure 18). Smolt survival to McNary Dam during 2019 was 25.4% ± 8.8% (95% CI). Survival to McNary dam has averaged 31 percent from 2002 through 2019. Survival has not been above 30 percent since 2014.

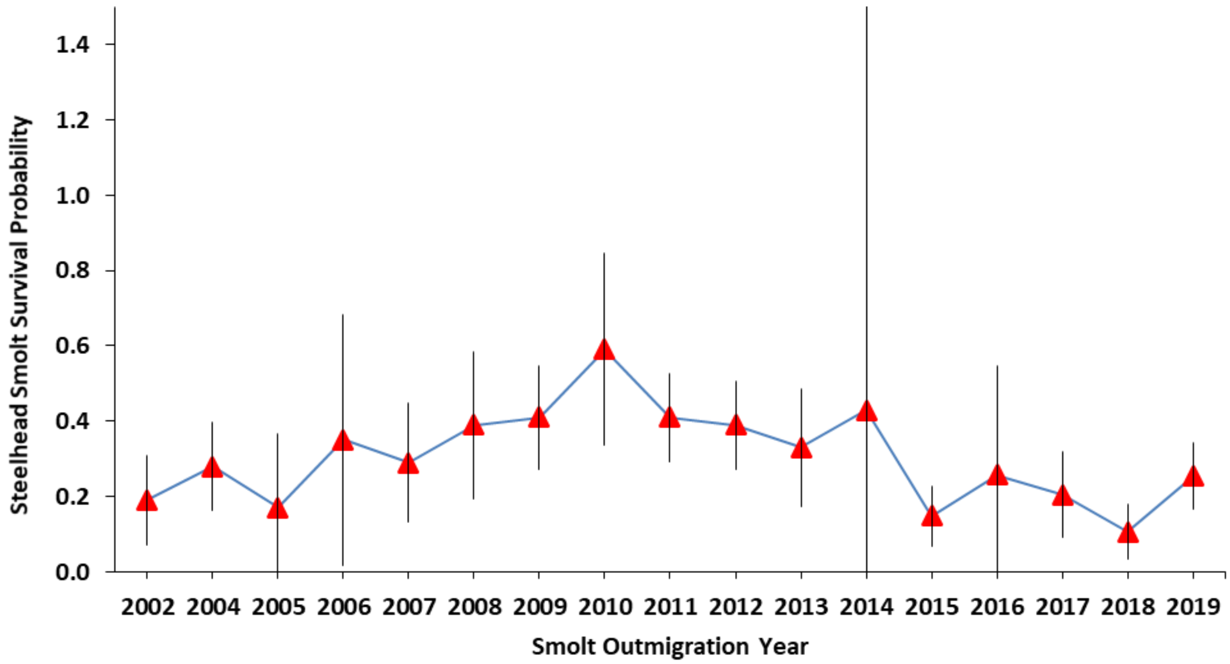

Figure 18. Cormack-Jolly-Seber survival estimates with 95% confidence intervals for natural juvenile steelhead smolts migrating from the Walla Walla River to McNary Dam, 2002-2019.

Steelhead Smolt to Adult Return Ratios

Juvenile steelhead PIT-tagged and released in the Walla Walla Watershed by CTUIR and detected as adults at Bonneville, McNary, and throughout the Walla Walla Watershed provided estimates for smolt-to-adult return (SAR) ratios (Figure 19). The most recent complete adult return cohort is from the 2016 out-migration year with an estimated SAR to McNary Dam of 0.0%. For the period of record (2002-2016) the average PIT tag based SAR to Bonneville Dam was 1.57% (with a range from 0.00 to 3.93%); to McNary Dam SAR was 1.31% (0.00-3.52%); and to the Walla Walla Subbasin SAR was 0.68% (0.00 to 2.25%).

Beginning in 2011, improved interrogation of PIT-tagged adults in the Walla Walla Watershed have provided estimates of SARs that are closer to but still below SARs observed at McNary Dam (Figure 19). Use of PIT tags tends to underestimate the SAR of untagged steelhead (Beckman et al. 1999, Knudsen et al 2009). SAR estimates should be considered minimum estimates.

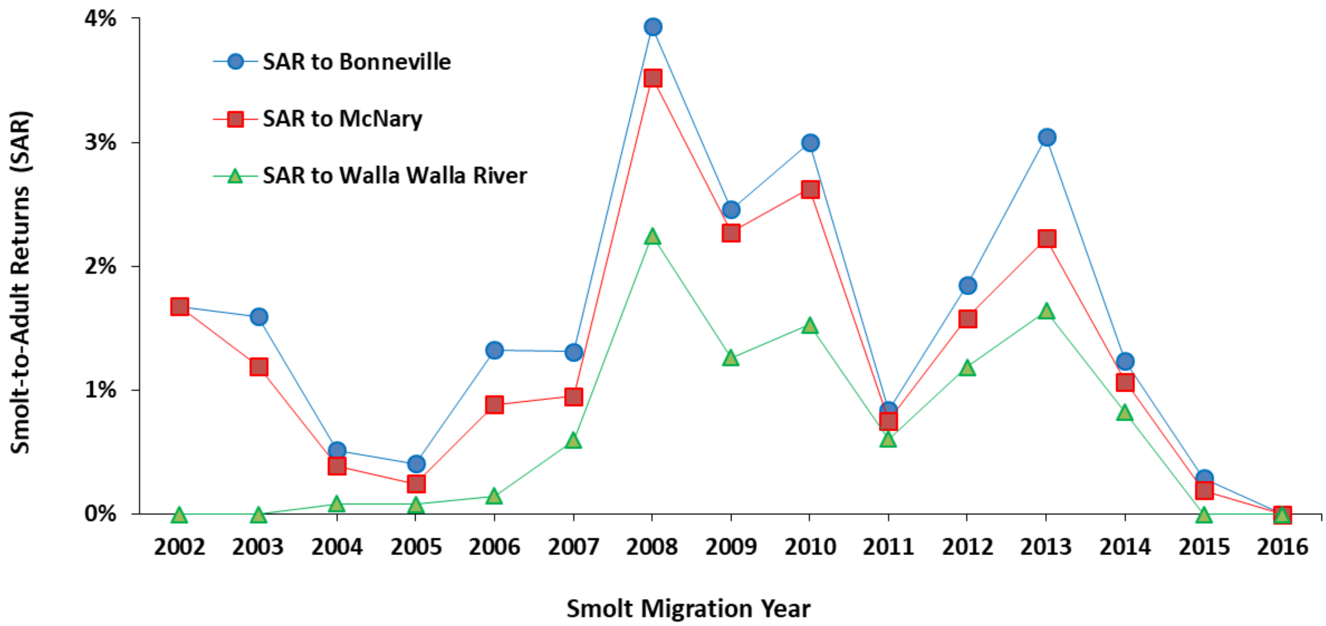

Figure 19. Estimated Smolt-to-Adult Returns for natural-origin summer steelhead from the Walla Walla River and Mill Creek to Bonneville and McNary dams, and the Walla Walla Subbasin. Percent SAR is based on PIT tag detections for smolt outmigration years 2002 to 2016 and adult return years 2003-2019.

Bull Trout

The count of upstream migrating bull trout at NBD was 106 in 2019 and averaged 113 since 2000 (range of 20 to 416). We observed an increase in bull trout until 2011 followed by a decrease through 2019 (Figure 20). These counts provide indices of adult abundance for migratory bull trout within the Walla Walla Basin. Bull trout population abundance estimates have been made by Utah State University (Al-Chokhachy et al. 2009) for several years in the South Fork Walla Walla River. The adult counts at dams and the redd counts provide an index of larger migratory bull trout, but do not represent juveniles and resident adults.

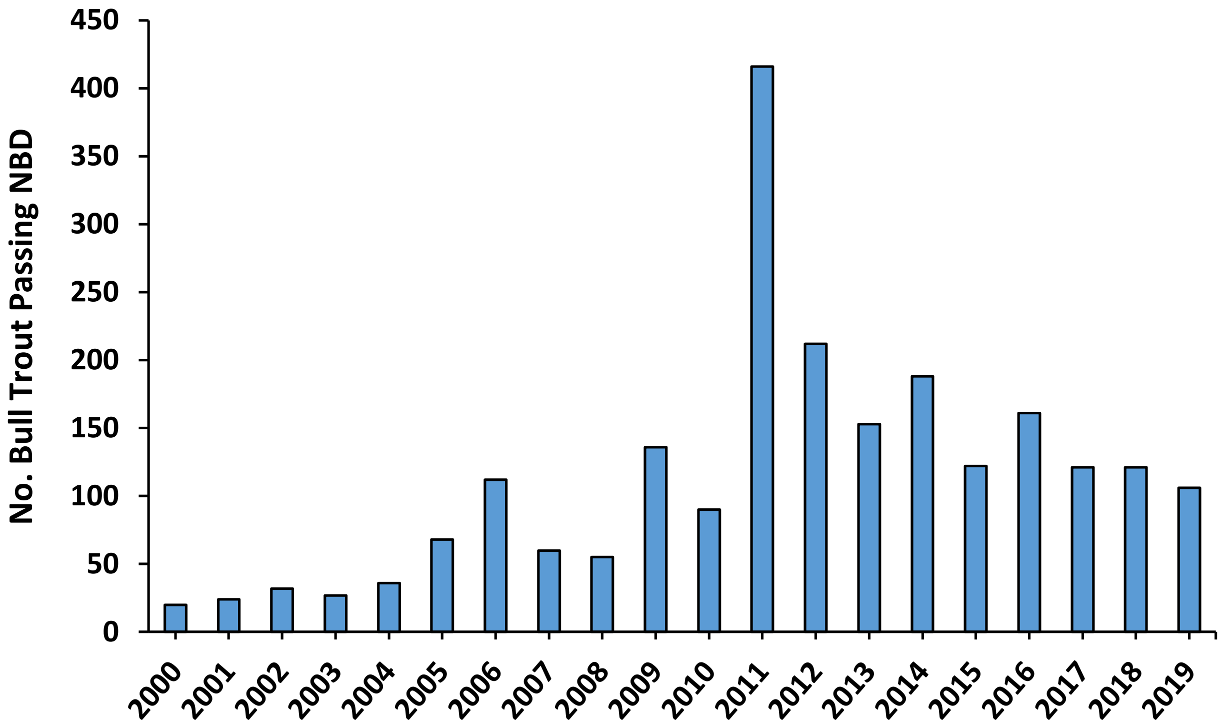

Figure 20. Upstream migrating bull trout counted at Nursery Bridge Dam (NBD), 2000-2019.

The location and timing of bull trout presence in reaches of the Walla Walla Basin have been summarized in the periodicity table found in Mahoney et al. 2013 (see Table 4 in that report). Bull trout in the Walla Walla Basin can be either migratory or resident. The migratory portion of the population moves downstream after spawning in September and October (if adequate flows are available). Additional movement occurs throughout the winter months. In spring and early summer most of these migratory fish move back upstream towards the spawning grounds, if sufficient flows allow (Figure 21). Bull trout movement and migration summaries were previously reported for the Walla Walla Basin from radio telemetry (Mahoney et al. 2009, Mendel et al. 2003) and PIT tag studies (Budy et al. 2004, 2005, 2007, 2010, Homel and Budy 2008, and Anglin et al. 2008).

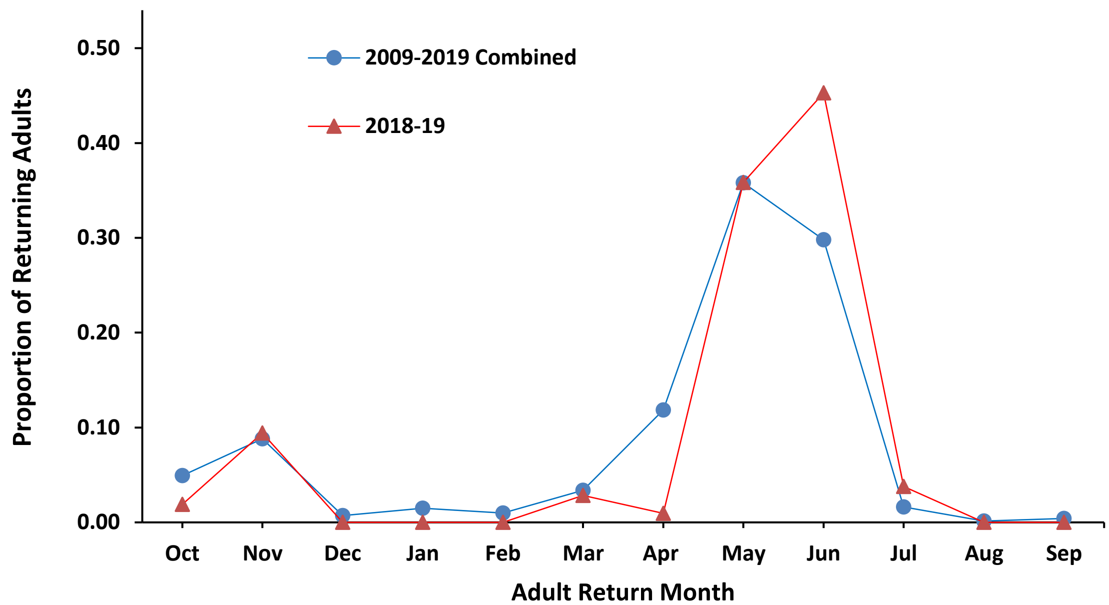

Figure 21. Proportion of bull trout observations by month at Nursery Bridge Dam, 2018-19 and 2009-2019 combined.

Discussion

Spring Chinook Population Assessment

The natural production and survival of spring Chinook in the Walla Walla Basin is dependent on successful adult spawners and the quality and quantity of rearing and migration habitats. Flows and water temperatures are quite good for natural rearing above Milton-Freewater despite extensive channelization in the upper mainstem of the Walla Walla and the lower South Fork. Below Milton-Freewater, channelization, diversion dams, low stream flows and related elevated water temperatures make summer rearing marginal at best. Smolt and adult migration is also negatively impacted by low flows from late spring through fall. Above Milton-Freewater, flows and water temperatures provide quality conditions for holding and spawning of adult spring Chinook. Pre-spawn mortality is low.

In general, smolt-to-adult return rates have been low for hatchery fish (mean of 0.10 percent). PIT tag detections suggest that smolt survival in the lower mainstem Walla Walla River is low and contributes significantly to the overall low smolt-to-adult return rates. Mortality within and outside the basin is substantially higher than historic conditions and limits recruitment to the Walla Walla Basin. Smolt-to-adult return rates for natural origin spring Chinook are low, but three times higher than hatchery origin Chinook. The escapement goal of more than 1,000 spawners will be required to produce natural returns that will satisfy long-term broodstock and harvest requirements (CTUIR 2013). Development of a localized broodstock, implementation of the Hatchery Management Plan, and continued habitat improvements are all designed to improve adult return rates. Currently, natural reproduction cannot meet management goals and the implementation of the CTUIR's Spring Chinook Program is necessary to meet objectives. Above Milton-Freewater, the natural productivity potential of the basin is high because of adequate flows and excellent water temperatures but the effects of extensive channelization, agricultural and rural development has eliminated the functional floodplain and the associated natural services including the rearing of abundant juvenile salmonids (CTUIR 2013, Mahoney and Schwartz 2015).

Summer Steelhead Population Assessment

Life history plasticity is the basic biological premise for why summer steelhead populations have managed to sustain themselves in most Blue Mountain watersheds, while spring Chinook populations were extirpated. Summer steelhead typically are more tolerant of high water temperatures and have a much more prolonged adult return timing. They can wait for periods of high flow events to get over small dams and past reaches that are often dewatered. In addition, summer steelhead populations produce smolts that migrate at ages one, two and three. Resident forms of *O. mykiss* often produce anadromous progeny that also contribute to the ability of steelhead to persist in impacted basins (Kendal et al. 2015).

Initial passage and instream flow improvements implemented in the subbasin have provided better upstream passage conditions. CTUIR plans to continue with habitat restoration efforts. The Walla Walla steelhead adult returns have been variable with an average of 591 since 2001, which is about 60% of the recovery goal. However, during 2019, we observed a time series low of 214 adult returns and it appears that this pattern will likely continue for 2020 based on a paucity of PIT tag detections at Bonneville Dam during summer and fall of 2019. Trapping operations at Nursery Bridge Dam have shown that hatchery steelhead make up less than 3% of the returns. However, these abundance and run composition estimates exclude the Mill Creek drainage and all other steelhead production areas downstream of Nursery Bridge Dam. Data gaps in the Walla Walls steelhead population include adult abundance and composition (hatchery and natural), and an understanding of steelhead spawning, rearing, and production downstream of Nursery Bridge Dam.

The steelhead smolt production estimate for 2019 is 61,257 ± 12,349 (95% CI). The mean of steelhead smolt production estimates is 49,029 per year (2009-2019) with considerable variability (range; 13,263 – 99,245). We expect to observe a decreasing smolt production trend in the near future due to low adult counts at Nursery Bridge Dam and a paucity of adult PIT tag detections in recent years. The SARs to McNary Dam for naturally produced steelhead from the Walla Walla River averaged 1.31% (2002-2016 smolt outmigration years) but no adult PIT tags were detected for the 2016 cohort (2017-2019 adult return years) resulting in a 0% SAR to McNary Dam estimate. The 2019 out-migrant survival estimate to McNary Dam is 25.4%, which represents a rebound from the time series low of 10.6% for the 2018 cohort, but below the time series average of 30.6% (2002-2019). Unfortunately, we are not presently able to estimate the total natural origin returns to the Walla Walla Basin for two reasons: 1) we have no way of monitoring adult returns downstream of Nursery Bridge Dam, and 2) we do not know the steelhead run composition at or below Nursery Bridge Dam.

Steelhead spawning occurs throughout a large portion of the middle and upper reaches of the Walla Walla and Touchet basin, including most tributaries. The lower portions of many of these drainages are not suitable spawning habitat for steelhead because of high levels of suspended sediment, low water flows, and high water temperatures during summer.

Bull Trout Population Assessment

Migratory bull trout are showing signs of decreasing abundance since 2011 based on counts at Nursery Bridge dam. Bull trout spawning surveys have been conducted by various resource managers in the Walla Walla, Mill Creek, and Touchet drainages since 1994. Spawning surveys provide another set of indices of adult abundance and can be used to evaluate relative status and trends (Dunham et al. 2001, Hemmingsen et al. 2001, Starcevich et al. 2005, Mendel et al. 2006). Although redd counts for bull trout can have substantial sampling errors (Dunham et al. 2001, Hemmingsen et al. 2001 and 2002, Starcevich et al. 2005, Howell and Sancovich, 2012), a strong relationship between the estimated number of mature fluvial bull trout females, or total mature migratory adults, and the total number of redds observed has been documented in the South Fork Walla Walla River, and elsewhere in northeast Oregon by ODFW. Redd counts for small resident bull trout can have substantial bias in relation to actual redd abundance because of the small size of redds and associated redd enumeration errors (Starcevich et al. 2005, Al-Chokhachy et al. 2005, Howell and Sancovich 2012). Low Creek, an Oregon tributary of upper Mill Creek, is solely used by resident spawners (Howell and Sancovich, 2012). WDFW, ODFW, and others have used redd surveys as a relatively inexpensive means of monitoring relative abundance trends and distribution in southeast Washington (e.g., Mendel et al. 2004, 2005, 2006, 2007), and northeast Oregon (Al-Chokhachy et al. 2005, Howell and Sancovich 2012), especially for mature fluvial (migratory) bull trout. The ability to detect small changes in the abundance of adults or spawners is limited (see Howell and Sancovich 2012).

Adaptive Management & Lessons Learned

While collecting data for Viable Salmonid Populations parameters in the Walla Walla river basin, some issues have been identified that could affect the quality of data collected. To overcome these issues we have worked to: 1) upgrade screw traps to increase catch and containment; 2) increase the number of days of trapping and tagging at each trap; 3) moved the Mill Creek trap to a better location; and 4) obtained the required permitting from the U.S. Army Corps of Engineers. Survival and detection of PIT-tagged smolts and returning adults to McNary Dam can be low thereby making it difficult to generate reliable survival estimates. More hatchery smolts need to be PIT-tagged in order to improve accuracy and precision of survival estimates. For the second consecutive year we are increasing the number of hatchery smolts PIT-tagged from 5,000 to 10,000 for the 2019-20 trapping season. We will also attempt to tag more natural origin smolts collected at the rotary screw traps. To determine reach-specific smolt mortality between Nursery Bridge and McNary dams, we installed two 50 ft wide floating barges with twelve 6 ft vertical fins per barge. Each pair of fins act as a single antenna, detection for each antenna is the full length of the fin (6 ft) and 3 ft fore and aft of each fin. The barges were installed a few miles upstream of the confluence of the Walla Walla and Columbia rivers, and became fully operational during the spring of 2019 (Figure 1). Detection probability estimates for the Walla Walla River Barge Array (WWB) were similar to detection probabilities estimated at McNary Dam for both steelhead and Chinook smolts PIT-tagged during the 2019 out-migration. Preliminary data indicate that the WWB has improved our detection capabilities near the mouth of the Walla Walla River.

References

Al-Chokhachy, R., Budy, P., and Schaller, H. 2005. Understanding the significance of redd counts: a comparison between two methods for estimating the abundance of and monitoring bull trout populations. North American Journal of fisheries Management 2: 1505-1512.

Al-Chokhachy, R., Budy, P., and Conner, M. 2009. Detecting declines in the abundance of a bull trout (Salvelinus confluentus) population: understanding accuracy, precision, and costs of our efforts. Can. J. Fish. Aquat. Sci. 66:649-658.

Anglin, D. R., Gallion, D., Barrows, M., Newlon, C., and Ryan Koch. 2008. Current Status of Bull Trout Abundance, Connectivity, and Habitat Conditions in the Walla Walla Subbasin. U.S. Fish and Wildlife Service Columbia River Fisheries Program Office Vancouver, Washington.

Beckman, B. R., Dickhoff, W. W., Zaug, W. S., Sharpe, C., Hirtzel, S., Schrock, R., Larson, D. A., Ewing, R. D., Palisano, A., Schreck, C. B., and Mahnken, C. V. W. 1999. Growth, Smoltification, and Smolt-to-Adult Return of Spring Chinook Salmon from Hatcheries on the Deschutes River, Oregon. Transactions of the American Fisheries Society 128:1125-1150.

Budy, P., Al-Chokhachy, R., and Thiede, G. 2004. Bull trout population assessment and life-history characteristics in association with habitat quality and land use: a template for recovery planning. Annual Progress Report for 2003. From USGS Utah Cooperative Fish and Wildlife Research Unit, Logan, Utah.

Budy, P., Al-Chokhachy, P., Homel, K., and and Thiede, G. 2005. Bull trout population assessment in northeast Oregon: a template for recovery planning. Annual Progress Report for 2004. USGS Utah Cooperative Fish and Wildlife Research Unit Department of Aquatic Watershed and Earth Resources. Utah State University Logan, Utah 84 84322-5210.

Budy, P., Al-Chokhachy, R., and Thiede, G. 2007. Bull trout population assessment in northeast Oregon: a template for recovery planning. Annual Progress Report for 2006. From USGS Utah Cooperative Fish and Wildlife Research Unit, Logan, Utah.

Budy, P., Bowerman, T., and Thiede, G. D. 2010. Bull trout population assessment in northeastern Oregon: a template for recovery planning. Annual Progress Report for 2009. From USGS Utah Cooperative Fish and Wildlife Research Unit, Logan, Utah.

CTUIR. 2008. Walla Walla Spring Chinook Hatchery Master Plan. Prepared under BPA project #2000-038-00 and submitted to Northwest Power and Conservation Council.

CTUIR. 2009. HGMP Draft Hatchery and Genetic Management Plan. Walla Wall River Spring Chinook Reintroduction. Prepared by Fisheries Program Department of Natural Resources, The Confederated Tribes of the Umatilla Indian Reservation. Submitted to NMFS May 2009.

CTUIR. 2013. Walla Walla Spring Chinook Hatchery Master Plan. Prepared under BPA project #2000-038-00 and submitted to Northwest Power and Conservation Council.

Dunham, J.B., Rieman, B. E., and Davis, K. 2001. Sources and magnitude of sampling error in redd counts for bull trout Salvelinus confluentus. North American Journal of Fisheries Management 21:343-352.

Hemmingsen, A. R., Gunkel, S. L., Sankovich, P. M., and Howell, P. J. 2001. Bull trout life history, genetics, habitat needs and limiting factors in central and northeast Oregon, 2000 Annual Report. U.S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife. Project No. 199405400, Contract No. 94B134342. 34 pp.

Hemmingsen, A. R., Gunkel, S. L., Sankovich, P. M., and Howell, P. J. 2002. Bull trout life history, genetics, habitat needs and limiting factors in central and Northeast Oregon, 2001 Annual Report. U.S. Department of Energy, Bonneville Power Administration, division of Fish and Wildlife. Project no. 199405400, Contract no. 94B134342. pp. 34.

Homel, K., and Budy, P. 2008. Temporal and spatial variability in the migration patterns of juvenile and sub-adult bull trout in Northeast Oregon. TAFS 137:869-880.

Howell, P. J. and P. M. Sancovich. 2012. An evaluation of redd counts as a measure of bull trout population size and trend. NAJFM 32: 1-13.

Jones, K.L., Poole, G. C., Quaempts, E. J., O'Daniel, O, and Beechie, T. 2008. Umatilla River Vision. Prepared by Fisheries Program Department of Natural Resources, The Confederated Tribes of the Umatilla Indian Reservation.

Kendal Neala W., John R. McMillan, Matthew R. Sloat, Thomas W. Buehrens, Thomas P. Quinn, George R. Pess, Kirill V. Kuzishchin, Michelle M. McClure, Richard W. Zabel. 2015. Anadromy and residency in steelhead and rainbow trout (*Oncorhynchus mykiss*): a review of the processes and patterns. Canadian Journal of Fisheries and Aquatic Sciences, 2015, 72(3): 319-342, https://doi.org/10.1139/cjfas-2014-0192

Knudsen, C., Johnston, M., Schroder, S., Bosch, W., Fast, D., and Strom, C. 2009. Effects of Passive Integrated Transponder Tags on Smolt-to-Adult Recruit Survival, Growth, and Behavior of Hatchery Spring Chinook Salmon. North American journal of Fisheries Management 29:658-689.

Mahoney B. D., Mendel, G., Lambert, M., Trump, J., Bronson, P., Gembala, M., and Gallinat, M. 2009. Walla Walla Subbasin Collaborative Salmonid Monitoring and Evaluation Project: 2007 and 2008 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Mahoney, B.D., Mendel, G., Weldert, R., Trump, J., Olsen, J., Gembala, M., Gallinat, M., and Ross, L. 2011. Walla Walla Subbasin Monitoring and Evaluation Project: 2009 and 2010 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Mahoney, B.D., Mendel, G., Weldert, R., Trump, J., Olsen, J., Gembala, M., Gallinat, M., and Ross, L. 2013. Walla Walla Subbasin Monitoring and Evaluation Project: 2012 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Mahoney, B.D., and Schwartz J. D. M. 2015. 2014 Monitoring and Evaluation Plan for the Walla Walla Spring Chinook Hatchery Master Plan – public review draft. Confederated Tribes of the Umatilla Indian Reservation. Department of Natural Resources Confederated Tribes of the Umatilla Indian Reservation and the Washington Department of Fish and Wildlife.

Mendel, G., Trump, J., and Gembala, M. 2003. Assessment of Salmonids and Their Habitat Conditions in the Walla Walla River Basin within Washington: 2002 Annual Report. Report to BPA. Project No. 199802000. 119 pages.

Mendel, G., Trump, J., and Gembala, M. 2004. Assessment of Salmonid Fishes and Their Habitat Conditions in the Walla Walla River Basin of Washington: 2003 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland Oregon. 126 pages.

Mendel, G., Trump, J., and Gembala, M. 2005. Assessment of Salmonids and Their Habitat Conditions in the Walla Walla River Basin within Washington: 2004 Annual Report. Report to BPA. Project No. 199802000. 172 pages.

Mendel, G., Trump, J., and Gembala, M. 2006. Assessment of Salmonids and Their Habitat Conditions in the Walla Walla River Basin within Washington: 2005 Annual Report. Report to BPA. Project No. 199802000. 1118 pages.

Mendel, G., Trump, J., Gembala, M., Blankenship, S., and Kassler, T. 2007. Assessment of Salmonids and Their Habitat Conditions in the Walla Walla River Basin of Washington. 2006 Annual Report for Project No. 19980200, Submitted to US DOE, Bonneville Power Administration, Portland Oregon.

Mendel, G., Mahoney, B. D., Weldert, R., Trump, J., Olsen, J., and Fitzgerald, A. 2014. Walla Walla Subbasin Monitoring and Evaluation Project: 2013 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Snake River Salmon Recovery Board (SRSRB). 2006. Summary Snake River Salmon Recovery Plan for Southeast Washington. www.snakeriverboard.org.

Snake River Salmon Recovery Board (SRSRB). 2011. Snake River Salmon Recovery Plan for southeast Washington. www.snakeriverboard.org

Starcevich, S., Jacobs, S. and Howell, P. J. 2005. Migratory patterns, structure, abundance, and status of bull trout populations from subbasins in the Columbia Plateau and Blue Mountain provinces. Bonneville Power Administration. Project No. 199405400.

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID M&E - CTUIR		
Contract #:	46155	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$569,776	**Perf. Period:**	3/1/2010 - 2/28/2011
Contract Type:	Contract (IGC)	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 10/05/2010 with 0 problems, and 1 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

The Walla Walla Salmonid Monitoring and Evaluation Project is funded per the 2008 Columbia Basin Fish Accords Memorandum of Agreement between the Treaty Tribes and FCRPS Action Agencies. This collaborative project is conducted by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Washington Department of Fish and Wildlife (WDFW). This project provides technical information and support to fish and land managers, planners and stakeholders charged with maintaining viable salmon and steelhead populations in Southeast Washington and Northeast Oregon.

The purpose of this study is to strengthen salmonid status and trend monitoring in the basin, improve effectiveness monitoring, and facilitate the implementation of a regionally standardized monitoring and evaluation program. Focal species are spring Chinook (Oncorhynchus tshawytscha) salmon, and ESA-listed summer steelhead (O. mykiss) and bull trout (Salvelinus confluentus). Study objectives are to monitor and evaluate salmonid viability, survival and productivity (VSP) in areas of the Walla Walla, Touchet, and Mill Creek drainages. This project estimates adult returns, spawning abundance, and smolt production to describe stock status and trends in relation to hatchery and habitat treatments.

Project work includes Adult Enumeration, Spawning Surveys, Out-migrant monitoring, PIT-tagging, and Fish Salvage. We believe these monitoring and evaluation actions meet the highest priorities for fish population monitoring as identified by the Walla Walla Subbasin Plan and Snake River Salmon Recovery Plan. Project metrics include estimates of adult returns, run timing and distribution; spawning escapement, redd counts and distribution; out-migrant condition at emigration, abundance, survival and timing; smolt survival and timing to Columbia River interrogation sites, and smolt to adult returns; adult recruitment; and number of fish salvaged.

CTUIR and WDFW project partners collaborate on the project proposal, budget, statements of work and annual report; but retain their individual contracts with BPA. CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College; while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 20003900. Previous project reports may be found at either www.data.umatilla.nsn.us/fisheries/index.aspx, www.wdfw.wa.gov, or efw.bpa.gov/searchpublications/.

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Work Element Budget Summary:

	Work Element - Work Element Title	EC Needed*	Estimate	(%)
A :	185. Produce Pisces Status Report - Periodic Status Reports for BPA		$1,200	(0.20%)
B :	165. Produce Environmental Compliance Documentation - Compliance for WEs C - H		$2,500	(0.42%)
C :	157. Collect/Generate/Validate Field and Lab Data - Enumeration of Adult Migration	*	$18,000	(3.07%)
D :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys	*	$69,000	(11.80%)
E :	158. Mark/Tag Animals - PIT Tag smolts	*	$82,000	(14.02%)
F :	157. Collect/Generate/Validate Field and Lab Data - Smolt Monitoring and Evaluation	*	$273,415	(46.76%)
G :	28. Trap and Haul - Fish Salvage	*	$20,000	(3.42%)
H :	157. Collect/Generate/Validate Field and Lab Data - Rainwater Wildlife Area Fish M & E	*	$12,000	(2.05%)

I :	162. Analyze/Interpret Data - Analyze Data	$44,000	(7.52%)
J :	132. Produce (Annual) Progress Report - Technical Progress Report	$44,000	(7.52%)
K :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project	$18,500	(3.16%)
	Total:	$584,615	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report quarterly on the status of milestones and deliverables in Pisces. When indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $1200 (0.21%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2010 (3/1/2010 - 6/30/2010)	7/1/2010	7/15/2010	Completed	
B. Jul-Sep 2010 (7/1/2010 - 9/30/2010)	10/1/2010	10/15/2010	Completed	
C. Oct-Dec 2010 (10/1/2010 - 12/31/2010)	1/1/2011	1/15/2011	Completed	
D. Final Jan-Feb 2011 (1/1/2011 - 2/28/2011)	2/14/2011	2/28/2011	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C - H

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through H. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as an USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $2500 (0.43%)

Planned Metrics: Are herbicides used as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Keep JARPA permit updated	3/1/2010	6/30/2010	Completed	For rotary screw traps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Submit annual reports and take update for NOAA & USFWS	1/1/2011	1/31/2011	Completed	Tribe has a Section 10 permit for USFWS that covers all ceded areas. NOAA -- covered under pending BO for Umatilla & Walla Walla HGMP.
C. Contact BPA EC staff for next year's activities	12/1/2010	1/1/2011	Completed	Contact BPA environmental compliance staff (KEC) to discuss next year's SOW.
Deliverable: D. Compliance achieved and documented		2/28/2011	Completed	*See the Deliverable Specification above*

C: 157. Collect/Generate/Validate Field and Lab Data

Title: Enumeration of Adult Migration

Description: Because there are no counting stations on the lower Walla Walla River, fish ladder counts from upper basin are the best surrogate estimate of total adult returns. Return to fish ladders at Nursery Bridge Dam (rkm 71.9) on the upper Walla Walla, Bennington Dam (rkm 71.0) on Mill Creek, and Dayton Dam (rkm 123.5) on the Touchet River will be used to provide an index of adult returns. Annual fish counts combined with redd and carcass counts will be used to assess spawning success (fish per redd). Counts at dams are incomplete and steelhead spawning occurs below our three enumeration sites. Levels of pre-spawn loss of spring Chinook and steelhead below these sites are unknown. Our long-term goal is to establish additional enumeration sites lower in the system to better enumerate subbasin returns as a measure of adult abundance and productivity.

We are working to improve estimates of adult returns for the three major drainages in the Walla Walla Basin. Currently dam counts at Nursery Bridge Dam are used as the primary index of steelhead and spring Chinook returns to the Walla Walla River Basin. Partial counts at Dayton Dam and Bennington Dam are similarly used for estimating adult returns for the Touchet River and Mill Creek watersheds, respectively. Spawning surveys for steelhead in Mill Creek have been used to supplement the partial dam counts at Bennington Dam and to estimate the adult returns for Coppei Creek (below Dayton Dam). Spawning surveys also provide spawning distribution, timing and relative abundance information that is particularly useful for Chinook and bull trout (fall spawners during low flows), as well as composition (e.g. hatchery and wild, male and female, etc.), scale samples for age composition, and tag recovery from spring Chinook carcasses.

Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under separate contract. The Corps provides counts from Bennington Dam.

CTUIR and ODFW share fish counting duties at Nursery Bridge Dam. CTUIR operates the counting station on the east bank; ODFW operates the west side ladder. In the east side ladder, adult salmonids are enumerated using the Salmon-soft fish video-tracking program. Fish images are captured by video camera and DVR linked to a desk top computer as they pass a counting window located near the ladder exit. Video compaction programming greatly reduces the need for observer time in reviewing fish passage video-files. In the west ladder, ODFW uses an underwater video camera and DVR mounted near the ladder exit.

Video enumeration at NBD is conducted according to the annually-updated Annual Operating Plan (Bronson and Duke). Typically, enumeration occurs from November through June to encompass the known adult migration for summer steelhead and spring Chinook. Data collected from the video counting includes date, time, species, size (e.g. jack or adult for spring Chinook salmon), life stage (e.g. steelhead kelts), origin (e.g. adipose clip or unclipped) and migration direction for bull trout of steelhead kelts. Notations are also made of other species encountered and general fish condition. Daily fish tallies from both ladders are posted to an onsite tally board for the public. Project deliverable includes error checked database of daily fish counts.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook and bull trout past Nursery Bridge Dam, Bennington Dam, Dayton Dam, and in Coppei Creek.

Work Element Budget: $18000 (3.08%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)

Country: US | **NPCC Subbasin:** Walla Walla
State: OR | **HUC5 Watershed:** Middle Walla Walla River
County: Umatilla | **HUC6 Name:** Garrison Creek-Walla Walla River
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: BPA Fish and Wildlife Program Monitoring v1.0

Study Plan Owner: Russell Scranton
Protocol: BPA Fish and Wildelife Program (Pre-2012) v1.0
Protocol State: Draft
Protocol Owner: Russell Scranton
Sample Design: Enumeration of Adult Migration - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2

Data Repositories:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2010	3/1/2010	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Maintain video monitoring equipment @ Nursery Bridge Dam - spring	3/1/2010	7/15/2010	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
C. Maintain video monitoring equipment @ Nursery Bridge Dam - fall	11/15/2010	2/28/2011	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
D. Review, organize and summarize video results	8/1/2010	8/30/2010	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: E. Adult enumeration data		2/28/2011	Completed	*See the Deliverable Specification above*

D: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how utilization might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts combined with redd and carcass counts will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River- The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers (between river mile 71 and 40) and Mill Creek (from RM 27 to 11) between August and October. A total of47 river miles will be surveyed. Each reach will be surveyed three or four times, about two weeks apart until no new fish or redds are observed. Survey reaches are roughly 2 miles in length. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded with a Trimble GPS. Flagging is marked with observation date, observer initials, and species and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. In situations where multiple salmonid species overlap on a given spawning area (e.g. spring Chinook & bull trout), redd size and fish observed near the redd are used to differentiate the species involved. Care is taken not to disturb spawning fish or redds. Tallies of bull trout redds observed during spring Chinook surveys are forwarded to Bill Duke (ODFW Pendleton).

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data

	are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.
Deliverable Specification:	The deliverables are the error checked databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.
Work Element Budget:	$69000 (11.80%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Tributary Habitat
Locations:	8
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	Multiple	**HUC5 Watershed:**	Multiple
County:	Umatilla | Walla Walla	**HUC6 Name:**	Multiple

Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized

357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2010	3/1/2010	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Pre-spawn carcass survey	6/1/2010	7/30/2010	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of spawners over the spawning season and will be done in the upper Walla Walla River and Mill Creek.
C. Spring Chinook redd/carcass surveys	8/9/2010	10/15/2010	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
Deliverable: D. Spring Chinook spawner/carcass survey data		10/15/2010	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag smolts

Description: Estimates of out migrant run timing, abundance and survival based on PIT tag detections are key components for assessing the performance of hatchery origin fish relative to naturally produced fish and necessary for determining the success of the Tribe's spring Chinook program and other BPA funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

Since 2001, we have used various collection strategies in an effort to determine the best method for PIT-tagging juvenile salmonids for life cycle assessment studies. We have used screw traps, fish ladder traps, beach seining, electrofishing, and minnow traps to collect rearing and emigrating juvenile salmonids. PIT-tag detections from Walla Walla and Columbia River detection sites were used to estimate juvenile survival and emigration timing. Rotary screw traps set in the upper and lower river were selected as the preferred method to PIT-tag sufficient numbers of out-migrants to estimate out migrant survival and smolt to adult survival to McNary Dam.

CTUIR will maintain four rotary screw traps and PIT Tag up to 12,000 run of the river out-migrant salmonids. Trap locations will be the lower and upper Walla Walla River, lower Mill Creek, and lower Yellow hawk Creek. Traps will be run in the fall and spring to sample the entire outmigration. These, tagging efforts will supplement those conducted by project collaborator WDFW in the upper Touchet River above Dayton, WA.

In addition, we will also PIT-tag up to 4,000 hatchery origin spring Chinook smolts at the Willard hatchery prior to their release in the South Fork Walla Walla River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Salmonids will be scanned for PIT-tags and processed using a Biomark PIT Tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 100 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Trap efficiency (TE) tests using PIT tags will be done each day when possible based on the availability of PIT-tagged fish, and presumed susceptibility for recapture within 48 hours of release. Generally, all healthy PIT-tagged fish will be released roughly three habitat units (300 m) above the trap for TE tests. Our previous TE tests showed that most TE recaptures occurred within 24 hours of release; thus, TE tests will occur up to two days prior to a scheduled trap shut down. Trap efficiency will be assessed through out the outmigration during variable conditions. Only wild steelhead and Chinook will be used for TE.

Deliverable Specification: Maintenance of up to four screw traps to capture and PIT-tag up to 16,000 spring Chinook and summer steelhead smolts. PIT-Tag files submitted to PTAGIS within 15 days of release.

Work Element Budget: $82000 (14.03%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 4

Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2010	3/1/2010	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. PIT-Tag salmonid out-migrants - spring	3/1/2010	6/15/2010	Completed	Up to 12,000 run of the river out-migrant salmonids will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook and summer steelhead. Error check and submit PIT-tagging files to PTAGIS within 15 days of PIT-tagging.
C. PIT-Tag salmonid out-migrants - fall	11/15/2010	2/28/2011	Completed	Depending on adequate stream flow and conditions, up to 12,000 run of the river out-migrant salmonids will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook and summer steelhead. Error check and submit PIT-tagging files to PTAGIS within 15 days of PIT-tagging.
D. PIT-tag hatchery spring Chinook	3/1/2010	4/15/2010	Completed	PIT-tag up to 4,000 hatchery spring Chinook smolts at Willard National Fish Hatchery per the ISRP recommendation to develop an experimental design to use US V Oregon agreement stocking of 250,000 Chinook smolts to fully evaluate the Walla Walla Hatchery Master Plan preferred alternative of full hatchery supplementation. PIT-tagged fish will be used to estimate hatchery smolt survival, run timing, and abundance to McNary Dam, and to estimate smolt to adult survival back to the subbasin. Error check and submit PIT-tagging files to PTAGIS within 15 days of PIT-tagging.
Deliverable: E. Up to 16,000 smolts PIT tagged		2/28/2011	Completed	*See the Deliverable Specification above*

F: 157. Collect/Generate/Validate Field and Lab Data

Title: Smolt Monitoring and Evaluation

Description: PIT-tag detections from Walla Walla and Columbia River detection sites will be used to estimate juvenile survival and emigration timing. Rotary screw traps set in the upper and lower river are the preferred method to PIT-tag sufficient numbers of out-migrants to estimate outmigrant survival and smolt to adult survival to McNary Dam.

Smolt emigration software developed by the National Marine Fisheries Service (DARR 2.0; Bjorkstedt 2005) for small populations will be used to estimate smolt abundance. DARR 2.0 uses trap efficiency to expand total catch in estimating migrant abundance. Trap efficiency estimates are computed using the following formula:

$TE = R/M$

Where, TE is estimated trap efficiency, R equals the number of recaptured tagged fish, and M equals the number of tagged (marked) fish released.

Outmigrant abundance is computed using the following formula:

$A = C/TE$

Where, A is the estimated outmigrant abundance, C is the total new (un-tagged) catch, and TE is the estimated trap efficiency.

Tag retention and fish survival for all factors other than tagging is assumed to be 100% after release, and we assume that mortality due to tagging after release was equal to mortality during the holding period. Using DARR, trap catch at the lower Walla Walla site is expanded by the trap efficiency rate to estimate total smolt abundance emigrating from the Walla Walla River.

Survival and run timing is estimated using The University of Washington Columbia Basin Research Pit Pro and SURPH models to estimate minimum in-basin and out-of-basin survival based on number of tagged fish released and capture probability. Smolt survival estimates include a point estimate and associated variance. We will examine differential survival to downstream detection sites (e.g. Nursery Bridge Dam, Oasis Road Bridge, and McNary Dam) from several large tag groups (i.e. 500-4,000 fish) based on release locations (upper and lower Walla Walla) and season (fall and spring). Migration timing based on PIT-tag detection to McNary Dam will be reported to the 10th,

	50th, and 95th percentile for the migration year. In addition, mean travel in days to McNary is reported between the 10th and 90th percentiles.
Deliverable Specification:	The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.
Work Element Budget:	$273415 (46.77%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Population Status

Locations: 4
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: BPA Fish and Wildlife Program Monitoring v1.0
Study Plan Owner: Russell Scranton
Protocol: BPA Fish and Wildelife Program (Pre-2012) v1.0
Protocol State: Draft
Protocol Owner: Russell Scranton
Sample Design: Smolt Monitoring and Evaluation - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2

Data Repositories:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2010	3/1/2010	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Monitor salmonids leaving the upper Walla Walla River - spring	3/1/2010	6/15/2010	Completed	A 5-foot rotary screw trap will be run to PIT-tag (spring) out-migrant salmonids in the upper Walla Walla River near the Old Milton-Freewater Highway Bridge (RM 38). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance of out-migrants from the upper Walla Walla.
C. Monitor salmonids leaving the upper Walla Walla River - fall	11/15/2010	2/28/2011	Completed	A 5-foot rotary screw trap will be run to PIT-tag (fall) out-migrant salmonids in the upper Walla Walla River near the Old Milton-Freewater Highway Bridge (RM 38). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance of out-migrants from the upper Walla Walla.
D. Monitor salmonids leaving the lower Walla Walla River - spring	3/1/2010	6/15/2010	Completed	An 8-foot rotary screw trap will be run to PIT-tag (spring) out-migrant salmonids in the lower Walla Walla River near Pierce's RV Park (RM 9). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance of out-migrants to the Columbia River.

Milestone Title	Start Date	End Date	Status	Milestone Description
E. Monitor salmonids leaving the lower Walla Walla River - fall	11/15/2010	2/28/2011	Completed	An 8-foot rotary screw trap will be run to PIT-tag (fall) out-migrant salmonids in the lower Walla Walla River near Pierce's RV Park (RM 9). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance to the Columbia River.
F. Monitor salmonids leaving lower Yellowhawk Creek - spring	3/1/2010	6/15/2010	Completed	An 5-foot rotary screw trap will be run to PIT-tag (spring) out-migrant salmonids in the lower Yellowhawk Creek near the Old Milton Freewater Highway Bridge (RM 1). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance of out-migrants from lower Yellowhawk Creek.
G. Monitor salmonids leaving lower Yellowhawk Creek - fall	11/15/2010	2/28/2011	Completed	An 5-foot rotary screw trap will be run to PIT-tag (spring) out-migrant salmonids in the lower Yellowhawk Creek near the Old Milton Freewater Highway Bridge (RM 1). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance of out-migrants from lower Yellowhawk Creek.
H. Monitor salmonids leaving the lower Mill Creek - spring	3/1/2010	6/15/2010	Completed	An 5-foot rotary screw trap will be run to PIT-tag (spring) out-migrant salmonids in lower Mill Creek near the Wallula Road Bridge (RM 3). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance of out-migrants from lower Mill Creek.
I. Monitor salmonids leaving the lower Mill Creek - fall	11/15/2010	2/28/2011	Completed	An 5-foot rotary screw trap will be run to PIT-tag (fall) out-migrant salmonids in lower Mill Creek near the Wallula Road Bridge (RM 3). Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out of basin PIT-tag detections will used to estimate survival, migration timing and abundance of out-migrants from lower Mill Creek.
J. Submit PIT tag data to PTAGIS - spring	3/1/2010	6/15/2010	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
K. Submit PIT tag data to PTAGIS - fall	11/15/2010	2/28/2011	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
Deliverable: L. Outmigrant monitoring and PIT-tagging data		2/28/2011	Completed	*See the Deliverable Specification above*

G: 28. Trap and Haul

Title:	Fish Salvage
Description:	Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.
Deliverable Specification:	Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.
Work Element Budget:	$20000 (3.42%)
Planned Metrics:	# of fish transported: 1200
Locations:	1
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	OR	**HUC5 Watershed:**	Middle Walla Walla River
County:	Umatilla	**HUC6 Name:**	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2010	3/1/2010	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Rescue and haul fish	3/1/2010	2/28/2011	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/28/2011	Completed	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Rainwater Wildlife Area Fish M & E

Description: Estimate juvenile salmonid rearing densities at index sites within the Rainwater Wildlife Area (BPA project 2000-026-00). A sub-set of established index sites will be sampled by multiple-pass depletion electrofishing with block nets. Repeated electrofish passes will be done until reaching a 60% depletion between passes. Estimates of salmonid abundance at electrofishing sites are calculated with maximum likelihood model (Van Deventer and Platts 1989).

Deliverable Specification: The deliverables are the error checked databases of juvenile fish density, fork length, and scale samples.

Work Element Budget: $12000 (2.05%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Population Status

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla

State: WA **HUC5 Watershed:** Upper Touchet River

County: Columbia **HUC6 Name:** South Fork Touchet River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: BPA Fish and Wildlife Program Monitoring v1.0

Study Plan Owner: Russell Scranton

Protocol: BPA Fish and Wildelife Program (Pre-2012) v1.0

Protocol State: Draft

Protocol Owner: Russell Scranton

Sample Design: Rainwater Wildlife Area Fish M & E - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2

Data Repositories:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2010	3/1/2010	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Stream electrofishing	8/1/2010	8/14/2010	Completed	Perform depletion electrofishing for salmonid density (fish/100 meter2) estimates.
C. Data summary	8/16/2010	9/15/2010	Completed	Summarize data collected, and forward results to Rainwater Project Biologist (i.e. Allen Childs, CTUIR) for analysis and distribution.
Deliverable: D. Rainwater Fish M & E		9/30/2010	Completed	*See the Deliverable Specification above*

I: 162. Analyze/Interpret Data

Title: Analyze Data

Description: The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning and water management regimes are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements C-G listed above) to construct cohort lineages, run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed “run re-construction”, is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, and smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin.

Deliverable Specification: The deliverables are the quantitative and qualitative results produced from analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult estimates, and run reconstruction estimates.

Work Element Budget: $44000 (7.53%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:

NPCC Subbasin:

State:

HUC5 Watershed:

County:

HUC6 Name:

Salmonid ESUs Present:

Study Plan:

Study Plan Owner:

Protocol:

Protocol State:

Protocol Owner:

Sample Design:

Methods:

ID	Title	Type	Optional	Customized Based On	Status

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2

Data Repositories:

Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Analyze Adult enumeration data	3/1/2010	3/30/2010	Completed	Analyze and interpret adult escapement counts from return year 2009. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
B. Analyze Spawner / Carcass data	4/1/2010	4/30/2010	Completed	Analyze and interpret spawner and carcass densities and distributions from return year 2009. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, and spawn timing. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
C. Analyze smolt and PIT-tag data	5/3/2010	6/30/2010	Completed	Analyze and interpret out-migrant and PIT-tagging results from outmigration year 2009. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT-tagged detections at tributary and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.

Milestone Title	Start Date	End Date	Status	Milestone Description
Deliverable: D. Report Analysis		2/28/2011	Completed	*See the Deliverable Specification above*

J: 132. Produce (Annual) Progress Report

Title: Technical Progress Report

Description: Collaborate with WDFW to produce technical progress report that will provide a summary and analysis of project results.

Deliverable Specification: FY 2009 Progress Report (in scientific format) uploaded to Pisces per on-line specifications. Also, post report to WDFW and CTUIR Web sites.

Work Element Budget: $44000 (7.53%)

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	6/1/2010	6/1/2010	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. https://efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Internal WDFW / CTUIR review of draft	6/1/2010	9/30/2010	Completed	Perform iterative reviews of annual report drafts among contractors (CTUIR & WDFW).
C. Email copy of draft report to COTR for review	9/30/2010	2/15/2011	Active	The draft annual report must be submitted to the BPA COTR in MS Word format. COTR should provide review feedback and comments within 30 days of receiving the draft report.
Deliverable: D. Technical Progress Report(s) uploaded to Pisces		2/28/2011	Active	*See the Deliverable Specification above*

K: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: Deliverables: Contract package (SOW, budget and property inventory) submitted to COTR. The SOW should include location information (latitude and longitude) for those work elements that require it.

Work Element Budget: $18500 (3.16%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Submit invoices to BPA	3/1/2010	2/28/2011	Completed	Submit invoices to BPA consistent with the requirements described in BPA's contract management manual
B. Submit project accruals	8/20/2010	9/10/2010	Completed	Submit September accrual estimate to BPA for fiscal year-end exercise. Milestone specifications: provide BPA with an estimate of contract performance that will occur prior to September 30, but will not be billed until October 1, or later.
C. Coordinate w/ COTR & WDFW on next year's SOW	9/1/2010	10/31/2010	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
Deliverable: D. FY2011 SOW, line-item budget, property inventory submitted to COTR		11/1/2010	Completed	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP CTUIR WW SALMONID PRODUCTION M&E		
Contract #:	51994	**Amendment #:**	2
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$577,043	**Perf. Period:**	3/1/2011 - 2/29/2012
Contract Type:	Contract (IGC)	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd2		
SOW Validation:	Last validated 06/09/2011 with 0 problems, and 3 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

The Walla Walla River Basin Monitoring and Evaluation Project (WWM & E) is funded by Bonneville Power Administration (BPA, project No. 2000-039-00) under the 2008 Columbia Basin Fish Accords Memorandum of Agreement between the Three Treaty Tribes and Federal Columbia River Power System. The purpose of this collaborative project is to conduct natural production, tributary habitat, hatchery research, and monitoring and evaluation. Our goal is to provide ecological information and technical services to decision makers in support of adaptive management for restoration, conservation, and preservation of cultural, social, and economic salmonid resources. We plan to do this by collecting Viable Salmonid Population (VSP) criteria including estimates of abundance, productivity, survival rates, and distribution of reintroduced spring Chinook (Oncorhynchus tshawytscha) salmon, ESA-listed summer steelhead (O. mykiss), and bull trout (Salvelinus confluentus). Project results, including fish per redd, smolts per redd, smolt-to-adult return, recruit per spawner, etc. are used to help inform and adapt salmonid management and recovery goals.

Project Work elements include: adult enumeration, spawning surveys, out-migrant monitoring, PIT-tagging, and fish salvage. We believe these monitoring and evaluation actions meet the highest priorities for fish population monitoring as identified by the Walla Walla Subbasin Plan and Snake River Salmon Recovery Plan. This collaborative project is conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through 2017. The work location is the Walla Walla River Basin and tributaries (e.g. Touchet River, South Fork, and Mill Creek). Project methods were adapted from the Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmonid and Trout Populations (http://www.stateofthesalmon.org/fieldprotocols/). A major focus of ours is to estimate“adults in” and “juveniles out” as a measure of salmonid population viability; for example, adult salmonids entering the basin to spawn are enumerated using weirs and video, spawning fish and carcasses are enumerated by multiple pass ground surveys, while the juvenile emigrant population is estimated using rotary screw traps and PIT-tags.

CTUIR and WDFW project partners collaborate on the project proposal, budget, statements of work and annual report; but retain their individual contracts with BPA. CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located i`n Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (efw.bpa.gov).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Nancy Weintraub	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5373 / NA	nhweintraub@bpa.gov	P.O. Box 3621, Mailstop - KEC-4 Portland, OR 97208-3621
Peter Lofy	F&W Approver	Bonneville Power Administration	(503) 230-4193 / (503) 230-4563	ptlofy@bpa.gov	905 NE 11th Ave. Portland OR 97232
Gary James	Interested Party	Umatilla Confederated Tribes (CTUIR)	(541) 429-7285 / (541) 966-2397	garyjames@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Julie Burke	Administrative Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7292 / (429) 429-7292	julieburke@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Gene Shippentower	Supervisor	Umatilla Confederated Tribes (CTUIR)	(541) 429-7287 / (541) 966-2397	geneshippentower@ctuir.org	Confederated Tribes of the Umatilla Indian Reservation DNR Fisheries Program 46411 Timíne Way Pendleton OR 97801
Brian Mahoney	Contract Manager	Umatilla Confederated Tribes (CTUIR)	(541) 429-7541 / NA	brianmahoney@ctuir.org	William A. Grant Water and Environment Center Walla Walla Community College Walla Walla WA 99362
Michelle O'Malley	COTR	Bonneville Power Administration	(503) 230-5138 / (509) 493-3938	mmomalley@bpa.gov	905 NE 11th Ave. Portland OR 97232

Work Element Budget Summary:

	Work Element - Work Element Title	EC Needed*	Estimate	(%)
A :	185. Produce Pisces Status Report - Periodic Status Reports for BPA		$1,000	(0.15%)
B :	165. Produce Environmental Compliance Documentation - Compliance for WEs C - H		$2,222	(0.34%)
C :	157. Collect/Generate/Validate Field and Lab Data - Enumeration of Adult Migration	*	$23,000	(3.60%)
D :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys	*	$93,500	(14.66%)
E :	158. Mark/Tag Animals - PIT Tag smolts	*	$86,000	(13.48%)
F :	157. Collect/Generate/Validate Field and Lab Data - Smolt Monitoring and Evaluation	*	$253,000	(39.67%)
G :	28. Trap and Haul - Fish Salvage	*	$59,000	(9.25%)
H :	162. Analyze/Interpret Data - Analyze Data		$46,000	(7.21%)

I :	132. Produce (Annual) Progress Report - Technical Progress Report for 3/1/2010 - 2/28/2011	$57,000	(8.93%)
J :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project	$17,000	(2.66%)
	Total:	$637,722	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report quarterly on the status of milestones and deliverables in Pisces. When indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $1000 (0.16%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2011 (3/1/2011 - 6/30/2011)	7/1/2011	7/15/2011	Completed	
B. Jul-Sep 2011 (7/1/2011 - 9/30/2011)	10/1/2011	10/15/2011	Completed	
C. Oct-Dec 2011 (10/1/2011 - 12/31/2011)	1/1/2012	1/15/2012	Completed	
D. Final Jan-Feb 2012 (1/1/2012 - 2/29/2012)	2/15/2012	2/29/2012	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C - H

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through G. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as an USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $2222 (0.35%)

Planned Metrics:

* Are herbicides used as part of work performed under this contract?: No

* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Keep JARPA permit updated	3/1/2011	6/30/2011	Completed	For rotary screw traps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Submit annual reports and take update for NOAA & USFWS	1/1/2012	1/30/2012	Completed	Tribe has a Section 10 permit for USFWS that covers all ceded areas. NOAA -- covered under pending BO for Umatilla & Walla Walla HGMP.
C. Contact BPA EC staff for next year's activities	12/1/2011	1/1/2012	Completed	Contact BPA environmental compliance staff (KEC) to discuss next year's SOW.
Deliverable: D. Compliance achieved and documented		1/31/2012	Completed	*See the Deliverable Specification above*

C: 157. Collect/Generate/Validate Field and Lab Data

Title: Enumeration of Adult Migration

Description: Fish counts from Nursery Bridge, Bennington, and Dayton dams, plus the Coppei Creek trap, are used to provide index estimates of adult returns to the Walla Walla, Mill Creek, and Touchet drainages, respectively. Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under separate contract. The Corps provides counts from Bennington Dam.

Although, counts at these sites are incomplete, due to some upstream passage without detection and downstream spawning, these sites represent the best indices of adult returns currently available and they are the most feasible to operate and monitor the primary spawning areas. We are considering multiple alternatives to improve total adult population abundance estimates. Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns. We will also estimate adult returns based on smolt production estimates, and PIT-tag SARs.

CTUIR and ODFW share fish counting duties at Nursery Bridge Dam (NBD). CTUIR operates the counting station on the east bank; ODFW operates the west side ladder. In the east side ladder, adult salmonids are enumerated using the Salmon-soft fish video-tracking program. Fish images are captured by video camera and DVR linked to a desk top computer as they pass a counting window located near the ladder exit. Video compaction programming greatly reduces the need for observer time in reviewing fish passage video-files. In the west ladder, ODFW uses an underwater video camera and DVR mounted near the ladder exit.

Video enumeration at NBD is conducted according to the annually-updated Annual Operating Plan (Bronson and Duke). Typically, enumeration occurs from November through June to encompass the known adult migration for summer steelhead and spring Chinook. Data collected from the video counting includes date, time, species, size (e.g. jack or adult for spring Chinook salmon), life stage (e.g. steelhead kelts), origin (e.g. adipose clip or unclipped) and migration direction for bull trout of steelhead kelts. Notations are also made of other species encountered and general fish condition. Daily fish tallies from both ladders are posted to an onsite tally board for the public. Project deliverable includes error checked database of daily fish counts.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook and bull trout past Nursery Bridge Dam, Bennington Dam, Dayton Dam, and in Coppei Creek. Data is accessible through CTUIR's website and is also kept in project staff's office.

Work Element Budget: $23000 (3.61%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US — **NPCC Subbasin:** Walla Walla

State: Multiple — **HUC5 Watershed:** Multiple

County: Columbia | Umatilla | Walla Walla — **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: BPA Fish and Wildlife Program Monitoring v1.0

Study Plan Owner: Russell Scranton

Protocol: BPA Fish and Wildelife Program (Pre-2012) v1.0

Protocol State: Draft

Protocol Owner: Russell Scranton

Sample Design: Enumeration of Adult Migration - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2

Data Repositories:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2011	3/1/2011	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Maintain video monitoring equipment @ Nursery Bridge Dam - spring	3/1/2011	7/15/2011	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
C. Error-checked data for spring counts posted to website	8/16/2011	9/16/2011	Completed	Enter spring data into the computer. Error check. Post to public website.
D. Maintain video monitoring equipment @ Nursery Bridge Dam - fall	11/15/2011	2/28/2012	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
E. Error-checked data for fall counts posted to website	4/1/2011	5/1/2011	Completed	Enter fall data into the computer. Error check. Post to public website.
F. Review, organize and summarize video results	8/1/2011	8/31/2011	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: G. Adult enumeration data		2/29/2012	Completed	*See the Deliverable Specification above*

D: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts combined with redd and carcass counts will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River- The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed three or four times, about two weeks apart until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded with a Trimble GPS. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. In situations where multiple salmonid species overlap on a given spawning area (e.g. spring Chinook & bull trout), fish observed near the redd are used to differentiate the species involved. Care is taken not to disturb spawning fish or redds. Tallies of bull trout redds observed during spring Chinook surveys are forwarded to Bill Duke (ODFW Pendleton).

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.

Work Element Budget:	$93500	(14.66%)	
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Tributary Habitat		
Locations:	4		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	Multiple	**HUC5 Watershed:**	Multiple
County:	Umatilla | Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized

134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2011	3/1/2011	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Pre-spawn carcass survey	7/4/2011	7/29/2011	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of adult returns over the spawning season and will be done in the upper Walla Walla River and Mill Creek.
C. Spring Chinook redd/carcass surveys	8/1/2011	9/30/2011	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
D. Error-checked data for redd counts posted to website	9/15/2011	11/1/2011	Completed	Enter redd data into the computer. Error check. Post to public website.
E. Error-checked data for carcass counts posted to website	9/15/2011	11/1/2011	Completed	Enter carcass data into the computer. Error check. Post to public website.
F. Error-checked data for CWT data posted to website	9/15/2011	11/1/2011	Completed	Enter redd data into the computer. Error check. Post to public website.
G. All fish snouts sent to ODFW Mark Process Center	9/1/2011	12/1/2011	Completed	
Deliverable: H. Spring Chinook spawner/carcass survey data		11/30/2011	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag smolts

Description: Estimates of out migrant run timing, abundance, and survival based on PIT-tag detections are key components for assessing the performance of hatchery-origin fish relative to naturally-produced fish and necessary for determining the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

Since 2001, we have used various collection strategies in an effort to determine the best method for PIT-tagging juvenile salmonids for life cycle assessment studies. We have used screw traps, fish ladder traps, beach seining, electrofishing, and minnow traps to collect rearing and emigrating juvenile salmonids. PIT-tag detections from Walla Walla and Columbia River detection sites were used to estimate juvenile survival and emigration timing. Rotary screw traps set in the upper and lower river were selected as the preferred method to PIT-tag sufficient numbers of out-migrants to estimate out migrant survival and smolt to adult survival to McNary Dam.

CTUIR will maintain three rotary screw traps and PIT-tag up to 10,000 run of the river out-migrant salmonids. Traps will be fished in the upper and lower Walla Walla in Mill Creek from fall through spring as stream conditions allow. These tagging efforts will supplement those conducted by project collaborator WDFW in the upper and lower Touchet River. In addition, we will also PIT-tag up to 5,000 hatchery origin spring Chinook smolts at the Carson NFH prior to their later release to the South Fork Walla Walla River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 80 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Steelhead between 80 and 125 mm are tagged for abundance estimates and to monitor in-tributary movement. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: Maintenance of up to four screw traps to capture and PIT-tag up to 15,000 spring Chinook and summer steelhead smolts. PIT-tag files submitted to PTAGIS within 15 days of release.

Targets:
5,000 hatchery spring Chinook
4,000 to 5,000 out-migrant spring Chinook per brood year
4,000 to 5,000 out-migrant steelhead per year

Work Element Budget: $86000 (13.49%)

Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Tributary Habitat
Locations:	5
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	US
State:	WA
County:	Walla Walla
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

NPCC Subbasin:	Walla Walla
HUC5 Watershed:	Multiple
HUC6 Name:	Multiple

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2011	3/1/2011	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. PIT-Tag steelhead out-migrants - spring	3/1/2011	6/15/2011	Completed	Up to 5,000 (total for the year) run of the river out-migrant steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
C. PIT-Tag steelhead out-migrants - fall	10/15/2011	2/29/2012	Completed	Depending on adequate stream flow and conditions, up to 5,000 run of the river out-migrant steelhead (total for the year) will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag spring Chinook out-migrants - spring	3/1/2011	6/15/2011	Completed	Up to 5,000 (for the brood year) run of the river out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. PIT-Tag sprng Chinook out-migrants - fall	10/15/2011	2/29/2012	Completed	Depending on adequate stream flow and conditions, up to 5,000 (for the brood year) out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
F. PIT-tag hatchery spring Chinook	11/29/2011	11/30/2011	Completed	PIT-tag up to 5,000 hatchery spring Chinook smolts at Carson National Fish Hatchery per the ISRP recommendation to develop an experimental design to use US V Oregon agreement stocking of 250,000 Chinook smolts to fully evaluate the Walla Walla Hatchery Master Plan preferred alternative of full hatchery supplementation. PIT-tagged fish will be used to estimate hatchery smolt survival, run timing, and abundance to McNary Dam, and to estimate smolt to adult survival back to the subbasin. Error check and submit PIT-tagging files to PTAGIS within 15 days of PIT-tagging.
Deliverable: G. Up to 15,000 smolts PIT tagged		2/29/2012	Completed	*See the Deliverable Specification above*

F: 157. Collect/Generate/Validate Field and Lab Data

Title: Smolt Monitoring and Evaluation

Description: PIT-tag detections from Walla Walla and Columbia River detection sites will be used to estimate juvenile survival and emigration timing. Rotary screw traps set in the upper and lower river are the preferred method to PIT-tag sufficient numbers of out-migrants to estimate outmigrant survival and smolt to adult survival to McNary Dam.

Smolt emigration software developed by the National Marine Fisheries Service (DARR 2.0; Bjorkstedt 2005) for small populations will be used to estimate smolt abundance. DARR 2.0 uses trap efficiency (TE) to expand total catch in estimating migrant abundance.

Trap efficiency tests using PIT tags will be done each day at the screw traps based on the availability of PIT-tagged fish, and presumed susceptibility for recapture within 48 hours of release. Generally, all healthy PIT-tagged fish will be released roughly three habitat units (300 m) above the trap for TE tests. Our previous TE tests showed that most TE recaptures occurred within 24 hours of release. Trap efficiency will be assessed through out the outmigration during variable conditions. Only wild steelhead and Chinook will be used for TE tests.

Trap efficiency estimates are computed using the following formula:

TE = R/M

Where, TE is estimated trap efficiency, R equals the number of recaptured tagged fish, and M equals the number of tagged (marked) fish released.

Outmigrant abundance is computed using the following formula:

A = C/TE

Where, A is the estimated outmigrant abundance, C is the total new (un-tagged) catch, and TE is the estimated trap efficiency.

Tag retention and fish survival for all factors other than tagging is assumed to be 100% after release, and we assume that mortality due to tagging after release was equal to mortality during the holding period. Using DARR, trap catch at the lower Walla Walla site is expanded by the trap efficiency rate to estimate total smolt abundance emigrating from the Walla Walla River.

Survival and run timing is estimated using The University of Washington Columbia Basin Research Pit Pro and SURPH models to estimate minimum in-basin and out-of-basin survival based on number of tagged fish released and capture probability. Smolt survival estimates include a point estimate and associated variance. We will examine differential survival to downstream detection sites (e.g. Nursery Bridge Dam, Oasis Road Bridge, and McNary Dam) from several large tag groups (i.e. 500-4,000 fish) based on release locations (upper and lower Walla Walla) and season (fall and spring). Migration timing based on PIT-tag detection to McNary Dam will be reported to the 10th, 50th, and 95th percentile for the migration year. In addition, mean travel in days to McNary is reported between the 10th and 90th percentiles.

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38)
Lower Walla Walla River near the Garden City II diversion (RM30)
Lower Mill Creek near the Wallula Road bridge (RM 3).

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $253000 (39.67%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 4
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: BPA Fish and Wildlife Program Monitoring v1.0
Study Plan Owner: Russell Scranton
Protocol: BPA Fish and Wildelife Program (Pre-2012) v1.0
Protocol State: Draft
Protocol Owner: Russell Scranton
Sample Design: Smolt Monitoring and Evaluation - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2

Data Repositories:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2011	3/1/2011	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Monitor salmonids leaving the upper Walla Walla River - spring	3/1/2011	6/15/2011	Completed	Operate 5-foot rotary screw trap in spring
C. Monitor salmonids leaving the upper Walla Walla River - fall	10/15/2011	2/29/2012	Completed	Operate 5-foot rotary screw trap in fall
D. Monitor salmonids leaving the lower Walla Walla River - spring	3/1/2011	6/15/2011	Completed	Depending on flow, operate either a 5-foot 8-foot rotary screw trap in spring.
E. Monitor salmonids leaving the lower Walla Walla River - fall	11/15/2011	2/29/2012	Completed	Depending on flow, operate either a 5-foot 8-foot rotary screw trap in fall.
F. Monitor salmonids leaving lower Mill Creek - spring	3/1/2011	6/15/2011	Completed	Operate 5-foot rotary screw trap in spring
G. Monitor salmonids leaving lower Mill Creek - fall	11/15/2011	2/29/2012	Completed	Operate 5-foot rotary screw trap in fall
H. Submit PIT tag data to PTAGIS - spring	3/1/2011	7/1/2011	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
I. Submit PIT tag data to PTAGIS - fall	11/15/2011	2/29/2012	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
Deliverable: J. Outmigrant monitoring and PIT-tagging data		2/29/2012	Completed	*See the Deliverable Specification above*

G: 28. Trap and Haul

Title: Fish Salvage

Description: Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.

Deliverable Specification: Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.

Work Element Budget: $59000 (9.25%)

Planned Metrics: # of fish transported: 1200

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US

NPCC Subbasin: Walla Walla

State: OR

HUC5 Watershed: Middle Walla Walla River

County: Umatilla

HUC6 Name: Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2011	3/1/2011	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Rescue and haul fish	3/1/2011	2/29/2012	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/29/2012	Completed	*See the Deliverable Specification above*

H: 162. Analyze/Interpret Data

Title: Analyze Data

Description: The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning and water management regimes are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements C-G listed above) to construct cohort lineages, run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed “run re-construction”, is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, and smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin.

Deliverable Specification: The deliverables are the quantitative and qualitative results produced from analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult estimates, and run reconstruction estimates.

Work Element Budget: $46000 (7.21%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: **NPCC Subbasin:**

State: **HUC5 Watershed:**

County: **HUC6 Name:**

Salmonid ESUs Present:

Study Plan:

Study Plan Owner:

Protocol:

Protocol State:

Protocol Owner:

Sample Design:

Methods:

ID	Title	Type	Optional	Customized Based On	Status

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2

Data Repositories:

Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Analyze Adult enumeration data	6/1/2011	6/30/2011	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Analyze smolt and PIT-tag data	7/1/2011	7/29/2011	Completed	Analyze and interpret out-migrant and PIT-tagging results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT-tagged detections at tributary and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
C. Analyze Spawner / Carcass data	10/1/2011	10/31/2011	Completed	Analyze and interpret spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, and spawn timing. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Complete smolt-to-adult estimated return rate for 2005 brood year spring Chinook progeny	10/1/2011	10/31/2011	Completed	Adults return as 3, 4, 5 and 6 year olds
E. Reconstruct total outmigration of BY 2009 spring Chinook juveniles	10/1/2011	10/31/2011	Completed	Juveniles migrate out as subyearlings in the fall and yearlings in the spring
F. Reconstruct total outmigration of BY 2008 steelhead juveniles	10/1/2011	10/31/2011	Completed	Juveniles migrate out as subyearlings in the fall and 2 and (occasionally) 3 year olds, almost exclusively in the spring
Deliverable: G. Report Analysis		2/29/2012	Completed	*See the Deliverable Specification above*

I: 132. Produce (Annual) Progress Report

Title: Technical Progress Report for 3/1/2010 - 2/28/2011

Description: Collaborate with WDFW to produce technical progress report that will provide a summary and analysis of project results.

Deliverable Specification: Progress Report (in scientific format) uploaded to Pisces per on-line specifications. Also, post report to WDFW and CTUIR Web sites.

Work Element Budget: $57000 (8.94%)

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Internal WDFW / CTUIR review of draft	6/1/2011	2/29/2012	Completed	Perform iterative reviews of annual report drafts among contractors (CTUIR & WDFW).
B. Email copy of draft report to COTR for review	1/1/2012	1/31/2012	Completed	The draft annual report must be submitted to the BPA COTR in MS Word format. COTR should provide review feedback and comments within 30 days of receiving the draft report.
Deliverable: C. Technical Progress Report for 3/1/2010 - 2/28/2011 uploaded to Pisces		2/29/2012	Completed	*See the Deliverable Specification above*

J: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: Deliverables: Contract package (SOW, budget and property inventory) submitted to COTR. The SOW should include location information (latitude and longitude) for those work elements that require it.

Work Element Budget: $17000 (2.67%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Submit invoices to BPA	3/1/2011	2/29/2012	Completed	Submit invoices to BPA consistent with the requirements described in BPA's contract management manual
B. Submit project accruals	8/20/2011	9/10/2011	Completed	Submit September accrual estimate to BPA for fiscal year-end exercise. Milestone specifications: provide BPA with an estimate of contract performance that will occur prior to September 30, but will not be billed until October 1, or later.
C. Coordinate w/ COTR & WDFW on next year's SOW	9/1/2011	10/28/2011	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
D. Attend AFS or other professional training	10/1/2011	2/9/2012	Completed	
Deliverable: E. FY2012 SOW, line-item budget, property inventory submitted to COTR		11/1/2011	Completed	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP CTUIR WW SALMONID PRODUCTION M&E		
Contract #:	56615	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$679,320	**Perf. Period:**	3/1/2012 - 2/28/2013
Contract Type:	Contract (IGC)	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 10/31/2012 with 13 problems, and 3 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and efw.bpa.gov.

The Walla Walla Subbasin supports steelhead and bull trout that are both listed as threatened under the Endangered Species Act (ESA), and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Prior to the start of this project, the subbasin co-managers did not have adequate information to assess adult abundance, distribution, age structure, genetic characteristics, adult to adult production values, smolt-to-adult survival, and natural spawning escapement. In addition, numerous habitat protection and rehabilitation projects to improve salmonid freshwater production and survival have also been implemented in the subbasin and are in need of effectiveness monitoring. While our monitoring efforts outlined here will not specifically measure the effectiveness of any particular project, they will provide much needed background information for developing context for project-specific effectiveness monitoring. In the near future, we will begin to monitor the CTUIR spring Chinook hatchery program as a major part of this monitoring and evaluation program.

Our goal is to provide ecological information to decision makers in support of adaptive management for ESA recovery, population restoration, conservation, and preservation of cultural, social, and economic salmonid resources. We do this by emphasizing monitoring of population status and trends to estimate “adults in and juveniles out” as a measure of salmonid population viability within the subbasin, and as evaluation of the spring Chinook hatchery program.

Project objectives were chosen to answer specific management questions regarding Viable Salmonid Population (VSP) parameters (McElhany et al. 2000) of abundance, productivity, spatial structure, and diversity for reintroduced spring Chinook salmon, ESA listed summer steelhead, and bull trout in the Walla Walla Subbasin. Project results help inform the Tribes First Foods management within the Ceded lands.

Primary management questions addressed by this project are based on the Draft Adaptive Management and Research, Monitoring and Evaluation of the SE WA Salmon Recovery Plan (see Appendix C; SRSRB 2011). Primary monitoring questions 1 and 3 of that Appendix are most directly associated with this project. Those questions are: “Is the status of the population/ ESU/DPS improving?”And “Are hatchery programs meeting specific mitigation goals?” We used the following primary management questions derived from Appendix C of the draft Southeast Washington Salmon

Recovery Plan (SRSRB 2011) to guide our reporting of status and trends.
• Is the abundance of adult fish trending towards restoration goals for each population?
• Is the population productivity of fish trending towards restoration goals for each population?
• What is the spatial structure of each population?
• What are the major life history strategies for each population?
• Are the populations viable or meeting mitigation goals?

Project field methods were adapted from the Salmonid Field Protocols Handbook (Johnson et al. 2007) to collect a few key fish population performance indicators. For adults-in, our main population metric is adult abundance estimated at counting stations at dams or traps, or in some cases use of spawning surveys (depending on the species and location). The primary population productivity indicators are natural origin adult abundance and AAR based on spawning escapement. In the future, our long-term objective is to establish adult enumeration sites in the lower Walla Walla River (WWR) to better estimate total adult returns. For juveniles-out, our primary indicators are smolt abundance and SARs.

Fish population performance indicators used are:

Adults-in
Adult to adult return
Adult abundance
Spawning escapement
Fish per redd
Pre-spawn loss and stray fish
Redds per kilometer
Harvest

Juveniles-out
Smolt to adult return
Smolt abundance
Smolts per redd
Survival (Cormack-Jolly-Seber) & run timing

Project Work Elements include: adult enumeration, spawning surveys, PIT-tagging, outmigrant monitoring, juvenile production monitoring. However, we also collect water temperature and flow data because they are such major factors determining salmonid distributions. We believe these monitoring and evaluation actions meet the highest priorities for fish population monitoring as identified by the Walla Walla Subbasin Plan (Walla Walla County 2004), the Middle Columbia River Steelhead Distinct Population Segment Recovery Plan (NMFS 2009), Snake River Salmon and Steelhead Monitoring and Evaluation Plan for Southeast Washington (Appendix C in SRSRB 2011), the Independent Science Review Panel, the Council's draft Columbia River Basin Monitoring, Evaluation, Research and Reporting Plan (MERR 2010), the NOAA Draft Guidance for Monitoring Recovery of Salmon and Steelhead (NOAA 2009), and Draft Anadromous Salmonid Monitoring Strategy (ASMS, 2010).

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (efw.bpa.gov).

Contacts:

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Work Element Budget Summary:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		$1,000	(0.14%)
B : 165. Produce Environmental Compliance Documentation - Compliance for WEs C -K		$2,222	(0.32%)
C : 157. Collect/Generate/Validate Field and Lab Data - Adult enumeration	*	$32,000	(4.71%)
D : 157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys	*	$66,000	(9.71%)
E : 158. Mark/Tag Animals - PIT Tag smolts (out-migrant tagging)	*	$35,512	(5.22%)
F : 157. Collect/Generate/Validate Field and Lab Data - Outmigrant monitoring	*	$171,000	(25.17%)
G : 70. Install Fish Monitoring Equipment - Install PIT Array in Lower WWR	*	$96,000	(14.13%)

H :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$3,500	(0.51%)
I :	157. Collect/Generate/Validate Field and Lab Data - Juvenile fish habitat use (acoustic tag)	*	$70,000	(10.30%)
J :	157. Collect/Generate/Validate Field and Lab Data - Juvenile fish monitoring	*	$50,000	(7.36%)
K :	28. Trap and Haul - Fish Salvage	*	$32,000	(4.71%)
L :	162. Analyze/Interpret Data - Analyze Data		$54,000	(7.94%)
M :	132. Produce (Annual) Progress Report - Technical Progress Report for 3/1/2011 - 2/29/2012		$43,000	(6.32%)
N :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$23,086	(3.39%)
		Total:	$679,320	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report quarterly on the status of milestones and deliverables in Pisces. When indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $1000 (0.15%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2012 (3/1/2012 - 6/30/2012)	7/1/2012	7/15/2012	Completed	
B. Jul-Sep 2012 (7/1/2012 - 9/30/2012)	10/1/2012	10/15/2012	Completed	
C. Oct-Dec 2012 (10/1/2012 - 12/31/2012)	1/1/2013	1/15/2013	Completed	
D. Final Jan-Feb 2013 (1/1/2013 - 2/28/2013)	2/14/2013	2/28/2013	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C -K

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through K. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $2222 (0.33%)

Planned Metrics: * Are herbicides used as part of work performed under this contract?: No

* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Keep JARPA permit updated	3/1/2012	6/29/2012	Completed	For rotary screw traps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.
B. Submit annual reports and take update for NOAA & USFWS	1/1/2013	1/29/2013	Completed	Tribe has a Section 10 permit for USFWS that covers all ceded areas. NOAA -- covered under pending BO for Umatilla & Walla Walla HGMP.
C. Contact BPA EC staff for next year's activities	12/1/2012	1/1/2013	Completed	Contact BPA environmental compliance staff (KEC) to discuss next year's SOW.
D. Determine if contract work could adversely affect Pacific lamprey	3/1/2012	2/15/2013	Completed	Field work under this contract will take place in an area where lamprey may be present; therefore, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20 Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf (BMPs). By Feb 15 each year, the contractor should report any lamprey observations during the previous calendar year to US Fish and Wildlife Service contacts listed at http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/. This data should include date, location (river mile or GPS), number of individuals, and life stage. Report the life stage as ammocoete (larval stage with undeveloped eyes, found burrowed in substrate), macropthalmia (free-swimming juvenile stage with developed eyes), or adult. See page 10 of the BMP document for pictures. This milestone end date should match the last day of any field work that could adversely impact Pacific lamprey, under this contract, or the Feb 15 reporting date, whichever comes later.
E. Inspect and, if necessary, wash vehicles and equipment infested with invasive species	3/1/2012	3/1/2012	Completed	Prevent spread of invasive species
F. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2012	3/1/2012	Completed	
G. Obtain BPA's EC Lead sign-off that EC requirements are complete	3/1/2012	3/1/2012	Completed	
Deliverable: H. Compliance achieved and documented		1/29/2013	Completed	*See the Deliverable Specification above*

C: 157. Collect/Generate/Validate Field and Lab Data

Title: Adult enumeration

Description: The specific need this project addresses is to strengthen the overall effectiveness of salmonid restoration efforts in the Walla Walla Basin, and develop a baseline for population status and trend monitoring.

This collaborative effort is conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through at least 2017. Our goal is to provide ecological information in support of adaptive salmonid management. We do this by collecting Viable Salmonid Population (VSP) criteria (particularly abundance, productivity), and life-history survivals.

Project level performance indicators and metrics used to describe total abundance, productivity and life-cycle survival to describe "adults-in and juveniles out" include:

Adult abundance (metric and method)
• Spawning escapement (spawning surveys and/or adult counts at dams, weir and traps)
• Total population abundance (Pit-tag detection system, adult counts at dams, weir and traps)
• Fish per redd (spawning surveys and/or adult counts at dams, weir and traps)
• Redds per mile (spawning surveys)

Production and life-cycle survival (metric and method)
• Population level smolt production annually from the Walla Walla and Touchet watersheds (Pit-tag detection system)
• Smolts per Redd (Pit-tag detection system, rotary trapping, spawning surveys)
• Survival & Run Timing (Pit-tag detection system & rotary trapping)
• Smolt to Adult Return (Pit-tag detection system, rotary trapping, adult counts, and spawning surveys)
• Adult to adult return (spawning surveys and/or adult counts at dams, weir and traps)

Adult enumeration methods: Fish counts from Nursery Bridge, Bennington, and Dayton dams, plus the Coppei Creek trap, are used to provide index estimates of adult returns to the Walla Walla, Mill Creek, and Touchet drainages, respectively. Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under separate contract. The US Army Corps provides counts from Bennington Dam.

Although counts at these sites are incomplete due to some upstream passage without detection and downstream spawning, these sites represent the best indices of adult returns currently available and they are the most feasible to operate and monitor the primary spawning areas. We are considering multiple alternatives to improve total adult population abundance estimates. Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns (see WE on Installing PIT Array). We will also estimate adult returns based on smolt production estimates, and PIT-tag SARs.

CTUIR and ODFW share fish counting duties at Nursery Bridge Dam (NBD). CTUIR operates the counting station on the east bank; ODFW operates the west side ladder (not BPA funded). In the east side ladder, adult salmonids are enumerated using the Salmon-soft fish video-tracking program. Fish images are captured by video camera and DVR linked to a desk top computer as they pass a counting window located near the ladder exit. Video compaction programming greatly reduces the need for observer time in reviewing fish passage video-files. In the west ladder, ODFW uses an underwater video camera and DVR mounted near the ladder exit.

Video enumeration at NBD is conducted according to the annually-updated Annual Operating Plan (Bronson and Duke). Typically, enumeration occurs from November through June to encompass the known adult migration for summer steelhead and spring Chinook. Data collected from the video counting includes date, time, species, size (e.g. jack or adult for spring Chinook salmon), life stage (e.g. steelhead kelts), origin (e.g. adipose clip or unclipped) and migration direction for bull trout or steelhead kelts. Notations are also made of other species encountered and general fish condition. Daily fish tallies from both ladders are posted to an onsite tally board for the public. Project deliverable includes error checked database of daily fish counts.

See WDFW SOW for descriptions of activities regarding adult counts at Dayton Dam, Coppei Creek, and Mill Creek.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam, Bennington Dam, Dayton Dam, and in Coppei Creek. This contract only covers Nursery Bridge Dam; WDFW will operate at the facilities in Washington. Data is accessible through CTUIR's website and is also kept in project staff's office.

Work Element Budget: $32000 (4.71%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Action Effectiveness Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla
State: OR **HUC5 Watershed:** Middle Walla Walla River
County: Umatilla **HUC6 Name:** Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Adult enumeration - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized

395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA

Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: StreamNet Database (http://q.streamnet.org/Request.cfm?cmd=BuildCriteria&NewQuery=BuildCriteria)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2012	3/1/2012	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Maintain video monitoring equipment @ Nursery Bridge Dam - spring	3/1/2012	7/15/2012	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
D. Error-checked data for spring counts posted to website	8/16/2012	9/16/2012	Completed	Enter spring data into the computer. Error check. Post to public website.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - fall	11/15/2012	2/28/2013	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
F. Error-checked data for fall counts posted to website	4/1/2012	5/1/2012	Completed	Enter fall data into the computer. Error check. Post to public website.
G. Review, organize and summarize video results	8/1/2012	8/29/2012	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: H. Adult enumeration data from NBD		2/28/2013	Completed	*See the Deliverable Specification above*

D: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts (see WE C, adult enumeration) combined with redd and carcass counts (Crawford et al. 2007; Gallagher et al. 2007) will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River - The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed three or four times, about two weeks apart, until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded with a Trimble GPS. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. In situations where multiple salmonid species overlap on a given spawning area (e.g. spring Chinook & bull trout), fish observed near the redd are used to differentiate the species involved. Care is taken not to disturb spawning fish or redds. Tallies of bull trout redds observed during spring Chinook surveys are forwarded to Bill Duke (ODFW Pendleton).

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.

Work Element Budget: $66000 (9.72%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US | **NPCC Subbasin:** Walla Walla

State: Multiple | **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized

110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA

Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: StreamNet Database (http://q.streamnet.org/Request.cfm?cmd=BuildCriteria&NewQuery=BuildCriteria)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2012	3/1/2012	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Pre-spawn carcass survey	7/2/2012	7/29/2012	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of adult returns over the spawning season and will be done in the upper Walla Walla River and Mill Creek.
D. Spring Chinook redd/carcass surveys	8/1/2012	9/29/2012	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
E. Error-checked data for redd counts posted to website	9/15/2012	11/1/2012	Completed	Enter redd data into the computer. Error check. Post to public website.
F. Error-checked data for carcass counts posted to website	9/15/2012	11/1/2012	Completed	Enter carcass data into the computer. Error check. Post to public website.
G. Error-checked data for CWT data posted to website	9/15/2012	11/1/2012	Completed	Enter redd data into the computer. Error check. Post to public website.
H. All fish snouts sent to ODFW Mark Process Center	9/1/2012	11/1/2012	Completed	We will send collected snouts in to the ODFW Mark Precess center to read CWT from fish collect during the survey.
Deliverable: I. Spring Chinook spawner/ carcass survey data		11/29/2012	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag smolts (out-migrant tagging)

Description: Estimates of out-migrant run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 10,000 run of the river out-migrant salmonids for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery salmonid production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain up to three rotary screw traps and PIT-tag up to 10,000 run of the river out-migrant salmonids. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39), lower Walla Walla River near the Garden City II diversion (RM30), and in lower Mill Creek (rm 3). The traps will be run from October through June as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to three screw traps to capture and PIT-tag up to 10,000 spring Chinook and summer steelhead smolts. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 out-migrant spring Chinook per brood year
5,000 out-migrant steelhead per year

Work Element Budget: $35512 (5.23%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 3
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US
State: WA
County: Walla Walla
NPCC Subbasin: Walla Walla
HUC5 Watershed: Multiple
HUC6 Name: Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. PIT-Tag steelhead out-migrants - spring	3/1/2012	6/15/2012	Completed	Up to 5,000 (total for the year) run of the river out-migrant steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
C. PIT-Tag steelhead out-migrants - fall	10/15/2012	2/28/2013	Completed	Depending on adequate stream flow and conditions, up to 5,000 run of the river out-migrant steelhead (total for the year) will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag spring Chinook out-migrants - spring	3/1/2012	6/15/2012	Completed	Up to 5,000 (for the brood year) run of the river out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. PIT-Tag sprng Chinook out-migrants - fall	10/15/2012	2/28/2013	Completed	Depending on adequate stream flow and conditions, up to 5,000 (for the brood year) out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: F. Up to 10,000 smolts PIT tagged		2/28/2013	Completed	*See the Deliverable Specification above*

F: 157. Collect/Generate/Validate Field and Lab Data

Title: Outmigrant monitoring
Description: We will use screw traps, tagging equipment, and in-basin PIT-arrays to sample, tag and monitor salmonids. Traps are run from October through June as conditions allow intercepting migrating juvenile salmonids. When possible, traps fish 24-hours a day, seven days a week, and are checked daily. However, sub sampling is frequently required

due to stream conditions or limited staffing. When sub sampling is done, catch per hour is calibrated and used to expand catch estimates for trap down time. The number of fish that passed the trap during un-sampled periods is estimated as:

Nhat = (C/T)

where, Nhat = estimated number of out-migrants missed, C = calibration sample rate, and T = proportion of time sampled.

All captured salmonids are scanned for PIT-tags. Data collected from juvenile salmonids includes: number, species, length, weight, scales from steelhead for age structure and age at migration.

Body condition factor (K) is calculated as a measure of general health of migrants and calculated as:
K = W/L3 x 100,000

Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm - 220 mm F.L.) are PIT-tagged (Prentice et al. 1990). Salmon fry and parr (< 65 mm), and summer steelhead (< 125 mm) are presumed not to be out-migrants and are simply counted and measured and released. Data from tagged fish is processed using a Biomark PIT Tag station. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004). CTUIR recently, moved from manual tag insertion via hypodermic syringe to using the pre-loaded tag trays and needles and Biomark implant gun. Pre-loads and the implant gun make for quick, easy, and clean surgical insertion of PIT-tags; with less apparent fish injury and higher tag retention.

Subsequent PIT-tag detections of Walla Walla fish are obtained from the PTAGIS data base maintained by Pacific States Marine Fisheries Commission at http://www.ptagis.org.

Migrant abundance based on Trap efficiency (TE) estimates is estimated in DARR (Darroch Analysis with Rank Reduction) 2.0 and GAUSS programs (Steinhorst et al. 2004). and is of the general form:

Âj = Uj/ Êj

where Âj is the estimated number of fish migrating past the trap for the period j, Uj is the total number of unmarked fish captured that period, and Êj , is the estimated trap efficiency for the period/stratum j. Total migrant abundance is estimated as the sum of the stratum-specific abundance estimates.

Mark recapture estimators (such as DARR & GAUSS) generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging); (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

DARR 2.0 provides stratum-specific estimates of abundance for the aggregated data set, the standard error for each stratum-specific estimate, as well as the estimate of overall abundance and the standard error associated with the estimate of total abundance (Bjorkstedt 2005).

Trap Efficiency tests are done daily throughout the migratory year at each trap site. Trap efficiency is determined by releasing a known number of PIT-tagged or marked fish above each trap and enumerating recaptures. TE results are organized into (bi-weekly) strata for analysis.

Trap efficiency per stratum (j) was estimated by:

Êj = Rj/Mj

where Êj is the estimated trap efficiency for week j, Rj is the number of marked fish recaptured during week j, and Mj is the number of marked fish released upstream during week j.

Our previous TE tests showed that most recaptures occurred within 24 hours of release. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not PIT-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals.

Out-migrant survival and run timing of PIT-tagged fish is estimated using the University of Washington Columbia Basin Research PIT-Pro Model (Lady et al. 2001; www.cbr.washington.edu). PIT-Pro generated survival estimates included a Cormack-Jolley-Seber point estimate and associated standard error (SE).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:

Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38)
Lower Walla Walla River near the Garden City II diversion (RM30)
Lower Mill Creek near the Wallula Road bridge (RM 3).

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $171000 (25.17%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 3
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized

133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: StreamNet Database (http://q.streamnet.org/Request.cfm?cmd=BuildCriteria&NewQuery=BuildCriteria)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2012	3/1/2012	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Monitor salmonids leaving the upper Walla Walla River - spring	3/3/2012	6/15/2012	Completed	Operate 5-foot rotary screw trap in spring
D. Monitor salmonids leaving the upper Walla Walla River - fall	10/15/2012	2/28/2013	Completed	Operate 5-foot rotary screw trap in fall
E. Monitor salmonids leaving the lower Walla Walla River - spring	3/1/2012	6/15/2012	Completed	Depending on flow, operate either a 5-foot or 8-foot rotary screw trap in spring.
F. Monitor salmonids leaving the lower Walla Walla River - fall	11/15/2012	2/28/2013	Completed	Depending on flow, operate either a 5-foot or 8-foot rotary screw trap in fall.
G. Monitor salmonids leaving lower Mill Creek - spring	3/1/2012	6/15/2012	Completed	Operate 5-foot rotary screw trap in spring
H. Monitor salmonids leaving lower Mill Creek - fall	11/15/2012	2/28/2013	Completed	Operate 5-foot rotary screw trap in fall
I. Submit PIT tag data to PTAGIS - spring	3/1/2012	6/1/2012	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
J. Submit PIT tag data to PTAGIS - fall	11/15/2012	2/28/2013	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
K. Review, organize and summarize results	1/1/2013	1/30/2013	Completed	Review, organize and summarize results for migration year 2012.
Deliverable: L. Out-migrant monitoring and PIT-tagging data		2/28/2013	Completed	*See the Deliverable Specification above*

G: 70. Install Fish Monitoring Equipment

Title: Install PIT Array in Lower WWR

Description: The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) contacted Biomark to provide a cost estimate for establishing a PIT-tag detection system in the lower Walla Walla River, Washington. The system would be used to monitor PIT-tagged spring Chinook (Oncorhynchus tshawytscha) and steelhead (Oncorhynchus mykiss). Biomark proposes the pass-by antenna design as antennas are installed level with the streambed reducing susceptibility of the antennas being dislodged by debris and/or high flow (Figure 1). This antenna design has been used to successfully monitor movement of PITtagged salmon and steelhead in the Pacific Northwest. Detection efficiency of adult spring Chinook salmon at the South Fork Salmon River, Idaho array, based on detections from an upstream terminal weir, has exceeded 90%. Detection efficiency of juvenile salmonids ranges from 20-50%. PIT-tag systems include antennas, an electronics enclosure, and power supply platform. The FS1001M transceiver can power up to 6 antennas per unit and each pass-by antenna is 20ft in length allowing for a single array length of 120ft. The electronics enclosure houses the FS1001M multiplexing transceiver, data logger, and communication platform. The enclosure and power supply platform are installed adjacent to the antenna array. The accompanying budget reflects the cost to construct and assist with the installation of a PIT-tag detection system including 4 antennas, cellular communication, and a battery switching power supply platform.

The project is partitioned into four phases: Site Visit, System Assembly and Test, Installation, and Operation &Maintenance (O&M). Descriptions of the Site Visit, System Assembly and Test, Installation, and O&M phases are provided below. Site Visit: Representatives from Biomark and the CTUIR visited potential site locations on November 9, 2011 to identify a suitable location for a PIT-tag detection system. System Assembly and Test: Antennas will be constructed by Biomark. The entire system: transceiver, antennas, data logger, and power supply system will be tested at Biomark prior to installation.

Deliverable Specification: Biomark will provide a PIT-tag system that will consist of an FS1001M transceiver, transceiver enclosure, data

	logging equipment, antennas, and power supply system. A maintenance log at the end of the O&M performance period detailing any equipment failure, down time, or damage repair will be provided.		
Work Element Budget:	$96000	(14.13%)	
Locations:	1		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Lower Walla Walla River
County:	Walla Walla	**HUC6 Name:**	Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	7/31/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2012	11/30/2012	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. CTUIR cultural survey	3/1/2012	7/31/2012	Completed	Complete cultural survey of PIT-system installation site.
D. Install PIT-tag System (Biomark tasks)	8/1/2012	8/31/2012	Completed	Installation: Biomark will deliver the PIT-tag system including a transceiver enclosure, antennas, and power supply system and perform the following tasks: a. Install PIT-tag antennas, pull exciter cable, terminate exciter cable at transceiver enclosures, b. Install PIT-tag electronics into the enclosure, c. Install the data logger electronics, d. Install power supply system, e. Characterize the system performance, f. Verify the system prior to departure from the site. g. Biomark will train project personnel on the overall operation of the PIT-tag system. This will include discussion of the transceiver, antennas, and data collection platform. Biomark will coordinate and plan all tasks with CTUIR.
E. Install PIT-tag System (CTUIR tasks)	8/1/2012	8/31/2012	Completed	CTUIR will be responsible for: a. Providing personnel to assist with handling and installation of the antennas and associated equipment. b. Providing items listed in “Key Assumptions:” The following Key Assumptions were made in preparing this Work Element i. If transceiver enclosure is mounted outside of a climate controlled building CTUIR or others are responsible for providing sun shield if necessary. ii. CTUIR or others are responsible for establishing a contract with the provider of the cellular service for data transmission. iii. The budget proposed is a firm fixed price contract. Any additional work outside the scope of work would require a contract modification. Invoices will be submitted to CTUIR at the completion of each phase.
F. Maintain PIT-tag system	9/1/2012	2/28/2013	Completed	Daily system status check to ensure the remote PIT tag detection system is uploading to the PTAGIS database and to CTUIR office in Walla Walla. Site visits as needed to ensure proper system operation.
Deliverable: G. PIT-tag system installed in Lower Walla Walla River		2/28/2013	Completed	*See the Deliverable Specification above*

H: 158. Mark/Tag Animals

Title:	PIT Tag smolts (hatchery tagging)
Description:	Estimates of out migrant run timing, abundance, and survival based on PIT-tag detections are key components for assessing the performance of hatchery-origin fish relative to naturally-produced fish and necessary for determining the success of the Tribe’s spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine

production within the watershed or subbasin.

This WE is an in-kind collaboration between the USFWS and the CTUIR. The CTUIR supplies 5,000 PIT-tags and pays to have a PIT-trailer delivered to the Hatchery tagging site (e.g. Carson NFH). The USFWS then provides labor and ancillary support to PIT-tag 5,000 spring Chinook smolts. This marking effort represents about 2% of the 250,000 total fish the release to the South Fork Walla Walla River each year for the Tribe. These tagging levels will allow for estimates of smolt survivals and run timing to McNary Dam, and for smolt to adult survival back to the subbasin. USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 5,000 hatchery spring Chinook and and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $3500 (0.52%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 1
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Country: US **NPCC Subbasin:** Walla Walla
State: OR **HUC5 Watershed:** Upper Walla Walla River
County: Umatilla **HUC6 Name:** Lower South Fork Walla Walla River
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. PIT-Tag hatchery spring Chinook	3/1/2012	6/15/2012	Completed	PIT tag Up to 5,000 hatchery spring Chinook for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: C. Up to 5,000 smolts PIT tagged		2/28/2013	Completed	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Juvenile fish habitat use (acoustic tag)

Description: The purpose of this acoustic micro-tag study is to strengthen the overall effectiveness of BPA funded salmonid restoration efforts in the Walla Walla Basin and perform uncertainties research in support of planned CTUIR hatchery and habitat actions. This study will describe over-wintering micro habitats and distribution of juvenile spring Chinook in the Walla Walla River. We will report on juvenile spring Chinook run timing, distribution, habitat use, and overwinter loss in the Walla Walla River.

Methods
Fisheries staff will collect juvenile spring Chinook from the Basel Cellars rotary screw trap (rm 39). Collection of salmonids will be evenly stratified through fall migration to avoid any temporal bias (e.g. 10 fish per week for 10 weeks). Tag implementation should begin when trapping of the Basel Cellars trap begins in October. Acoustic tags should continue to be implemented through January with manual tracking until April. Manual tracking will be conducted throughout the Walla Walla River from the Basel Cellars rotary trap to the mouth of the River. Up to 100 Spring Chinook that fall within the size constraints determined by the tag size (Jonason, 2010) will be brought to the Water and Environmental Center and a Juvenile Salmon Acoustic Telemetry System Acoustic Micro Transmitter (JSATS AMT) will be implanted. Surgically implanted transmitter should not exceed 4.4% of the body weight of any of the wild juvenile spring Chinook salmon (Adams et al. 1998). Implanting protocols should be derived from Adams et al. 1998. Tagged fish will be held for 24-72 hrs prior to release. Tagged fish will be returned to the trap site and released. Transmitters will be activated at release.

After fish are released, fisheries staff will locate overwintering juvenile spring Chinook salmon that have acoustic tags. Stationary and mobile tracking techniques will be utilized to obtain relocations for all radio-tagged fish from October through April. Four stationary WHS 4000 receivers will be positioned strategically in the middle and lower Walla Walla River. Stationary receivers will be downloaded weekly and subsequent relocations will yield broad scale stream reach occupancy. Data obtained from stationary receivers will be used to guide mobile tracking efforts and improve tracking efficiency by maximizing relocations per distance tracked. In addition, stationary receivers will enable relocations during inclement weather and when navigating the Walla Walla River is prohibited by unsuitable flows.

Mobile tracking will be conducted by boat in an attempt to completely track overwintering stream reaches at least once per week. Geographic coordinates will be obtained for each relocated fish using a hand-held global positioning system unit. In localized areas, mobile tracking along the Walla Walla River by foot will be implemented when environmental conditions necessitate such efforts. Specific information collected when a fish is located includes: tag number, GPS coordinate, microhabitat variables (water temperature, dissolved oxygen, depth, substrate, cover type – distance to cover and distance to bank).

JSATS AMTs will be used for tracking juvenile salmon. The transmitters are relatively small in size; they range from 0.3 g-0.43g. The two types of tags are the L-AMT 1.1 (.3g) with a battery life of 50 days and the L-AMT 1.2 (.43g) which has a battery life of 76 days. The size of tag chosen will determine the size class of juvenile salmon that we are able to tag (Jonason, 2010).

Stationary receivers (Lotek WHS 4000 Series JSATS Acoustic Node Receiver) will be set up along the Walla Walla River, at Burlingame (rm 36), Garden City II (rm 30), Touchet -Gardena Rd. Bridge (rm 22) and Pierce's RV Park (rm 9). Data recorded on relocated fish will include:
• Tag number
• GPS location
• Microhabitat variables
o water temperature (ºC)
o dissolved oxygen (mg/L)
o depth (m)
o substrate
o cover type-distance to cover
o distance to bank
o mortality (if applicable)

The information collected will be analyzed to answer two key questions:
1) Where are juvenile spring Chinook salmon over-wintering; including location and micro-habitat variables.
2) Lower Walla Walla River distribution of juvenile spring Chinook; including areas of increased mortality.

Deliverable Specification: The deliverables are: 1) up to 100 juvenile CHS fitted w/ acoustic tags; 2) the error checked databases and data summaries; 3) fish habitat use; 4) distribution; and 5) acoustic detections at in-basin and mainstem interrogation sites.

Work Element Budget: $70000 (10.30%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Action Effectiveness Monitoring
* Secondary R, M, and E Type : Uncertainty Research

Locations: 5

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US **NPCC Subbasin:** Walla Walla

State: WA **HUC5 Watershed:** Multiple

County: Walla Walla **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Juvenile fish habitat use (acoustic tag) - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized

107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA

Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2012	3/1/2012	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Install acoustic stations	9/1/2012	9/1/2012	Completed	Four stationary WHS 4000 receivers will be positioned systematically on the mid – lower Walla Walla River. Stationary receivers will be downloaded weekly and subsequent relocations will yield broad scale stream reach occupancy. Data obtained from stationary receivers will be used to guide mobile tracking efforts and improve tracking efficiency by maximizing relocations per distance tracked.
D. Collect and tag up to 100 juvenile spring Chinook	10/1/2012	11/30/2012	Completed	Fisheries staff will collect juvenile spring Chinook from the Basel Cellars rotary screw trap. Up to 100 Spring Chinook that fall within the size constraints determined by the tag size (Jonason, 2010) will be brought to the Water and Environmental Center and a Juvenile Salmon Acoustic Telemetry System Acoustic Micro Transmitter (JSATS AMT) will be implanted.
E. Mobile track tagged fish	10/1/2012	2/28/2013	Completed	Mobile tracking will be conducted by boat in an attempt to completely track overwintering stream reaches at least once per week. Geographic coordinates will be obtained for each mobilly relocated fish using a hand-held global positioning system unit. In localized areas, mobile tracking along the Walla Walla River by foot will be implemented when environmental conditions necessitate such efforts. Specific information collected when a fish is located includes: tag number, GPS coordinate, microhabitat variables (water temperature, dissolved oxygen, depth, substrate, cover type – distance to cover and distance to bank).
F. Review, organize and summarize results	1/1/2013	1/30/2013	Completed	Review, organize and summarize results.
Deliverable: G. Acoustic telemetry (micro-tag) data		1/31/2013	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Juvenile fish monitoring

Description: One of the main purposes of a monitoring program is to detect changes in a particular variable of interest over time. To evaluate whether fish are responding to changes in habitat as expected, it was recommended that the following list or response variables be assessed. Some of these variables may be difficult to measure with sufficient precision to be useful in modeling fish response to treatments; however, all of these response variables will be assessed to determine which variables will provide the most robust assessment of treatment effects.
Possible response variables include:

• Smolt/spawner, smolt-to adult ratio (SAR), recruiting adults(R/S),
• Population abundance and spatial distribution,
• Seasonal and parr-to–smolt survival, and
• Migratory timing, size and growth rates.

Objectives
Comparisons of juvenile responses to changes in habitat will be made between treatment and control reaches within and between streams. We will focus on capturing and assessing Chinook parr and 1+ steelhead juveniles for all assessments. The juvenile responses to be evaluated are: freshwater production (smolts/spawner), survival, changes in life history, distribution (as measured by change in density), and growth. These proposed measures match with the NOAA Fisheries Viable Salmonid Population (VSP) parameters: abundance, population growth rate, spatial structure, and diversity (McElhany et al. 2000).

The VSP parameters are necessary for determining the long-term viability of salmonid populations.
Abd X Growth X Survival = Production

Methods and Standard Operating Procedure
We will sample 6 reaches for fish 4 times a year. A treatment site and control site on the main stem Walla Walla River (Lampson), South Fork Walla Walla River (Kentch) and Mill Cr (TBD) will be sampled. We will use a Mark-recapture method to estimate juvenile fish abundance. Mark-recapture methods give more precise and less biased estimates than traditional depletion estimates. Fish will be sampled over two consecutive days to allow for equal capture probabilities per sample event. We will use snorkel seining to herd fish into the seine or dip nets to reduce the stress and possible mortality from electrofishing. Captured fish will be anesthetized, tagged with 12 mm passive integrated transponder (PIT) tags, weighed and measured, revived and released near the site of capture.

The equipment required for this sampling will include pre loaded PIT tag needles and injectors, measuring boards and O'Haus balance, PIT transceiver, numerous buckets and dipnets, one seine net with ¼ inch or less mesh, aerators, data sheets and one field computer.
After release of these fish, the PIT tags will be detected at the PIT detection arrays in either of the emigration routes to the Walla Walla River and in the Walla Walla River itself.

Timeline
This will occur once a month June through September as conditions allow. It would be preferable to do this the same days each month. We will begin sampling as waters recede in June of 2012 and continue until September. It is expected to continue to do this yearly, to monitor and evaluate growth, run-timing and survival each year.

Deliverable Specification: Beach seine 6 reaches 4 times per year, PIT-tag all fish collected within size constraints; use Mark-recapture techniques, weight, measure and release fish at the same site captured. Submit tag files to PTAGIS within 15 days of release.

Work Element Budget: $50000 (7.36%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Action Effectiveness Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Population Status

Locations: 4
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: Multiple **HUC5 Watershed:** Multiple
County: Columbia | Umatilla | Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Juvenile fish monitoring - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized

395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA

Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: StreamNet Database (http://q.streamnet.org/Request.cfm?cmd=BuildCriteria&NewQuery=BuildCriteria)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2012	3/1/2012	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Juvenile fish montoring (mark-recapture)	6/15/2012	6/30/2012	Completed	Conduct mark recapture surveys for juvenile salmonids at Walla Walla fish habitat project sites. A treatment site and control site on the mainstem Walla Walla River (Lampson), South Fork Walla Walla River (Kentch) and Mill Cr (TBD) will be sampled. We will use PIT-tags and a Mark-recapture method to estimate juvenile fish abundance.
D. Juvenile fish montoring (mark-recapture)	7/15/2012	7/31/2012	Completed	Conduct mark recapture surveys for juvenile salmonids at Walla Walla fish habitat project sites. A treatment site and control site on the mainstem Walla Walla River (Lampson), South Fork Walla Walla River (Kentch) and Mill Cr (TBD) will be sampled. We will use PIT-tags and a Mark-recapture method to estimate juvenile fish abundance.
E. Juvenile fish monitoring (mark-recapture)	8/15/2012	8/31/2012	Completed	Conduct mark recapture surveys for juvenile salmonids at Walla Walla fish habitat project sites. A treatment site and control site on the mainstem Walla Walla River (Lampson), South Fork Walla Walla River (Kentch) and Mill Cr (TBD) will be sampled. We will use PIT-tags and a Mark-recapture method to estimate juvenile fish abundance.
F. Juvenile fish monitoring (mark-recapture)	9/15/2012	9/30/2012	Completed	Conduct mark recapture surveys for juvenile salmonids at Walla Walla fish habitat project sites. A treatment site and control site on the mainstem Walla Walla River (Lampson), South Fork Walla Walla River (Kentch) and Mill Cr (TBD) will be sampled. We will use PIT-tags and a Mark-recapture method to estimate juvenile fish abundance.
G. Review, organize and summarize results	1/1/2013	1/30/2013	Completed	Review, organize and summarize results

Milestone Title	Start Date	End Date	Status	Milestone Description
Deliverable: H. Juvenile Chinook and steelhead monitoring data		1/31/2013	Completed	*See the Deliverable Specification above*

K: 28. Trap and Haul

Title: Fish Salvage

Description: Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.

Deliverable Specification: Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.

Work Element Budget: $32000 (4.71%)

Planned Metrics: # of fish transported: 1200

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)

Country: US

NPCC Subbasin: Walla Walla

State: WA

HUC5 Watershed: Middle Walla Walla River

County: Walla Walla

HUC6 Name: Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2012	3/1/2012	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Rescue and haul fish	3/1/2012	2/28/2013	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/28/2013	Completed	*See the Deliverable Specification above*

L: 162. Analyze/Interpret Data

Title: Analyze Data

Description: The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning, and water management regimes, are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements listed above, or elsewhere) to construct cohort lineages and run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed “run re-construction”, is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin. WDFW will also compile bull trout spawning data for the Touchet Basin, and assist as necessary in upper Mill Creek, as an index of adult abundance and trends.

Deliverable Specification: The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult, and run reconstruction estimates.

Work Element Budget: $54000 (7.95%)

Planned Metrics: * Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: **NPCC Subbasin:**
State: **HUC5 Watershed:**
County: **HUC6 Name:**
Salmonid ESUs Present:
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
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115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
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447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized

143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: Walla Walla Basin Watershed Council Website for Environmental Data (http://www.wwbwc.org/)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA

Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2012	3/1/2012	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Coordinate analysis with WDFW and WDFW Snake River Lab	3/1/2012	2/28/2013	Completed	Work with WDFW to analyze all available data and summarize results.
C. Analyze adult enumeration data	6/1/2012	1/31/2013	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Analyze smolt and PIT-tag data	7/1/2012	1/31/2013	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
E. Analyze Spawner / Carcass data	10/1/2012	1/31/2013	Completed	Analyze and interpret spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
F. Analyze Acoustic tag data	10/1/2012	1/31/2013	Completed	Analyze and interpret Acoustic tag data. Results will be used to describe juvenile fish distribution and over winter habitat use in the mainstem Walla Walla River.
Deliverable: G. Analyzed data		2/28/2013	Completed	*See the Deliverable Specification above*

M: 132. Produce (Annual) Progress Report

Title:	Technical Progress Report for 3/1/2011 - 2/29/2012
Description:	Collaborate with WDFW to produce technical progress report that will provide a summary and analysis of project results.
Deliverable Specification:	Progress Report (in scientific format) uploaded to Pisces per on-line specifications. Also, post report to WDFW and CTUIR Web sites.
Work Element Budget:	$43000 (6.33%)
Planned Metrics:	* Start date of reporting period : 3/1/2011 * End date of reporting period : 2/29/2012

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Internal WDFW / CTUIR review of draft	6/1/2012	2/28/2013	Completed	Perform iterative reviews of annual report drafts among contractors (CTUIR & WDFW).
B. Email copy of draft report to COTR for review	1/1/2013	1/29/2013	Completed	The draft annual report must be submitted to the BPA COTR in MS Word format. COTR should provide review feedback and comments within 30 days of receiving the draft report.
Deliverable: C. Technical Progress Report for 3/1/2011 - 2/29/2012 uploaded to Pisces		2/28/2013	Completed	*See the Deliverable Specification above*

N: 119. Manage and Administer Projects

Title:	Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project
Description:	Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.
Deliverable Specification:	Deliverables: Contract package (SOW, budget and property inventory) submitted to COTR. The SOW should include location information (latitude and longitude) for those work elements that require it.
Work Element Budget:	$23086 (3.40%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Submit invoices to BPA	3/1/2012	2/28/2013	Completed	Submit invoices to BPA consistent with the requirements described in BPA's contract management manual
B. Submit project accruals	8/20/2012	9/10/2012	Completed	Submit September accrual estimate to BPA for fiscal year-end exercise. Milestone specifications: provide BPA with an estimate of contract performance that will occur prior to September 30, but will not be billed until October 1, or later.
C. Coordinate w/ COTR & WDFW on next year's SOW	9/1/2012	11/30/2012	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
D. Attend AFS or other professional training	10/1/2012	2/9/2013	Completed	Attend professional training
Deliverable: E. FY2012 SOW, line-item budget, property inventory submitted to COTR		11/1/2012	Completed	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	60695	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$711,314	**Perf. Period:**	3/1/2013 - 2/28/2014
Contract Type:	Contract (IGC)	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 02/08/2013 with 0 problems, and 0 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and efw.bpa.gov.

The Walla Walla Subbasin supports steelhead and bull trout that are both listed as threatened under the Endangered Species Act (ESA), and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Prior to the start of this project, the subbasin co-managers did not have adequate information to assess adult abundance, distribution, age structure, genetic characteristics, adult to adult production values, smolt-to-adult survival, and natural spawning escapement. In addition, numerous habitat protection and rehabilitation projects to improve salmonid freshwater production and survival have also been implemented in the subbasin and are in need of effectiveness monitoring. While our monitoring efforts outlined here will not specifically measure the effectiveness of any particular project, they will provide much needed background information for developing context for project-specific effectiveness monitoring. In the near future, we will begin to monitor the CTUIR spring Chinook hatchery program as a major part of this monitoring and evaluation program.

Our goal is to provide ecological information to decision makers in support of adaptive management for ESA recovery, population restoration, conservation, and preservation of cultural, social, and economic salmonid resources. We do this by emphasizing monitoring of population status and trends to estimate “adults in and juveniles out” as a measure of salmonid population viability within the subbasin, and as evaluation of the spring Chinook hatchery program. Project results help inform the Tribes First Foods management within the Ceded lands.

This collaborative effort is conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through at least 2017. Our goal is to provide ecological information in support of adaptive salmonid management. We do this by collecting Viable Salmonid Population (VSP) criteria (particularly abundance, productivity), and life-history survivals (McElhany et al. 2000).

Project level performance indicators and metrics used to describe total abundance, productivity and life-cycle survival to describe "adults-in and juveniles out" include:

Adult abundance (metric and method)
• Spawning escapement (spawning surveys and/or adult counts at dams, weir and traps)
• Total population abundance (Pit-tag detection system, adult counts at dams, weir and traps)
• Fish per redd (spawning surveys and/or adult counts at dams, weir and traps)
• Redds per mile (spawning surveys)

Production and life-cycle survival (metric and method)
• Population level smolt production annually from the Walla Walla and Touchet watersheds (Pit-tag detection system)
• Smolts per Redd (Pit-tag detection system, rotary trapping, spawning surveys)
• Survival & Run Timing (Pit-tag detection system & rotary trapping)
• Smolt to Adult Return (Pit-tag detection system, rotary trapping, adult counts, and spawning surveys)
• Adult to adult return (spawning surveys and/or adult counts at dams, weir and traps)

Primary management questions addressed by this project are based on the Draft Adaptive Management and Research, Monitoring and Evaluation of the SE WA Salmon Recovery Plan (see Appendix C; SRSRB 2011). Primary monitoring questions 1 and 3 of that Appendix are most directly associated with this project. Those questions are: "Is the status of the population/ ESU/DPS improving?" And "Are hatchery programs meeting specific mitigation goals?"

Project field methods were adapted from the Salmonid Field Protocols Handbook (Johnson et al. 2007) to collect a few key fish population performance indicators. For adults-in, our main population metric is adult abundance estimated at counting stations at dams or traps, or in some cases use of spawning surveys (depending on the species and location). The primary population productivity indicators are natural origin adult abundance and AAR based on spawning escapement. In the future, our long-term objective is to establish adult enumeration sites in the lower Walla Walla River (WWR) to better estimate total adult returns. For juveniles-out, our primary indicators are smolt abundance and SARs.

Project Work Elements include: adult enumeration, spawning surveys, PIT-tagging, outmigrant monitoring, juvenile production monitoring. However, we also collect water temperature and flow data because they are such major factors determining salmonid distributions. We believe these monitoring and evaluation actions meet the highest priorities for fish population monitoring as identified by the Walla Walla Subbasin Plan (Walla Walla County 2004), the Middle Columbia River Steelhead Distinct Population Segment Recovery Plan (NMFS 2009), Snake River Salmon and Steelhead Monitoring and Evaluation Plan for Southeast Washington (Appendix C in SRSRB 2011), the Independent Science Review Panel, the Council's draft Columbia River Basin Monitoring, Evaluation, Research and Reporting Plan (MERR 2010), the NOAA Draft Guidance for Monitoring Recovery of Salmon and Steelhead (NOAA 2009), and Draft Anadromous Salmonid Monitoring Strategy (ASMS, 2010).

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (efw.bpa.gov).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Brenda Heister	Contracting Officer	Bonneville Power Administration	(503) 230-3531 / NA	bsheister@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland OR 97208-3621
Peter Lofy	F&W Approver	Bonneville Power Administration	(503) 230-4193 / (503) 230-4563	ptlofy@bpa.gov	905 NE 11th Ave. Portland OR 97232

Tracey Yerxa	COTR	Bonneville Power Administration	(503) 230-4738 / NA	tyerxa@bpa.gov	905 NE 11th Ave. Portland OR 97232
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Glen Mendel	Interested Party	Washington Department of Fish and Wildlife (WDFW)	(509) 382-1005 / (509) 382-1267	mendegwm@dfw.wa.gov	529 W Main Street Dayton WA 99328
Julie Burke	Administrative Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7292 / (429) 429-7292	julieburke@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Gene Shippentower	Supervisor	Umatilla Confederated Tribes (CTUIR)	(541) 429-7287 / (541) 966-2397	geneshippentower@ctuir.org	Confederated Tribes of the Umatilla Indian Reservation DNR Fisheries Program 46411 Timíne Way Pendleton OR 97801
Brian Mahoney	Contract Manager	Umatilla Confederated Tribes (CTUIR)	(541) 429-7541 / NA	brianmahoney@ctuir.org	William A. Grant Water and Environment Center Walla Walla Community College Walla Walla WA 99362
Brenda Aguirre	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5928 / NA	baguirre@bpa.gov	PO Box 3621 Mail Stop ECF-4 Portland OR 97208

Work Element Budget Summary:

	Work Element - Work Element Title	EC Needed*	Estimate	(%)
A :	185. Produce Pisces Status Report - Periodic Status Reports for BPA		$1,211	(0.14%)
B :	165. Produce Environmental Compliance Documentation - Compliance for WEs C -K		$2,222	(0.25%)
C :	157. Collect/Generate/Validate Field and Lab Data - Adult enumeration	*	$54,000	(6.30%)
D :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys	*	$74,000	(8.64%)
E :	158. Mark/Tag Animals - PIT Tag smolts (out-migrant tagging)	*	$62,000	(7.24%)
F :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$3,500	(0.40%)
G :	157. Collect/Generate/Validate Field and Lab Data - Outmigrant monitoring	*	$125,000	(14.60%)
H :	70. Install Fish Monitoring Equipment - Install PIT Array in upper Walla Walla River	*	$96,533	(11.27%)
I :	157. Collect/Generate/Validate Field and Lab Data - Maintain PIT arrays	*	$25,000	(2.92%)
J :	157. Collect/Generate/Validate Field and Lab Data -	*	$75,000	(8.76%)

	Juvenile fish habitat use (Telemetry)			
K :	157. Collect/Generate/Validate Field and Lab Data - Steelhead spawning ground survey for biomonitoring plan	*	$32,000	(3.73%)
L :	157. Collect/Generate/Validate Field and Lab Data - Mark Recapture juvenile steelhead & Chinook for biomonitoring plan	*	$94,000	(10.98%)
M :	157. Collect/Generate/Validate Field and Lab Data - Temperpature monitoring	*	$22,475	(2.62%)
N :	28. Trap and Haul - Fish Salvage	*	$30,000	(3.50%)
O :	162. Analyze/Interpret Data - Analyze Data		$64,000	(7.47%)
P :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$34,000	(3.97%)
Q :	162. Analyze/Interpret Data - Analyze data		$6,000	(0.70%)
R :	132. Produce (Annual) Progress Report - RME Annual Technical Report for the period 1/1/13 - 12/31/13)		$55,000	(6.42%)
		Total:	$855,941	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA
Description:
Deliverable Specification:

Work Element Budget: $1211 (0.14%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2013 (3/1/2013 - 6/30/2013)	7/1/2013	7/15/2013	Completed	
B. Jul-Sep 2013 (7/1/2013 - 9/30/2013)	10/1/2013	10/15/2013	Completed	
C. Oct-Dec 2013 (10/1/2013 - 12/31/2013)	1/1/2014	1/15/2014	Completed	
D. Final Jan-Feb 2014 (1/1/2014 - 2/28/2014)	2/14/2014	2/28/2014	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C -K
Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through K. Support provided includes any updates that might be needed to cover any new activities not already covered.
Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $2222 (0.26%)

Planned Metrics:
* Are herbicides used as part of work performed under this contract?: No
* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: Yes

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Determine if contract work could adversely affect Pacific lamprey	3/1/2013	3/1/2013	Completed	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If you answer no to EITHER 1 or 2 above, the following does not apply. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf (BMPs). By Feb 15 each year, the contractor should report any lamprey observations during the previous calendar year to US Fish and Wildlife Service contacts listed at http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/. This data should include date, location (river mile or GPS), number of individuals, and life stage. Report the life stage as ammocoete (larval stage with undeveloped eyes, found burrowed in substrate), macropthalmia (free-swimming juvenile stage with developed eyes) or adult. See page 10 of the BMP document for pictures. This milestone end date should match the last day of any field work that could adversely impact Pacific lamprey, under this contract, or the Feb 15 reporting date, whichever comes later.
B. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2013	3/1/2013	Completed	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.coastal.ca.gov/ccbn/bmp-boaters.pdf -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.clr.pdx.edu/publications/files/OR_ANS_Plan.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.idahoag.us/Categories/Environment/InvasiveSpeciesCouncil/documents/Idaho%20Aquatic%20Nuisance%20Species%20Plan.pdf
C. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2013	3/1/2013	Completed	Prevent spread of invasive species
D. Complete and document public involvement activities and provide to EC Lead	3/1/2013	3/1/2013	Completed	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
E. Participate in ESA Consultation	3/1/2013	3/1/2013	Completed	Work may include drafting BA, completing HIP II BO Project Notification Form, providing copy of Section 10, 4(d), or 6 permit, etc.; or submitting Hatchery Genetic Management Plan to BPA for ESA consultation initiation, and providing input for the ensuing consultation.
F. Participate in Cultural/Historic Resource Consultation	3/1/2013	3/1/2013	Completed	Examples include providing maps and detailed project descriptions, contracting for an archaeological survey, etc.
G. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2013	3/1/2013	Completed	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits.

Milestone Title	Start Date	End Date	Status	Milestone Description
H. Obtain BPA's EC Lead sign-off that EC requirements are complete	3/1/2013	3/1/2013	Completed	The EC? column on the contract SOW tab in Pisces must have a "full moon" for each work element requiring environmental compliance before ground-disturbing implementation of that work element can begin. You will receive verbal or email notification from the EC Lead when a work element or, in rare instances, a portion of a work element is approved for implementation.
I. Use Best Management Practices to stabilize soils and prevent spread of noxious weeds	3/1/2013	3/1/2013	Completed	Use applicable BMPs to retain existing vegetation and achieve re-establishment of vegetation in disturbed areas to at least 70% of pre-disturbance levels. Visit chapter 7.3 of http://www.ecy.wa.gov/pubs/0410076.pdf for BMPs to consider for construction contracts and http://wdfw.wa.gov/publications/01330/wdfw01330.pdf for guidance on re-vegetation in the Columbia River Basin.
J. Keep JARPA permit updated	3/1/2013	3/1/2013	Completed	For rotary screw traps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.
K. Assist BPA's EC Lead to meet necessary environmental compliance requirements	12/1/2013	1/1/2014	Completed	Assist BPA's EC lead
Deliverable: L. Compliance achieved and documented		1/28/2014	Completed	*See the Deliverable Specification above*

C: 157. Collect/Generate/Validate Field and Lab Data

Title: Adult enumeration

Description: The specific need this Work Element addresses is to strengthen the overall effectiveness of salmonid restoration efforts in the Walla Walla Basin, and develop a baseline for population status and trend monitoring.

Adult enumeration methods: Fish counts from Nursery Bridge, Bennington, and Dayton dams, plus the Coppei Creek trap, are used to provide index estimates of adult returns to the Walla Walla, Mill Creek, and Touchet drainages, respectively. Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under separate contract. The US Army Corps provides counts from Bennington Dam.

Although counts at these sites are incomplete due to some upstream passage without detection and downstream spawning, these sites represent the best indices of adult returns currently available and they are the most feasible to operate and monitor the primary spawning areas. We are considering multiple alternatives to improve total adult population abundance estimates. Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns.

CTUIR and ODFW share fish counting duties at Nursery Bridge Dam (NBD). CTUIR operates the counting station on the east bank; ODFW operates the west side ladder (not BPA funded). In the east side ladder, adult salmonids are enumerated using the Salmon-soft fish video-tracking program. Fish images are captured by video camera and DVR linked to a desk top computer as they pass a counting window located near the ladder exit. Video compaction programming greatly reduces the need for observer time in reviewing fish passage video-files. In the west ladder, ODFW uses an underwater video camera and DVR mounted near the ladder exit.

Video enumeration at NBD is conducted according to the annually-updated Annual Operating Plan (Bronson and Duke). Typically, enumeration occurs from November through June to encompass the known adult migration for summer steelhead and spring Chinook. Data collected from the video counting includes date, time, species, size (e.g. jack or adult for spring Chinook salmon), life stage (e.g. steelhead kelts), origin (e.g. adipose clip or unclipped) and migration direction for bull trout or steelhead kelts. Notations are also made of other species encountered and general fish condition. Daily fish tallies from both ladders are posted to an onsite tally board for the public. Project deliverable includes error checked database of daily fish counts.

See WDFW SOW for descriptions of activities regarding adult counts at Dayton Dam, Coppei Creek, and Mill Creek.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam, Bennington Dam, Dayton Dam, and in Coppei Creek. This contract only covers Nursery Bridge Dam; WDFW will operate at the facilities in Washington. Data is accessible through CTUIR's website and is also kept in project staff's office.

Work Element Budget: $54000 (6.31%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla

State: OR **HUC5 Watershed:** Middle Walla Walla River

County:	Umatilla	**HUC6 Name:**	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Adult enumeration - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Maintain video monitoring equipment @ Nursery Bridge Dam - spring	3/1/2013	7/15/2013	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Error-checked data for spring counts posted to website	8/16/2013	8/30/2013	Completed	Enter spring data into the computer. Error check. Post to public website.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - fall	11/15/2013	2/28/2014	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
F. Error-checked data for fall counts posted to website	11/15/2013	2/28/2014	Completed	Enter fall data into the computer. Error check. Post to public website.
G. Review, organize and summarize video results	1/1/2014	1/31/2014	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: H. Adult enumeration data from NBD		1/28/2014	Completed	*See the Deliverable Specification above*

D: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts (see WE C, adult enumeration) combined with redd and carcass counts (Crawford et al. 2007; Gallagher et al. 2007) will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River - The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded with a Trimble Nomad GPS unit. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. In situations where multiple salmonid species overlap on a given spawning area (e.g. spring Chinook & bull trout), fish observed near the redd are used to differentiate the species involved. Care is taken not to disturb spawning fish or redds. Tallies of bull trout redds observed during spring Chinook surveys are forwarded to ODFW Pendleton.

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.

Work Element Budget: $74000 (8.65%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US | **NPCC Subbasin:** Walla Walla

State: Multiple | **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
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107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
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931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery

CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Pre-spawn carcass survey in lower walla walla river	7/1/2013	7/15/2013	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of adult returns over the spawning season and will be done in the lower walla Walla Walla River and lower Mill Creek; to locate fish that do not ascend into the spawning grounds.
D. Spring Chinook redd/carcass surveys	8/1/2013	9/30/2013	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.

Milestone Title	Start Date	End Date	Status	Milestone Description
E. Error-checked data for redd counts posted to website	8/1/2013	9/30/2013	Completed	Enter redd data into the computer. Error check. Post to public website.
F. Error-checked data for carcass counts posted to website	8/1/2013	9/30/2013	Completed	Enter carcass data into the computer. Error check. Post to public website.
G. Error-checked data for CWT data posted to website	8/1/2013	9/30/2013	Completed	Enter CWT data into the computer. Error check. Post to public website.
H. All fish snouts sent to ODFW Mark Process Center	9/1/2013	9/30/2013	Completed	We will send collected snouts in to the ODFW Mark Precess center to read CWT from fish collect during the survey.
Deliverable: I. Spring Chinook spawner/ carcass survey data		9/30/2013	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag smolts (out-migrant tagging)

Description: Estimates of smolt run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 10,000 run of the river out-migrant salmonids for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery salmonid production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain two rotary screw traps and PIT-tag up to 10,000 run of the river out-migrant salmonids. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3). The traps will be run from October through June as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag up to 10,000 spring Chinook and summer steelhead smolts. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 natural origin out-migrant spring Chinook
5,000 natural origin out-migrant steelhead

Work Element Budget: $62000 (7.24%)

Planned Metrics: * Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring

Locations: 2

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla

State: WA **HUC5 Watershed:** Multiple

County: Walla Walla **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. PIT-Tag steelhead out-migrants - spring	3/1/2013	6/15/2013	Completed	Up to 5,000 (total for the year) run of the river out-migrant steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. PIT-Tag steelhead out-migrants - fall	10/15/2013	2/28/2014	Completed	Depending on adequate stream flow and conditions, up to 5,000 run of the river out-migrant steelhead (total for the year) will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag spring Chinook out-migrants - spring	3/1/2013	6/15/2013	Completed	Up to 10,000 run of the river out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. PIT-Tag sprng Chinook out-migrants - fall	10/15/2013	2/28/2014	Completed	Depending on adequate stream flow and conditions, up to 5,000 (for the brood year) out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: F. Up to 10,000 smolts PIT tagged		2/28/2014	Completed	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title: PIT Tag smolts (hatchery tagging)

Description: Estimates of out migrant run timing, abundance, and survival based on PIT-tag detections are key components for assessing the performance of hatchery-origin fish relative to naturally-produced fish and necessary for determining the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

This WE is an in-kind collaboration between the USFWS and the CTUIR. The CTUIR supplies 5,000 PIT-tags and pays to have a PIT-trailer delivered to the Hatchery tagging site (e.g. Carson NFH). The USFWS then provides labor and ancillary support to PIT-tag 5,000 spring Chinook smolts. This marking effort represents about 2% of the 250,000 total fish the release to the South Fork Walla Walla River each year for the Tribe. These tagging levels will allow for estimates of smolt survivals and run timing to McNary Dam, and for smolt to adult survival back to the subbasin. USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 5,000 hatchery spring Chinook and and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $3500 (0.41%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US | **NPCC Subbasin:** Walla Walla

State: OR | **HUC5 Watershed:** Upper Walla Walla River

County: Umatilla | **HUC6 Name:** Lower South Fork Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. PIT-Tag hatchery spring Chinook	3/1/2013	3/30/2013	Completed	PIT tag Up to 5,000 hatchery spring Chinook for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: C. Up to 5,000 smolts PIT tagged		3/30/2013	Completed	*See the Deliverable Specification above*

G: 157. Collect/Generate/Validate Field and Lab Data

Title: Outmigrant monitoring

Description: We will use screw traps, tagging equipment, and in-basin PIT-arrays to sample, tag and monitor salmonids. Traps are run from October through June as conditions allow intercepting migrating juvenile salmonids. When possible, traps fish 24-hours a day, seven days a week, and are checked daily. However, sub sampling is frequently required due to stream conditions or limited staffing. When sub sampling is done, catch per hour is calibrated and used to expand catch estimates for trap down time. The number of fish that passed the trap during un-sampled periods is estimated as:

Nhat = (C/T)

where, Nhat = estimated number of out-migrants missed, C = calibration sample rate, and T = proportion of time sampled.

All captured salmonids are scanned for PIT-tags. Data collected from juvenile salmonids includes: number, species, length, weight, scales from steelhead for age structure and age at migration.

Body condition factor (K) is calculated as a measure of general health of migrants and calculated as:
K = W/L3 x 100,000

Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm - 220 mm F.L.) are PIT-tagged (Prentice et al. 1990). Salmon fry and parr (< 65 mm), and summer steelhead (< 125 mm) are presumed not to be out-migrants and are simply counted and measured and released. Data from tagged fish is processed using a Biomark PIT Tag station. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004). CTUIR recently, moved from manual tag insertion via hypodermic syringe to using the pre-loaded tag trays and needles and Biomark implant gun. Pre-loads and the implant gun make for quick, easy, and clean surgical insertion of PIT-tags; with less apparent fish injury and higher tag retention.

Subsequent PIT-tag detections of Walla Walla fish are obtained from the PTAGIS data base maintained by Pacific States Marine Fisheries Commission at http://www.ptagis.org.

Migrant abundance based on Trap efficiency (TE) estimates is estimated in DARR (Darroch Analysis with Rank Reduction) 2.0 and GAUSS programs (Steinhorst et al. 2004). and is of the general form:

Âj = Uj/ Êj

where Âj is the estimated number of fish migrating past the trap for the period j, Uj is the total number of unmarked fish captured that period, and Êj , is the estimated trap efficiency for the period/stratum j. Total migrant abundance is estimated as the sum of the stratum-specific abundance estimates.

Mark recapture estimators (such as DARR & GAUSS) generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging); (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

DARR 2.0 provides stratum-specific estimates of abundance for the aggregated data set, the standard error for each stratum-specific estimate, as well as the estimate of overall abundance and the standard error associated with the estimate of total abundance (Bjorkstedt 2005).

Trap Efficiency tests are done daily throughout the migratory year at each trap site. Trap efficiency is determined by releasing a known number of PIT-tagged or marked fish above each trap and enumerating recaptures. TE results are organized into (bi-weekly) strata for analysis.

Trap efficiency per stratum (j) was estimated by:

Êj = Rj/Mj

where Êj is the estimated trap efficiency for week j, Rj is the number of marked fish recaptured during week j, and Mj is the number of marked fish released upstream during week j.

Our previous TE tests showed that most recaptures occurred within 24 hours of release. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not PIT-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals.

Out-migrant survival and run timing of PIT-tagged fish is estimated using the University of Washington Columbia Basin Research PIT-Pro Model (Lady et al. 2001; www.cbr.washington.edu). PIT-Pro generated survival estimates included a Cormack-Jolley-Seber point estimate and associated standard error (SE).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38)
Lower Mill Creek near the Wallula Road bridge (RM 3).

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $125000 (14.60%)

Planned Metrics: * Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring

Locations: 2

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla

State: WA **HUC5 Watershed:** Multiple

County: Walla Walla **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized

357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Monitor salmonids leaving the upper Walla Walla River - spring	3/1/2013	6/15/2013	Completed	Operate 5-foot rotary screw trap in spring
D. Monitor salmonids leaving the upper Walla Walla River - fall	10/15/2013	2/28/2014	Completed	Operate 5-foot rotary screw trap in fall
E. Monitor salmonids leaving lower Mill Creek - spring	3/1/2013	6/15/2013	Completed	Operate 5-foot rotary screw trap in spring
F. Monitor salmonids leaving lower Mill Creek - fall	11/15/2013	2/28/2014	Completed	Operate 5-foot rotary screw trap in fall
G. Submit PIT tag data to PTAGIS - spring	3/1/2013	6/30/2013	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
H. Submit PIT tag data to PTAGIS - fall	11/15/2013	2/28/2014	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
I. Review, organize and summarize results	1/1/2014	1/28/2014	Completed	Review, organize and summarize results for migration year 2012.
Deliverable: J. Out-migrant monitoring and PIT-tagging data		2/28/2014	Completed	*See the Deliverable Specification above*

H: 70. Install Fish Monitoring Equipment

Title: Install PIT Array in upper Walla Walla River

Description: The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) contacted Biomark to provide a cost estimate for establishing a PIT-tag detection system in the upper Walla Walla River, Washington. The system would be used to monitor PIT-tagged spring Chinook (Oncorhynchus tshawytscha) and steelhead (Oncorhynchus mykiss). Biomark proposes the pass-by antenna design as antennas are installed level with the streambed reducing susceptibility of the antennas being dislodged by debris and/or high flow. This antenna design has been used to successfully monitor movement of PITtagged salmon and steelhead in the Pacific Northwest. Detection efficiency of adult spring Chinook salmon at the South Fork Salmon River, Idaho array, based on detections from an upstream terminal weir, has exceeded 90%. Detection efficiency of juvenile salmonids ranges from 20-50%. PIT-tag systems include antennas, an electronics enclosure, and power supply platform. The FS1001M transceiver can power up to 6 antennas per unit and each pass-by antenna is 20ft in length allowing for a single array length of 120ft. The electronics enclosure houses the FS1001M multiplexing transceiver, data logger, and communication platform. The enclosure and power supply platform are installed adjacent to the antenna array. The accompanying budget reflects the cost to construct and assist with the installation of a PIT-tag detection system including 4 antennas, cellular communication, and a battery switching power supply platform.

The project is partitioned into four phases: Site Visit, System Assembly and Test, Installation, and Operation &Maintenance (O&M). Descriptions of the Site Visit, System Assembly and Test, Installation, and O&M phases are provided below. Site Visit: Representatives from Biomark and the CTUIR visited potential site locations on November 9, 2011 to identify a suitable location for a PIT-tag detection system. System Assembly and Test: Antennas will be constructed by Biomark. The entire system: transceiver, antennas, data logger, and power supply system will be tested at Biomark prior to installation.

Deliverable Specification: Biomark will provide a PIT-tag system that will consist of an FS1001M transceiver, transceiver enclosure, data logging equipment, antennas, and power supply system. A maintenance log at the end of the O&M performance period detailing any equipment failure, down time, or damage repair will be provided.

Work Element Budget: $96533 (11.28%)

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Lower Walla Walla River
County:	Walla Walla	**HUC6 Name:**	Mud Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	7/31/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. CTUIR cultural survey	3/1/2013	5/31/2013	Completed	Complete cultural survey of PIT-system installation site.
D. Install PIT-tag System (tasks)	8/1/2013	8/28/2013	Completed	Installation: will deliver the PIT-tag system including a transceiver enclosure, antennas, and power supply system and perform the following tasks: a. Install PIT-tag antennas, pull exciter cable, terminate exciter cable at transceiver enclosures, b. Install PIT-tag electronics into the enclosure, c. Install the data logger electronics, d. Install power supply system, e. Characterize the system performance, f. Verify the system prior to departure from the site. g. Biomark will train project personnel on the overall operation of the PIT-tag system. This will include discussion of the transceiver, antennas, and data collection platform. Biomark will coordinate and plan all tasks with CTUIR.
E. Install PIT-tag System (CTUIR tasks)	8/1/2013	8/28/2013	Completed	CTUIR will be responsible for: a. Providing personnel to assist with handling and installation of the antennas and associated equipment. b. Providing items listed in “Key Assumptions:” The following Key Assumptions were made in preparing this Work Element i. If transceiver enclosure is mounted outside of a climate controlled building CTUIR or others are responsible for providing sun shield if necessary. ii. CTUIR or others are responsible for establishing a contract with the provider of the cellular service for data transmission. iii. The budget proposed is a firm fixed price contract. Any additional work outside the scope of work would require a contract modification. Invoices will be submitted to CTUIR at the completion of each phase.
F. Maintain PIT-tag system	9/1/2013	2/28/2014	Completed	Daily system status check to ensure the remote PIT tag detection system is uploading to the PTAGIS database and to CTUIR office in Walla Walla. Site visits as needed to ensure proper system operation.
Deliverable: G. PIT-tag system installed in Upper Walla Walla River		2/28/2014	Completed	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Maintain PIT arrays

Description: CTUIR will maintain and operate 6 PIT-Arrays in the Walla Wall subbasin. We propose to install a new PIT array in the mainstem Walla Walla River near Lowden WA (RM 29); in August of 2012 this project installed a new PIT array in the Lower Walla Walla River (RM 9). In addition, we are proposing to assume operation of four other established PIT arrays in the basin: 1) Oasis Road Bridge (RM 12),2) Burlingame Dam (RM 36), 3) Nursery Bridge Dam (RM 47), and 4) the Mill Creek Diversion Dam (RM12). These four arrays were installed and maintained by the USFWS and the PIT detections we collect are needed to continue to estimate salmonid production and abundance.

Deliverable Specification: CTUIR will maintain PIT arrays and fish detection data will be automatically uploaded each week.

Work Element Budget: $25000 (2.92%)

Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring
Locations:	6
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	US **NPCC Subbasin:** Walla Walla
State:	Multiple **HUC5 Watershed:** Multiple
County:	Umatilla | Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Maintain PIT arrays - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized

143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories:

CTUIR GIS Program Databases	(https://cdms.ctuir.org)
PTAGIS Website	(http://www.ptagis.org/)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
Deliverable: C. Maintain PIT arrays		2/28/2014	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Juvenile fish habitat use (Telemetry)

Description: The purpose of this telemetry study is to strengthen the overall effectiveness of BPA funded salmonid restoration efforts in the Walla Walla Basin and perform uncertainties research in support of planned CTUIR hatchery and habitat actions. This study will describe over-wintering micro habitats and distribution of juvenile spring Chinook in the Walla Walla River. We will report on juvenile spring Chinook run timing, distribution, habitat use, and overwinter loss in the Walla Walla River.

Methods
Fisheries staff will collect juvenile spring Chinook from the Basel Cellars rotary screw trap (rm 39). Collection of salmonids will be evenly stratified through fall migration to avoid any temporal bias (e.g. 10 fish per week for 10 weeks). Tag implementation should begin when trapping of the Basel Cellars trap begins in October. Radio tags should continue to be implemented through January with manual tracking until April. Manual tracking will be conducted throughout the Walla Walla River from the Basel Cellars rotary trap to the mouth of the River. Up to 100 Spring Chinook that fall within the size constraints determined by the tag size (Jonason, 2010) will be brought to the Water and Environmental Center and a Nanotag coded radio transmitter will be implanted. Surgically implanted radio tags should not exceed 4.4% of the body weight of any of the wild juvenile spring Chinook salmon (Adams et al. 1998). Implanting protocols should be derived from Adams et al. 1998. Tagged fish will be held for 24-48 hours prior to release. Tagged fish will be returned to the trap site and released. Radio tags will be activated at release.

After fish are released, fisheries staff will locate overwintering juvenile spring Chinook salmon that have radio tags. Stationary and mobile tracking techniques will be utilized to obtain relocations for all radio-tagged fish from October through April. Four stationary SRX 400 receivers will be positioned strategically in the middle and lower Walla Walla River. Stationary receivers will be downloaded weekly and subsequent relocations will yield broad scale stream reach occupancy. Data obtained from stationary receivers will be used to guide mobile tracking efforts and improve tracking efficiency by maximizing relocations per distance tracked. In addition, stationary receivers will enable relocations during inclement weather and when navigating the Walla Walla River is prohibited by unsuitable flows.

Mobile tracking will be conducted by boat in an attempt to completely track overwintering stream reaches at least once per week. Geographic coordinates will be obtained for each relocated fish using a hand-held global positioning system unit. In localized areas, mobile tracking along the Walla Walla River by foot will be implemented when environmental conditions necessitate such efforts. Specific information collected when a fish is located includes: tag number, GPS coordinate, microhabitat variables (water temperature, dissolved oxygen, depth, substrate, cover type – distance to cover and distance to bank).
Nanotag coded radio transmitters will be used for tracking juvenile salmon. The tags are relatively small in size; 0.25g with dimensions of 5x3x10mm. The calculated battery life is 27 days with 8 seconds between bursts. Fish weighing greater than or equal to 8.5 g will be selected for coded radio tag implantation to ensure the transmitter to fish weight ratio remains less than 3.0%.
Stationary receivers (Lotek SRX_ 400 Telemetry Receiver) will be set up along the Walla Walla River, at Burlingame (rm 36), Garden City II (rm 30), Touchet -Gardena Rd. Bridge (rm 22) and Pierce's RV Park (rm 9).During mobile relocation of fish the data data recorded will include:
• Tag number
• GPS location
• water temperature (ºC)
o depth (m)
o substrate
o cover type
o distance to bank
o mortality (if applicable)

The information collected will be analyzed to answer two key questions:
1) Where are juvenile spring Chinook salmon over-wintering; including location and micro-habitat variables.
2) Lower Walla Walla River distribution of juvenile spring Chinook; including areas of increased mortality.

Deliverable Specification: The deliverables are: 1) up to 100 juvenile CHS fitted w/ nano radio tags; 2) the error checked databases and data summaries; 3) fish habitat use; 4) distribution; and 5) detections at in-basin and mainstem interrogation sites.

Work Element Budget: $75000 (8.76%)

Planned Metrics:	* Primary R, M, and E Focal Strategy : Tributary Habitat * Primary R, M, and E Type : Status and Trend Monitoring
Locations:	4
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Country:	US
State:	WA
County:	Walla Walla
NPCC Subbasin:	Walla Walla
HUC5 Watershed:	Multiple
HUC6 Name:	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Juvenile fish habitat use (Telemetry) - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
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447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
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847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized

144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Install telemetry stations	10/1/2013	10/31/2013	Completed	up three stationary SRX 4000 telemetry receivers will be positioned systematically on the mid – lower Walla Walla River. Stationary receivers will be maintained and downloaded weekly and subsequent relocations will yield broad scale stream reach occupancy. Data obtained from stationary receivers will be used to guide mobile tracking efforts and improve tracking efficiency by maximizing relocations per distance tracked.
D. Collect and tag up to 100 juvenile spring Chinook	10/1/2013	1/30/2014	Completed	Fisheries staff will collect juvenile spring Chinook from the Basel Cellars rotary screw trap. Up to 100 Spring Chinook that fall within the size constraints determined by the tag size (Jonason, 2010) will be brought to the Water and Environmental Center and a Juvenile Salmon Acoustic Telemetry System Acoustic Micro Transmitter (JSATS AMT) will be implanted.
E. Mobile track tagged fish	10/1/2013	2/28/2014	Completed	Mobile tracking will be conducted by boat in an attempt to completely track overwintering stream reaches at least once per week. Geographic coordinates will be obtained for each mobilly relocated fish using a hand-held global positioning system unit. In localized areas, mobile tracking along the Walla Walla River by foot will be implemented when environmental conditions necessitate such efforts. Specific information collected when a fish is located includes: tag number, GPS coordinate, microhabitat variables (water temperature, dissolved oxygen, depth, substrate, cover type – distance to cover and distance to bank).
F. Review, organize and summarize results	1/1/2014	1/30/2014	Completed	Review, organize and summarize results.
Deliverable: G. Nanotag coded radio transmitter telemetry data		1/28/2014	Completed	*See the Deliverable Specification above*

K: 157. Collect/Generate/Validate Field and Lab Data

Title:	Steelhead spawning ground survey for biomonitoring plan
Description:	Adult abundance and distribution will be estimated based on redd counts conducted in the treatment and control reaches. The entire length of the treatment and control reaches will be assessed and specific field protocols are detailed by Terraqua Inc. (2009a). Live fish and carcasses will also be documented to corroborate redd identification. Sampling will occur annually (a departure from the recommended protocol), commencing at the onset of the spawning season and continue approximately every 10–14 days until spawning is complete. • Steelhead: mid-February to mid-June if high flows permit
Deliverable Specification:	Count and GPS reference summer steelhead redds in treatment reaches. Data derived from steelhead redd count surveys include: 1. Index temporal abundance of spawners 2. Estimate total abundance of spawning females 3. Determine spatial spawning distribution 4. Determine temporal spawning distribution In addition to newly collected data, some of the basins have almost a decade of monitoring that has focused on adult counts (escapement) and redd counts for Chinook salmon and steelhead. Should such data exist for a given site (e.g., Pataha Creek), it may be incorporated as valuable baseline information.
Work Element Budget:	$32000 (3.74%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring
Locations:	3
Primary Focal Species:	Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	US
State:	WA
County:	Columbia | Garfield
NPCC Subbasin:	Multiple
HUC5 Watershed:	Multiple
HUC6 Name:	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible) | Snake River Basin Steelhead DPS (Accessible) | Snake River Spring/Summer-run Chinook Salmon ESU (Accessible)
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Biomonitoring Program (2009-014-00) v1.0 v1.0
Study Plan Owner:	Brian Mahoney

Protocol:	Biomonitoring Program (2009-014-00) v1.0
Protocol State:	Expired
Protocol Owner:	Kaylyn Costi
Sample Design:	Steelhead spawning ground survey for biomonitoring plan - Umatilla Confederated Tribes (CTUIR): Walla Walla River v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Unknown
	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Unknown
	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Data input and Quality Control	3/1/2013	6/15/2013	Completed	Input data into computers and quality control checks against raw data sheets.
D. South Fork Touchet: Rainwater treatment area	3/1/2013	6/15/2013	Completed	The Rainwater Wildlife Area is highly valued for its restoration and enhancement potential and also the amount of available data. As such, it serves as an important site for inclusion in the comprehensive CTUIR biomonitoring plan. Upon review and discussion with CTUIR staff, treatment and control areas were both identified on the South Fork Touchet in an effort to reduce environmental and geomorphic variability that could results from using control sites in adjacent watersheds (Figures 11 and 12). The recommended treatment and control sites are 2.9 and 1.97 miles in length, respectively.
E. Tucannon River: Russell Spring Creek	3/1/2013	6/15/2013	Completed	Although Russell Spring Creek is the smallest of the eight restoration sites being recommended for monitoring under this plan, it represents a project that enhances important rearing and spawning habitat using low-cost treatment methods, in contrast to some of the other restoration efforts. Given its small size, no suitable control sites were identified for Russell Spring Creek; however, it is a candidate for conducting a Before-After (BA) analysis of restoration effectiveness (Green 1979, Downes et al. 2002). Although no data were collected prior to site treatment, steelhead and Chinook salmon were not present at the site prior to restoration efforts due to passage barriers.

Milestone Title	Start Date	End Date	Status	Milestone Description
F. Tucannon River: Pataha	3/1/2013	6/15/2013	Completed	Given the unique conditions of Pataha Creek within the Tucannon subbasin, there is no surrogate site appropriate to serve as a control. However the potential contributions of passage improvements on Pataha Creek are critically important to steelhead and Chinook salmon populations and therefore warrant evaluation. A before-after (BA) analysis of restoration effectiveness (Green 1979, Downes et al. 2002) can be applied on Pataha Creek based on adult and juvenile data collected upstream of RM 1 and RM 10 prior to passage improvements (see Section 7.1). WDFW operates a screw trap downstream on the main stem Tucannon River which can be used to detect downstream smolt migration. Downstream PIT tag arrays in the mainstem Tucannon will also provide an estimate of adult steelhead escapement otherwise difficult to make in during high flow events.
Deliverable: G. Steelhead redd counts		6/30/2013	Completed	*See the Deliverable Specification above*

L: 157. Collect/Generate/Validate Field and Lab Data

Title: Mark Recapture juvenile steelhead & Chinook for biomonitoring plan

Description: Juvenile sampling will reflect the long-term viability of salmonid populations as measured by VSP parameters (McElhaney et al. 2000). Juvenile responses to be evaluated include:
• Abundance (fry/km2)
• Freshwater production (fry to smolt, seasonal survival)
• Distribution (change in density)
• Survival
• Growth and size
• Migratory timing

Following protocols established by Terraqua Inc. (2009) sampling will consist of a three-pass, mark-recapture method with low-voltage electrofishing to herd fish into a seine or dip net. Block nets will be placed at the upstream and downstream ends of the habitat units to prevent immigration and emigration of fish during the removal events. This approach was selected in an effort to increase capture efficiency, reduce bias commonly associated with one-pass snorkel or traditional electrofishing studies (Rosenberger and Dunham 2005) and reduce stress from traditional electrofishing practices.
Following initial marking, recapture events will occur in one or more methods: (1) repeat electrofish/seine or dip net surveys, (2) PIT tag antenna arrays (Steinke et al. 2011), or (3) smolt traps. The method of choice will be based site conditions (Table 13). Protocols for use of PIT tag technology in small streams are provided in Appendix D (Terraaua Inc. 2008). Protocols for construction and operation of PIT tag antenna arrays are provided in Appendix E (Steinke et al. 2011).

Deliverable Specification: The data derived from spring Chinook & juvenile steelhead mark recapture surveys include:
1. Time series of smolt out-migrants
2. Seasonal growth rate/age class
3. Size at outmigration
4. Seasonal juvenile survival
5. Fry-to-smolt survival
6. Smolts/redd
7. Percent of habitat occupied, changes in density by location.

Work Element Budget: $94000 (10.98%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Action Effectiveness Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Population Status

Locations: 5

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US — **NPCC Subbasin:** Multiple

State: Multiple — **HUC5 Watershed:** Multiple

County: Columbia | Garfield | Umatilla — **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible) | Snake River Basin Steelhead DPS (Accessible) | Snake River Spring/Summer-run Chinook Salmon ESU (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Mark Recapture juvenile steelhead & Chinook for biomonitoring plan - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery

CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Data input and Quality Control	7/15/2013	9/30/2013	Completed	Input data into computers and quality control checks against raw data sheets.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. South Fork Walla Walla: treatment area - Spring/Summer sampling	7/15/2013	7/31/2013	Completed	Spring/Summer sampling of juvenile steelhead in the South Fork Walla Walla treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
E. South Fork Walla Walla: treatment area- Fall sampling	9/15/2013	9/30/2013	Completed	Fall sampling of juvenile steelhead in the South Fork Walla Walla treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
F. Upper Walla Walla: treatment area - Spring/Summer sampling	7/15/2013	7/31/2013	Completed	Spring/Summer sampling of juvenile steelhead in the South Fork Walla Walla treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with

				elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
G. Upper Walla Walla: treatment area - Fall sampling	9/16/2013	9/30/2013	Completed	Fall sampling of juvenile steelhead in the South Fork Walla Walla treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
H. South Fork Touchet: Rainwater - Spring/Summer sampling	7/16/2013	7/31/2013	Completed	Spring/Summer sampling of juvenile steelhead in the Rainwater treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
I. South Fork Touchet: Rainwater treatment area- Fall sampling	9/16/2013	9/30/2013	Completed	Fall sampling of juvenile steelhead in the Rainwater treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified

				to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
J. Tucannon River: Russell Springs - Spring/Summer sampling	7/17/2013	7/31/2013	Completed	Spring/Summer sampling of juvenile steelhead in the Russell springs treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.

Milestone Title	Start Date	End Date	Status	Milestone Description
K. Tucannon River: Russell Springs - Fall sampling	9/18/2013	9/30/2013	Completed	Fall sampling of juvenile steelhead in the Russell springs treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
L. Tucannon River: Pataha -Spring/Summer sampling	7/19/2013	7/31/2013	Completed	Spring/Summer sampling of juvenile steelhead in the Pataha treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
M. Tucannon River: Pataha- Fall sampling	9/19/2013	9/30/2013	Completed	Fall sampling of juvenile steelhead in the Pataha treatment area will occur on three consecutive days wherein all juvenile fish captured will be anesthetized with tricaine methanesulfonate (MS-222) or an equivalent anesthetic, identified to species, and their fork length (FL, to the nearest millimeter) and wet weight (to the nearest 0.01 gram) recorded. The target is to mark 50-100 juveniles per reach per sampling event (3-day period). All fish greater than 65 mm fork length will be implanted with sterilized 12-mm PIT tags. Prior to release, each fish will be given a unique elastomer mark and PIT tag. Tags will be inserted into the body cavity anterior to the pelvic fin with a 12-gauge hypodermic needle by experienced field personnel. Fish will be held in covered net pens or live wells within the stream channel for a minimum of 0.5h and examined for mortality, injury, and tag loss prior to being released. A random sample of at least 10% of fish/site will be held in a live box for 24h to assess tag loss and delayed mortality. Fish implanted with PIT tags will also be marked with elastomer dye to

				aid identification and to estimate PIT-tag retention. In addition, fish less than 65 mm FL will be given an elastomer mark. Fish that were initially marked with only an elastomer will be implanted with a PIT tag upon recapture if larger than 65 mm FL. For fish previously tagged, the occurrence will be documented as a recapture. PIT tag procedures should follow recent protocols developed by BPA's ISEMP program for the Upper Columbia River Basin (Miller et al. 2008) which are consistent with PTAGIS protocols (CBFWA 1999). Sampling treatment and control reaches should occur on consecutive days to minimize the risk of sampling bias due to juvenile movement. Representative digital photos of each species will be obtained. Twenty scale samples for each priority species will be collected in each reach from a variety of length sizes. All necessary federal and state permits required for fish capture, handling, and tagging operations must be obtained.
N. Review, organize and summarize results	1/1/2014	1/28/2014	Completed	Review, organize and summarize results
Deliverable: O. Productivity of juvenile steelhead and Chinook		1/28/2014	Completed	*See the Deliverable Specification above*

M: 157. Collect/Generate/Validate Field and Lab Data

Title: Temperpature monitoring

Description: The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in 2011 began a local discussion in regards to the Washington Department of Ecology pulling back from its' commitment to monitor the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road (through the summer low flow period). As fish enhancement projects focused on listed species continue to occur within the Walla Walla Watershed the Walla Walla River discharge information continues to be a vital tool in the understanding of how much water is available and when it's available within the watershed. The CTUIR contacted the WWBWC to continue the gauging activity at the Pepper Bridge gauge, Beet Road Bridge gauge, Grove School Bridge gauge, along with adding an additional gauge site at the McDonald Road Bridge (at which a WWBWC temporary gauge is located at the present time).

The McDonald Road Bridge site has been listed as an area of concern by the WDFW during the low flow periods. The location downstream of the last major diversion (Garden City) and upstream of the Walla Walla River and Touchet River confluence and typically during low flow periods have flow levels below 20 cubic feet per second (cfs). In 2012 the Bergevin-Williams Diversion which was directly downstream of the McDonald Road Bridge was moved upstream as part of a diversion consolidation project. Of the 20 cfs in river at McDonald Road Bridge a portion of that flow was taken at the Bergevin-Williams diversion leaving very low surface flow remaining instream below the diversion. With the last major diversion upstream of McDonald Road Bridge starting in 2013 additional low surface flow pressure will be placed on the McDonald Road reach. The proposed near-real time gauge at McDonald Road Bridge would provide a mechanism to monitor the river flows for potentially critical low flow conditions.

Project Phases: The project is divided into three phases: Installation, Field Measurements, and Data Processing and Publishing.

Coordination and Planning: WWBWC will coordinate and plan all tasks with CTUIR.

Deliverable Specification: We will provide a near-real time gauge at the McDonald Road Bridge site and will provide continuous streamflow data for four gauge stations on the Walla Walla River. We will also provide the publishing of provisional and confirmed data to WWBWC website which is available to all agency partners. We will also provide an annual report on the four Walla Walla River gauge sites at the end of the contract period.

Work Element Budget: $22475 (2.63%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Status and Trend Monitoring

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US — **NPCC Subbasin:** Walla Walla

State: Multiple — **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla — **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Stream Gauge Supplementation (2010-051-00) v1.0

Study Plan Owner: James White

Protocol: Stream Gauge Supplementation (2010-051-00) v1.0

Protocol State: Draft

Protocol Owner: James White

Sample Design: Temperpature monitoring - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	6/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	9/30/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Installation	6/1/2013	6/30/2013	Completed	The first phase of the project will be the installation of the McDonald Road Bridge near-real time gauge. This gauge will report back to the WWBWC office on an hourly basis this information will be published to the WWBWC website for distribution.
D. Field measurments	6/1/2013	10/31/2013	Completed	The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
E. Data processing and publishing	1/1/2014	1/31/2014	Completed	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Real time Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements.
Deliverable: F. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/28/2014	Completed	*See the Deliverable Specification above*

N: 28. Trap and Haul

Title: Fish Salvage

Description: Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river

	conditions.
Deliverable Specification:	Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.
Work Element Budget:	$30000 (3.50%)
Planned Metrics:	# of fish transported: 2800
Locations:	1
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)
Country:	US
NPCC Subbasin:	Walla Walla
State:	WA
HUC5 Watershed:	Middle Walla Walla River
County:	Walla Walla
HUC6 Name:	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2013	3/1/2013	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Rescue and haul fish	3/1/2013	2/28/2014	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/28/2014	Completed	*See the Deliverable Specification above*

O: 162. Analyze/Interpret Data

Title:	Analyze Data
Description:	The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning, and water management regimes, are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements listed above, or elsewhere) to construct cohort lineages and run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed “run re-construction”, is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin. WDFW will also compile bull trout spawning data for the Touchet Basin, and assist as necessary in upper Mill Creek, as an index of adult abundance and trends.
Deliverable Specification:	The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult, and run reconstruction estimates.
Work Element Budget:	$64000 (7.48%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Tributary Habitat
Locations:	
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	
NPCC Subbasin:	
State:	
HUC5 Watershed:	
County:	
HUC6 Name:	
Salmonid ESUs Present:	
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft

Protocol Owner: Travis Olsen

Sample Design: Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery

CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	3/1/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Coordinate analysis with WDFW and WDFW Snake River Lab	11/1/2013	11/30/2013	Completed	Work with WDFW to analyze all available data and summarize results.
C. Analyze adult enumeration data	1/1/2014	1/31/2014	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Analyze smolt and PIT-tag data	1/1/2014	1/31/2014	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
E. Analyze Spawner / Carcass data	1/1/2014	1/31/2014	Completed	Analyze and interpret spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
F. Analyze radio telemetry data	1/1/2014	1/30/2014	Completed	Analyze and interpret Radio telemetry data. Results will be used to describe juvenile fish distribution and over winter habitat use in the mainstem Walla Walla River.
Deliverable: G. Analyzed data		1/31/2014	Completed	*See the Deliverable Specification above*

P: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: All administrative tasks shall be fulfilled on time and with quality products. Timely responses to request for more information are required. Proactive communication between the contractor and BPA's Contracting Officer (CO) and Contracting Officer Technical Representative (COTR) is required if a significant lag in scheduled delivery lags.

Work Element Budget: $34000 (3.97%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. #1 Funding package- Review current SOW/Budget with BPA's Environmental Compliance (EC) Lead and COTR	7/1/2013	8/1/2013	Completed	Review Environmental Compliance and work anticipated during the following year, paying particular attention to actions anticipated in the next SOW that do not yet have EC approval in the current SOW. Milestone 240-211 days before the contract end date.
B. #2 Funding Package - Conduct internal review (e.g., with Supervisor) of draft SOW and budget.	8/1/2013	9/1/2013	Completed	Submit next year's SOW, Budget and inventory for internal contractor review before submitting to BPA. Milestone 210-185 days before the contract end date.
C. #3 Funding Package - Attach budget and inventory documents then click Submit in SOW tab.	8/1/2013	12/31/2013	Completed	The SOW should include location, planned metrics, and focal species information (species benefited) for those work elements that require it. If contractor or contractor's organization takes longer than 30 days to sign the contract, the contractor will need to send this funding package to BPA more than 181 days before the end of the current contract. Milestone begins and ends on approximately day 180--actually on the last day of the month #6 for 12-month contracts.
D. #4 Funding Package - Use Pisces to revise and finalize the new package (SOW, Budget & Inventory).	9/1/2013	11/1/2013	Completed	The contractor is expected to make COTR-requested changes within 15 days of receiving feedback from the COTR, who will coordinate BPA's internal review. This includes re-uploading of Excel documents (budget and inventory) or re-submitting the SOW. In order to do this, the funding package must be approved by the COTR in the Workflow tab in Pisces a minimum of 130 days before the contract starts. (Milestone 179-120 days before contract end.)

Milestone Title	Start Date	End Date	Status	Milestone Description
E. #5 Funding Package - Respond to any Contracting Officer's requests for revisions within 7 days.	11/1/2013	12/1/2013	Completed	Contractor must respond to and revise documents within 7 days of CO request. (as communicated through the COTR or directly from the CO, with COTR concurrence). Milestone 119-90 days before the contract end date.
F. #6 Funding Package – Contractor returns signed contract to BPA's Contracting Officer.	12/1/2013	1/1/2014	Completed	The contractor is required to respond to the CO and COTR indicating any problems within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days (Milestone begins 89 and ends 60 days before contract end.)
G. #7 Funding Package- Set up accounting for subsequent contract. Write subcontracts.	1/1/2014	2/27/2014	Completed	Contractor's administrative personnel commences internal work to assist contract manager. Accounting Office will set up cost codes for subsequent contract and notify the contractor's contract manager. Subcontracting personnel set up and offer subcontracts (59-1 days before the new contract start date.)
H. Accrual - Submit September estimate to BPA	8/10/2013	9/10/2013	Completed	Provide BPA with an estimate of contract work that will occur prior to September 30 but will not be billed until October 1 or later. Data must be input in to Pisces by September 10 (begins Aug 10, ends Sep 10).
I. Administer subcontractor paperwork	2/1/2014	2/28/2014	Completed	Read all BPA contract terms and conditions include all contract clauses that are required to flow down into subcontracts in preparation for subcontract negotiation. Upload confidential copy of subcontracts to Pisces. Upload is due 30 days from date of subcontractor signature. Email the link to the COTR after upload. (Delete if there are no subcontracts)
J. Submit monthly invoices electronically within 45 days.	3/1/2013	2/28/2014	Completed	Contractor's Contract Manager should review all charges included in contract invoices to ensure they are allowable, allocable, and consistent with the approved line-item budget. For contracts with subcontracts, invoices and associated supporting backup must be submitted electronically within 90 days of the end of the month in which costs were incurred. Subcontracts should be written to include requirements for timely submission of invoices from the subcontractor. (This milestone should be marked red if more than 30% of the invoices in the reporting period are later than 45 days - 60 days if they have subcontracts).
K. Submit final invoice within 90 days of end of the previous contract to facilitate contract closeout.	3/1/2013	5/31/2013	Completed	Within 90 days of the last day of the previous contract, the contractor shall issue a final invoice. In instances where an extension to the 90 days to produce the final invoice is required, (e.g., because subcontractors have not invoiced), AND the remaining contract balance is in excess of $100,000, the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount will be emailed to FWinvoices@bpa.gov and the COTR.
L. Inventory – Mark/Tag all equipment purchased during the contract.	3/1/2013	2/28/2014	Completed	Governments have required procedures for what does, and does not have to be tagged. If you are not a government, please follow requirements in the standardized language of your contract and with any additional clarity as provided by BPA's Contracting Officer if you have questions.)
M. Facilitate inputting Cost Share information into Pisces at the Project level.	10/1/2013	11/15/2013	Completed	(b1) If there are multiple contractors under this project, and you are the lead project Proponent, solicit cost share information for the previous federal FY from project partners by Oct 1.
N. #4 Funding Package - Use Pisces to revise and finalize the new package (SOW, Budget & Inventory).	9/1/2013	11/1/2013	Completed	The contractor is expected to make COTR-requested changes within 15 days of receiving feedback from the COTR, who will coordinate BPA's internal review. This includes re-uploading of Excel documents (budget and inventory) or re-submitting the SOW. In order to do this, the funding package must be approved by the COTR in the Workflow tab in Pisces a minimum of 130 days before the contract starts. (Milestone 179-120 days before contract end.)
O. Submit invoices to BPA	3/1/2013	2/28/2014	Completed	Submit invoices to BPA consistent with the requirements described in BPA's contract management manual
P. Submit project accruals	8/20/2013	9/10/2013	Completed	Submit September accrual estimate to BPA for fiscal year-end exercise. Milestone specifications: provide BPA with an estimate of contract performance that will occur prior to September 30, but will not be billed until October 1, or later.
Q. Coordinate w/ COTR & WDFW on next year's SOW	8/1/2013	1/31/2014	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
R. Attend AFS or other professional training	10/1/2013	2/9/2014	Completed	Attend professional training
S. Attend NWFCC	12/1/2013	12/31/2013	Completed	Attend Northwest Fish Culture Conference

Deliverable: T. Fulfill all administrative tasks with quality products and in a timely manner.		2/28/2014	Completed	*See the Deliverable Specification above*

Q: 162. Analyze/Interpret Data

Title: Analyze data

Description: Analyze and interpret field survey data for quantifying the effectiveness of restoration actions.

Based on the monitoring questions and objectives set forth in the Biological Effectiveness Monitoring and Evaluation Plan (Stillwater Sciences 2012), the following hypotheses will be tested:
1. Restoration actions will increase juvenile density by 30% or greater within the treatment reach relative to the control reach (abundance)
2. Restoration actions will increase juvenile survival in smolts/spawner by 30% or greater within the treatment reach relative to the control reach (productivity)
3. Restoration actions will increase juvenile residence time (changing age structure/life history diversity)
4. Restoration actions will increase juvenile growth rates by age class and season (productivity)
5. Restoration actions will change fish distribution (spatial structure)

Deliverable Specification: Quantitative written results produced from analysis and interpretation of data to inform biomonitoring plan.

Work Element Budget: $6000 (0.70%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Action Effectiveness Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:

Primary Focal Species: Steelhead (O. mykiss) - Middle Columbia River DPS | Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country:
NPCC Subbasin:
State:
HUC5 Watershed:
County:
HUC6 Name:
Salmonid ESUs Present:

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized

119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA

Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	**Value**
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2013	3/31/2013	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Power Analysis	6/15/2013	12/31/2013	Completed	An essential component to a successful monitoring program is the ability to detect biologically meaningful changes in the face of confounding influences (e.g. hatchery supplementation), natural variability, and low statistical power (Larsen et al. 2004, Roni et al. 2008). As such, a focal goal of the monitoring design is to demonstrate the probability of detecting a biological effect (e.g., abundance or survival) through a statistically rigorous power analysis. Power reflects the probability of being able to detect an effect. It is affected by four variables: a, effect size, sample size and standard deviation. Peterman (1990), Bryant et al. (2004) and Morrison (2007) provide a more detailed discussion of power analysis. During the first year of study implementation, power curves will be developed based on measures of variability from initial site sampling and available literature (e.g. Gibbs et al. 1998). This will estimate the range of statistical power based on different levels of variability for a target effect size. Effect size is the magnitude of the reported relationship, reported as the difference between the means of two populations. Statistical rules of thumb denote 0.5 standard deviations between the means as a medium effect and 0.8 as a large effect (Cohen 1992).
C. Steelhead redd Counts	9/15/2013	12/31/2013	Completed	Estimated Adult abundance and distribution of redd counts for the entire length of treatment and control reaches for the Rainwater site (Walla Walla river); and estimated adult abundance and distribution of redd counts for the entire length treatment reaches for Russell springs and Pataha sites (Tucannon). 1. Index temporal abundance of spawners 2. Estimate total abundance of spawning females 3. Determine spatial spawning distribution 4. Determine temporal spawning distribution

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Juvenile Density	9/15/2013	12/31/2013	Completed	Density estimates using mark recapturing 50-100 juveniles per reach per Spring and Fall sampling event (over a 3-day period) for the for Rainwater treatment and control area in the South Fork Touchet River; and Pataha and Spring Creek treatment area in the Tucannon River.
E. Growth Rate and Size	9/15/2013	12/31/2013	Completed	Growth rate, size, and migratory timing of 50-100 juveniles per reach per Spring and Fall sampling event (over a 3-day period) for the for Rainwater treatment and control area in the South Fork Touchet River; and Pataha and Spring Creek treatment area in the Tucannon River.
F. Juvenile survival	9/15/2013	12/31/2013	Completed	Migratory timing of 50-100 juveniles per reach per Spring and Fall sampling event (over a 3-day period) for the for Rainwater treatment and control area in the South Fork Touchet River; and Pataha and Spring Creek treatment area in the Tucannon River. Smolts/redd and fry-to-smolt survival will be calculated using a Barker robust design model (Kendall et al. 1995, 1997; Kendall and Nichols 1995) publically available in the Program MARK (Cooch and White 2006). With the inclusion of resighting data from PIT tag arrays, the Barker model has been shown to produce survival estimates with higher precision and less bias than the traditional Cormack-Jolly-Seber (Nelle et al. 2009). Although the monitoring sites do not all have PIT tag arrays, for the sake of analytical consistency, we recommend the Barker model be used to estimate survival at all sites. Abundance and spatial structure between treatment and control sites, as well as before and after for the BA sites will also be evaluated using ANOVA.
Deliverable: G. Quantitative results		1/31/2014	Completed	*See the Deliverable Specification above*

R: 132. Produce (Annual) Progress Report

Title: RME Annual Technical Report for the period 1/1/13 - 12/31/13)

Description: RME Reporting Requirements:
Due to new BPA RM&E and FCRPS BiOp RPA reporting needs, WDFW & CTUIR shall submit the2013 RME annual technical progress report through Taurus and upload to PISCES when completed. This report will summarize results from 1-1-13 to 12-31-13 time frame for data collected/analyzed and the significance of the findings relative to Fish and Wildlife Program's restoration, O&M, and RM&E Strategies. This report satisfies RM&E reporting requirements in support of Program Strategy's progress toward program goals and objectives. Additional reporting of information relating to this contract can be added at the end of the RME annual technical report as needed.

• Submit Draft RME Technical Annual Report Due by January 15th, 2014.

Description: Draft Annual Report of work conducted for the calendar year to be submitted to BPA for upload by the project sponsor into Pisces and if a RM&E Technical Report also include RMESupport@bpa.gov.

Final Annual RME Progress Report will be due 2-28-14. This annual progress report will cover the period from 1/1/13 to 12/31/13.

New RPA Reporting Requirements:
This project supports an ESA BiOp RM&E RPA (RPA62), therefore the sponsor is required to electronically submit a Final Annual BiOp RPA Report of work conducted for the calendar year for upload into Taurus and Pisces or as an appendix to the RME annual technical report. This report is required annually on all Declared BiOp RPA associations.

Deliverable Specification: RM&E joint Annual report:

A template will be created in Taurus at the project level under Reports and Documents. By selecting RM&E Technical report tab, the wizard will assemble a word template based on basic information and program strategies entered. See link directly below.

https://www.cbfish.org/Project.mvc/Publications/2000-039-00/2012/RmeTechnicalReport

If this project requires a BiOP Annual RPA report (appendix) see link below:

https://www.cbfish.org/Project.mvc/Publications/2000-039-00/2012/BiOpAnnualReport

Once the report is completed use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Work Element Budget: $55000 (6.43%)

Planned Metrics:
* Start date of reporting period : 1/1/2013
* End date of reporting period : 12/31/2013

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RPA Reporting: Review FCRPS BiOp RM&E documentation in preparation for CY12 reporting in Taurus	3/1/2013	3/31/2013	Completed	Project Sponsors who have claimed that they support one or more RM&E RPAs (i.e., RPA >= #50) under the BiOp are now required to explicitly report their results in Taurus. Reports encompass only data collections and/or analyses actually completed by the end of the calendar year. Attend training or review all documentation and training materials in preparation for creating the RPA BiOp report: https://www.cbfish.org/Link.mvc/To/RMETechnicalReportProceduralGuidance
B. RPA Reporting: Complete BiOp RM&E RPA reporting in Taurus for CY12 actions	6/1/2013	6/30/2013	Canceled	Complete reporting (through Calendar Year 2012) for the RPA Report in Taurus that relates to data collection, analyses, and data management which have been completed by 31 Dec 2012. Follow directions for each of the three sections of the Report and, when appropriate, input Graphical or Tabular data with explanatory text for each RPA declared associations. These are cumulative summary reports and should show relevant results for the life of your project.
C. RPA Reporting: Start drafting report for CY13, reviewing data collection and statistical analyses	10/1/2013	1/15/2014	Completed	Review data collection and statistical analyses likely to be completed by Dec 31 for Calendar Year 13. Prepare all information for input into Taurus for Calendar Year 13. Initiate input of information into Taurus. Add 2013 time series data to 2012 Graphics and Tables with new data, and any new findings.
D. RPA Reporting: Submit final CY13 RPA Report in Taurus, not including incomplete items as of 31-Dec	1/16/2014	2/28/2014	Active	Data collections and/or analyses that are incomplete as of Dec 31 should not be included so as to meet the March submission deadline. The final version is due 75 days after the end of the calendar year.
E. RM&E Annual Technical Report: Develop and submit draft for CY13 using Taurus template	10/1/2013	2/28/2014	Completed	A- Review and consider all guidance documents in preparation for creating the Annual Technical report: https://www.cbfish.org/Link.mvc/To/RMETechnicalReportProceduralGuidance. Building off last years report develop a draft report to submit to BPA on RM&E and data management actions and discuss relevancy of results to Fish and Wildlife Program. Upon completion send draft to COTR and RMEsupport@bpa.gov for draft review.
F. RM&E Annual Technica Report: Address comments and upload final version into Pisces	1/16/2014	2/28/2014	Active	Address any comments by BPA then upload Final version of Progress (Annual) Report as "Technical, Draft" for Calendar Year 2013 into Pisces Attachments as a Word document. (BPA staff will convert it to a PDF). Do not include any results fully complete after Dec 31. The final version is due 75 days after the end of the calendar year.
Deliverable: G. Attach RME Annual Technical Report and BiOp RPA report in Pisces		2/28/2014	Active	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP CTUIR WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	65224	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$702,751	**Perf. Period:**	3/1/2014 - 2/28/2015
Contract Type:	Contract (IGC)	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 12/10/2013 with 0 problems, and 0 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and efw.bpa.gov.

The Walla Walla Subbasin supports steelhead and bull trout that are both listed as threatened under the Endangered Species Act (ESA), and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Prior to the start of this project, the subbasin co-managers did not have adequate information to assess adult abundance, distribution, age structure, genetic characteristics, adult to adult production values, smolt-to-adult survival, and natural spawning escapement. In addition, numerous habitat protection and rehabilitation projects to improve salmonid freshwater production and survival have also been implemented in the subbasin and are in need of effectiveness monitoring. While our monitoring efforts outlined here will not specifically measure the effectiveness of any particular project, they will provide much needed background information for developing context for project-specific effectiveness monitoring. In the near future, we will begin to monitor the CTUIR spring Chinook hatchery program as a major part of this monitoring and evaluation program.

Our goal is to provide ecological information to decision makers in support of adaptive management for ESA recovery, population restoration, conservation, and preservation of cultural, social, and economic salmonid resources. We do this by emphasizing monitoring of population status and trends to estimate “adults in and juveniles out” as a measure of salmonid population viability within the subbasin, and as evaluation of the spring Chinook hatchery program. Project results help inform the Tribes First Foods management within the Ceded lands.

This collaborative effort is conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through at least 2017. Our goal is to provide ecological information in support of adaptive salmonid management. We do this by collecting Viable Salmonid Population (VSP) criteria (particularly abundance, productivity), and life-history survivals (McElhany et al. 2000).

Project level performance indicators and metrics used to describe total abundance, productivity and life-cycle survival to describe "adults-in and juveniles out" include:

Adult abundance (metric and method)

- Spawning escapement (spawning surveys and/or adult counts at dams, weir and traps)
- Total population abundance (Pit-tag detection system, adult counts at dams, weir and traps)
- Fish per redd (spawning surveys and/or adult counts at dams, weir and traps)
- Redds per mile (spawning surveys)

Production and life-cycle survival (metric and method)
- Population level smolt production annually from the Walla Walla and Touchet watersheds (Pit-tag detection system)
- Smolts per Redd (Pit-tag detection system, rotary trapping, spawning surveys)
- Survival & Run Timing (Pit-tag detection system & rotary trapping)
- Smolt to Adult Return (Pit-tag detection system, rotary trapping, adult counts, and spawning surveys)
- Adult to adult return (spawning surveys and/or adult counts at dams, weir and traps)

Primary management questions addressed by this project are based on the Draft Adaptive Management and Research, Monitoring and Evaluation of the SE WA Salmon Recovery Plan (see Appendix C; SRSRB 2011). Primary monitoring questions 1 and 3 of that Appendix are most directly associated with this project. Those questions are: “Is the status of the population/ ESU/DPS improving?” And “Are hatchery programs meeting specific mitigation goals?”

Project field methods were adapted from the Salmonid Field Protocols Handbook (Johnson et al. 2007) to collect a few key fish population performance indicators. For adults-in, our main population metric is adult abundance estimated at counting stations at dams or traps, or in some cases use of spawning surveys (depending on the species and location). The primary population productivity indicators are natural origin adult abundance and AAR based on spawning escapement. In the future, our long-term objective is to establish adult enumeration sites in the lower Walla Walla River (WWR) to better estimate total adult returns. For juveniles-out, our primary indicators are smolt abundance and SARs.

Project Work Elements include: adult enumeration, spawning surveys, PIT-tagging, outmigrant monitoring, juvenile production monitoring. However, we also collect water temperature and flow data because they are such major factors determining salmonid distributions. We believe these monitoring and evaluation actions meet the highest priorities for fish population monitoring as identified by the Walla Walla Subbasin Plan (Walla Walla County 2004), the Middle Columbia River Steelhead Distinct Population Segment Recovery Plan (NMFS 2009), Snake River Salmon and Steelhead Monitoring and Evaluation Plan for Southeast Washington (Appendix C in SRSRB 2011), the Independent Science Review Panel, the Council’s draft Columbia River Basin Monitoring, Evaluation, Research and Reporting Plan (MERR 2010), the NOAA Draft Guidance for Monitoring Recovery of Salmon and Steelhead (NOAA 2009), and Draft Anadromous Salmonid Monitoring Strategy (ASMS, 2010).

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (efw.bpa.gov).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Brenda Heister	Contracting Officer	Bonneville Power Administration	(503) 230-3531 / NA	bsheister@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland OR 97208-3621
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Brian Mahoney	Contract Manager	Umatilla Confederated Tribes (CTUIR)	(541) 429-7541 / NA	brianmahoney@ctuir.org	William A. Grant Water and Environment Center Walla Walla Community College Walla Walla WA 99362
Jason Sweet	F&W Approver	Bonneville Power Administration	(503) 230-3349 / NA	jcsweet@bpa.gov	
Brenda Aguirre	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5928 / NA	baguirre@bpa.gov	PO Box 3621 Mail Stop ECF-4 Portland OR 97208

Work Element Budget Summary:

	Work Element - Work Element Title	EC Needed*	Estimate	(%)
A :	185. Produce Pisces Status Report - Periodic Status Reports for BPA		$1,250	(0.13%)
B :	165. Produce Environmental Compliance Documentation - Compliance for WEs D through N		$2,222	(0.24%)
C :	156. Develop RM&E Methods and Designs - Walla Walla Fish Production RM&E Plan	*	$35,000	(3.84%)
D :	157. Collect/Generate/Validate Field and Lab Data - Adult enumeration	*	$73,000	(8.01%)
E :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys	*	$90,800	(9.96%)
F :	158. Mark/Tag Animals - PIT Tag smolts (out-migrant tagging)	*	$86,337	(9.47%)
G :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$5,000	(0.54%)
H :	157. Collect/Generate/Validate Field and Lab Data - Outmigrant monitoring	*	$232,900	(25.56%)
I :	70. Install Fish Monitoring Equipment - Upgrade and maintain PIT arrays	*	$125,000	(13.71%)
J :	157. Collect/Generate/Validate Field and Lab Data - Juvenile fish habitat use (Telemetry)	*	$62,600	(6.87%)
K :	157. Collect/Generate/Validate Field and Lab Data - Steelhead spawning ground survey for biomonitoring plan	*	$30,000	(3.29%)
L :	157. Collect/Generate/Validate Field and Lab Data - Snorkel	*	$24,000	(2.63%)

	survey for biomonitoring plan			
M :	157. Collect/Generate/Validate Field and Lab Data - Stream Gauge Monitoring and Data Distribution	*	$23,000	(2.52%)
N :	28. Trap and Haul - Fish Salvage	*	$30,000	(3.29%)
O :	162. Analyze/Interpret Data - Analyze Data		$56,000	(6.14%)
P :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$24,000	(2.63%)
Q :	141. Produce Other Report - Produce BiOp RPA Report for Calendar Year 2014		$5,000	(0.54%)
R :	132. Produce (Annual) Progress Report - Submit RME Annual Technical Progress Report (1-1-2014) to (12-31-2014)		$5,000	(0.54%)
		Total:	$911,109	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $1250 (0.14%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2014 (3/1/2014 - 6/30/2014)	7/1/2014	7/15/2014	Completed	
B. Jul-Sep 2014 (7/1/2014 - 9/30/2014)	10/1/2014	10/15/2014	Completed	
C. Oct-Dec 2014 (10/1/2014 - 12/31/2014)	1/1/2015	1/15/2015	Completed	
D. Final Jan-Feb 2015 (1/1/2015 - 2/28/2015)	2/14/2015	2/28/2015	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs D through N

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through K. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $2222 (0.24%)

Planned Metrics:

* Are herbicides used as part of work performed under this contract?: No
* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Obtain BPA's EC Lead sign-off that EC requirements are complete	3/1/2014	3/1/2014	Completed	The EC? column on the contract SOW tab in Pisces must have a "full moon" for each work element requiring environmental compliance before ground-disturbing implementation of that work element can begin. You will receive verbal or email notification from the EC Lead when a work element or, in rare instances, a portion of a work element is approved for implementation.
B. Use Best Management Practices to stabilize soils and prevent spread of noxious weeds	3/1/2014	3/1/2014	Completed	Use applicable BMPs to retain existing vegetation and achieve re-establishment of vegetation in disturbed areas to at least 70% of pre-disturbance levels. Visit chapter 7.3 of http://www.ecy.wa.gov/pubs/0410076.pdf for BMPs to consider for construction contracts and http://wdfw.wa.gov/publications/01330/wdfw01330.pdf for guidance on re-vegetation in the Columbia River Basin.
C. Determine if contract work could adversely affect Pacific lamprey	3/1/2014	3/1/2014	Completed	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf (BMPs).
D. Report lamprey observation and catch data to USFWS	2/1/2015	2/15/2015	Completed	All contractors doing instream work in anadromous fish areas (e.g., surveys, habitat improvements, electrofishing, screwtraps, etc.) are required to report annually, by Feb 15 each year, on lamprey observations or catch, including zero, during the previous calendar year to christina_luzier@fws.gov at US Fish and Wildlife Service. A data template is available (https://efw.bpa.gov/contractors/docs/Lamprey_Database_Template.xls) and should include the following information: 1) BPA project, 2) BPA contract number, 3) observation or catch date, 4) location (river mile or GPS), 5) species, 6) species id confidence, 7) photo taken, 8) a "sample taken" field such as genetic sample, fin clip, other biological sampling done, 9) sampling technique, 10) sampling effort, 11) number of ammocoetes (larval stage with undeveloped eyes, found burrowed in substrate), 12) number of macropthalmia (free-swimming juvenile stage with developed eyes) and 13) number of adults. See page 10 of USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf (BMPs) for life stage pictures.
E. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2014	2/28/2015	Completed	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.coastal.ca.gov/ccbn/bmp-boaters.pdf -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.clr.pdx.edu/publications/files/OR_ANS_Plan.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.idahoag.us/Categories/Environment/InvasiveSpeciesCouncil/documents/Idaho%20Aquatic%20Nuisance%20Species%20Plan.pdf
F. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2014	2/28/2015	Completed	Prevent spread of invasive species

Milestone Title	Start Date	End Date	Status	Milestone Description
G. Complete and document public involvement activities and provide to EC Lead	3/1/2014	2/28/2015	Completed	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
H. Participate in ESA Consultation	3/1/2014	2/28/2015	Completed	Work may include drafting BA, completing HIP III BO Project Notification Form, submitting high risk project designs to Restoration Review Team (RRT), providing copy of Section 10, 4(d), or 6 permit, etc., or submitting Hatchery Genetic Management Plan to BPA for ESA consultation initiation, and providing input for the ensuing consultation.
I. Participate in Cultural/Historic Resource Consultation	3/1/2014	2/28/2015	Completed	Examples include providing maps and detailed project descriptions, contracting for an archaeological survey, etc.
J. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2014	2/28/2015	Completed	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits.
K. Keep JARPA permit updated	3/1/2014	2/28/2015	Completed	For rotary screw traps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.
Deliverable: L. Compliance achieved and documented		2/28/2015	Completed	*See the Deliverable Specification above*

C: 156. Develop RM&E Methods and Designs

Title: Walla Walla Fish Production RM&E Plan

Description: On June 17, 2013, the Confederated Tribes of the Umatilla India Reservation (CTUIR) submitted Step 1 planning documents to the Council, as part of the Three-Step Review Process for the HMP as a task under Project #2000-038-00, Walla Walla Hatchery Final Design/Construction. On October 8, 2013 the Northwest Power and Conservation Council (Council) approved the HMP Step 1 submission for the Walla Walla Spring Chinook Hatchery subject to the requirement that the CTUIR fully address the comments raised by the ISRP (ISRP document 2013-12) as part of the Step 2 submittal. A Monitoring & Evaluation (M&E) plan is seen as key to the Step 2 submittal to address the scientific requirements of the program change proposed under the HMP. Specifically:

“The ISRP points out the importance of having the comments addressed as part of an adaptive management process and M&E plan described in Step 2 of the review process. The M&E plan should ensure that data and information will be available to guide the program toward harvest and conservation goals in a scientifically defensible manner, in the face of uncertainty about assumptions and environmental variability. The adaptive management process should show how new information about habitat, passage, harvest, and hatchery conditions is brought forward to inform future decisions.”

Develop a draft 2014 Walla Walla Fish Production, Research, Monitoring & Evaluation Plan (WWFPRM&E) as part of the Step 2 submittal. Provide the clear articulation of the monitoring and evaluation plan goals, decision-rules and objectives (measurable benchmarks) against which the Chinook program can be evaluated within an adaptive management context. The M&E plan should include methods to attain reliable estimates of the number of hatchery-origin fish in the natural spawning escapement and to quantify trends and yearly fluctuations in carrying capacity in the Subbasin as habitat and watershed improvements are completed. It will also be critical for the M&E plan to include metrics to assess and adaptively manage risk posed by the hatchery program.

Objectives:
• Link the proposed production levels, broodstock allocation, and program operations to the current state of the subbasin’s capacity for hatchery and natural production, and the anticipated trajectory for improvement in habitat capacity and productivity.
• Include monitoring of smolt size and the number of smolts produced per spawner in relation to parent spawners or smolt production as an approach for assessing stream capacity.
• Develop methods to empirically determine the survival rates of HOR and NOR smolts to the adult stage. Accordingly, clearly describe how smolt and adult abundances will be monitored in the field and estimated by the program.
• Compare smolt-per-spawner productivity values and stock-recruitment relationships from different portions of the subbasin. Such comparisons may prove useful when future habitat actions in the subbasin are being considered.
• Clearly state the rationale and assumptions that produced the harvest and spawning escapement goals for each of the tributaries (i.e. SFWWR, Mill and Touchet R.) and develop an experimental design to monitor and evaluate environmental conditions in terms of the carrying capacity and productivity for those systems.
• Attain reliable estimates of the numbers of hatchery- and natural-origin fish in the natural spawning escapement to quantify trends and yearly fluctuations in carrying capacity in the Subbasin as habitat and watershed improvements are completed.

• Maintain a multi-year time series of smolt-per-spawner productivity values to estimate the variation in smolt production to evaluate program performance and to serve as an indicator transitions through program phases.
• Develop metrics and an experimental design to assess and adaptively manage risk posed by the hatchery program to ESA listed species and/or natural production.
• Finalize methods for the use of modeling tools (e.g. EDT, all H-Analyzer etc.) to link the proposed production levels to the current state of the Subbasins capacity for hatchery and natural production, and to support All-H management of the Walla Walla under the operations of the HMP.

Deliverable Specification: Development of a draft 2014 Walla Walla Fish Production, Research, Monitoring & Evaluation Plan in submission to Step 2 review of the Walla Walla Spring Chinook HMP.

Work Element Budget: $35000 (3.84%)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State:

Protocol Owner: Travis Olsen

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized

143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Scoping & First Draft	3/1/2014	3/15/2014	Completed	The Kickoff Meeting will take place at CTUIRs' Walla Walla Office and will include members of the CTUIR HGM team. The objectives of the Kickoff meeting are as follows: • Review project schedules, tasks, and deliverables. • Brainstorm project ideas, concepts, and anticipated outcomes • Discuss specific project timeline issues.
D. 30 Percent Manuscript	4/1/2014	4/30/2014	Completed	Develop a programmatic experimental design with rigorous measurement and evaluation of benchmark indicators sufficient to provide a 30% manuscript draft. Benchmarks: • Methods for monitoring and evaluating stream capacity. • Methods to empirically determine the abundance and survival rates of HOR and NOR smolts. • Methods to compare smolt-per-spawner productivity values and stock-recruitment relationships from different portions of the subbasin. • Methods for the use of appropriate modeling tools (e.g. EDT, all H-Analyzer etc.) to address the adaptive management elements of the program.
E. 60 Percent Manuscript	5/1/2014	5/31/2014	Completed	Develop an RME experimental plan to the 60 percent level. Preparation of the plan will be an iterative and collaborative process between the CTUIR/HGM team. Benchmarks: • Completion and delivery of 60 percent plan.
F. 90 Percent Manuscript	6/1/2014	6/30/2014	Completed	The draft plan will be updated to address comments received from the project participants, developed to 90% completion, and submitted for administrative review by BPA. The 90% manuscript will include methods to: • Link the proposed production levels, broodstock allocation, and program operations to the current state of the subbasin's capacity for hatchery and natural production, and the anticipated trajectory for improvement in habitat capacity and productivity. • Clearly state the rationale and assumptions that produced the harvest and spawning escapement goals for each of the tributaries (i.e. SFWWR, Mill and Touchet R.), and provide an experimental design to evaluate carrying capacity and productivity for those systems. • Attain reliable estimates of the number of hatchery-origin fish in the natural spawning escapement and to quantify trends and yearly fluctuations in carrying capacity in the Subbasin as habitat and watershed improvements are completed. It will also be critical for the M&E plan to include metrics to assess and adaptively manage risk posed by the hatchery program. • Maintain a multi-year time series of smolt-per-spawner productivity values to estimate the variation in smolt production, but also indicate when or if sustainability is likely.
G. Address Comments & Edits	7/1/2014	8/31/2014	Completed	The CTUIR-HGM Team will develop narrative responses to agency comments received. Benchmarks: • Comment-response table • Narrative responses to comments
H. Develop Final Plan	9/1/2014	12/31/2014	Completed	Complete the M&E Plan based on comments received by BPA. The final manuscript will be delivered, along with related materials, as part of a final presentation and project team workshop to discuss lessons learned and subsequent steps. Benchmarks: • Completion of Final WWFPRME Plan • Participation in "Lessons learned" document or workshop • Package of all raw data, modeling, and analyses
Deliverable: I. RM&E Plan		12/31/2014	Completed	*See the Deliverable Specification above*

D: 157. Collect/Generate/Validate Field and Lab Data

Title: Adult enumeration

Description: The specific need this Work Element addresses is to strengthen the overall effectiveness of salmonid restoration efforts in the Walla Walla Basin and develop a baseline for population status and trend monitoring.

Adult enumeration methods: Fish counts from Nursery Bridge, Bennington, and Dayton dams, plus the Coppei Creek trap, are used to provide index estimates of adult returns to the Walla Walla, Mill Creek, and Touchet drainages, respectively. Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under separate contract. The US Army Corps provides counts from Bennington Dam.

Although counts at these sites are incomplete due to some upstream passage without detection and downstream spawning, these sites represent the best indices of adult returns currently available and they are the most feasible to operate and monitor the primary spawning areas. We are considering multiple alternatives to improve total adult population abundance estimates (e.g. PIT array systems). Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns.

CTUIR and ODFW share fish counting duties at Nursery Bridge Dam (NBD). CTUIR operates the counting station on the east bank; ODFW operates the west side ladder (not BPA funded). In the east side ladder, adult salmonids are enumerated using the Salmon-soft fish video-tracking program. Fish images are captured by video camera and DVR linked to a desk top computer as they pass a counting window located near the ladder exit. Video compaction programming greatly reduces the need for observer time in reviewing fish passage video-files. In the west ladder, ODFW uses an underwater video camera and DVR mounted near the ladder exit.

Video enumeration at NBD is conducted according to the annually-updated Annual Operating Plan. Typically, enumeration occurs from September through June to encompass the known adult migration for summer steelhead and spring Chinook. Data collected from the video counting includes date, time, species, size (e.g. jack or adult for spring Chinook salmon), life stage (e.g. steelhead kelts), origin (e.g. adipose clip or unclipped) and migration direction for bull trout or steelhead kelts. Notations are also made of other species encountered and general fish condition. Daily fish tallies from both ladders are posted to an onsite tally board for the public. Project deliverable includes error checked database of daily fish counts.

See WDFW SOW for descriptions of activities regarding adult counts at Dayton Dam, Coppei Creek, and Mill Creek.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam, Bennington Dam, Dayton Dam, and in Coppei Creek. This contract only covers Nursery Bridge Dam; WDFW will operate at the facilities in Washington. Data is accessible through CTUIR's website and is also kept in project staff's office.

Work Element Budget: $73000 (8.01%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US | **NPCC Subbasin:** Walla Walla

State: OR | **HUC5 Watershed:** Middle Walla Walla River

County: Umatilla | **HUC6 Name:** Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Adult enumeration - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized

395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
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131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
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357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
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143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
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145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
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Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA

Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Maintain video monitoring equipment @ Nursery Bridge Dam - spring/summer	3/1/2014	7/31/2014	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
D. Error-checked data for spring counts posted to website	3/1/2014	7/31/2014	Completed	Enter spring data into the computer. Error check. Post to public website.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - fall/Winter	9/15/2014	2/28/2015	Completed	This contract period spans parts of two adult return years (i.e. March to July and November to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
F. Error-checked data for fall counts posted to website	9/15/2014	2/28/2015	Completed	Enter fall data into the computer. Error check. Post to public website.
G. Review, organize and summarize video results	8/1/2014	8/31/2014	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: H. Adult fish count from Nursery Bridge Dam		2/28/2015	Completed	*See the Deliverable Specification above*

E: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts (see WE C, adult enumeration) combined with redd and carcass counts (Crawford et al. 2007; Gallagher et al. 2007) will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River - The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded with a Trimble Nomad GPS unit. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. In situations where multiple salmonid species overlap on a given spawning area (e.g. spring Chinook & bull trout), fish observed near the redd are used to differentiate the species involved. Care is taken not to disturb spawning fish or redds. Tallies of bull trout redds observed during spring Chinook surveys are forwarded to ODFW Pendleton.

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.

Work Element Budget: $90800 (9.97%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US — **NPCC Subbasin:** Walla Walla

State: Multiple — **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla — **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized

112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA

Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Pre-spawn carcass survey in lower walla walla river	7/1/2014	7/15/2014	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of adult returns over the spawning season and will be done in the lower walla Walla Walla River and lower Mill Creek; to locate fish that do not ascend into the spawning grounds.
D. Spring Chinook redd/carcass surveys	8/1/2014	9/15/2014	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
E. Error-checked data for redd counts posted to website	8/1/2014	9/30/2014	Completed	Enter redd data into the computer. Error check. Post to public website.
F. Error-checked data for carcass counts posted to website	8/1/2014	9/30/2014	Completed	Enter carcass data into the computer. Error check. Post to public website.
G. Error-checked data for CWT data posted to website	8/1/2014	9/30/2014	Completed	Enter CWT data into the computer. Error check. Post to public website.
H. All fish snouts sent to ODFW Mark Process Center	9/30/2014	9/30/2014	Completed	We will send collected snouts in to the ODFW Mark Precess center to read CWT from fish collect during the survey.
Deliverable: I. Spring Chinook spawner/ carcass survey data		9/30/2014	Completed	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title: PIT Tag smolts (out-migrant tagging)

Description: Estimates of smolt run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 8,000 run of the river out-migrant salmonids for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery salmonid production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain two rotary screw traps and PIT-tag up to 8,000 run of the river out-migrant salmonids. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating spring Chinook and summer steelhead. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 natural origin out-migrant spring Chinook
3,000 natural origin out-migrant steelhead

Work Element Budget: $86337 (9.48%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 8000

Locations: 2

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US | **NPCC Subbasin:** Walla Walla
State: WA | **HUC5 Watershed:** Multiple
County: Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. PIT-Tag steelhead out-migrants - spring	3/1/2014	5/30/2014	Completed	Up to 5,000 (total for the year) run of the river out-migrant steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
C. PIT-Tag steelhead out-migrants - fall	11/1/2014	2/28/2015	Completed	Depending on adequate stream flow and conditions, up to 5,000 run of the river out-migrant steelhead (total for the year) will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag spring Chinook out-migrants - spring	3/1/2014	5/30/2014	Completed	Up to 10,000 run of the river out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. PIT-Tag sprng Chinook out-migrants - fall	11/1/2014	2/28/2015	Completed	Depending on adequate stream flow and conditions, up to 5,000 (for the brood year) out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.

Milestone Title	Start Date	End Date	Status	Milestone Description
Deliverable: F. PIT tagged outmigrants		2/28/2015	Completed	*See the Deliverable Specification above*

G: 158. Mark/Tag Animals

Title: PIT Tag smolts (hatchery tagging)

Description: Estimates of out migrant run timing, abundance, and survival based on PIT-tag detections are key components for assessing the performance of hatchery-origin fish relative to naturally-produced fish and necessary for determining the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

This WE is an in-kind collaboration between the USFWS and the CTUIR. The CTUIR supplies 5,000 PIT-tags and pays to have a PIT-trailer delivered to the Hatchery tagging site (e.g. Carson NFH). The USFWS then provides labor and ancillary support to PIT-tag 5,000 spring Chinook smolts. This marking effort represents about 2% of the 250,000 total fish the release to the South Fork Walla Walla River each year for the Tribe. These tagging levels will allow for estimates of smolt survivals and run timing to McNary Dam, and for smolt to adult survival back to the subbasin. USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 5,000 hatchery spring Chinook and and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $5000 (0.55%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 5000
* # fish marked with ad clip: 5000

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US — **NPCC Subbasin:** Walla Walla

State: OR — **HUC5 Watershed:** Upper Walla Walla River

County: Umatilla — **HUC6 Name:** Lower South Fork Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	Assure environmental compliance is completed before beginning any on the ground work.
B. PIT-Tag hatchery spring Chinook	11/1/2014	1/31/2015	Completed	PIT tag Up to 5,000 hatchery spring Chinook for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: C. PIT tag Hatchery smolts		1/31/2015	Completed	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Outmigrant monitoring

Description: We will use screw traps, tagging equipment, and in-basin PIT-arrays to sample, tag and monitor salmonids. Traps are run from October through June as conditions allow intercepting migrating juvenile salmonids. When possible, traps fish continuously 24-hours a day, seven days a week, and are checked daily. However, sub sampling is frequently required due to stream conditions or limited staffing. When sub sampling is done, catch per hour is calibrated and used to expand catch estimates for trap down time. The number of fish that passed the trap during un-sampled periods is estimated as:

Nhat = (C/T)

where, Nhat = estimated number of out-migrants missed, C = calibration sample rate, and T = proportion of time sampled.

All captured salmonids are scanned for PIT-tags. Data collected from juvenile salmonids includes: number, species, length, weight, scales from steelhead for age structure and age at migration.

Body condition factor (K) is calculated as a measure of general health of migrants and calculated as:
K = W/L3 x 100,000

Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm - 220 mm F.L.) are PIT-tagged (Prentice et al. 1990). Salmon fry and parr (< 65 mm), and summer steelhead (< 125 mm) are presumed not to be out-migrants and are simply counted and measured and released. Data from tagged fish is processed using a Biomark PIT Tag station. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004). CTUIR recently, moved from manual tag insertion via hypodermic syringe to using the pre-loaded tag trays and needles and Biomark implant gun. Pre-loads and the implant gun make for quick, easy, and clean surgical insertion of PIT-tags; with less apparent fish injury and higher tag retention.

Subsequent PIT-tag detections of Walla Walla fish are obtained from the PTAGIS data base maintained by Pacific States Marine Fisheries Commission at http://www.ptagis.org.

Migrant abundance based on Trap efficiency (TE) estimates is estimated in DARR (Darroch Analysis with Rank Reduction) 2.0 and GAUSS programs (Steinhorst et al. 2004). and is of the general form:

$\hat{A}j = Uj/ \hat{E}j$

where $\hat{A}j$ is the estimated number of fish migrating past the trap for the period j, Uj is the total number of unmarked fish captured that period, and $\hat{E}j$, is the estimated trap efficiency for the period/stratum j. Total migrant abundance is estimated as the sum of the stratum-specific abundance estimates.

Mark recapture estimators (such as DARR & GAUSS) generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging); (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

DARR 2.0 provides stratum-specific estimates of abundance for the aggregated data set, the standard error for each stratum-specific estimate, as well as the estimate of overall abundance and the standard error associated with the estimate of total abundance (Bjorkstedt 2005).

Trap Efficiency tests are done daily throughout the migratory year at each trap site. Trap efficiency is determined by releasing a known number of PIT-tagged or marked fish above each trap and enumerating recaptures. TE results are organized into (bi-weekly) strata for analysis.

Trap efficiency per stratum (j) was estimated by:

$\hat{E}j = Rj/Mj$

where $\hat{E}j$ is the estimated trap efficiency for week j, Rj is the number of marked fish recaptured during week j, and Mj is the number of marked fish released upstream during week j.

Our previous TE tests showed that most recaptures occurred within 24 hours of release. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not PIT-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals.

Out-migrant survival and run timing of PIT-tagged fish is estimated using the University of Washington Columbia Basin Research PIT-Pro Model (Lady et al. 2001; www.cbr.washington.edu). PIT-Pro generated survival estimates included a Cormack-Jolley-Seber point estimate and associated standard error (SE).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38)
Lower Mill Creek near the Wallula Road bridge (RM 3).

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $232900 (25.56%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring

	* Secondary R, M, and E Type : Status and Trend Monitoring
	* Secondary R, M, and E Focal Strategy : Hatchery
Locations:	2
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	US
NPCC Subbasin:	Walla Walla
State:	WA
HUC5 Watershed:	Multiple
County:	Walla Walla
HUC6 Name:	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized

144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Monitor salmonids leaving the upper Walla Walla River - spring/summer	3/1/2014	5/31/2014	Completed	Operate 5-foot rotary screw trap in spring
D. Monitor salmonids leaving the upper Walla Walla River - fall	11/1/2014	2/28/2015	Completed	Operate 5-foot rotary screw trap in fall
E. Monitor salmonids leaving lower Mill Creek - spring	3/1/2014	5/31/2014	Completed	Operate 5-foot rotary screw trap in spring
F. Monitor salmonids leaving lower Mill Creek - fall	11/1/2014	2/28/2015	Completed	Operate 5-foot rotary screw trap in fall
G. Submit PIT tag data to PTAGIS - spring	3/1/2014	5/31/2014	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
H. Submit PIT tag data to PTAGIS - fall	11/1/2014	2/28/2015	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
I. Review, organize and summarize results	11/1/2014	11/30/2014	Completed	Review, organize and summarize results for migration year 2012.
Deliverable: J. Out-migrant monitoring and PIT-tagging data		2/28/2015	Completed	*See the Deliverable Specification above*

I: 70. Install Fish Monitoring Equipment

Title: Upgrade and maintain PIT arrays

Description: The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) contacted Biomark to provide a cost estimate for upgrading exsisting PIT array systems in the Walla Walla subbasin.

CTUIR will upgrade, maintain and operate 6 PIT-Arrays in the Walla Wall subbasin. 2012 & 2013 we installed two new PIT arrays, one near the Mouth of the Walla Walla River (i.e. Pierces RV Park sit; RM 9) and one at McDonald Road Bridge (RM 29). In 2014, the CTUIR will assume operation and maintenance of four additional PIT arrays from the USFWS. CTUIR will contact Biomark to provide a cost estimate for upgrading existing PIT array systems at Oasis Road Bridge (RM 12),Burlingame Dam (RM 36), 3) Nursery Bridge Dam (RM 47) and Mill Creek Diversion Dam (RM12). The proposed upgrade will improve detection probability for out-migrating juvenile fish at each of these sites. In addition to the PRV and McDonald Road Bridge site these four sites are essential to continue PIT tag data for ongoing salmonid life cycle studies.

Deliverable Specification: CTUIR will maintain PIT arrays and fish detection data will be automatically uploaded each week.

Work Element Budget: $125000 (13.72%)

Locations: 5
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US
NPCC Subbasin: Walla Walla
State: Multiple
HUC5 Watershed: Multiple
County: Umatilla | Walla Walla
HUC6 Name: Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. CTUIR cultural survey	3/1/2014	8/31/2014	Completed	Complete cultural survey of PIT-system installation site.
D. Upgrade/install install PIT-tag System (Biomark tasks)	3/1/2014	8/31/2014	Completed	As needed to retrofit Biomark will deliver the components of a PIT-tag system including a transceiver enclosure, antennas, and power supply system and perform the following tasks : a. replace/repair PIT-tag antennas, exciter cable, terminate exciter cable at transceiver enclosures, b. Install PIT-tag electronics into the enclosure, c. Install the data logger electronics, d. Install power supply system, e. Characterize the system performance, f. Verify the system prior to departure from the site. g. Biomark will train project personnel on the overall operation of the PIT-tag system. This will include discussion of the transceiver, antennas, and data collection platform. Biomark will coordinate and plan all tasks with CTUIR.
E. Maintain PIT-tag system	3/1/2014	2/28/2015	Completed	Daily system status check to ensure the remote PIT tag detection system is uploading to the PTAGIS database and to CTUIR office in Walla Walla. Site visits as needed to ensure proper system operation.
Deliverable: F. PIT- Array Monitoring and Data Distribution		2/28/2015	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Juvenile fish habitat use (Telemetry)

Description: The migration of a significant portion of natural origin smolts from the South Fork to lower portions of the river in the fall and early winter means the lower river is an important habitat area. This effort is directed towards identifying what areas in the lower river are used for holding/rearing and how abundant such locations might be. such an examination would help determine if restoration efforts in the lower portions of the river should be directed toward providing adequate overwintering holding and rearing areas for spring Chinook

Methods
Fisheries staff will collect juvenile spring Chinook from the upper Walla Walla River rotary screw trap (rm 39). Collection of salmonids will be stratified through fall migration to avoid any temporal bias (e.g. 10 fish per week for 10 weeks). Tag implementation should begin when trapping begins in October or November depending on stream flow. Radio tags should continue to be implemented through December with manual tracking into February. Manual tracking will be conducted throughout the Walla Walla River from the rotary trap to the mouth of the River. Up to 50 Spring Chinook that fall within the size constraints determined by the tag size (Jonason, 2010) will be brought to the Water and Environmental Center and a Nanotag coded radio transmitter will be implanted. Surgically implanted radio tags should not exceed 4.4% of the body weight of any of the wild juvenile spring Chinook salmon (Adams et al. 1998). Implanting protocols should be derived from Adams et al. 1998. Tagged fish will be held for 24-48 hours prior to release. Tagged fish will be returned to the trap site and released. Radio tags will be activated at release.

After fish are released, fisheries staff will locate overwintering juvenile spring Chinook salmon that have radio tags. Stationary and mobile tracking techniques will be utilized to obtain relocations for all radio-tagged fish from October through April. Four stationary SRX 400 receivers will be positioned strategically in the middle and lower Walla Walla River. Stationary receivers will be downloaded weekly and subsequent relocations will yield broad scale stream reach occupancy. Data obtained from stationary receivers will be used to guide mobile tracking efforts and improve tracking efficiency by maximizing relocations per distance tracked. In addition, stationary receivers will enable relocations during inclement weather and when navigating the Walla Walla River is prohibited by unsuitable flows.

Mobile tracking will be conducted by boat in an attempt to completely track overwintering stream reaches at least once per week. Geographic coordinates will be obtained for each relocated fish using a hand-held global positioning system unit. In localized areas, mobile tracking along the Walla Walla River by foot will be implemented when environmental conditions necessitate such efforts. Specific information collected when a fish is located includes: tag number, GPS coordinate, habitat variables (e.g. water temperature, dissolved oxygen, depth, substrate, cover type – distance to cover and distance to bank).

Nanotag coded radio transmitters will be used for tracking juvenile salmon. The tags are relatively small in size; 0.25g

with dimensions of 5x3x10mm. The calculated battery life is 27 days with 8 seconds between bursts. Fish weighing greater than or equal to 8.5 g will be selected for coded radio tag implantation to ensure the transmitter to fish weight ratio remains less than 3.0%.
Stationary receivers (Lotek SRX_ 400 Telemetry Receiver) will be set up along the Walla Walla River, at Burlingame (rm 36), Garden City II (rm 30), Touchet -Gardena Rd. Bridge (rm 22) and Pierce's RV Park (rm 9).During mobile relocation of fish the data recorded will include:
• Tag number
• GPS location
• water temperature (ºC)
o depth (m)
o substrate
o cover type
o distance to bank
o mortality (if applicable)

The information collected will be analyzed to answer two key questions:
1) Where are juvenile spring Chinook salmon over-wintering; including location and micro-habitat variables.
2) Lower Walla Walla River distribution of juvenile spring Chinook; including areas of increased mortality.

Deliverable Specification: The deliverables are: 1) up to 50 juvenile CHS fitted w/ nano radio tags; 2) the error checked databases and data summaries; 3) fish habitat use; 4) distribution; and 5) detections at in-basin and mainstem interrogation sites.

Work Element Budget: $62600 (6.87%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Population Status

Locations: 4
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Country: US | **NPCC Subbasin:** Walla Walla
State: WA | **HUC5 Watershed:** Multiple
County: Walla Walla | **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Juvenile fish habitat use (Telemetry) - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized

115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural

Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Install telemetry stations	10/1/2014	11/30/2014	Completed	up three stationary SRX 4000 telemetry receivers will be positioned systematically on the mid – lower Walla Walla River. Stationary receivers will be maintained and downloaded weekly and subsequent relocations will yield broad scale stream reach occupancy. Data obtained from stationary receivers will be used to guide mobile tracking efforts and improve tracking efficiency by maximizing relocations per distance tracked.
D. Collect and tag up to 50 juvenile spring Chinook	10/1/2014	12/15/2014	Completed	Fisheries staff will collect juvenile spring Chinook from the Basel Cellars rotary screw trap. Up to 100 Spring Chinook that fall within the size constraints determined by the tag size (Jonason, 2010) will be brought to the Water and Environmental Center and a Juvenile Salmon Acoustic Telemetry System Acoustic Micro Transmitter (JSATS AMT) will be implanted.
E. Mobile track tagged fish	10/1/2014	2/28/2015	Completed	Mobile tracking will be conducted by boat in an attempt to completely track overwintering stream reaches at least once per week. Geographic coordinates will be obtained for each mobilly relocated fish using a hand-held global positioning system unit. In localized areas, mobile tracking along the Walla Walla River by foot will be implemented when environmental conditions necessitate such efforts. Specific information collected when a fish is located includes: tag number, GPS coordinate, microhabitat variables (water temperature, dissolved oxygen, depth, substrate, cover type – distance to cover and distance to bank).
F. Review, organize and summarize results	2/1/2015	2/28/2015	Completed	Review, organize and summarize results.
Deliverable: G. Nanotag coded radio transmitter telemetry data		2/28/2015	Completed	*See the Deliverable Specification above*

K: 157. Collect/Generate/Validate Field and Lab Data

Title: Steelhead spawning ground survey for biomonitoring plan

Description: Adult abundance and distribution will be estimated based on redd counts conducted in the treatment and control reaches. The entire length of the treatment and control reaches will be assessed and specific field protocols are detailed by Terraqua Inc. (2009a). Live fish and carcasses will also be documented to corroborate redd identification. Sampling will occur annually (a departure from the recommended protocol), commencing at the onset of the spawning season and continue approximately every 10–14 days until spawning is complete.
• Steelhead: mid-February to mid-May if flows permit

Deliverable Specification: Count and GPS reference summer steelhead redds in treatment reaches. Data derived from steelhead redd count surveys include:
1. Index temporal abundance of spawners
2. Estimate total abundance of spawning females
3. Determine spatial spawning distribution

4. Determine temporal spawning distribution

In addition to newly collected data, some of the basins have almost a decade of monitoring that has focused on adult counts (escapement) and redd counts for Chinook salmon and steelhead. Should such data exist for a given site (e.g., Pataha Creek), it may be incorporated as valuable baseline information.

Work Element Budget: $30000 (3.29%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations: 3
Primary Focal Species: Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Multiple
State: WA **HUC5 Watershed:** Multiple
County: Columbia | Garfield **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible) | Snake River Basin Steelhead DPS (Accessible) | Snake River Spring/Summer-run Chinook Salmon ESU (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Biomonitoring Program (2009-014-00) v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Biomonitoring Program (2009-014-00) v1.0
Protocol State: Expired
Protocol Owner: Kaylyn Costi
Sample Design: Steelhead spawning ground survey for biomonitoring plan - Umatilla Confederated Tribes (CTUIR): Walla Walla River v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Unknown
	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Unknown
	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Data input and Quality Control	3/1/2014	5/15/2014	Completed	Input data into computers and quality control checks against raw data sheets.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Tucannon River: Russell Spring Creek	3/1/2014	5/15/2014	Completed	Although Russell Spring Creek is the smallest of the eight restoration sites being recommended for monitoring under this plan, it represents a project that enhances important rearing and spawning habitat using low-cost treatment methods, in contrast to some of the other restoration efforts. Given its small size, no suitable control sites were identified for Russell Spring Creek; however, it is a candidate for conducting a Before-After (BA) analysis of restoration effectiveness (Green 1979, Downes et al. 2002). Although no data were collected prior to site treatment, steelhead and Chinook salmon were not present at the site prior to restoration efforts due to passage barriers.
E. Tucannon River: Pataha	3/1/2014	5/15/2014	Completed	Given the unique conditions of Pataha Creek within the Tucannon subbasin, there is no surrogate site appropriate to serve as a control. However the potential contributions of passage improvements on Pataha Creek are critically important to steelhead and Chinook salmon populations and therefore warrant evaluation. A before-after (BA) analysis of restoration effectiveness (Green 1979, Downes et al. 2002) can be applied on Pataha Creek based on adult and juvenile data collected upstream of RM 1 and RM 10 prior to passage improvements (see Section 7.1). WDFW operates a screw trap downstream on the main stem Tucannon River which can be used to detect downstream smolt migration. Downstream PIT tag arrays in the mainstem Tucannon will also provide an estimate of adult steelhead escapement otherwise difficult to make in during high flow events.
F. South Fork Touchet: Rainwater treatment area	3/1/2014	5/30/2014	Completed	The Rainwater Wildlife Area is highly valued for its restoration and enhancement potential and also the amount of available data. As such, it serves as an important site for inclusion in the comprehensive CTUIR biomonitoring plan. Upon review and discussion with CTUIR staff, treatment and control areas were both identified on the South Fork Touchet in an effort to reduce environmental and geomorphic variability that could results from using control sites in adjacent watersheds (Figures 11 and 12). The recommended treatment and control sites are 2.9 and 1.97 miles in length, respectively.
Deliverable: G. Steelhead redd counts		5/31/2014	Completed	*See the Deliverable Specification above*

L: 157. Collect/Generate/Validate Field and Lab Data

Title: Snorkel survey for biomonitoring plan

Description: We will use a standard snorkeling protocol developed by CRITFC for monitoring fish densities and fish assemblage structure using snorkel surveys (White et al. 2012). The Columbia River Inter-Tribal Fish Commission (CRITFC), Oregon Department of Fish & Wildlife (ODFW), and Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have recognized the need to use a common snorkel survey so that information collected by individual entities can help managers determine whether aggregate habitat restoration actions will yield a net improvement in basin-wide habitat quality for ESA listed fish species (NOAA 2007). To this end, we developed a snorkeling protocol drawing heavily from the protocols of Thurow (1994) and O'Neal (2007), intended for use among all agencies responsible for data collection in the upper Grande Ronde, Catherine Creek, Minam River, and potentially other nearby basins.

Methods for Snorkel Surveys
During base flow conditions after fish habitat surveys have been completed, fish abundance and size, along with a semi-quantitative description of fish assemblage structure, will be enumerated at each reach. It is important to note that although this snorkel survey occurs over the length of an entire reach, the data is collected at the channel unit scale. If snorkeling occurs in reaches where habitat surveys were conducted, the field crew should ensure that all channel units can be referenced to the corresponding channel units in the habitat survey.
A single snorkeler or a team of two snorkelers (depending on channel unit size and visibility, see below) will identify and count fish species and size classes in all slow water habitats (e.g., pools and runs) and 25% of all fast water, turbulent habitats (e.g., riffles, rapids, and cascades) . Fish counts will be standardized by area sampled and reported by habitat unit type and total reach densities. Before surveys commence each field season, snorkelers will spend a morning and/or afternoon training in habitat types where different species are likely to occur, and will calibrate estimates of fish length by using plastic cut outs of fish in 50 mm size classes. Periodic calibrations of fish size will ensure precise estimates. Field identification of fish species should be practiced and validated by occasional capture of fish using a hand net or electrofisher and checked against the keys of Bond (1973), Dauble (2009), Martinson et al. [no date], or other relevant sources. Plates of a few of the commonly-encountered fish species are kept on file for easy review.

Required Conditions for Snorkeling
? During low stream flows and when flow conditions are similar to those recorded during the habitat survey.
? When visibility is equal to or greater than 1.5 m (as measured by minimum distance that a plastic fish cut-out with parr marks can be discerned).
? Between late morning and early afternoon (i.e., 1000-1600 hrs) when the sun is directly overhead, or during cloudy or overcast conditions if reaches have significant cover.

? When both stream banks can be observed by a single observer, one snorkeler will be sufficient. When the stream is larger, two snorkelers are required.

Deliverable Specification: Completed and error checked snorkel survey data.

Work Element Budget: $24000 (2.63%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 3

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Multiple

State: WA **HUC5 Watershed:** Multiple

County: Columbia | Garfield **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible) | Snake River Basin Steelhead DPS (Accessible) | Snake River Spring/Summer-run Chinook Salmon ESU (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Snorkel survey for biomonitoring plan - Umatilla Confederated Tribes (CTUIR): Walla Walla v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized

357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Data input and Quality Control	7/15/2014	8/31/2014	Completed	Input data into computers and quality control checks against raw data sheets.
D. South Fork Touchet: Rainwater control area survey	7/15/2014	7/31/2014	Completed	Summer snorkel sampling of juvenile steelhead in the Rainwater control area will occur.
E. South Fork Touchet: Rainwater treatment area survey	7/15/2014	7/31/2014	Completed	Summer snorkel sampling of juvenile steelhead in the Rainwater control area will occur.
F. Tucannon River: Russell Springs - survey	8/1/2014	8/15/2014	Completed	Summer snorkel sampling in the Russell Springs area will occur.
G. Tucannon River: Pataha -Control area survey	8/1/2014	8/15/2014	Completed	Summer snorkel sampling in the Tucannon River control area will occur.
H. Tucannon River: Pataha- treatment area survey	8/1/2014	8/15/2014	Completed	Summer snorkel sampling in the Tucannon River treatment area will occur.
I. Review, organize and summarize results	8/16/2014	8/31/2014	Completed	Review, organize and summarize results
Deliverable: J. Snorkel Survey Data for CTUIR biomonitoring Plan		8/31/2014	Completed	*See the Deliverable Specification above*

M: 157. Collect/Generate/Validate Field and Lab Data

Title: Stream Gauge Monitoring and Data Distribution

Description: Stream Gauge Monitoring and Data Distribution

The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in 2011 began a local discussion in regards to the Washington Department of Ecology pulling back from its' commitment to monitor the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road (through the summer low flow period). As fish enhancement projects focused on listed species continue to occur within the Walla Walla Watershed the Walla Walla River discharge information continues to be a vital tool in the understanding of how much water is available and when it's available within the watershed. The WWBWC proposes to continue the gauging activity at the Pepper Bridge gauge, Beet Road Bridge gauge, Grove School Bridge gauge, McDonald Road Bridge gauge, and at the Pierce RV Park gauge.

The McDonald Road Bridge site has been listed as an area of concern by the WDFW during the low flow periods. The location downstream of the last major diversion (Garden City) and upstream of the Walla Walla River and Touchet River confluence and typically during low flow periods have flow levels below 20 cubic feet per second (cfs). In 2012 the Bergevin-Williams Diversion which was directly downstream of the McDonald Road Bridge was moved upstream as part of a diversion consolidation project. Of the 20 cfs in river at McDonald Road Bridge a portion of that flow was taken at the Bergevin-Williams diversion leaving very low surface flow remaining instream below the diversion. With the last major diversion upstream of McDonald Road Bridge starting in 2013 additional low surface flow pressure was placed on the McDonald Road reach. During one the WWBWC seepage assessments (July 17, 2013) the two immediate reaches below the McDonald Road Bridge gauge recorded flows of less than 5cfs.

C. Project Phases: The project is divided into three phases: Installation, Field Measurements, and Data Processing and Publishing.

Coordination and Planning: WWBWC will coordinate and plan all tasks with CTUIR. WWBWC is a subcontractor under this contract.

Deliverable Specification: WWBWC will maintain and install two air temperature sensors at the McDonald Road Bridge and the Pierce RV Park site and install a turbidity sensor at the Pierce RV Park site. We will provide continuous streamflow data for five gauge stations on the Walla Walla River. The WWBWC will also provide the publishing of provisional and confirmed data to the WWBWC website which is available to all agency partners. The WWBWC will also provide an annual report on the five Walla Walla River gauge sites at the end of the contract period.

Work Element Budget: $23000 (2.52%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Population Status

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US | **NPCC Subbasin:** Walla Walla

State: Multiple | **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Stream Gauge Supplementation (2010-051-00) v1.0

Study Plan Owner: James White

Protocol: Stream Gauge Supplementation (2010-051-00) v1.0

Protocol State: Draft

Protocol Owner: James White

Sample Design: Stream Gauge Monitoring and Data Distribution - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Installation	5/1/2014	6/30/2014	Completed	The first phase of the project will be the installation of the air temperature sensors at both the Pierce RV Park site and the McDonald Road Bridge Gauge site along with installing a turbidity sensor at the Pierce RV Site.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Field measurments	3/1/2014	2/28/2015	Completed	Field Measurements: The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
E. Data processing and publishing	3/1/2014	2/28/2015	Completed	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Realtime Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements.
Deliverable: F. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/28/2015	Completed	*See the Deliverable Specification above*

N: 28. Trap and Haul

Title: Fish Salvage

Description: Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.

Deliverable Specification: Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.

Work Element Budget: $30000 (3.29%)

Planned Metrics: # of fish transported: 2800

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)

Country: US | **NPCC Subbasin:** Walla Walla

State: WA | **HUC5 Watershed:** Middle Walla Walla River

County: Walla Walla | **HUC6 Name:** Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2014	3/1/2014	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Rescue and haul fish	3/1/2014	2/28/2015	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/28/2015	Completed	*See the Deliverable Specification above*

O: 162. Analyze/Interpret Data

Title: Analyze Data

Description: The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning, and water management regimes, are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements listed

	above, or elsewhere) to construct cohort lineages and run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed “run re-construction”, is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin. WDFW will also compile bull trout spawning data for the Touchet Basin, and assist as necessary in upper Mill Creek, as an index of adult abundance and trends.
Deliverable Specification:	The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult, and run reconstruction estimates.
Work Element Budget:	$56000 (6.15%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Tributary Habitat
Locations:	
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:		**NPCC Subbasin:**	
State:		**HUC5 Watershed:**	
County:		**HUC6 Name:**	

Salmonid ESUs Present:	
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized

447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA

Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2014	3/1/2014	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Coordinate analysis with WDFW and WDFW Snake River Lab	11/1/2014	11/30/2014	Completed	Work with WDFW to analyze all available data and summarize results.
C. Analyze adult enumeration data	10/1/2014	11/30/2014	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Analyze smolt and PIT-tag data	10/1/2014	11/30/2014	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
E. Analyze Spawner / Carcass data	10/1/2014	11/30/2014	Completed	Analyze and interpret spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
F. Analyze radio telemetry data	10/1/2014	11/30/2014	Completed	Analyze and interpret Radio telemetry data. Results will be used to describe juvenile fish distribution and over winter habitat use in the mainstem Walla Walla River.
Deliverable: G. Analyzed data		11/30/2014	Completed	*See the Deliverable Specification above*

P: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: All administrative tasks shall be fulfilled on time and with quality products. Timely responses to requests for more information are required. Proactive communication between the contractor and BPA's Contracting Officer (CO) and Contracting Officer Technical Representative (COTR) is required if a significant lag in scheduled delivery is expected.

Work Element Budget: $24000 (2.63%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Begin drafting contract renewal documents and conduct internal review as needed	10/1/2014	10/31/2014	Completed	Your statement of work, line-item budget, and (if required) property inventory for your next contract are due to BPA at least 5 months prior to the contract start date (longer if your internal processes require more time to get the contract signed and in place prior to the start date).
B. Submit contract renewal package (SOW, Excel budget, property inventory) to BPA COTR	10/15/2014	10/31/2014	Completed	Once your statement of work (SOW) in Pisces is complete, and you have attached your line-item budget (LIB) and property inventory (PI) (if required), click the “Submit” button on the SOW tab to notify your COTR the package is ready for review.
C. Address comments and revise SOW, LIB, and PI as needed to get BPA manager approval	11/1/2014	12/31/2014	Completed	Once your COTR and his or her BPA manager have reviewed your contract renewal package and returned any comments to you, you will need to provide responses and changes as needed to achieve approval from the BPA manager, who will then forward the package to the Contracting Officer. This should be completed at least two months prior to the next contract start date, but may need to be 3 or 4 months depending on your internal processing time for contract signatures. If you have subcontracts that need to be signed prior to the contract start, it should be a minimum of 4 months.
D. Return signed contract to BPA’s Contracting Officer within 30 days	1/1/2015	1/31/2015	Completed	Respond to the CO and COTR indicating any problems with the contract within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days.
E. Submit final invoice for prior contract within 90 days to facilitate contract closeout	3/1/2014	5/31/2014	Completed	Within 90 days of the last day of the PRIOR contract, the contractor shall issue a final invoice. In instances where more than 90 days is needed (e.g., because subcontractors have not invoiced), the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount shall be emailed to FWinvoices@bpa.gov and the COTR.
F. Accrual - Submit September estimate to BPA	8/10/2014	9/10/2014	Completed	Provide BPA with an estimate of contract work that will occur prior to September 30 but will not be billed until October 1 or later. Data must be input in to Pisces by September 10 (begins Aug 10, ends Sep 10).
G. Ignore/Cancel milestone	3/1/2014	3/1/2014	Completed	Could not delete this "extra" accrual milestone. Please ignore.
H. Facilitate inputting Cost Share information into Pisces at the Project level	9/30/2014	11/15/2014	Completed	If there are multiple contractors under this project, and you are the lead project Proponent, solicit cost share information for the previous federal FY from project partners and enter previous FY’s Cost Share information on the Project Cost Share tab by Nov 15 for all project partners.
I. Submit invoices to BPA	3/1/2014	2/28/2015	Completed	Submit invoices to BPA consistent with the requirements described in BPA's contract management manual
J. Coordinate w/ COTR & WDFW on next year's SOW	10/1/2014	12/31/2014	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
K. Attend AFS Western Division meeting	4/6/2014	4/12/2014	Active	Attend AFS Western Division Meeting to present project findings Abstract: Walla Walla spring Chinook reintroduction with continued research, monitoring and evaluation. The goals of the Confederated Tribes of the Umatilla Indian Reservation for Walla Walla Basin spring Chinook are to provide treaty and non-treaty fisheries in the basin, and to restore natural spawning. The purpose of the proposed hatchery program is to contribute to harvest and natural spawning in the near term. This is to be done in a manner consistent with the longer-term goal of re-establishing a self-sustaining, naturally spawning population through an “all-H” approach that includes hatchery production and improvements in habitat and fish passage. The program’s design is proposed to end the current dependence on imported broodstock, improve survival through local adaptation, and meet harvest and natural spawning objectives. Implementation is proposed to occur in three phases: 1) establishment of local stock, 2) transition, and 3) natural production focused with integrated harvest. Transitions from one phase to another will be based on the performance of hatchery and naturally spawning fish as measured by the proposed Walla Fish Production, Research, Monitoring & Evaluation Plan. This work is being funded under a contractual agreement with the Bonneville Power Administration which includes the implementation of artificial production in support of mitigation efforts related to Columbia River dams.

				Juvenile Spring Chinook Salmon Overwinter Rearing Habitat Use in the Walla Walla River The historic distribution and overwinter rearing habitat use of spring Chinook in the Walla Walla River is unknown. However, the documented migration of a significant portion of juvenile spring Chinook salmon from the South Fork Walla Walla River into to lower portions of the Walla Walla River in the fall and early winter suggests that the lower river is an important habitat area (Mahoney et al 2013). This study was designed toward identifying what areas in the lower river are used for holding/rearing and how abundant such locations might be. Such an examination would help determine if restoration efforts in lower portions of the river should be directed toward providing adequate overwintering holding and rearing areas for spring Chinook.
L. Attend NWFCC	11/1/2014	12/15/2014	Completed	CTUIR is hosting the Northwest Fish Culture Conference in Mission OR, assist with conference hosting.
Deliverable: M. All administrative tasks fulfilled with timely quality products		2/28/2015	Completed	*See the Deliverable Specification above*

Q: 141. Produce Other Report

Title: Produce BiOp RPA Report for Calendar Year 2014

Description: BiOp RPA Reporting Requirements.

This project supports an ESA BiOp RPA (RPA64.2), therefore the CTUIR and WDFW are required to electronically submit a Final Annual BiOp RPA Report of work conducted for calendar year 2014 for upload into Taurus. This BiOp RPA report is required annually on all declared BiOp RPA associations.

The online BiOp RPA report in Taurus (https://www.cbfish.org) should include the data, analyses, and data management completed by your project by December 31, 2014. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent RPA report.

For each RPA, follow the directions in Taurus for each of the three sections and as appropriate input graphical or tabular data, accompanied by explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

For detailed information on how to access and produce this report please see "Sponsor Reporting Procedural Guidance" in Pisces. To find this procedural guidance document go to https://www.cbfish.org, select the "Login In" link at the upper right of corner. Enter your project number or name in the upper right of the search box. Select "Reports & Documents tab on left. Select "BiOp Annual Report." The "Sponsor Reporting Procedural Guidance" is a link directly below "1. Enter Basic Report Information." If you need further assistance please contact your PM/COTR.

Deliverable Specification: BiOp RPA Report: This project requires a 2014 BiOp Annual RPA report.

Work Element Budget: $5000 (0.55%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. BiOp RM&E Projects: RPA reporting – download your associated RPA questions from Taurus	6/1/2014	8/31/2014	Completed	To prepare for your RPA report, go to Taurus (www.cbfish.org) and find your RPA reporting requirements (those with "Input Needed") so you will know how much time to set aside for this task. (Milestone start/end: June 1 – August 31)
B. BiOp RM&E Projects: RPA reporting - complete draft calendar year report in Taurus	9/15/2014	1/15/2015	Completed	When you are done, email RMEsupport@bpa.gov and the COTR to send them your working draft in Word or to notify them to review in Taurus. (Milestone start/end: September 15 - January 15)
C. BiOp RM&E Projects: RPA reporting – finalize the calendar year 2014 RPA report in Taurus	1/16/2015	2/28/2015	Completed	The final version is due 75 days after the end of the calendar year. (Milestone start/end: January 16 - February 28 (last day of contract).

Milestone Title	Start Date	End Date	Status	Milestone Description
Deliverable: D. Attach Annual RME 2014 Technical Report & BiOp RPA Report in Pisces		2/28/2015	Completed	*See the Deliverable Specification above*

R: 132. Produce (Annual) Progress Report

Title: Submit RME Annual Technical Progress Report (1-1-2014) to (12-31-2014)

Description: RME Technical Annual Progress Reporting Requirements:

Due to BPA RM&E reporting needs WDFW & CTUIR will submit a joint RME Annual Technical Progress Report (Report) for calendar year 2014 (1/1/14 thru12-31-14). This Report should be submitted using the template available in Taurus (https://www.cbfish.org, go to your project, click on Reports & Documents, then go to the RM&E Technical Report tab).

The Report will be a deliverable under this CTUIR contract.

This report will summarize results from 1-1-14 through 12-31-14 time frame. The progress report summarizes the project goal, objectives, hypotheses, completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning. Examples of long-term planning include future improvements, new directions, or level of effort for contract implementation, including any ramping up or ramping down of contract components or of the project as a whole.

If desired, additional reporting of information relating to this contract can be added at the end of the report.

The calendar year calendar year 2013 RME Techinal Annual report is uploaded under contract 60695.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web. This report will summarize results from 1-1-14 through 12-31-14 time frame.

Work Element Budget: $5000 (0.55%)

Planned Metrics:
* Start date of reporting period : 1/1/2014
* End date of reporting period : 12/31/2014

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Prepare for calendar year 2014 RM&E annual technical reporting	3/1/2014	3/31/2014	Completed	Updated reporting requirements apply to BPA fish and wildlife project sponsors who have the following work elements in their contract(s): 70 Install Equipment, 156 Develop RM&E Methods and Designs, 157 Collect/Generate/Validate Field and Lab Data, 158 Mark and Tag Animals, 159 Transfer/Consolidate Regionally Standardized Data, 160 Create/Manage/Maintain Database, and/or 162 Analyze/Interpret Data. Due to regulatory reporting requirements, BPA needs all sponsors to have draft reports submitted January 15 and final reports completed no later than the end of March to align with BPA's BiOp reporting timelines. Review all documentation and training materials in Taurus (www.cbfish.org) and create the report template for your technical report so you will know whether, or how much, your report will need to change to meet the new requirements. https://www.cbfish.org/Content/tutorials/Sponsor_Reporting_Procedural_Guidance_Final%202-14.docx. (Milestone start/end: Mar 1-31)
B. Draft calendar year 2014 RM&E Technical Report and email MS Word version for BPA review	9/15/2014	1/15/2015	Completed	Use Taurus to create a template for your technical Annual Progress Report. Building off last year's report, develop a draft report on RM&E and data management actions and discuss relevancy of results to the Fish and Wildlife Program. Your report should include the data, analyses, and data management completed by your project by December 31st, 2014. Any activity after the last day of the Calendar Year should be included in a subsequent report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent report. Upon completion, email a draft to your COTR and RMEsupport@bpa.gov for BPA review of the draft. (Milestone start/end: September 15 - January 15)

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Submit progress report for internal contractor review	11/1/2014	11/15/2014	Completed	Use this milestone if the annual report requires an internal review before being reviewed externally. Make sure to allow for both technical and policy reviews if necessary.
D. Submit progress report for external review	11/16/2014	11/30/2014	Completed	Use this milestone if the progress report requires external review.
E. Upload MS Word calendar year 2014 FINAL RM&E Annual Technical Progress Report	1/16/2015	2/28/2015	Completed	Address BPA comments and upload FINAL RME Annual Technical Progress Report into Pisces Attachments tab as an MS Word document as a "Technical, Draft." Upon completion, email draft to COTR and RMEsupport@bpa.gov (Note: This MS Word format is a change in policy. BPA staff will now convert it to a PDF).
Deliverable: F. Attach 2014 RME Annual Technical Progress Report in Pisces		2/28/2015	Completed	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	68666	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$594,748	**Perf. Period:**	3/1/2015 - 2/29/2016
Contract Type:	Contract (IGC)	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 09/26/2016 with 0 problems, and 1 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and efw.bpa.gov.

The Walla Walla subbasin supports ESA listed populations of steelhead and bull trout, and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Spring Chinook were extirpated from the Walla Walla in the early 20th century. For the past 25 years the CTUIR and others have implemented numerous passage, flow, and habitat to improve salmonid production in the Subbasin.

The Tribes Walla Walla Spring Chinook program began in 2000 with the outplanting of hatchery adults collected from the Ringold Hatchery, Carson National Fish Hatchery, and the Umatilla River at Three Mile Falls Dam. Direct stream release of hatchery reared juveniles began in 2005 using Carson stock from the Carson National Fish Hatchery. Monitoring & Evaluation of the Spring Chinook Program began in 2000. The work included assessment of spring Chinook and steelhead natural production, and evaluation of fish passage based on adult steelhead and bull trout. In 2007 CTUIR, WDFW, and BPA developed a collaborative M & E program in the Subbasin based on salmonid VSP Parameters of abundance, productivity, diversity, and spatial structure. The expanded project was designed to provide high level indicators of fish population status and trends for spring Chinook, steelhead, and bull trout. This information is used to inform the CTUIR first foods management, and to address BPA fish and wildlife program strategies.

The purpose of this M & E project is to addresses the adaptive management requirements of the Spring Chinook Program, and to maintain the baseline monitoring needed by the existing management system. This effort includes an ecosystem-based scientific framework for adaptive management and performance evaluation based on measurements of success and monitors of risk to other species and populations. The techniques and designs used for implementation and detailed methodology can be found online at www.monitoringmethods.org. This collaborative effort is funded by the Columbia River Fish Accords. Our M & E objectives were developed based on the requirements of the Walla Walla Spring Chinook Hatchery Master Plan (HMP), BPA's Fish Management Sub-strategies, the Reasonable and Prudent Alternatives (RPA's) of the Columbia Power System Biological Opinion, and the existing comprehensive fish restoration program. Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for the objectives and technical methodology.

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (efw.bpa.gov).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Brenda Aguirre	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5928 / NA	baguirre@bpa.gov	PO Box 3621 Mail Stop ECF-4 Portland OR 97208
Amber McMahon	Contracting Officer	Bonneville Power Administration	(503) 230-3983 / NA	almcmahon@bpa.gov	P.O. Box 3621 Mailstop - NSSP Portland OR 97208-3621
Sang Seon Yun	Technical Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7541 / NA	sang-seonyun@ctuir.org	CTUIR DNR Fisheries Program 500 Tausick Way Walla Walla WA 99362-9267
Alexandra Fitzgerald	Interested Party	Washington Department of Fish and Wildlife (WDFW)		alexandra.fitzgerald@dfw.wa.gov	

Work Element Budget Summary:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		$5,400	(0.55%)

B :	165. Produce Environmental Compliance Documentation - Compliance for WEs C thru J		$10,822	(1.11%)
C :	28. Trap and Haul - Fish Salvage	*	$30,000	(3.07%)
D :	70. Install Fish Monitoring Equipment - Upgrade and maintain PIT arrays	*	$132,600	(13.60%)
E :	158. Mark/Tag Animals - PIT Tag smolts (out-migrant tagging)	*	$56,300	(5.77%)
F :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$5,000	(0.51%)
G :	157. Collect/Generate/Validate Field and Lab Data - Adult fish counts at Nursery Bridge Dam (video work)	*	$108,600	(11.13%)
H :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates	*	$81,500	(8.35%)
I :	157. Collect/Generate/Validate Field and Lab Data - Outmigrant monitoring for population estimates, survival, & migration	*	$313,681	(32.17%)
J :	157. Collect/Generate/Validate Field and Lab Data - Stream Gauge Monitoring and Data Distribution	*	$22,000	(2.25%)
K :	162. Analyze/Interpret Data - Analyze Data		$54,300	(5.56%)
L :	132. Produce (Annual) Progress Report - RME Annual Technical Progress Report (1-1-2015) to (12-31-2015)		$20,822	(2.13%)
M :	202. Produce BiOp RPA Report - BiOp RPA Report for Steelhead CY 2015		$3,000	(0.30%)
N :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$54,300	(5.56%)
O :	122. Provide Technical Review and Recommendation - Quantitative Science and technical support for M & E plan implementation		$76,600	(7.85%)
		Total:	$974,925	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $5400 (0.55%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2015 (3/1/2015 - 6/30/2015)	7/1/2015	7/15/2015	Completed	
B. Jul-Sep 2015 (7/1/2015 - 9/30/2015)	10/1/2015	10/15/2015	Completed	
C. Oct-Dec 2015 (10/1/2015 - 12/31/2015)	1/1/2016	1/15/2016	Completed	
D. Final Jan-Feb 2016 (1/1/2016 - 2/29/2016)	2/15/2016	2/29/2016	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C thru J

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements D through X. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $10822 (1.11%)

Planned Metrics:
* Are herbicides used as part of work performed under this contract?: No
* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: Yes

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Obtain BPA's EC Lead sign-off that EC requirements are complete	3/1/2015	3/1/2015	Completed	The EC? column on the contract SOW tab in Pisces must have a "full moon" for each work element requiring environmental compliance before ground-disturbing implementation of that work element can begin. You will receive verbal or email notification from the EC Lead when a work element or, in rare instances, a portion of a work element is approved for implementation.
B. Determine if contract work could adversely affect Pacific lamprey	3/1/2015	3/1/2015	Completed	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf (BMPs).
C. Report lamprey observation and catch data to USFWS by Feb. 15	2/15/2016	2/15/2016	Completed	[IF ALL WORK UNDER THE SOW IS IN SUBBASINS BLOCKED TO ANADROMOUS SPECIES, ASK YOUR COTR TO CANCEL THIS MILESTONE.] All contractors doing instream work (e.g., surveys, habitat improvements, electrofishing, screwtraps, etc.) in anadromous fish areas are required to annually report lamprey observations or catch, including zero, by Feb 15 for the previous calendar year's work. A data template is available at: (https://efw.bpa.gov/contractors/docs/Lamprey_Database_Template.xls) As per instructions on the form, email your data to christina_luzier@fws.gov at US Fish and Wildlife Service and CC your COTR. For identification of lamprey life stages see page 10 of USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2015	2/29/2016	Completed	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.coastal.ca.gov/ccbn/bmp-boaters.pdf -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.clr.pdx.edu/publications/files/OR_ANS_Plan.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.idahoag.us/Categories/Environment/InvasiveSpeciesCouncil/documents/Idaho%20Aquatic%20Nuisance%20Species%20Plan.pdf
E. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2015	2/29/2016	Completed	Prevent spread of invasive species
F. Complete and document public involvement activities and provide to EC Lead	3/1/2015	3/1/2015	Completed	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
G. Participate in ESA Consultation	3/1/2015	2/29/2016	Completed	Work may include drafting BA, completing HIP III BO Project Notification Form, submitting high risk project designs to Restoration Review Team (RRT), providing copy of Section 10, 4(d), or 6 permit, etc., or submitting Hatchery Genetic Management Plan to BPA for ESA consultation initiation, and providing input for the ensuing consultation.
H. Participate in Cultural/Historic Resource Consultation	3/1/2015	2/29/2016	Completed	BPA must initiate the Sec. 106 consultation – sponsors cannot do this themselves. Provide the EC Lead with appropriate information to help them initiate Sec. 106 consultation (examples include maps, a detailed project description, GIS data, etc.). Provide this information to your EC Lead early to avoid affecting your construction schedule. Section 106 consultations typically take 4 months to complete, assuming access is available for survey fieldwork (e.g., weather permitting). If the EC Lead and sponsor have agreed that the sponsor will be responsible for contracting out some of the compliance work (such as surveys), the EC Lead will assist the project sponsor in drafting a SOW for the contract to ensure that the appropriate methodology and deliverables are included. Survey methods and the area of potential effects map needs to be shared and reviewed by BPA archaeologists and the SHPO prior to initiation of cultural resources fieldwork. The EC Lead will include this information in the letter initiating consultation with the SHPO/THPO and tribes. Draft cultural resource survey reports must be submitted to the BPA archaeologist for review. Any comments resulting from this review need to be addressed in the final report. BPA, or another federal cost share partner if they have been determined the lead for consultation, has the sole authority to submit the final survey report to the SHPO/THPO. Submitting these reports yourself or having your consultant submit them will only result in delays to your approval.
I. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2015	3/1/2015	Completed	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits.
J. Keep JARPA permit updated	3/1/2015	2/29/2016	Completed	For rotary screw traps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.
Deliverable: K. Compliance achieved and documented		3/1/2015	Completed	*See the Deliverable Specification above*

C: 28. Trap and Haul

Title: Fish Salvage

Description: Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as

	needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.
Deliverable Specification:	Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.
Work Element Budget:	$30000 (3.08%)
Planned Metrics:	# of fish transported: 2800
Locations:	1
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)
Country:	US
NPCC Subbasin:	Walla Walla
State:	WA
HUC5 Watershed:	Middle Walla Walla River
County:	Walla Walla
HUC6 Name:	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Rescue and haul fish	3/1/2015	2/29/2016	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/29/2016	Completed	*See the Deliverable Specification above*

D: 70. Install Fish Monitoring Equipment

Title:	Upgrade and maintain PIT arrays
Description:	CTUIR will continue to upgrade, maintain and operate to 11 PIT-Arrays in the Walla Walla subbasin at 8 locations. In 2015, CTUIR will contact Biomark to provide a cost estimate for upgrading existing PIT array systems at Oasis Road Bridge (RM 12), and install a new PIT array near the end of the Concrete channel in Mill Creek (RM 6). The proposed upgrade will improve detection probability for out-migrating juvenile fish at each of these sites. In addition to the 11 arrays are essential to continue to collect PIT tag data for ongoing salmonid life cycle studies.
Deliverable Specification:	CTUIR will maintain PIT arrays and fish detection data will be automatically uploaded each week.
Work Element Budget:	$132600 (13.60%)
Locations:	5
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	US
NPCC Subbasin:	Walla Walla
State:	Multiple
HUC5 Watershed:	Multiple
County:	Umatilla | Walla Walla
HUC6 Name:	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2015	3/1/2015	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and and has been "Proposed", but still needs to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Upgrade/install install PIT-tag System (Biomark tasks)	8/1/2015	10/31/2015	Completed	As needed to retrofit Biomark will deliver the components of a PIT-tag system including a transceiver enclosure, antennas, and power supply system and perform the following tasks : a. replace/repair PIT-tag antennas, exciter cable, terminate exciter cable at transceiver enclosures, b. Install PIT-tag electronics into the enclosure, c. Install the data logger electronics, d. Install power supply system, e. Characterize the system performance, f. Verify the system prior to departure from the site. g. Biomark will train project personnel on the overall operation of the PIT-tag system. This will include discussion of the transceiver, antennas, and data collection platform. Biomark will coordinate and plan all tasks with CTUIR.
D. Maintain PIT-tag system	3/1/2015	2/29/2016	Completed	Daily system status check to ensure the remote PIT tag detection system is uploading to the PTAGIS database and to CTUIR office in Walla Walla. Site visits as needed to ensure proper system operation.
Deliverable: E. PIT-Array Monitoring and Data Distribution		2/29/2016	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag smolts (out-migrant tagging)

Description: Estimates of smolt run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 8,000 run of the river out-migrant salmonids for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery salmonid production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain two rotary screw traps and PIT-tag up to 8,000 run of the river out-migrant salmonids. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating spring Chinook and summer steelhead. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 natural origin out-migrant spring Chinook
3,000 natural origin out-migrant steelhead

Work Element Budget: $56300 (5.77%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 8000

Locations: 2

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Order PIT tags in TDI system	9/1/2015	2/29/2016	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag steelhead out-migrants - spring	3/1/2015	5/31/2015	Completed	Up to 3,000 (total for the year) run of the river out-migrant steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag steelhead out-migrants - fall	11/1/2015	2/29/2016	Completed	Depending on adequate stream flow and conditions, up to 3,000 run of the river out-migrant steelhead (total for the year) will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. PIT-Tag spring Chinook out-migrants - spring	3/1/2015	5/31/2015	Completed	Up to 5,000 run of the river out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
F. PIT-Tag sprng Chinook out-migrants - fall	11/1/2015	2/29/2016	Completed	Depending on adequate stream flow and conditions, up to 5,000 (for the brood year) out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
G. Submit PIT-tag data to PTAGIS-spring	3/1/2015	5/31/2015	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
H. Submit PIT-tag data to PTAGIS-fall	11/1/2015	2/29/2016	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
Deliverable: I. PIT tagged outmigrants		2/29/2016	Completed	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title: PIT Tag smolts (hatchery tagging)

Description: Estimates of out migrant run timing, abundance, and survival based on PIT-tag detections are key components for assessing the performance of hatchery-origin fish relative to naturally-produced fish and necessary for determining the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

This WE is an in-kind collaboration between the USFWS and the CTUIR. The CTUIR supplies 5,000 PIT-tags and pays to have a PIT-trailer delivered to the Hatchery tagging site (e.g. Carson NFH). The USFWS then provides labor and ancillary support to PIT-tag 5,000 spring Chinook smolts. This marking effort represents about 2% of the 250,000 total fish the release to the South Fork Walla Walla River each year for the Tribe. These tagging levels will allow for estimates of smolt survivals and run timing to McNary Dam, and for smolt to adult survival back to the subbasin. USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 5,000 hatchery spring Chinook and and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $5000 (0.51%)

Planned Metrics:

* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 5000

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US **NPCC Subbasin:** Walla Walla

State: OR **HUC5 Watershed:** Upper Walla Walla River

County:	Umatilla	**HUC6 Name:**	Lower South Fork Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Order PIT tags in TDI system	9/1/2015	2/29/2016	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag hatchery spring Chinook	11/1/2015	11/30/2015	Completed	PIT tag Up to 5,000 hatchery spring Chinook for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: D. PIT tag Hatchery smolts		11/30/2015	Completed	*See the Deliverable Specification above*

G: 157. Collect/Generate/Validate Field and Lab Data

Title: Adult fish counts at Nursery Bridge Dam (video work)

Description: We will estimate adult abundance at index areas based on adult outplants, adult ladder and weir counts in the upper WWR (above NBD), Mill Creek (above Bennington Dam), Coppei Creek, and Upper Touchet River (above DAT). Because there are no counting stations on the lower Walla Walla River, fish counts from the upper subbasin are used to estimate adult returns. Returns to NBD (rkm 71.9) on the mainstem, Mill Creek Division Dam (rkm 16.9), and Dayton Dam (rkm 86.9) on the Touchet River will be used to provide an index of adult returns by species. Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under separate contract. We are also deploying multiple PIT arrays to improve total adult population abundance estimates (e.g. PIT array systems). Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns.

Although, counts at these sites are incomplete due to some upstream passage without detection and downstream spawning, these sites represent the best index of adult return currently available for those tributaries. Enumeration will occur year round to encompass the known adult migration for spring Chinook, summer steelhead, and bull trout. Enumeration at Nursery Bridge Dam will use video counts, whereas Mill Creek will rely on PIT-tag detections only, and the Dayton Weir will rely on trapping and handling. Past escapement counts are minima because they have not been corrected for error. We will generate estimates of SE and 95% CI based on mark recapture tests for all our adult abundance estimates .

Data collected from the video counting included date, time, species, size (e.g., jack or adult for spring Chinook salmon), life stage (e.g., steelhead kelts), origin (e.g., adipose clip or unclipped) and migration direction for bull trout. Video counts are not reliable for fish less than 30.5 cm. Notations were also made of other species encountered and general fish condition. Daily fish tallies from both ladders were posted to an onsite tally board for the public. The deliverable for this work was an error-checked database of daily fish counts.

At video facilities an underwater video camera activated by a motion detector was linked to a DVR at each site to capture a video image of passing fish. Overhead dusk-to-dawn lights will be operated at each site. The stations will be checked and downloaded daily. Downloaded video clips will be archived with CTUIR and housed in the data repository.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam, Dayton Dam, and in Coppei Creek. This contract only covers Nursery Bridge Dam; WDFW will operate at the facilities in Washington. Data is accessible through CTUIR's website and is also kept in project staff's office.

Work Element Budget: $108600 (11.14%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	OR	**HUC5 Watershed:**	Middle Walla Walla River
County:	Umatilla	**HUC6 Name:**	Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Adult fish counts at Nursery Bridge Dam (video work) - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2015	3/1/2015	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2015	2/29/2016	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/1/2015	2/29/2016	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - spring/summer	3/1/2015	7/31/2015	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
F. Maintain video monitoring equipment @ Nursery Bridge Dam - fall/Winter	9/1/2015	2/29/2016	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
G. Review, organize and summarize video results	11/1/2015	2/29/2016	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: H. Adult fish count from Nursery Bridge Dam		2/29/2016	Completed	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts (see WE C, adult enumeration) combined with redd and carcass counts (Crawford et al. 2007; Gallagher et al. 2007) will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River - The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. Care is taken not to disturb spawning fish or redds.

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla

	drainage.			
Work Element Budget:	$81500	(8.36%)		
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery			
Locations:	4			
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU			
Country:	US	**NPCC Subbasin:**	Walla Walla	
State:	Multiple	**HUC5 Watershed:**	Multiple	
County:	Umatilla | Walla Walla	**HUC6 Name:**	Multiple	
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)			
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0			
Study Plan Owner:	Brian Mahoney			
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0			
Protocol State:	Draft			
Protocol Owner:	Travis Olsen			
Sample Design:	Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0			

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft

847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2015	3/1/2015	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2015	2/29/2016	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/31/2015	2/29/2016	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Pre-spawn carcass survey in lower walla walla river	7/1/2015	7/31/2015	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of adult returns over the spawning season and will be done in the lower walla Walla Walla River and lower Mill Creek; to locate fish that do not ascend into the spawning grounds.
F. Spring Chinook redd/carcass surveys	8/1/2015	9/30/2015	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
G. All fish snouts sent to ODFW Mark Process Center	10/1/2015	10/31/2015	Completed	We will send collected snouts in to the ODFW Mark Precess center to read CWT from fish collect during the survey.
H. Collect genetic samples from carcasses	7/1/2015	10/31/2015	Completed	Fin clips will be collected during spawning ground surveys and sent to CRITFC for analysis.
Deliverable: I. Spring Chinook spawner/ carcass survey data		10/31/2015	Completed	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Outmigrant monitoring for population estimates, survival, & migration

Description: Smolt escapement to the mouth of the Walla Walla and to McNary Dam will be estimated for spring Chinook and steelhead by applying an estimated Cormack-Jolly Seber survival probability to fish injected with a PIT tag. Prior to each tagging season the Sample Size 1.3 program will be used to determine the number of tags needed to estimate survival rates at the desired levels of precision. We estimate a sample size of 3,600 to 6,200 spring Chinook should provide a 10% coefficient of variation (CV) to Burlingame and McNary Dams, respectively.

Smolt production monitoring will be conducted in the mainstem Touchet River, the Walla Walla River near the Oregon state line, and in lower Mill Creek (Volkhardt et al. 2007, Mahoney et al. 2013, Mendel et al. 2014). Out-migrating naturally produced salmonids captured at the smolt traps will be PIT tagged so we can evaluate juvenile run timing and survival to McNary Dam, as well as to evaluate adult return timing and survival. A sub-sample of tagged fish will

be scale-sampled, weighed, and photographed for growth and morphometric information.
Multiple PIT tag arrays have been set up in the Walla Walla River, Mill Creek and in the Touchet River to help us understand run timing, survival, and to estimate adult returns, adult-to-adult productivity or smolt to adult survival. The location of rotary screw traps and PIT-tag arrays in the Walla Walla Subbasin are shown in (Figure 36). Previously used smolt trapping sites in the lower Walla Walla River have been abandoned because of maintenance and debris issues but may be revised in the future (Mahoney et al. 2012).

Natural smolt abundance will be estimated for both the upper Walla Walla River (i.e. Basel Cellars site) and lower Mill Creek trap locations. Screw traps will be installed by October and run continuously as stream conditions allow into June. The traps are not operated during periods of high/low stream flow (e.g. between 2000 and 200 CFS), peak hatchery releases, and extreme cold and ice. To estimate potential juvenile migrants passing when the trap was not operated for short intervals (= 5 days) we will calculate the mean number of fish trapped for three days before and three days after non-trapping periods. To estimate numbers of fish emigrating past the trap when the trap was not operated for long durations (6 days or more), we used a within year regression of daily stream flow and daily number of natural-origin outmigrants (by size category) captured for the following periods: October-December, January-March, and April-May. The mean number of fish passed is then divided by the estimated trap efficiency to calculate daily fish passage.

Natural salmonid abundance is estimated for the Walla Walla River using a stratified Petersen/Darroch estimator (DARR 2.02, Bjorkstedt 2005 and 2009). DARR 2.02 uses Darroch's (1961) stratified Peterson estimator for estimating abundance and associated variance (SE) from stratified mark-recapture data (http://santacruz.nmfs.noaa.gov/publications/software/439/). Trap efficiency (TE) is determined by releasing a known number of PIT-tagged fish above each trap and enumerating recaptures. TE results are organized into bi-weekly strata for analysis in DARR. Mark recapture estimators generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging; (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

In this study, we release all healthy PIT-tagged fish roughly 1000 m above the trap. Our previous TE tests showed that most recaptures occurred within 24 hours of release. Thus, TE tests are done daily up to 24 hours prior to a scheduled trap shut down. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not pit-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals.
Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). All captured salmonids will be scanned for PIT-tags and processed using a Biomark PIT Tag station. Data collected from juvenile salmonids includes: number, species, length, weight, scales from steelhead for age structure and age at migration. Healthy, spring Chinook (> 65 mm, F.L.), summer steelhead (> 124 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) are manually PIT-Tagged and released on site (Prentice et al.1990). The downstream movement of Chinook salmon fry and parr (< 65 mm), age-0 summer steelhead (< 124 mm) are presumed not to be outmigrants. Tagging crews submitted the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004).

Scale samples are collected from about 30% of juvenile steelhead to estimate the age composition of emigrants. The goal is to collect about 500 readable scales from about 2,000 fish (assuming a 78% readable scale rate; Mayer and Shuck 2009). All scale samples are handled according CTUIR protocols. CTUIR personnel made age determinations by counting annuli as described by DeVries and Frie (1996).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38)
Mill Creek below Bennington Dam (RM 10).

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $313681 (32.17%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 2
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple

Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2015	3/1/2015	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2015	2/29/2016	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/31/2015	2/29/2016	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Monitor salmonids leaving the upper Walla Walla River - spring/summer	3/1/2015	5/31/2015	Completed	Operate 5-foot rotary screw trap in spring
F. Monitor salmonids leaving the upper Walla Walla River - fall	11/1/2015	2/29/2016	Completed	Operate 5-foot rotary screw trap in fall
G. Monitor salmonids leaving Mill Creek - spring	3/1/2015	2/29/2016	Completed	Operate 5-foot rotary screw trap in spring
H. Monitor salmonids leaving lower Mill Creek - fall	11/1/2015	2/29/2016	Completed	Operate 5-foot rotary screw trap in fall
I. Review, organize and summarize results	11/1/2015	2/29/2016	Completed	Review, organize and summarize results for migration year 2012.
Deliverable: J. Smolt monitoring and PIT-tagging data		2/29/2016	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Stream Gauge Monitoring and Data Distribution

Description: Stream Gauge Monitoring and Data Distribution

The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in 2011 began a local discussion in regards to the Washington Department of Ecology pulling back from its' commitment to monitor the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road (through the summer low flow period). As fish enhancement projects focused on listed species continue to occur within the Walla Walla Watershed the Walla Walla River discharge information continues to be a vital tool in the understanding of how much water is available and when it's available within the watershed. The WWBWC proposes to continue the gauging activity at the Pepper Bridge gauge, Beet Road Bridge gauge, Grove School Bridge gauge, McDonald Road Bridge gauge, and at the Pierce RV Park gauge.

The McDonald Road Bridge site has been listed as an area of concern by the WDFW during the low flow periods. The location downstream of the last major diversion (Garden City) and upstream of the Walla Walla River and Touchet River confluence and typically during low flow periods have flow levels below 20 cubic feet per second (cfs). In 2012 the Bergevin-Williams Diversion which was directly downstream of the McDonald Road Bridge was moved upstream as part of a diversion consolidation project. Of the 20 cfs in river at McDonald Road Bridge a portion of that flow was taken at the Bergevin-Williams diversion leaving very low surface flow remaining instream below the diversion. With the last major diversion upstream of McDonald Road Bridge starting in 2013 additional low surface flow pressure was placed on the McDonald Road reach. During one the WWBWC seepage assessments (July 17, 2013) the two immediate reaches below the McDonald Road Bridge gauge recorded flows of less than 5cfs.

Project Phases: The project is divided into three phases: Installation, Field Measurements, and Data Processing and Publishing.

Coordination and Planning: WWBWC will coordinate and plan all tasks with CTUIR. WWBWC is a subcontractor under this contract.

Deliverable Specification: WWBWC will maintain and install two air temperature sensors at the McDonald Road Bridge and the Pierce RV Park site and install a turbidity sensor at the Pierce RV Park site. We will provide continuous streamflow data for five gauge stations on the Walla Walla River. The WWBWC will also provide the publishing of provisional and confirmed data to the WWBWC website which is available to all agency partners. The WWBWC will also provide an annual report on the five Walla Walla River gauge sites at the end of the contract period.

Work Element Budget: $22000 (2.26%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Tributary Habitat
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Population Status

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US | **NPCC Subbasin:** Walla Walla

State: Multiple | **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Stream Gauge Supplementation (2010-051-00) v1.0

Study Plan Owner: James White

Protocol: Stream Gauge Supplementation (2010-051-00) v1.0

Protocol State: Draft

Protocol Owner: James White

Sample Design: Stream Gauge Monitoring and Data Distribution - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2015	3/1/2015	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2015	3/1/2015	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2015	2/29/2016	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	3/1/2015	2/29/2016	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Installation	5/1/2015	6/30/2015	Completed	The first phase of the project will be the installation of the air temperature sensors at both the Pierce RV Park site and the McDonald Road Bridge Gauge site along with installing a turbidity sensor at the Pierce RV Site.
F. Field measurments	3/1/2015	2/29/2016	Completed	Field Measurements: The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
G. Data processing and publishing	3/1/2015	2/29/2016	Completed	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Realtime Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements.
Deliverable: H. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/29/2016	Completed	*See the Deliverable Specification above*

K: 162. Analyze/Interpret Data

Title: Analyze Data

Description: The Walla Walla M&E plan (Mahoney and Schwartz 2014) was developed to address key performance indicators relevant to the Tribes Spring Chinook Program, and to provide a system for evaluating performance to support adaptive management. The objectives and rational of the plan were developed based on the requirements of the Walla Walla Spring Chinook Master Plan (HMP, CTUIR2013), and the information requirements of the funding agency and co-managers. These are identified in the BPA Strategies (Council, 2014), Reasonable and Prudent Alternatives (RPA's) of the Columbia Power System Biological Opinion (Fisheries, 2014), and the existing comprehensive fish restoration program (County & Council, 2004; CRITFC, 1996; CTUIR, 2013; Jones et al, 2011; Walla Walla County et al, 2004).

Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for our M & E objectives and technical methodology. These foundational documents were used to develop minimum requirements of the plan objectives, which were then expanded upon to address the specific information requirements of the Walla Walla program. Project objectives are to:
1. Monitor and evaluate salmonid performance in the natural environment
2. Monitor and evaluate performance in the hatchery
3. Monitor and evaluate ecological conditions

These objectives will address local information and management requirements, and will support learning in the Walla Walla Subbasin. In addition our activities will contribute to scientific knowledge throughout the Columbia Basin, and will help support numerous Basin-wide Required and Prudent Actions. These milestones are focused on Chinook, but will address steelhead and bull trout through direct study and collaboration. This project will be responsible for the facilitation, analysis, and reporting required to provide the co-managers with a nexus for the decision making process based on best available science.

The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning, and water management regimes, are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements listed above, or elsewhere) to construct cohort lineages and run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed “run re-construction”, is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin. WDFW will also compile bull trout spawning data for the Touchet Basin, and assist as necessary in upper Mill Creek, as an index of adult abundance and trends.

Deliverable Specification: The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult, and run reconstruction estimates.

Work Element Budget: $54300 (5.57%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: **NPCC Subbasin:**

State: **HUC5 Watershed:**

County: **HUC6 Name:**

Salmonid ESUs Present:

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized

115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural

Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2015	3/1/2015	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Coordinate analysis with WDFW and WDFW Snake River Lab	10/1/2015	2/29/2016	Completed	Work with WDFW to analyze all available data and summarize results.
C. Analyze adult enumeration data	10/1/2015	2/29/2016	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Analyze smolt and PIT-tag data	10/1/2015	2/29/2016	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
E. Analyze Spawner / Carcass data	10/1/2015	2/29/2016	Completed	Analyze and interpret spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
F. Estimate & evaluate power & precision of all monitored variables	9/1/2015	2/29/2016	Completed	Sample size requirements for in-situ monitoring are expected to change through time. Therefore, statistical power will be estimated for all metrics on an annual basis as part of the adaptive management process. Sample size, sampling schedules, and expected Power for each metric will be included in the annual operating plan.
G. EDT/AHA modeling	10/1/2015	2/29/2016	Active	revised baseline B-H models, revision of baseline AHA estimates, and EDT models.
Deliverable: H. Analyzed data		2/29/2016	Active	*See the Deliverable Specification above*

L: 132. Produce (Annual) Progress Report

Title: RME Annual Technical Progress Report (1-1-2015) to (12-31-2015)

Description: RME Technical Annual Progress Reporting Requirements:

Due to BPA RM&E reporting needs WDFW & CTUIR will submit a joint RME Annual Technical Progress Report (Report) for calendar year 2015 (1/1/15 thru12-31-15). This Report should be submitted using the template available in Taurus (https://www.cbfish.org, go to your project, click on Reports & Documents, then go to the RM&E Technical Report tab).

The Report will be a deliverable under this CTUIR contract and will be drafted in coordination with WDFW (CR 283437.

This report will summarize results from 1-1-15 through 12-31-15 time frame. The progress report summarizes the project goal, objectives, hypotheses, completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning. Examples of long-term planning include future improvements, new directions, or level of effort for contract implementation, including any ramping up or ramping down of contract components or of the project as a whole.

If desired, additional reporting of information relating to this contract can be added at the end of the report.

Deliverable Specification: It usually takes BPA 30-45 days to publish the final PDF version of a report. This milestone's end date should therefore be 45 days after the final version is uploaded in Pisces. You will receive an email from BPA confirming that your report has been finalized and posted to the web. If you do not, contact your COTR.

Work Element Budget: $20822 (2.14%)

Planned Metrics:

* Start date of reporting period : 1/1/2015
* End date of reporting period : 12/31/2015

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Prepare for RM&E Technical Report. Review the revised (2015) guidance & template	8/1/2015	2/29/2016	Active	BPA Fish and Wildlife project sponsors who have the following work elements in their contracts are required to complete an RM&E technical report showing cumulative results and synthesis for the duration data collection/analysis studies: 156 Develop RM&E Methods and Designs, 157 Collect/Generate/Validate Field and Lab Data, 158 Mark and Tag Animals, and/or 162 Analyze/Interpret Data. BPA needs to have the reports finalized in March to align with its regulatory reporting timelines. The most recent BPA guidance and template for RM&E Technical Reports are available at: https://www.cbfish.org/Help.mvc/GuidanceDocuments.
B. Draft technical report in coordination with WDFW	10/1/2015	2/29/2016	Active	Coordinate with WDFW in drafting technical report.
C. RM&E Technical: Upload draft RM&E Technical Report (MS Word) for BPA review	1/1/2016	1/16/2016	Active	Use the guidance & template for your RME Technical Report. Develop a draft report on RM&E and data management actions and discuss relevancy of results to the Fish and Wildlife Program. Your report should include the cumulative: data, analyses, and data management. For more information, please see the RME Report guidance located at https://www.cbfish.org/Help.mvc/GuidanceDocuments. Upon completion, upload report into the Pisces Attachments tab as an MS Word document as a "Technical, Draft" for BPA review. If your Word file is too big to be uploaded, contact Pisces Support at support@cbfish.org.
D. RM&E Technical: Upload finalized RM&E Technical Report (MS Word) for BPA to publish	1/16/2016	2/29/2016	Active	Address any BPA comments on the draft and re-upload finalized report into the Pisces Attachments tab as an MS Word document as a "Technical, draft." (Note: This MS Word format is a change in policy. BPA staff will now convert it to a PDF.) (Milestone start/end: Jan 16 - Feb 29)
Deliverable: E. Progress Report has been published		2/29/2016	Active	*See the Deliverable Specification above*

M: 202. Produce BiOp RPA Report

Title: BiOp RPA Report for Steelhead CY 2015

Description: This project is associated with RPA 64.2. CTUIR is the lead on this report. WDFW is in the support role for this report. The CTUIR and WDFW will work together and coordinate on this report. The report will be submitted under this CTUIR contract. This report only includes Spring chinook.

Projects that have claimed that they support one or more RM&E RPAs (i.e., RPAs 50-73) under the FCRPS BiOp are required to report their results. To facilitate the summary of these results across the entire Columbia River Basin, and to provide more clarity as to the format required under the BiOp, these reports are required to be completed online. If desired, the required information can be prepared in MS Word, and pasted into Taurus. For more guidance see https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf.

BiOp RPA Reporting Requirements.

This project supports an ESA BiOp RPA (RPA64.2), therefore the CTUIR and WDFW are required to electronically submit a Final Annual BiOp RPA Report of work conducted for calendar year 2015 for upload into Taurus. This BiOp RPA report is required annually on all declared BiOp RPA associations.

The online BiOp RPA report in Taurus (www.cbfish.org) should include the data, analyses, and data management completed by your project by December 31, 2015. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent RPA report.

For each RPA, follow the directions in Taurus for each of the three sections and as appropriate input graphical or tabular data, accompanied by explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

For detailed information on how to access and produce this report please see "Sponsor Reporting Procedural Guidance" in Pisces. To find this procedural guidance document go to www.cbfish.org, select the "Login In" link at the upper right of corner. Enter your project number or name in the upper right of the search box. Select "Reports & Documents tab on left. Select "BiOp Annual Report." The "Sponsor Reporting Procedural Guidance" is a link directly below "1. Enter Basic Report Information." If you need further assistance please contact your PM/COTR.

Deliverable Specification: The online BiOp RPA report in Taurus (https://www.cbfish.org/BiologicalOpinionAction.mvc/Index/2014/BiOpRpaStatus) should include the data, analyses, and data management completed no later than December 31st. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the scale analyses, you will report the preliminary data (# of redds), but not (incomplete) age distributions of carcasses, which would be reported in the subsequent CY report.

Work Element Budget: $3000 (0.31%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Download RPA questions from cbfish.org	8/1/2015	9/30/2015	Completed	To prepare for your RPA report, 1) Go to www.cbfish.org and log in, 2) Navigate to your project and select "BiOp Annual Report" from the menu on the left, 3) Click on "Input Needed" for each applicable RPA to find your RPA reporting requirements so you will know how much time to set aside for this task. You may also click the “download RPA doc” button to get all RPA questions in one MS Word document. 4) Use “Request Review” link to email COTR or BPA RM&E RPA lead to request help or for review of draft content. For further guidance, see: https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf
B. Draft calendar year report in cbfish.org in coordination with WDFW	9/30/2015	2/29/2016	Completed	The CTUIR is the lead for this report. The CTUIR will work with and coordinate with WDFW, CR283437 on this report. For guidance on completing your report, see: https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf. If you have questions or would like BPA to review your draft, you may email RMEsupport@bpa.gov and your COTR to send them your working draft in Word or notify them to review in cbfish.org by using the “Request Review” email icon link to e-mail your COTR & BPA RM&E RPA lead.
C. Finalize calendar year report in cbfish.org and click Publish by March 15	12/31/2015	2/29/2016	Active	The final version is due by March 15. (Milestone start/end: December 31 - March 15)

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Coordinate with WDFW on report	8/1/2015	2/29/2016	Completed	The CTUIR is the lead for this report and will coordinate with WDFW who will provide support.
Deliverable: E. Submit BiOp RPA Report in Taurus		2/29/2016	Active	*See the Deliverable Specification above*

N: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: All administrative tasks shall be fulfilled on time and with quality products. Timely responses to requests for more information are required. Proactive communication between the contractor and BPA's Contracting Officer (CO) and Contracting Officer Technical Representative (COTR) is required if a significant lag in scheduled delivery is expected.

Work Element Budget: $54300 (5.57%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Attach initial FISMA Compliance Attestation (BPA risk category Low)	3/1/2015	3/1/2015	Completed	BPA contractors are required to protect their data and electronic systems consistent with the federal FISMA law (Federal Information Security Management Act of 2002). Your contract has been rated as low risk by BPA Cyber Security. The designated signatory for your organization may vary. Check with your COTR to see if BPA has already obtained, or will soon obtain through previous contracts, the attestation. If not, please work with your COTR to obtain a signed attestation confirming your organizations compliance with FISMA. Attestations can be in the form of a formal memorandum, letter, or email. An email will need to be cut and pasted into a word processing program. All attachments must be saved and uploaded as PDF. A sample attestation communication that describes the minimum information required can be found as a Pisces attachment at {https://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P137862}. Upload the attestation to Pisces under the new FISMA Attestation File Type, and type in the title as Low-risk FISMA attestation. This milestone is considered complete when the contractor has uploaded an electronic copy of a signed attestation. Deadline: Start and end dates are both the first day of the contract.
B. Confirm that FISMA compliance documentation for any subsequent contract is current	10/1/2015	10/31/2015	Completed	Contact your COTR and check in Pisces to confirm that the FISMA compliance documentation for your subsequent contact is still current. If not, work with COTR to update documentation. (Due 125 days before the contract end date). BPA contractors are required to protect their data and electronic systems consistent with the federal FISMA law (Federal Information Security Management Act of 2002). Your contract will be rated as low risk by BPA Cyber Security.
C. Begin drafting contract renewal documents and conduct internal review as needed	10/1/2015	10/31/2015	Completed	Your statement of work, line-item budget, and (if required) property inventory for your next contract are due to BPA at least 5 months prior to the contract start date (longer if your internal processes require more time to get the contract signed and in place prior to the start date).
D. Submit contract renewal package (SOW, Excel budget, property inventory) to BPA COTR	11/1/2015	11/1/2015	Completed	Once your statement of work (SOW) in Pisces is complete, and you have attached your line-item budget (LIB) and property inventory (PI) (if required), click the “Submit” button on the SOW tab to notify your COTR the package is ready for review.

Milestone Title	Start Date	End Date	Status	Milestone Description
E. Address comments and revise SOW, LIB, and PI as needed to get BPA manager approval	11/1/2015	12/31/2015	Completed	Once your COTR and his or her BPA manager have reviewed your contract renewal package and returned any comments to you, you will need to provide responses and changes as needed to achieve approval from the BPA manager, who will then forward the package to the Contracting Officer. This should be completed at least two months prior to the next contract start date, but may need to be 3 or 4 months depending on your internal processing time for contract signatures. If you have subcontracts that need to be signed prior to the contract start, it should be a minimum of 4 months.
F. Return signed contract to BPA's Contracting Officer within 30 days	2/1/2016	2/29/2016	Completed	Respond to the CO and COTR indicating any problems with the contract within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days.
G. Submit final invoice for prior contract within 90 days to facilitate contract closeout	3/1/2015	5/31/2015	Completed	Within 90 days of the last day of the PRIOR contract, the contractor shall issue a final invoice. In instances where more than 90 days is needed (e.g., because subcontractors have not invoiced), the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount shall be emailed to FWinvoices@bpa.gov and the COTR.
H. Accrual - Submit September estimate to BPA	8/10/2015	9/10/2015	Completed	Provide BPA with an estimate of contract work that will occur prior to September 30 but will not be billed until October 1 or later. Data must be input in to Pisces by September 10 (begins Aug 10, ends Sep 10).
I. Facilitate inputting Cost Share information into Pisces at the Project level	9/30/2015	11/15/2015	Completed	There are multiple contractors under this project and I am the lead project Proponent. I will solicit cost share information for the previous federal FY from project partners and enter previous FY's Cost Share information on the Project Cost Share tab by Nov 15 for all project partners. (Milestone starts Sep. 30 and ends Nov. 15)
J. Coordinate w/ COTR & WDFW on next year's SOW	9/1/2015	10/31/2015	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
K. Attend AFS OR Chapter and Western Division meeting	8/16/2015	8/20/2015	Completed	Attend AFS Western Division Meeting In Portland Oregon to present project findings Abstract: Walla Walla spring Chinook reintroduction with continued research, monitoring and evaluation. The goals of the Confederated Tribes of the Umatilla Indian Reservation for Walla Walla Basin spring Chinook are to provide treaty and non-treaty fisheries in the basin, and to restore natural spawning. The purpose of the proposed hatchery program is to contribute to harvest and natural spawning in the near term. This is to be done in a manner consistent with the longer-term goal of re-establishing a self-sustaining, naturally spawning population through an "all-H" approach that includes hatchery production and improvements in habitat and fish passage. The program's design is proposed to end the current dependence on imported broodstock, improve survival through local adaptation, and meet harvest and natural spawning objectives. Implementation is proposed to occur in three phases: 1) establishment of local stock, 2) transition, and 3) natural production focused with integrated harvest. Transitions from one phase to another will be based on the performance of hatchery and naturally spawning fish as measured by the proposed Walla Fish Production, Research, Monitoring & Evaluation Plan. This work is being funded under a contractual agreement with the Bonneville Power Administration which includes the implementation of artificial production in support of mitigation efforts related to Columbia River dams. Juvenile Spring Chinook Salmon Overwinter Rearing Habitat Use in the Walla Walla River The historic distribution and overwinter rearing habitat use of spring Chinook in the Walla Walla River is unknown. However, the documented migration of a significant portion of juvenile spring Chinook salmon from the South Fork Walla Walla River into to lower portions of the Walla Walla River in the fall and early winter suggests that the lower river is an important habitat area (Mahoney et al 2013). This study was designed toward identifying what areas in the lower river are used for holding/rearing and how abundant such locations might be. Such an examination would help determine if restoration efforts in lower portions of the river should be directed toward providing adequate overwintering holding and

				rearing areas for spring Chinook.
L. Attend AFS Idaho Chapter meeting	3/4/2015	3/6/2015	Completed	Attend AFS Idaho Chapter meeting in Boise Idaho.
M. Adaptive management	6/1/2015	2/29/2016	Completed	The Adaptive Management process requires quarterly and annual updates of key management assumptions to revise in-season and long-term estimates of program performance and future outcomes. The parameters used in the adaptive management process are defined by the in-season and forecasting models. Each of these models has implicit hypotheses expressed in their structure and function that are described in their documentation or annual operating procedure. As learning occurs the structure and function of the in-season and long-term management models will be reviewed and revised to reflect current understanding.
N. Annual Operation Plan	6/1/2015	2/29/2016	Completed	CTUIR will support an adaptive management and decision making process for the spring Chinook program. The adaptive management process will support in-season management by facilitating three quarterly in-season reviews, and one annual adaptive management workshop culminating in an Annual Operating Plan (AOP). The AOP will incorporate current information to provide updated sampling plans, details regarding implementation of the program, and revised operational criteria as agreed upon.
Deliverable: O. All administrative tasks fulfilled with timely quality products		2/29/2016	Completed	*See the Deliverable Specification above*

O: 122. Provide Technical Review and Recommendation

Title: Quantitative Science and technical support for M & E plan implementation

Description: Provide quantitative science and technical support for M & E plan implementation. Participate in review and development of technical of details, power analysis, annual operating procedures, monitoring methods, habitat capacity modeling and annual technical reports by Walla Walla M & E staff and a contractor yet to be determined.

We will develop methods to monitor Parentage and the characteristics of adaptation that are not already addressed in the VSP parameters. We will develop methods and a protocol for monitoring adaptation of Walla Walla spring Chinook. During the first year on this work element we will develop techniques and protocols for observing adaptation in terms of life history, morphology, and behavior. This Work Element is divided into three phases:
1) Review and development of annual operating procedures and methods
2) Baseline monitoring of characteristics prior to implementation of a local hatchery program
3) Continuing M & E after implementation of a local hatchery program

Deliverable Specification: The Methods, protocols, and annual operating procedures for all monitored metrics for the Walla Walla M & E Plan will be developed by Walla Walla M & E staff and a contractor yet to be selected. CTUIR staff will review and provide input on all aspects M & E implementation Plan .

Work Element Budget: $76600 (7.86%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Develop RFP for a subcontract to work with a consultant	3/1/2015	10/31/2015	Completed	Develop Request for proposal for a subcontract to work with a consultant.
B. Perform power analysis for all monitored metrics	5/1/2015	2/29/2016	Completed	Provide power and error estimates for all monitored metrics
C. Review and Update Annual Operating Procedures	6/1/2015	8/31/2015	Completed	Review and update annual operating procedures (i.e. methods and protocols) for addressing natural and hatchery fish performance (i.e. abundance, productivity, spatial structure and diversity (parentage and adaptation) in Walla Walla spring Chinook.
D. Review and update habitat capacity model	9/1/2015	9/30/2015	Completed	Collect and update EDT habitat capacity model parameters for the South Fork Walla Walla River.
E. Review and update Annual technical reports	10/1/2015	2/29/2016	Completed	Collaborate with WW M & E staff to review and update CY Annual technical reports.

Milestone Title	Start Date	End Date	Status	Milestone Description
F. Develope protocols and methods for monitoring adaptation and parentage (parental tagging)	7/1/2015	11/30/2015	Completed	During 2015 we will work with CRITIFC and regional partners to develop protocols and methods for monitoring parentage in the Walla Walla. We will meet directly CRITFC scientific staff and staff from the Hagerman genetics laboratory to develop a sampling regime and protocol that will provide sufficient assignments to monitor performance of the population. In addition we will develop laboratory techniques for addressing the other key genetic performance metrics identified in the Walla Walla M&E Plan including effective population size, allelic diversity, and specific alleles of interest including run-timing genes. The work will build upon standard methods for genetic assessments such as Maximum likelihood (Marshall et al. 1998) and Bayesian (Neff et al. 2001) procedures for parental exclusion analysis (Gerber et al. 2003), and will incorporate best practices including recently developed protocols for estimating effective population size ((BLANKENSHIP et al). Development of a locally produced stock is intended to increase survival, and to help nurture a locally adapted stock. Fish adapted to the Walla Walla are expected to have life history traits, morphologies, and behavior that are better suited to conditions that are specific to the Walla Walla when compared to Carson Stock fish. Adaptation, coupled with local acclimation and a local program, is expected to result in increased survival in comparison to Carson stock fish. Although it will not be possible to determine causation between fish attributes and survival, it will be practical to monitor adaptation and to relate adaption to survival based on correlation. We will develop methods and a protocol for monitoring adaptation of Walla Walla spring Chinook. in 2015 we will focus on the existing methods for monitoring adaptation, and will develop techniques and protocols for observing adaptation in terms of life history, morphology, and behavior.
Deliverable: G. Provide Technical Review of M & E Implementation Plan		2/29/2016	Completed	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	72135	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$711,130	**Perf. Period:**	3/1/2016 - 2/28/2017
Contract Type:	Contract (IGC)	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 02/22/2016 with 0 problems, and 0 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and efw.bpa.gov.

The Walla Walla subbasin supports ESA listed populations of steelhead and bull trout, and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Spring Chinook were extirpated from the Walla Walla in the early 20th century. For the past 25 years the CTUIR and others have implemented numerous passage, flow, and habitat to improve salmonid production in the Subbasin.

The Tribes Walla Walla Spring Chinook program began in 2000 with the outplanting of hatchery adults collected from the Ringold Hatchery, Carson National Fish Hatchery, and the Umatilla River at Three Mile Falls Dam. Direct stream release of hatchery reared juveniles began in 2005 using Carson stock from the Carson National Fish Hatchery. Monitoring & Evaluation of the Spring Chinook Program began in 2000. The work included assessment of spring Chinook and steelhead natural production, and evaluation of fish passage based on adult steelhead and bull trout. In 2007 CTUIR, WDFW, and BPA developed a collaborative M & E program in the Subbasin based on salmonid VSP Parameters of abundance, productivity, diversity, and spatial structure. The expanded project was designed to provide high level indicators of fish population status and trends for spring Chinook, steelhead, and bull trout. This information is used to inform the CTUIR first foods management, and to address BPA fish and wildlife program strategies.

The purpose of this M & E project is to address the adaptive management requirements of the Spring Chinook Program, and to maintain the baseline monitoring needed by the existing management system. This effort includes an ecosystem-based scientific framework for adaptive management and performance evaluation based on measurements of success and monitors of risk to other species and populations. The techniques and designs used for implementation and detailed methodology can be found online at www.monitoringmethods.org. This collaborative effort is funded by the Columbia River Fish Accords. Our M & E objectives were developed based on the requirements of the Walla Walla Spring Chinook Hatchery Master Plan (HMP), BPA's Fish Management Sub-strategies, the Reasonable and Prudent Alternatives (RPA's) of the Columbia Power System Biological Opinion, and the existing comprehensive fish restoration program. Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for the objectives and technical methodology.

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (efw.bpa.gov).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Brenda Aguirre	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5928 / NA	baguirre@bpa.gov	PO Box 3621 Mail Stop ECF-4 Portland OR 97208
Amber McMahon	Contracting Officer	Bonneville Power Administration	(503) 230-3983 / NA	almcmahon@bpa.gov	P.O. Box 3621 Mailstop - NSSP Portland OR 97208-3621

Work Element Budget Summary:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		$5,500	(0.59%)
B : 165. Produce Environmental Compliance Documentation - Compliance for WEs C thru J		$9,500	(1.03%)
C : 28. Trap and Haul - Fish Salvage	*	$27,000	(2.93%)
D : 158. Mark/Tag Animals - PIT Tag Spring Chinook smolts (out-migrant tagging)	*	$54,500	(5.91%)
E : 158. Mark/Tag Animals - PIT Tag steelhead smolts (out-migrant tagging)	*	$29,100	(3.16%)

F :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$29,500	(3.20%)
G :	157. Collect/Generate/Validate Field and Lab Data - Adult fish counts at Nursery Bridge Dam (video work)	*	$108,000	(11.73%)
H :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates	*	$75,425	(8.19%)
I :	157. Collect/Generate/Validate Field and Lab Data - Outmigrant monitoring for population estimates, survival, & migration	*	$297,325	(32.29%)
J :	157. Collect/Generate/Validate Field and Lab Data - Maintain and operate PIT Arrays	*	$73,670	(8.00%)
K :	157. Collect/Generate/Validate Field and Lab Data - Stream Gauge Monitoring and Data Distribution	*	$18,500	(2.00%)
L :	162. Analyze/Interpret Data - Analyze Data		$55,600	(6.03%)
M :	132. Produce (Annual) Progress Report - DRAFT Annual Technical Progress Report (1-1-2016) to (12-31-2016)		$17,800	(1.93%)
N :	202. Produce BiOp RPA Report - BiOp RPA Report for Steelhead CY 2016		$3,000	(0.32%)
O :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$54,500	(5.91%)
P :	122. Provide Technical Review and Recommendation - Quantitative Science and technical support for M & E plan implementation		$61,756	(6.70%)
		Total:	$920,676	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $5500 (0.60%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2016 (3/1/2016 - 6/30/2016)	7/1/2016	7/15/2016	Completed	
B. Jul-Sep 2016 (7/1/2016 - 9/30/2016)	10/1/2016	10/15/2016	Completed	
C. Oct-Dec 2016 (10/1/2016 - 12/31/2016)	1/1/2017	1/15/2017	Completed	

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Final Jan-Feb 2017 (1/1/2017 - 2/28/2017)	2/14/2017	2/28/2017	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C thru J

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through J. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $9500 (1.03%)

Planned Metrics:

* Are herbicides used as part of work performed under this contract?: No

* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: Yes

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Obtain BPA's EC Lead sign-off that EC requirements are complete	3/1/2016	3/1/2016	Completed	The EC column on the contract SOW tab in Pisces must have a "full moon" for each work element requiring environmental compliance before ground-disturbing implementation of that work element can begin. You will receive verbal or email notification from the EC Lead when a work element or, in rare instances, a portion of a work element is approved for implementation.
B. Determine if contract work could adversely affect Pacific lamprey	3/1/2016	3/1/2016	Completed	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best %20Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf (BMPs).
C. Report lamprey observation and catch data to USFWS by Feb. 15	2/15/2017	2/15/2017	Completed	All contractors doing instream work (e.g., surveys, habitat improvements, electrofishing, screwtraps, etc.) in anadromous fish areas are required to annually report lamprey observations or catch, including zero, by Feb 15 for the previous calendar year's work. A data template is available at: (https://efw.bpa.gov/contractors/docs/Lamprey_Database_Template.xls) As per instructions on the form, email your data to christina_wang@fws.gov at US Fish and Wildlife Service and CC your COTR. For identification of lamprey life stages see page 10 of USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best %20Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2016	2/28/2017	Completed	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.coastal.ca.gov/ccbn/bmp-boaters.pdf -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.clr.pdx.edu/publications/files/OR_ANS_Plan.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.idahoag.us/Categories/Environment/InvasiveSpeciesCouncil/documents/Idaho%20Aquatic%20Nuisance%20Species%20Plan.pdf
E. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2016	2/28/2017	Completed	Prevent spread of invasive species
F. Complete and document public involvement activities and provide to EC Lead	3/1/2016	3/1/2016	Completed	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
G. Participate in ESA Consultation	3/1/2016	2/28/2017	Completed	Work may include drafting BA, completing HIP III BO Project Notification Form, submitting high risk project designs to Restoration Review Team (RRT), providing copy of Section 10, 4(d), or 6 permit, etc., or submitting Hatchery Genetic Management Plan to BPA for ESA consultation initiation, and providing input for the ensuing consultation.
H. Participate in Cultural/Historic Resources Consultation	3/1/2016	2/28/2017	Completed	BPA must initiate the Sec. 106 consultation-sponsors cannot do this themselves. Provide the EC Lead with appropriate information to help them initiate Sec. 106 consultation (examples include maps, a detailed project description, GIS data, etc.). Provide this information to your EC Lead early to avoid affecting your construction schedule. Section 106 consultation typically take 4 months to complete, assuming access is available for survey field work (e.g., weather permitting). If the EC leader and sponsor have agreed that the sponsor will be responsible for contracting out some of the compliance work (such as surveys), the EC Lead will assist the project sponsor in drafting a SOW for the contract to ensure that the appropriate methodology and deliverables are included. Survey methods and the area of potential effects map needs to be shared and reviewed by BPA archaeologists and the SHPO prior to initiation of cultural resources fieldwork. The EC Lead will include this information in the letter initiating consultation with the SHPO/THPO and tribes. Draft cultural resource survey reports must be submitted to the BPA archaeologist for review. Any comments resulting from this review need to be addressed in the final report. BPA, or another federal cost share partner if they have been determined the lead for consultation, has the sole authority to submit the final survey report to the SHPO/THPO. Submitting these reports yourself or having your consultant submit them will only result in delays to your approval.
I. Plan for field inventory			Canceled	Coordinate with EC Lead and BPA archaeologist to determine appropriate approach and methodology for field inventory, if determined necessary by BPA archaeologist.
J. Cultural resource surveys			Canceled	Coordinate with EC lead to schedule cultural resources surveys if required by BPA archaeologist.
K. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2016	3/1/2016	Completed	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits.
L. Keep JARPA permit updated	3/1/2016	2/28/2017	Completed	For rotary screw trapps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.
Deliverable: M. Compliance achieved and documented		3/1/2016	Completed	*See the Deliverable Specification above*

C: 28. Trap and Haul

Title: Fish Salvage

Description: Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.

Deliverable Specification: Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.

Work Element Budget: $27000 (2.93%)

Planned Metrics: # of fish transported: 2800

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)

Country: US | **NPCC Subbasin:** Walla Walla

State: WA | **HUC5 Watershed:** Middle Walla Walla River

County: Walla Walla | **HUC6 Name:** Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Rescue and haul fish	3/1/2016	2/28/2017	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/28/2017	Completed	*See the Deliverable Specification above*

D: 158. Mark/Tag Animals

Title: PIT Tag Spring Chinook smolts (out-migrant tagging)

Description: Estimates of smolt run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 5,000 run of the river out-migrant spring Chinook for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery Spring Chinook salmon production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain two rotary screw traps and PIT-tag up to 5,000 run of the river out-migrant Spring Chinook salmon. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating spring Chinook. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 natural origin out-migrant spring Chinook

Work Element Budget: $54500 (5.92%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring

	* Secondary R, M, and E Focal Strategy : Hatchery		
	* # fish tagged with PIT: 8000		
Locations:	2		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Order PIT tags in TDI system	9/1/2016	10/31/2016	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag spring Chinook out-migrants - spring	3/1/2016	5/31/2016	Completed	Up to 5,000 run of the river out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag sprng Chinook out-migrants - fall	11/1/2016	2/28/2017	Completed	Depending on adequate stream flow and conditions, up to 5,000 (for the brood year) out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. Submit PIT-tag data to PTAGIS-spring	3/1/2016	5/31/2016	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
F. Submit PIT-tag data to PTAGIS-fall	3/1/2016	2/28/2017	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
Deliverable: G. PIT tagged outmigrants		2/28/2017	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag steelhead smolts (out-migrant tagging)

Description: Estimates of smolt run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 3,000 run of the river out-migrant summer steelhead for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery steelhead production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain two rotary screw traps and PIT-tag up to 3,000 run of the river out-migrant Summer steelhead. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Steelheads will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating summer steelheads. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
3,000 natural origin out-migrant spring Chinook

Work Element Budget: $29100 (3.16%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring

	* Secondary R, M, and E Focal Strategy : Hatchery * # fish tagged with PIT: 3000		
Locations:	2		
Primary Focal Species:	Steelhead (O. mykiss) - Middle Columbia River DPS		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Order PIT tags in TDI system	9/1/2016	10/31/2016	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag steelhead out-migrants - spring	3/1/2016	5/31/2016	Completed	Up to 3,000 run of the river out-migrant summer steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag steelhead out-migrants - fall	11/1/2016	2/28/2017	Completed	Depending on adequate stream flow and conditions, up to 3,000 (for the brood year) out-migrant summer steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. Submit PIT-tag data to PTAGIS-spring	3/1/2016	5/31/2016	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
F. Submit PIT-tag data to PTAGIS-fall	11/1/2016	2/28/2017	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
Deliverable: G. PIT tagged outmigrants		2/28/2017	Completed	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title: PIT Tag smolts (hatchery tagging)

Description: Estimates of out migrant run timing, abundance, and survival based on PIT-tag detections are key components for assessing the performance of hatchery-origin fish relative to naturally-produced fish and necessary for determining the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

This WE is an in-kind collaboration between the USFWS and the CTUIR. The CTUIR supplies 5,000 PIT-tags and pays to have a PIT-trailer delivered to the Hatchery tagging site (e.g. Carson NFH). The USFWS then provides labor and ancillary support to PIT-tag 5,000 spring Chinook smolts. This marking effort represents about 2% of the 250,000 total fish released to the South Fork Walla Walla River each year for the Tribe. These tagging levels will allow for estimates of smolt survivals and run timing to McNary Dam, and for smolt to adult survival back to the subbasin. USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 5,000 hatchery spring Chinook and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $29500 (3.20%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 5000

Locations:	1		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU		
Country:	US	**NPCC Subbasin:**	Walla Walla

State:	OR	**HUC5 Watershed:**	Upper Walla Walla River
County:	Umatilla	**HUC6 Name:**	Lower South Fork Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Order PIT tags in TDI system	9/1/2016	10/31/2016	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag hatchery spring Chinook	11/1/2016	11/30/2016	Completed	PIT tag up to 5,000 hatchery spring Chinook for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: D. PIT tag Hatchery smolts		11/30/2016	Completed	*See the Deliverable Specification above*

G: 157. Collect/Generate/Validate Field and Lab Data

Title: Adult fish counts at Nursery Bridge Dam (video work)

Description: We will estimate adult abundance at index areas based on adult outplants, adult ladder and weir counts in the upper WWR (above NBD), Mill Creek (above Bennington Dam), Coppei Creek, and Upper Touchet River (above DAT). Because there are no counting stations on the lower Walla Walla River, fish counts from the upper subbasin are used to estimate adult returns. Returns to NBD (rkm 71.9) on the mainstem, Mill Creek Division Dam (rkm 16.9), and Dayton Dam (rkm 86.9) on the Touchet River will be used to provide an index of adult returns by species. Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under a separate contract. We are also deploying multiple PIT arrays to improve total adult population abundance estimates (e.g. PIT array systems). Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns.

Although, counts at these sites are incomplete due to some upstream passage without detection and downstream spawning, these sites represent the best index of adult return currently available for those tributaries. Enumeration will occur year round to encompass the known adult migration for spring Chinook, summer steelhead, and bull trout. Enumeration at Nursery Bridge Dam will use video counts, whereas Mill Creek will rely on PIT-tag detections only, and the Dayton Weir will rely on trapping and handling. Past escapement counts are minimal because they have not been corrected for error. We will generate estimates of SE and 95% CI based on mark recapture tests for all our adult abundance estimates .

Data collected from the video counting included date, time, species, size (e.g., jack or adult for spring Chinook salmon), life stage (e.g., steelhead kelts), origin (e.g., adipose clip or unclipped) and migration direction for bull trout. Video counts are not reliable for fish less than 30.5 cm. Notations were also made of other species encountered and general fish condition. Daily fish tallies from both ladders were posted to an onsite tally board for the public. The deliverable for this work was an error-checked database of daily fish counts.

At video facilities an underwater video camera activated by a motion detector was linked to a DVR at each site to capture a video image of passing fish. Overhead dusk-to-dawn lights will be operated at each site. The stations will be checked and downloaded daily. Downloaded video clips will be archived with CTUIR and housed in the data repository.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam, Dayton Dam, and in Coppei Creek. This contract only covers Nursery Bridge Dam; WDFW will operate at the facilities in Washington. Data is accessible through CTUIR's website and is also kept in project staff's office.

Work Element Budget: $108000 (11.73%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	OR	**HUC5 Watershed:**	Middle Walla Walla River

County:	Umatilla	**HUC6 Name:**	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Adult fish counts at Nursery Bridge Dam (video work) - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringresources.org	3/1/2016	3/1/2016	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2016	2/28/2017	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/1/2016	2/28/2017	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - spring/summer	3/1/2016	7/31/2016	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
F. Maintain video monitoring equipment @ Nursery Bridge Dam - fall/Winter	9/1/2016	2/28/2017	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
G. Review, organize and summarize video results	11/1/2016	2/28/2017	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: H. Adult fish count from Nursery Bridge Dam		2/28/2017	Completed	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts (see WE C, adult enumeration) combined with redd and carcass counts (Crawford et al. 2007; Gallagher et al. 2007) will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River - The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. Care is taken not to disturb spawning fish or redds.

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Fin clips from carcasses will be collected for genetic analysis. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked databases and data summaries. Data collected will be used to estimate

	temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.		
Work Element Budget:	$75425	(8.19%)	
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery		
Locations:	4		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	Multiple	**HUC5 Watershed:**	Multiple
County:	Umatilla | Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft

847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2016	3/1/2016	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2016	2/28/2017	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/31/2016	2/28/2017	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Pre-spawn carcass survey in lower walla walla river	7/1/2016	7/31/2016	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of adult returns over the spawning season and will be done in the lower Walla Walla River and lower Mill Creek; to locate fish that do not ascend into the spawning grounds.
F. Spring Chinook redd/carcass surveys	8/1/2016	9/30/2016	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
G. All fish snouts sent to ODFW Mark Process Center	10/1/2016	10/31/2016	Completed	We will send collected snouts in to the ODFW Mark Precess center to read CWT from fish collect during the survey.
H. Collect genetic samples from carcasses	7/1/2016	10/31/2016	Completed	Fin clips will be collected during spawning ground surveys and sent to CRITFC for analysis.
Deliverable: I. Spring Chinook spawner/ carcass survey data		10/31/2016	Completed	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Outmigrant monitoring for population estimates, survival, & migration

Description: Smolt escapement to the mouth of the Walla Walla and to McNary Dam will be estimated for spring Chinook and steelhead by applying an estimated Cormack-Jolly Seber survival probability to fish injected with a PIT tag. Prior to each tagging season the Sample Size 1.3 program will be used to determine the number of tags needed to estimate survival rates at the desired levels of precision. We estimate a sample size of 3,600 to 6,200 spring Chinook should provide a 10% coefficient of variation (CV) to Burlingame and McNary Dams, respectively.

Smolt production monitoring will be conducted in the mainstem Touchet River, the Walla Walla River near the Oregon state line, and in lower Mill Creek (Volkhardt et al. 2007, Mahoney et al. 2013, Mendel et al. 2014). Out-migrating naturally produced salmonids captured at the smolt traps will be PIT tagged so we can evaluate juvenile run timing and survival to McNary Dam, as well as to evaluate adult return timing and survival. A sub-sample of tagged fish will

be scale-sampled, weighed, and photographed for growth and morphometric information.
Multiple PIT tag arrays have been set up in the Walla Walla River, Mill Creek and in the Touchet River to help us understand run timing, survival, and to estimate adult returns, adult-to-adult productivity or smolt to adult survival. The location of rotary screw traps and PIT-tag arrays in the Walla Walla Subbasin are shown in Figure 36. Previously used smolt trapping sites in the lower Walla Walla River have been abandoned because of maintenance and debris issues but may be revised in the future (Mahoney et al. 2012).

Natural smolt abundance will be estimated for both the upper Walla Walla River (i.e. Basel Cellars site) and lower Mill Creek trap locations. Screw traps will be installed by October and run continuously as stream conditions allow into June. The traps are not operated during periods of high/low stream flow (e.g. between 2000 and 200 CFS), peak hatchery releases, and extreme cold and ice. To estimate potential juvenile migrants passing when the trap was not operated for short intervals (= 5 days) we will calculate the mean number of fish trapped for three days before and three days after non-trapping periods. To estimate numbers of fish emigrating past the trap when the trap was not operated for long durations (6 days or more), we used a within year regression of daily stream flow and daily number of natural-origin outmigrants (by size category) captured for the following periods: October-December, January-March, and April-May. The mean number of fish passed is then divided by the estimated trap efficiency to calculate daily fish passage.

Natural salmonid abundance is estimated for the Walla Walla River using a stratified Petersen/Darroch estimator (DARR 2.02, Bjorkstedt 2005 and 2009). DARR 2.02 uses Darroch's (1961) stratified Peterson estimator for estimating abundance and associated variance (SE) from stratified mark-recapture data (http://santacruz.nmfs.noaa.gov/publications/software/439/). Trap efficiency (TE) is determined by releasing a known number of PIT-tagged fish above each trap and enumerating recaptures. TE results are organized into bi-weekly strata for analysis in DARR. Mark recapture estimators generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging; (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

In this study, we release all healthy PIT-tagged fish roughly 1000 m above the trap. Our previous TE tests showed that most recaptures occurred within 24 hours of release. Thus, TE tests are done daily up to 24 hours prior to a scheduled trap shut down. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not pit-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals. Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). All captured salmonids will be scanned for PIT-tags and processed using a Biomark PIT Tag station. Data collected from juvenile salmonids include: number, species, length, weight, scales from steelhead for age structure and age at migration. Healthy, spring Chinook (> 65 mm, F.L.), summer steelhead (> 124 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) are manually PIT-Tagged and released on site (Prentice et al. 1990). The downstream movement of Chinook salmon fry and parr (< 65 mm), age-0 summer steelhead (< 124 mm) are presumed not to be out-migrants. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004).

Scale samples are collected from about 30% of juvenile steelhead to estimate the age composition of emigrants. The goal is to collect about 500 readable scales from about 2,000 fish (assuming a 78% readable scale rate; Mayer and Shuck 2009). All scale samples are handled according to CTUIR protocols. CTUIR personnel made age determinations by counting annuli as described by DeVries and Frie (1996).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38)
Mill Creek below Bennington Dam (RM 10).

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data will be performed. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $297325 (32.29%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 2
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
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447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
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145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
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Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
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Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2016	2/28/2017	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/31/2016	2/28/2017	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Monitor salmonids leaving the upper Walla Walla River - spring/summer	3/1/2016	5/31/2016	Completed	Operate 5-foot rotary screw trap in spring
F. Monitor salmonids leaving the upper Walla Walla River - fall	11/1/2016	2/28/2017	Completed	Operate 5-foot rotary screw trap in fall
G. Monitor salmonids leaving Mill Creek - spring	3/1/2016	2/28/2017	Completed	Operate 5-foot rotary screw trap in spring
H. Monitor salmonids leaving lower Mill Creek - fall	11/1/2016	2/28/2017	Completed	Operate 5-foot rotary screw trap in fall
I. Review, organize and summarize results	11/1/2016	2/28/2017	Completed	Review, organize and summarize results for migration year 2012.
Deliverable: J. Smolt monitoring and PIT-tagging data		2/28/2017	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Maintain and operate PIT Arrays
Description: CTUIR will continue to maintain and operate 11 PIT-Arrays in the Walla Walla subbasin at 8 locations.
Deliverable Specification: CTUIR will maintain PIT arrays and fish detection data will be automatically uploaded each week.

Work Element Budget: $73670 (8.00%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen

Sample Design: Maintain and operate PIT Arrays - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery

CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CRITFC Cloud Secure Tribal Repository (CCSTR) (http://www.critfc.org/)
PTAGIS Website (http://www.ptagis.org/)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2016	3/1/2016	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Maintain and operate PIT Array systems	3/1/2016	2/28/2017	Completed	Daily system status check to ensure the remote PIT tag detection system is uploading to the PTAGIS database and to CTUIR office in Walla Walla. Site visits as needed to ensure proper system operation. Biomark will be maintaining the PIT Arrays.
Deliverable: D. PIT Array monitoring and Data Distribution		2/28/2017	Completed	*See the Deliverable Specification above*

K: 157. Collect/Generate/Validate Field and Lab Data

Title: Stream Gauge Monitoring and Data Distribution
Description: Stream Gauge Monitoring and Data Distribution

The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in 2011 began a local discussion in regards to the Washington Department of Ecology pulling back from its' commitment to monitoring the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road (through the summer low flow period). As fish enhancement projects focused on listed species continue to occur within the Walla Walla Watershed the Walla Walla River discharge information continues to be a vital tool in the understanding of how much water is available and when it's available within the watershed. The WWBWC proposes to continue the gauging activity at the Pepper Bridge gauge, Beet Road Bridge gauge, Grove School Bridge gauge, McDonald Road Bridge gauge, and at the Pierce RV Park gauge.

The McDonald Road Bridge site has been listed as an area of concern by the WDFW during the low flow periods. The location downstream of the last major diversion (Garden City) and upstream of the Walla Walla River and Touchet River confluence and typically during low flow periods have flow levels below 20 cubic feet per second (cfs). In 2012 the Bergevin-Williams Diversion which was directly downstream of the McDonald Road Bridge was moved upstream as part of a diversion consolidation project. Of the 20 cfs in river at McDonald Road Bridge a portion of that flow was taken at the Bergevin-Williams diversion leaving very low surface flow remaining instream below the diversion. With the last major diversion upstream of McDonald Road Bridge starting in 2013 additional low surface flow pressure was placed on the McDonald Road reach. During one the WWBWC seepage assessments (July 17, 2013) the two immediate reaches below the McDonald Road Bridge gauge recorded flows of less than 5cfs.

Project Phases: The project is divided into three phases: Field Measurements, Data Processing and Publishing, and Analysis/reporting.

Coordination and Planning: WWBWC will coordinate and plan all tasks with CTUIR. WWBWC is a subcontractor under this contract.

Deliverable Specification: WWBWC will maintain and install two air temperature sensors at the McDonald Road Bridge and the Pierce RV Park site and install a turbidity sensor at the Pierce RV Park site. We will provide continuous streamflow data for five gauge stations on the Walla Walla River. The WWBWC will also publish provisional and confirmed data to the WWBWC website, which is available to all agency partners. The WWBWC will also provide an annual report on the five Walla Walla River gauge sites at the end of the contract period.

Work Element Budget: $18500 (2.01%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5
Primary Focal Species: Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US
NPCC Subbasin: Walla Walla
State: Multiple
HUC5 Watershed: Multiple
County: Umatilla | Walla Walla
HUC6 Name: Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Stream Gauge Supplementation (2010-051-00) v1.0
Study Plan Owner: James White
Protocol: Stream Gauge Supplementation (2010-051-00) v1.0
Protocol State: Draft
Protocol Owner: James White
Sample Design: Stream Gauge Monitoring and Data Distribution - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2016	3/1/2016	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA).
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2016	3/1/2016	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2016	2/28/2017	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	3/1/2016	2/28/2017	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Field measurements	3/1/2016	2/28/2017	Completed	Field Measurements: The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
F. Data processing and publishing	3/1/2016	2/28/2017	Completed	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Realtime Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements.
Deliverable: G. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/28/2017	Completed	*See the Deliverable Specification above*

L: 162. Analyze/Interpret Data

Title: Analyze Data

Description: The Walla Walla M&E plan (Mahoney and Schwartz 2014) was developed to address key performance indicators relevant to the Tribes Spring Chinook Program, and to provide a system for evaluating performance to support adaptive management. The objectives and rational of the plan were developed based on the requirements of the Walla Walla Spring Chinook Hatchery Master Plan (HMP, CTUIR 2013), and the information requirements of the funding agency and co-managers. These are identified in the BPA Strategies (Council, 2014), Reasonable and Prudent Alternatives (RPA's) of the Columbia Power System Biological Opinion (Fisheries, 2014), and the existing comprehensive fish restoration program (County & Council, 2004; CRITFC, 1996; CTUIR, 2013; Jones et al, 2011; Walla Walla County et al, 2004).

Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for our M & E objectives and technical methodology. These foundational documents were used to develop minimum requirements of the plan objectives, which were then expanded upon to address the specific information requirements of the Walla Walla program. Project objectives are to:
1. Monitor and evaluate salmonid performance in the natural environment
2. Monitor and evaluate performance in the hatchery
3. Monitor and evaluate ecological conditions

These objectives will address local information and management requirements, and will support learning in the Walla Walla Subbasin. In addition, our activities will contribute to scientific knowledge throughout the Columbia Basin, and will help support numerous Basin-wide Required and Prudent Actions. These milestones are focused on Chinook, but will address steelhead and bull trout through direct study and collaboration. This project will be responsible for the facilitation, analysis, and reporting required to provide the co-managers with a nexus for the decision making process based on best available science.

The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning, and water management regimes, are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements listed above, or elsewhere) to construct cohort lineages and run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed “run re-construction”, is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin. WDFW will also compile bull trout spawning data for the Touchet Basin, and assist as necessary in upper Mill Creek, as an index of adult abundance and trends.

Deliverable Specification: The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult, and run reconstruction estimates.

Work Element Budget: $55600 (6.04%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations:

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: **NPCC Subbasin:**

State: **HUC5 Watershed:**

County: **HUC6 Name:**

Salmonid ESUs Present:

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized

395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA

Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	**Value**
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2016	3/1/2016	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringresources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Coordinate analysis with WDFW and WDFW Snake River Lab	10/1/2016	2/28/2017	Completed	Work with WDFW to analyze all available data and summarize results.
C. Analyze adult enumeration data	10/1/2016	2/28/2017	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Analyze smolt and PIT-tag data	10/1/2016	2/28/2017	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.

Milestone Title	Start Date	End Date	Status	Milestone Description
E. Analyze Spawner / Carcass data	10/1/2016	2/28/2017	Completed	Analyze and interpret spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
F. Estimate & evaluate power & precision of all monitored variables	9/1/2016	11/30/2016	Completed	Sample size requirements for in-situ monitoring are expected to change through time. Therefore, statistical power will be estimated for all metrics on an annual basis as part of the adaptive management process. Sample size, sampling schedules, and expected Power for each metric will be included in the annual operating plan.
G. EDT/AHA modeling	10/1/2016	2/28/2017	Completed	Revised baseline B-H models, revision of baseline AHA estimates, and EDT models.
Deliverable: H. Analyzed data		2/28/2017	Completed	*See the Deliverable Specification above*

M: 132. Produce (Annual) Progress Report

Title: DRAFT Annual Technical Progress Report (1-1-2016) to (12-31-2016)

Description: DRAFT Technical Annual Progress Reporting Requirements: The final APR report for calendar year2016 will be due in the following 2017 contract.

Due to BPA RM&E reporting needs WDFW & CTUIR will submit a joint RME DRAFT Annual Technical Progress Report (Report) for calendar year 2016 (1-1-16 thru12-31-16). This Report should be submitted using the template available in Taurus (https://www.cbfish.org, go to your project, click on Reports & Documents, then go to the RM&E Technical Report tab).

The Report will be a deliverable under this CTUIR contract and will be drafted in coordination with WDFW (CR 294776).

This report will summarize results from 1-1-16 through 12-31-16 time frame. The progress report summarizes the project goal, objectives, hypotheses, completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning. Examples of long-term planning include future improvements, new directions, or level of effort for contract implementation, including any ramping up or ramping down of contract components or of the project as a whole.

If desired, additional reporting of information relating to this contract can be added at the end of the report.

Deliverable Specification: The DRAFT APR report for 2016 will be uploaded into Pisces.

Work Element Budget: $17800 (1.93%)

Planned Metrics:
* Start date of reporting period : 1/1/2016
* End date of reporting period : 12/31/2016

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Prepare for RM&E Technical Report. Review the revised (2016) guidance & template	8/1/2016	11/30/2016	Completed	Review the newly-revised guidance & template for your RME Technical Report. BPA Fish and Wildlife project sponsors who have the following work elements in their contracts are required to complete a RM&E technical report: 156 Develop RM&E Methods and Designs, 157 Collect/Generate/Validate Field and Lab Data, 158 Mark and Tag Animals, and/or162 Analyze/Interpret Data. Reports must show cumulative results and synthesis for the duration data collection/analysis studies. Final RME reports are due in March to align with regulatory reporting timelines.
B. Draft technical report in coordination with WDFW	10/1/2016	12/31/2016	Completed	Coordinate with WDFW in drafting technical report.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. RM&E Technical: Upload draft RM&E Technical Report (MS Word) for BPA review	1/1/2017	2/28/2017	Active	Upload your draft RM&E report into the Pisces Attachments tab as an MS Word document as a "Technical, Draft" for BPA review. BPA will review the draft RM&E report. If your Word file is too big to be uploaded, contact Pisces Support (support@cbfish.org). For more information on structure and content of your report, please use the newly-revised guidance & template for RME Reports located at https://www.cbfish.org/Help.mvc/GuidanceDocuments. (Milestone start/end: September 15 - January 15).
Deliverable: D. Completed DRAFT Annual Report		2/28/2017	Active	*See the Deliverable Specification above*

N: 202. Produce BiOp RPA Report

Title: BiOp RPA Report for Steelhead CY 2016

Description: This project is associated with RPA 64.2. CTUIR is the lead on this report. WDFW is in the support role for this report. The CTUIR and WDFW will work together and coordinate on this report. The report will be submitted under this CTUIR contract. This report only includes Spring Chinook.

Projects that have claimed that they support one or more RM&E RPAs (i.e., RPAs 50-73) under the FCRPS BiOp are required to report their results. To facilitate the summary of these results across the entire Columbia River Basin, and to provide more clarity as to the format required under the BiOp, these reports are required to be completed online. If desired, the required information can be prepared in MS Word, and pasted into Taurus. For more guidance see https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf.

BiOp RPA Reporting Requirements.

This project supports an ESA BiOp RPA (RPA64.2), therefore the CTUIR and WDFW are required to electronically submit a Final Annual BiOp RPA Report of work conducted for calendar year 2016 for upload into Taurus. This BiOp RPA report is required annually on all declared BiOp RPA associations.

The online BiOp RPA report in Taurus (www.cbfish.org) should include the data, analyses, and data management completed by your project by December 31, 2016. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent RPA report.

For each RPA, follow the directions in Taurus for each of the three sections and as appropriate input graphical or tabular data, accompanied by explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

For detailed information on how to access and produce this report please see "Sponsor Reporting Procedural Guidance" in Pisces. To find this procedural guidance document go to www.cbfish.org, select the "Login In" link at the upper right of corner. Enter your project number or name in the upper right of the search box. Select "Reports & Documents tab on left. Select "BiOp Annual Report." The "Sponsor Reporting Procedural Guidance" is a link directly below "1. Enter Basic Report Information." If you need further assistance please contact your PM/COTR.

Deliverable Specification: The online BiOp RPA report in Taurus (https://www.cbfish.org/BiologicalOpinionAction.mvc/Index/2014/BiOpRpaStatus) should include the data, analyses, and data management completed no later than December 31st. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the scale analyses, you will report the preliminary data (# of redds), but not (incomplete) age distributions of carcasses, which would be reported in the subsequent CY report.

For each RPA, follow the directions in Taurus for each of the three sections and, input completed graphical or tabular data, accompanied by any complete explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

Work Element Budget: $3000 (0.33%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Download RPA questions from cbfish.org	8/1/2016	9/30/2016	Completed	To prepare for your RPA report, 1) Go to www.cbfish.org and log in, 2) Navigate to your project and select "BiOp Annual Report" from the menu on the left, 3) Click on "Input Needed" for each applicable RPA to find your RPA reporting requirements so you will know how much time to set aside for this task. You may also click the “download RPA doc” button to get all RPA questions in one MS Word document. 4) Use “Request Review” link to email COTR or BPA RM&E RPA lead to request help or for review of draft content. For further guidance, see: https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf
B. Draft calendar year report in cbfish.org	9/30/2016	12/31/2016	Completed	The CTUIR is the lead for this report. The CTUIR will work with and coordinate with WDFW, CR 294776 on this report. For guidance on completing your report, see: https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf. If you have questions or would like BPA to review your draft, you may email RMEsupport@bpa.gov and your COTR to send them your working draft in Word or notify them to review in cbfish.org by using the “Request Review” email icon link to e-mail your COTR & BPA RM&E RPA lead.
C. Finalize calendar year report in cbfish.org and click Publish by March 15	12/31/2016	2/28/2017	Completed	The final version is due by March 15. (Milestone start/end: December 31 - March 15)
D. Coordinate with WDFW on report	8/1/2016	2/28/2017	Completed	The CTUIR is the lead for this report and will coordinate with WDFW who will provide support.
Deliverable: E. Submit BiOp RPA Report in Taurus		2/28/2017	Completed	*See the Deliverable Specification above*

O: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: All administrative tasks shall be fulfilled on time and with quality products. Timely responses to requests for more information are required. Proactive communication between the contractor and BPA's Contracting Officer (CO) and Contracting Officer Technical Representative (COTR) is required if a significant lag in scheduled delivery is expected.

Work Element Budget: $54500 (5.92%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Attach initial FISMA Compliance Attestation (BPA risk category Low)	3/1/2016	3/1/2016	Canceled	BPA contractors are required to protect their data and electronic systems consistent with the federal FISMA law (Federal Information Security Management Act of 2002). Your contract has been rated as "low risk" by BPA Cyber Security. The designated signatory for your organization may vary. Check with your COTR to see if BPA has already obtained, or will soon obtain through previous contracts, the attestation. If not, please work with your COTR to obtain a signed attestation confirming your organization's compliance with FISMA. Attestations can be in the form of a formal memorandum, letter, or email. An email will need to be cut and pasted into a word processing program. All attachments must be saved and uploaded as PDF. A sample attestation communication that describes the minimum information required can be found as a Pisces attachment at {https://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P137862}. Upload the attestation to Pisces under the new "FISMA Attestation" File Type, and type in the title as "Low-risk FISMA attestation". This milestone is considered complete when the contractor has uploaded an electronic copy of a signed attestation. Deadline: Start and end dates are both the first day of the contract.
B. Confirm that FISMA compliance documentation for any subsequent contract is current	10/1/2016	10/31/2016	Canceled	Contact your COTR and check in Pisces to confirm that the FISMA compliance documentation for your subsequent contact is still current. If not, work with COTR to update documentation. (Due 125 days before the contract end date). BPA contractors are required to protect their data and electronic systems consistent with the federal FISMA law (Federal Information Security Management Act of 2002). Your contract will be rated as "low risk" by BPA Cyber Security.
C. Begin drafting contract renewal documents and conduct internal review as needed	10/1/2016	10/31/2016	Completed	Your statement of work, line-item budget, and (if required) property inventory for your next contract are due to BPA at least 5 months prior to the contract start date (longer if your internal processes require more time to get the contract signed and in place prior to the start date).
D. Submit contract renewal package (SOW, Excel budget, property inventory) to BPA COTR	11/1/2016	11/1/2016	Completed	Once your statement of work (SOW) in Pisces is complete, and you have attached your line-item budget (LIB) and property inventory (PI) (if required), click the "Submit" button on the SOW tab to notify your COTR the package is ready for review.
E. Address comments and revise SOW, LIB, and PI as needed to get BPA manager approval	11/1/2016	12/31/2016	Completed	Once your COTR and his or her BPA manager have reviewed your contract renewal package and returned any comments to you, you will need to provide responses and changes as needed to achieve approval from the BPA manager, who will then forward the package to the Contracting Officer. This should be completed at least two months prior to the next contract start date, but may need to be 3 or 4 months depending on your internal processing time for contract signatures. If you have subcontracts that need to be signed prior to the contract start, it should be a minimum of 4 months.
F. Return signed contract to BPA's Contracting Officer within 30 days	2/1/2017	2/28/2017	Completed	Respond to the CO and COTR indicating any problems with the contract within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days.
G. Submit final invoice for prior contract within 90 days to facilitate contract closeout	3/1/2016	5/31/2016	Completed	Within 90 days of the last day of the PRIOR contract, the contractor shall issue a final invoice. In instances where more than 90 days is needed (e.g., because subcontractors have not invoiced), the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount shall be emailed to FWinvoices@bpa.gov and the COTR.
H. Accrual - Submit September estimate to BPA	8/10/2016	9/10/2016	Completed	Provide BPA with an estimate of contract work that will occur prior to September 30 but will not be billed until October 1 or later. Data must be input in to Pisces by September 10 (begins Aug 10, ends Sep 10).
I. Facilitate inputting Cost Share information into Pisces at the Project level	9/30/2016	11/15/2016	Completed	There are multiple contractors under this project and I am the lead project Proponent. I will solicit cost share information for the previous federal FY from project partners and enter previous FY's Cost Share information on the Project Cost Share tab by Nov 15 for all project partners. (Milestone starts Sep. 30 and ends Nov. 15)
J. Comply with all applicable federal, state,			Canceled	As described in the contract's Terms and Conditions, the contract manager and contractor shall comply with all applicable federal, state, tribal and local safety

tribal and local safety requirements, including reporting				laws, rules, regulations and requirements.
K. Coordinate w/ COTR & WDFW on next year's SOW	9/1/2016	10/31/2016	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
L. Attend AFS Oregon Chapter meeting	3/1/2016	3/4/2016	Completed	Attend AFS Oregon Chapter annual meeting at Seaside, OR, to present project findings. Three WWM&E member will attend this meeting. Abstract: Walla Walla spring Chinook reintroduction with continued research, monitoring and evaluation. The goals of the Confederated Tribes of the Umatilla Indian Reservation for Walla Walla Basin spring Chinook are to provide treaty and non-treaty fisheries in the basin, and to restore natural spawning. The purpose of the proposed hatchery program is to contribute to harvest and natural spawning in the near term. This is to be done in a manner consistent with the longer-term goal of re-establishing a self-sustaining, naturally spawning population through an “all-H” approach that includes hatchery production and improvements in habitat and fish passage. The program’s design is proposed to end the current dependence on imported broodstock, improve survival through local adaptation, and meet harvest and natural spawning objectives. Implementation is proposed to occur in three phases: 1) establishment of local stock, 2) transition, and 3) natural production focused with integrated harvest. Transitions from one phase to another will be based on the performance of hatchery and naturally spawning fish as measured by the proposed Walla Fish Production, Research, Monitoring & Evaluation Plan. This work is being funded under a contractual agreement with the Bonneville Power Administration which includes the implementation of artificial production in support of mitigation efforts related to Columbia River dams. Juvenile Spring Chinook Salmon Overwinter Rearing Habitat Use in the Walla Walla River The historic distribution and overwinter rearing habitat use by spring Chinook in the Walla Walla River is unknown. However, the documented migration of a significant portion of juvenile spring Chinook salmon from the South Fork Walla Walla River into the lower portions of the Walla Walla River in the fall and early winter suggests that the lower river is an important habitat area (Mahoney et al 2013). This study was designed toward identifying what areas in the lower river are used for holding/rearing and how abundant such locations might be. Such an examination would help determine if restoration efforts in lower portions of the river should be directed toward providing adequate overwintering holding and rearing areas for spring Chinook.
M. Attend AFS Idaho Chapter meeting	3/8/2016	3/10/2016	Completed	Attend AFS Idaho Chapter meeting in Coeur d'Alene, Idaho. Three WWM&E members will attend this meeting.
N. Adaptive management	6/1/2016	2/28/2017	Completed	The Adaptive Management process requires quarterly and annual updates of key management assumptions to revise in-season and long-term estimates of program performance and future outcomes. The parameters used in the adaptive management process are defined by the in-season and forecasting models. Each of these models has implicit hypotheses expressed in their structure and function that are described in their documentation or annual operating procedure. As learning occurs the structure and function of the in-season and long-term management models will be reviewed and revised to reflect current understanding.
O. Annual Operation Plan	6/1/2016	2/28/2017	Completed	CTUIR will support an adaptive management and decision making process for the spring Chinook program. The adaptive management process will support in-season management by facilitating three quarterly in-season reviews, and one annual adaptive management workshop culminating in an Annual Operating Plan (AOP). The AOP will incorporate current information to provide updated sampling plans, details regarding implementation of the program, and revised operational criteria as agreed upon.
P. Comply with all applicable federal, state, tribal and local safety requirements, including reporting	3/1/2016	2/28/2017	Completed	As described in the contract’s Terms and Conditions, the contract manager and contractor shall comply with all applicable federal, state, tribal and local safety laws, rules, regulations and requirements.

Deliverable: Q. All administrative tasks fulfilled with timely quality products		2/28/2017	Completed	*See the Deliverable Specification above*

P: 122. Provide Technical Review and Recommendation

Title: Quantitative Science and technical support for M & E plan implementation

Description: Provide quantitative science and technical support for M & E plan implementation. Participate in review and development of technical details, power analysis, annual operating procedures, monitoring methods, habitat capacity modeling and annual technical reports by Walla Walla M & E staff.

We will develop methods to monitor Parentage and the characteristics of adaptation that are not already addressed in the VSP parameters. We will develop methods and a protocol for monitoring adaptation of Walla Walla spring Chinook. During the first year on this work element we will develop techniques and protocols for observing adaptation in terms of life history, morphology, physiology, and behavior. This Work Element is divided into three phases:
1) Review and development of annual operating procedures and methods
2) Baseline monitoring of characteristics prior to implementation of a local hatchery program
3) Continuing M & E after implementation of a local hatchery program

Deliverable Specification: The methods, protocols, and annual operating procedures for all monitored metrics for the Walla Walla M & E Plan will be developed by Walla Walla M & E staff. CTUIR staff will review and provide input on all aspects M & E implementation Plan .

Work Element Budget: $61756 (6.71%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Perform power analysis for all monitored metrics	5/1/2016	2/28/2017	Completed	Provide power and error estimates for all monitored metrics
B. Review and Update Annual Operating Procedures	6/1/2016	8/31/2016	Completed	Review and update annual operating procedures (i.e. methods and protocols) for addressing natural and hatchery fish performance (i.e. abundance, productivity, spatial structure and diversity (parentage and adaptation) in Walla Walla spring Chinook.
C. Review and update habitat capacity model	9/1/2016	9/30/2016	Completed	Collect and update EDT habitat capacity model parameters for the South Fork Walla Walla River.
D. Review and update Annual technical reports	10/1/2016	1/31/2017	Completed	Collaborate with WW M & E staff to review and update CY Annual technical reports.

Milestone Title	Start Date	End Date	Status	Milestone Description
E. Develope protocols and methods for monitoring adaptation and parentage (parental tagging)	7/1/2016	11/30/2016	Completed	During 2016 we will work with CRITIFC and regional partners to develop protocols and methods for monitoring parentage in the Walla Walla. We will meet directly CRITFC scientific staff and staff from the Hagerman genetics laboratory to develop a sampling regime and protocol that will provide sufficient assignments to monitor performance of the population. In addition we will develop laboratory techniques for addressing the other key genetic performance metrics identified in the Walla Walla M&E Plan including effective population size, allelic diversity, and specific alleles of interest including run-timing genes. The work will build upon standard methods for genetic assessments such as Maximum likelihood (Marshall et al. 1998) and Bayesian (Neff et al. 2001) procedures for parental exclusion analysis (Gerber et al. 2003), and will incorporate best practices including recently developed protocols for estimating effective population size ((BLANKENSHIP et al). Development of a locally produced stock is intended to increase survival, and to help nurture a locally adapted stock. Fish adapted to the Walla Walla River are expected to have life history traits, morphologies, and behavior that are better suited to conditions that are specific to the Walla Walla when compared to Carson Stock fish. Adaptation, coupled with local acclimation and a local program, is expected to result in increased survival in comparison to Carson stock fish. Although it will not be possible to determine causation between fish attributes and survival, it will be practical to monitor adaptation and to relate adaption to survival based on correlation. We will develop methods and a protocol for monitoring adaptation of Walla Walla spring Chinook. In 2016 we will focus on the existing methods for monitoring adaptation, and will develop techniques and protocols for observing adaptation in terms of life history, morphology, and behavior.
Deliverable: F. Provide Technical Review of M & E Implementation Plan		2/28/2017	Completed	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	73982 REL 14	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$726,869	**Perf. Period:**	3/1/2017 - 2/28/2018
Contract Type:	Release	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 02/14/2017 with 0 problems, and 0 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and https://www.bpa.gov/efw/FishWildlife/Pages/default.aspx.

The Walla Walla subbasin supports ESA listed populations of steelhead and bull trout, and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Spring Chinook were extirpated from the Walla Walla in the early 20th century. For the past 25 years the CTUIR and others have implemented numerous passage, flow, and habitat to improve salmonid production in the Subbasin.

The Tribes Walla Walla Spring Chinook program began in 2000 with the outplanting of hatchery adults collected from the Ringold Hatchery, Carson National Fish Hatchery, and the Umatilla River at Three Mile Falls Dam. Direct stream release of hatchery reared juveniles began in 2005 using Carson stock from the Carson National Fish Hatchery. Monitoring & Evaluation of the Spring Chinook Program began in 2000. The work included assessment of spring Chinook and steelhead natural production, and evaluation of fish passage based on adult steelhead and bull trout. In 2007 CTUIR, WDFW, and BPA developed a collaborative M & E program in the Subbasin based on salmonid VSP Parameters of abundance, productivity, diversity, and spatial structure. The expanded project was designed to provide high level indicators of fish population status and trends for spring Chinook, steelhead, and bull trout. This information is used to inform the CTUIR first foods management, and to address BPA fish and wildlife program strategies.

The purpose of this M & E project is to address the adaptive management requirements of the Spring Chinook Program, and to maintain the baseline monitoring needed by the existing management system. This effort includes an ecosystem-based scientific framework for adaptive management and performance evaluation based on measurements of success and monitors of risk to other species and populations. The techniques and designs used for implementation and detailed methodology can be found online at https://monitoringresources.org. This collaborative effort is funded by the Columbia River Fish Accords. Our M & E objectives were developed based on the requirements of the Walla Walla Spring Chinook Hatchery Master Plan (HMP), BPA's Fish Management Sub-strategies, the Reasonable and Prudent Alternatives (RPA's) of the Columbia Power System Biological Opinion, and the existing comprehensive fish restoration program. Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for the objectives and technical methodology.

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (https://www.bpa.gov/efw/FishWildlife/Pages/default.aspx).

Contacts:

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Work Element Budget Summary:

Work Element - Work Element Title		EC Needed*	Estimate	(%)
A :	185. Produce Pisces Status Report - Periodic Status Reports for BPA		$5,500	(0.54%)
B :	165. Produce Environmental Compliance Documentation - Compliance for WEs C thru K		$11,500	(1.14%)
C :	28. Trap and Haul - Fish Salvage	*	$28,500	(2.84%)
D :	158. Mark/Tag Animals - PIT Tag Spring Chinook smolts (out-migrant tagging)	*	$55,500	(5.54%)
E :	158. Mark/Tag Animals - PIT Tag steelhead smolts (out-migrant tagging)	*	$31,500	(3.14%)
F :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$31,500	(3.14%)
G :	157. Collect/Generate/Validate Field and Lab Data - Adult fish counts at Nursery Bridge Dam (video work)	*	$130,000	(12.98%)
H :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates	*	$85,500	(8.54%)
I :	157. Collect/Generate/Validate Field and Lab Data - Outmigrant monitoring for population estimates, survival, & migration	*	$312,250	(31.20%)
J :	157. Collect/Generate/Validate Field and Lab Data - Maintain and operate PIT Arrays	*	$73,000	(7.29%)
K :	157. Collect/Generate/Validate Field and Lab Data - Stream Gauge Monitoring and Data Distribution	*	$25,500	(2.54%)
L :	162. Analyze/Interpret Data - Analyze Data		$62,500	(6.24%)
M :	202. Produce BiOp RPA Report - BiOp RPA Report for Steelhead CY 2017		$3,500	(0.34%)
N :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$56,037	(5.59%)
O :	122. Provide Technical Review and Recommendation - Quantitative Science and technical support for M & E plan implementation		$61,989	(6.19%)
P :	132. Produce (Annual) Progress Report - Submit Progress Report for the period (1-1-2015) to (12-31-2015) Late Annual Report		$500	(0.04%)
Q :	132. Produce (Annual) Progress Report - Submit technical Progress Report for the period 1-1-16 to 12-31-16		$500	(0.04%)
R :	132. Produce (Annual) Progress Report - DRAFT Annual Technical Progress Report (1-1-2017) to (12-31-2017)		$25,500	(2.54%)
		Total:	$1,000,776	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $5500 (0.55%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2017 (3/1/2017 - 6/30/2017)	7/1/2017	7/15/2017	Completed	
B. Jul-Sep 2017 (7/1/2017 - 9/30/2017)	10/1/2017	10/15/2017	Completed	
C. Oct-Dec 2017 (10/1/2017 - 12/31/2017)	1/1/2018	1/15/2018	Completed	
D. Final Jan-Feb 2018 (1/1/2018 - 2/28/2018)	2/14/2018	2/28/2018	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C thru K

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through K. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $11500 (1.15%)

Planned Metrics:
* Are herbicides used as part of work performed under this contract?: No
* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Use Best Management Practices to stabilize soils and prevent spread of noxious weeds	3/1/2017	2/28/2018	Completed	Use applicable BMPs to retain existing vegetation and achieve re-establishment of vegetation in disturbed areas to at least 70% of pre-disturbance levels. Visit chapter 7.3 of http://www.ecy.wa.gov/pubs/0410076.pdf for BMPs to consider for construction contracts and http://wdfw.wa.gov/publications/01330/wdfw01330.pdf for guidance on re-vegetation in the Columbia River Basin.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Determine if contract work could adversely affect Pacific lamprey	3/1/2017	3/1/2017	Completed	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best %20Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf (BMPs).
C. Report lamprey observation and catch data to USFWS by Feb. 15	2/15/2018	2/15/2018	Completed	All contractors doing instream work (e.g., surveys, habitat improvements, electrofishing, screwtraps, etc.) in anadromous fish areas are required to annually report lamprey observations or catch, including zero, by Feb 15 for the previous calendar year's work. A data template is available at: (https://www.cbfish.org/EfwDocument.mvc/DownloadFile/11) As per instructions on the form, email your data to christina_wang@fws.gov at US Fish and Wildlife Service and CC your COTR. For identification of lamprey life stages see page 10 of USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best %20Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf.
D. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2017	2/28/2018	Completed	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.westernais.org -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.anstaskforce.gov/stateplans.php
E. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2017	2/28/2018	Completed	Prevent spread of invasive species
F. Complete and document public involvement activities and provide to EC Lead	3/1/2017	3/1/2017	Completed	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
G. Participate in ESA Consultation	3/1/2017	2/28/2018	Completed	Work may include drafting BA, completing HIP III BO Project Notification Form, submitting high risk project designs to Restoration Review Team (RRT), providing copy of Section 10, 4(d), or 6 permit, etc., or submitting Hatchery Genetic Management Plan to BPA for ESA consultation initiation, and providing input for the ensuing consultation.
H. Provide information for Section 106 Cultural review	3/1/2017	2/28/2018	Completed	Email EC lead detailed project description, map, and shapefiles so that BPA can initiate Section 106 review.
I. Plan for field inventory	3/1/2017	2/28/2018	Completed	Coordinate with EC Lead and BPA archaeologist to determine appropriate approach and methodology for field inventory, if determined necessary by BPA archaeologist.
J. Cultural resource surveys	3/1/2017	2/28/2018	Completed	Coordinate with EC lead to schedule cultural resources surveys if required by BPA archaeologist.
K. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2017	2/28/2018	Completed	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits.

Milestone Title	Start Date	End Date	Status	Milestone Description
L. Keep JARPA permit updated	3/1/2017	2/28/2018	Completed	For rotary screw traps in Washington (no screw traps in Oregon anymore). Permits are renewed every two or three years.
Deliverable: M. Compliance achieved and documented		3/1/2017	Completed	*See the Deliverable Specification above*

C: 28. Trap and Haul

Title: Fish Salvage

Description: Each year, often near the start or end of the irrigation season, CTUIR, ODFW, WDFW, and irrigation districts cooperate in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. During these fish salvage efforts, seines and backpack electrofishing gear are used to collect fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.

Deliverable Specification: Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.

Work Element Budget: $28500 (2.85%)

Planned Metrics: # of fish transported: 1000

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)

Country: US

NPCC Subbasin: Walla Walla

State: WA

HUC5 Watershed: Middle Walla Walla River

County: Walla Walla

HUC6 Name: Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Rescue and haul fish	3/1/2017	2/28/2018	Completed	Rescue and transport fish prior to annual and emergency maintenance at Nursery Bridge Dam, Little Walla Walla Dam, Gardena Dam and other locations (e.g. mainstem berms) as needed throughout the year. Trap and haul stranded adult spring Chinook.
Deliverable: C. Fish salvage data		2/28/2018	Completed	*See the Deliverable Specification above*

D: 158. Mark/Tag Animals

Title: PIT Tag Spring Chinook smolts (out-migrant tagging)

Description: Estimates of smolt run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 8,000 run of the river out-migrant spring Chinook for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery Spring Chinook salmon production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain two rotary screw traps and PIT-tag up to 8,000 run of the river out-migrant Spring Chinook salmon. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating spring Chinook. PIT-tag files will be submitted to PTAGIS within 15 days of release.

	Targets: 8,000 natural origin out-migrant spring Chinook		
Work Element Budget:	$55500	(5.55%)	
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery * # fish tagged with PIT: 8000		
Locations:	2		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	9/1/2017	10/31/2017	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag spring Chinook out-migrants - spring	3/1/2017	5/31/2017	Completed	Up to 8,000 run of the river out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag sprng Chinook out-migrants - fall	11/1/2017	2/28/2018	Completed	Depending on adequate stream flow and conditions, up to 8,000 (for the brood year) out-migrant spring Chinook will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. Submit PIT-tag data to PTAGIS-spring	3/1/2017	5/31/2017	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
F. Submit PIT-tag data to PTAGIS-fall	11/1/2017	2/28/2018	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
Deliverable: G. PIT tagged outmigrants		2/28/2018	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag steelhead smolts (out-migrant tagging)

Description: Estimates of smolt run timing, abundance, and survival based on PIT-tag detections are critical for viable salmonid population (VSP) monitoring of BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag up to 3,000 run of the river out-migrant summer steelhead for life cycle studies. Our results will evaluate the status and trend of both natural and hatchery steelhead production (e.g. SAR and AAR) in the subbasin.

Rotary screw traps are commonly used to collect out-migrating salmonids (Volkhardt et al. 2007). CTUIR will maintain two rotary screw traps and PIT-tag up to 3,000 run of the river out-migrant Summer steelhead. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Steelheads will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating summer steelheads. PIT-tag files will be submitted to PTAGIS within 15 days of release.

	Targets: 3,000 natural origin out-migrant summer steelhead		
Work Element Budget:	$31500	(3.15%)	
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery * # fish tagged with PIT: 3000		
Locations:	2		
Primary Focal Species:	Steelhead (O. mykiss) - Middle Columbia River DPS		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	WA	**HUC5 Watershed:**	Multiple
County:	Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	9/1/2017	10/31/2017	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag steelhead out-migrants - spring	3/1/2017	5/31/2017	Completed	Up to 3,000 run of the river out-migrant summer steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag steelhead out-migrants - fall	11/1/2017	2/28/2018	Completed	Depending on adequate stream flow and conditions, up to 3,000 (for the brood year) out-migrant summer steelhead will be PIT-tagged and released to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. Submit PIT-tag data to PTAGIS-spring	3/1/2017	5/31/2017	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
F. Submit PIT-tag data to PTAGIS-fall	11/1/2017	2/28/2018	Completed	Usually done daily, but within 15 days, according to latest PTAGIS manual.
Deliverable: G. PIT tagged outmigrants		2/28/2018	Completed	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title: PIT Tag smolts (hatchery tagging)

Description: Estimates of out migrant run timing, abundance, and survival based on PIT-tag detections are key components for assessing the performance of hatchery-origin fish relative to naturally-produced fish and necessary for determining the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

This WE is an in-kind collaboration between the USFWS and the CTUIR. The CTUIR supplies 5,000 PIT-tags and pays to have a PIT-trailer delivered to the Hatchery tagging site (e.g. Carson NFH). The USFWS then provides labor and ancillary support to PIT-tag 5,000 spring Chinook smolts. This marking effort represents about 2% of the 250,000 total fish released to the South Fork Walla Walla River each year for the Tribe. These tagging levels will allow for estimates of smolt survivals and run timing to McNary Dam, and for smolt to adult survival back to the subbasin. USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 5,000 hatchery spring Chinook and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $31500 (3.15%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring

	* Secondary R, M, and E Type : Status and Trend Monitoring
	* Secondary R, M, and E Focal Strategy : Hatchery
	* # fish tagged with PIT: 5000
Locations:	1
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Country:	US
State:	OR
County:	Umatilla
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

NPCC Subbasin:	Walla Walla
HUC5 Watershed:	Upper Walla Walla River
HUC6 Name:	Lower South Fork Walla Walla River

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	9/1/2017	10/31/2017	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag hatchery spring Chinook	11/1/2017	11/30/2017	Completed	PIT tag up to 5,000 hatchery spring Chinook for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: D. PIT tag Hatchery smolts		11/30/2017	Completed	*See the Deliverable Specification above*

G: 157. Collect/Generate/Validate Field and Lab Data

Title: Adult fish counts at Nursery Bridge Dam (video work)

Description: We will estimate adult abundance at index areas based on adult outplants, adult ladder and weir counts in the upper WWR (above NBD), Mill Creek (above Bennington Dam), Coppei Creek, and Upper Touchet River (above DAT). Because there are no counting stations on the lower Walla Walla River, fish counts from the upper subbasin are used to estimate adult returns. Returns to NBD (rkm 71.9) on the mainstem, Mill Creek Division Dam (rkm 16.9), and Dayton Dam (rkm 86.9) on the Touchet River will be used to provide an index of adult returns by species. Fish counting at Dayton Dam and Coppei Creek is performed by WDFW under a separate contract. We are also deploying multiple PIT arrays to improve total adult population abundance estimates (e.g. PIT array systems). Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns.

Although, counts at these sites are incomplete due to some upstream passage without detection and downstream spawning, these sites represent the best index of adult return currently available for those tributaries. Enumeration will occur year round to encompass the known adult migration for spring Chinook, summer steelhead, and bull trout. Enumeration at Nursery Bridge Dam will use video counts, whereas Mill Creek will rely on PIT-tag detections only, and the Dayton Weir will rely on trapping and handling. Past escapement counts are minimal because they have not been corrected for error. We will generate estimates of SE and 95% CI based on mark recapture tests for all our adult abundance estimates .

Data collected from the video counting included date, time, species, size (e.g., jack or adult for spring Chinook salmon), life stage (e.g., steelhead kelts), origin (e.g., adipose clip or unclipped) and migration direction for bull trout. Video counts are not reliable for fish less than 30.5 cm. Notations were also made of other species encountered and general fish condition. Daily fish tallies from both ladders were posted to an onsite tally board for the public. The deliverable for this work was an error-checked database of daily fish counts.

At video facilities an underwater video camera activated by a motion detector was linked to a DVR at each site to capture a video image of passing fish. Overhead dusk-to-dawn lights will be operated at each site. The stations will be checked and downloaded daily. Downloaded video clips will be archived with CTUIR and housed in the data repository.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam, Dayton Dam, and in Coppei Creek. This contract only covers Nursery Bridge Dam; WDFW will operate at the facilities in Washington. Data is accessible through CTUIR's website and is also kept in project staff's office.

Work Element Budget: $130000 (12.99%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring

	* Secondary R, M, and E Focal Strategy : Hatchery		
Locations:	1		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	OR	**HUC5 Watershed:**	Middle Walla Walla River
County:	Umatilla	**HUC6 Name:**	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Adult fish counts at Nursery Bridge Dam (video work) - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized

144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2017	3/1/2017	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2017	2/28/2018	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/1/2017	2/28/2018	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - spring/summer	3/1/2017	7/31/2017	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
F. Maintain video monitoring equipment @ Nursery Bridge Dam - fall/Winter	9/1/2017	2/28/2018	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). 1) Maintain video monitoring equipment in Nursery Bridge Dam fish ladder; 2) Download, review and tally Salmon-soft video-tracking results; 3) Collate and distribute NBD fish counts; 4) update NBD fish tally board.
G. Review, organize and summarize video results	11/1/2017	2/28/2018	Completed	Summarize NBD fish count methods, results and discussion for BPA annual report.
Deliverable: H. Adult fish count from Nursery Bridge Dam		2/28/2018	Completed	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts (see WE C, adult enumeration) combined with redd and carcass counts (Crawford et al. 2007; Gallagher et al. 2007) will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River - The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. Care is taken not to disturb spawning fish or redds.

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Fin clips from carcasses will be collected for genetic analysis. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked databases and data summaries. Data collected will be used to estimate

	temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.		
Work Element Budget:	$85500	(8.54%)	
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery		
Locations:	4		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	Multiple	**HUC5 Watershed:**	Multiple
County:	Umatilla | Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft

847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2017	3/1/2017	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2017	2/28/2018	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/31/2017	2/28/2018	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Pre-spawn carcass survey in lower walla walla river	7/1/2017	7/31/2017	Completed	Pre-spawn carcass counts are necessary to estimate the total or relative number of adult returns over the spawning season and will be done in the lower Walla Walla River and lower Mill Creek; to locate fish that do not ascend into the spawning grounds.
F. Spring Chinook redd/carcass surveys	8/1/2017	9/30/2017	Completed	Redd & carcass counts will be conducted every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spawning spring Chinook. Organize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
Deliverable: G. Spring Chinook spawner/ carcass survey data		10/31/2017	Completed	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Outmigrant monitoring for population estimates, survival, & migration

Description: Smolt escapement to the mouth of the Walla Walla and to McNary Dam will be estimated for spring Chinook and steelhead by applying an estimated Cormack-Jolly Seber survival probability to fish injected with a PIT tag. Prior to each tagging season the Sample Size 1.3 program will be used to determine the number of tags needed to estimate survival rates at the desired levels of precision. We estimate a sample size of 3,600 to 6,200 spring Chinook should provide a 10% coefficient of variation (CV) to Burlingame and McNary Dams, respectively.

Smolt production monitoring will be conducted in the mainstem Touchet River, the Walla Walla River near the Oregon state line, and in lower Mill Creek (Volkhardt et al. 2007, Mahoney et al. 2013, Mendel et al. 2014). Out-migrating naturally produced salmonids captured at the smolt traps will be PIT tagged so we can evaluate juvenile run timing and survival to McNary Dam, as well as to evaluate adult return timing and survival. A sub-sample of tagged fish will be scale-sampled, weighed, and photographed for growth and morphometric information.
Multiple PIT tag arrays have been set up in the Walla Walla River, Mill Creek and in the Touchet River to help us understand run timing, survival, and to estimate adult returns, adult-to-adult productivity or smolt to adult survival. The location of rotary screw traps and PIT-tag arrays in the Walla Walla Subbasin are shown in Figure 36. Previously used smolt trapping sites in the lower Walla Walla River have been abandoned because of maintenance and debris issues but may be revised in the future (Mahoney et al. 2012).

Natural smolt abundance will be estimated for both the upper Walla Walla River (i.e. Basel Cellars site) and lower Mill Creek trap locations. Screw traps will be installed by October and run continuously as stream conditions allow into June. The traps are not operated during periods of high/low stream flow (e.g. between 2000 and 200 CFS), peak hatchery releases, and extreme cold and ice. To estimate potential juvenile migrants passing when the trap was not operated for short intervals (= 5 days) we will calculate the mean number of fish trapped for three days before and three days after non-trapping periods. To estimate numbers of fish emigrating past the trap when the trap was not operated for long durations (6 days or more), we used a within year regression of daily stream flow and daily number of natural-origin outmigrants (by size category) captured for the following periods: October-December, January-March, and April-May. The mean number of fish passed is then divided by the estimated trap efficiency to calculate daily fish passage.

Natural salmonid abundance is estimated for the Walla Walla River using a stratified Petersen/Darroch estimator (DARR 2.02, Bjorkstedt 2005 and 2009). DARR 2.02 uses Darroch's (1961) stratified Peterson estimator for estimating abundance and associated variance (SE) from stratified mark-recapture data (http://santacruz.nmfs.noaa.gov/publications/software/439/). Trap efficiency (TE) is determined by releasing a known number of PIT-tagged fish above each trap and enumerating recaptures. TE results are organized into bi-weekly strata for analysis in DARR. Mark recapture estimators generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging; (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

In this study, we release all healthy PIT-tagged fish roughly 1000 m above the trap. Our previous TE tests showed that most recaptures occurred within 24 hours of release. Thus, TE tests are done daily up to 24 hours prior to a scheduled trap shut down. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not pit-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals. Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). All captured salmonids will be scanned for PIT-tags and processed using a Biomark PIT Tag station. Data collected from juvenile salmonids include: number, species, length, weight, scales from steelhead for age structure and age at migration. Healthy, spring Chinook (> 65 mm, F.L.), summer steelhead (> 124 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) are manually PIT-Tagged and released on site (Prentice et al. 1990). The downstream movement of Chinook salmon fry and parr (< 65 mm), age-0 summer steelhead (< 124 mm) are presumed not to be out-migrants. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38)
Mill Creek below Bennington Dam (RM 10).

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Data entry, compilation, and quality control of field data will be performed. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $312250 (31.20%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 2
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US | **NPCC Subbasin:** Walla Walla
State: WA | **HUC5 Watershed:** Multiple
County: Walla Walla | **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized

136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both

Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2017	3/1/2017	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2017	2/28/2018	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	7/31/2017	2/28/2018	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.

Milestone Title	Start Date	End Date	Status	Milestone Description
E. Monitor salmonids leaving the upper Walla Walla River - spring/summer	3/1/2017	5/31/2017	Completed	Operate 5-foot rotary screw trap in spring
F. Monitor salmonids leaving the upper Walla Walla River - fall	11/1/2017	2/28/2018	Completed	Operate 5-foot rotary screw trap in fall
G. Monitor salmonids leaving Mill Creek - spring	3/1/2017	2/28/2018	Completed	Operate 5-foot rotary screw trap in spring
H. Monitor salmonids leaving lower Mill Creek - fall	11/1/2017	2/28/2018	Completed	Operate 5-foot rotary screw trap in fall
I. Review, organize and summarize results	11/1/2017	2/28/2018	Completed	Review, organize and summarize results for migration year 2013.
Deliverable: J. Smolt monitoring and PIT-tagging data		2/28/2018	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Maintain and operate PIT Arrays
Description: CTUIR will continue to maintain and operate 11 PIT-Arrays in the Walla Walla subbasin at 8 locations.
Deliverable Specification: CTUIR will maintain PIT arrays and fish detection data will be automatically uploaded each week.

Work Element Budget: $73000 (7.29%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Maintain and operate PIT Arrays - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized

110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA

Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CRITFC Cloud Secure Tribal Repository (CCSTR) (http://www.critfc.org/)
PTAGIS Website (http://www.ptagis.org/)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2017	3/1/2017	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2017	2/28/2018	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Maintain and operate PIT Array systems	3/1/2017	2/28/2018	Completed	Daily system status check to ensure the remote PIT tag detection system is uploading to the PTAGIS database and to CTUIR office in Walla Walla. Site visits as needed to ensure proper system operation. Biomark will be maintaining the PIT Arrays.
E. Yearly upload of error-checked datasets	3/1/2017	2/28/2018	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
Deliverable: F. Produce accessible, error-checked datasets		2/28/2018	Completed	*See the Deliverable Specification above*

K: 157. Collect/Generate/Validate Field and Lab Data

Title: Stream Gauge Monitoring and Data Distribution
Description: Stream Gauge Monitoring and Data Distribution

The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in 2011 began a local discussion in regards to the Washington Department of Ecology pulling back from its' commitment to monitoring the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road (through the summer low flow period). As fish enhancement projects focused on listed species continue to occur within the Walla Walla Watershed the Walla Walla River discharge information continues to be a vital tool in the understanding of how much water is available and when it's available within the watershed. The WWBWC proposes to continue the gauging activity at the Pepper Bridge gauge, Beet Road Bridge gauge, Grove School Bridge gauge, McDonald Road Bridge gauge, and at the Pierce RV Park gauge.

The McDonald Road Bridge site has been listed as an area of concern by the WDFW during the low flow periods. The location downstream of the last major diversion (Garden City) and upstream of the Walla Walla River and Touchet River confluence and typically during low flow periods have flow levels below 20 cubic feet per second (cfs). In 2012 the Bergevin-Williams Diversion which was directly downstream of the McDonald Road Bridge was moved upstream as part of a diversion consolidation project. Of the 20 cfs in river at McDonald Road Bridge a portion of that flow was taken at the Bergevin-Williams diversion leaving very low surface flow remaining instream below the diversion. With the last major diversion upstream of McDonald Road Bridge starting in 2013 additional low surface flow pressure was placed on the McDonald Road reach. During one the WWBWC seepage assessments (July 17, 2013) the two immediate reaches below the McDonald Road Bridge gauge recorded flows of less than 5cfs.

Project Phases: The project is divided into three phases: Field Measurements, Data Processing and Publishing, and Analysis/reporting.

Coordination and Planning: WWBWC will coordinate and plan all tasks with CTUIR. WWBWC is a subcontractor under this contract.

Deliverable Specification: WWBWC will maintain and install two air temperature sensors at the McDonald Road Bridge and the Pierce RV Park site and install a turbidity sensor at the Pierce RV Park site. We will provide continuous streamflow data for five gauge stations on the Walla Walla River. The WWBWC will also publish provisional and confirmed data to the WWBWC website, which is available to all agency partners. The WWBWC will also provide an annual report on the five Walla Walla River gauge sites at the end of the contract period. Data will also be uploaded into the Streamflow Gage Network.

Work Element Budget: $25500 (2.55%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5

Primary Focal Species: Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US | **NPCC Subbasin:** Walla Walla

State: Multiple | **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Stream Gauge Supplementation (2010-051-00) v1.0

Study Plan Owner: James White

Protocol: Stream Gauge Supplementation (2010-051-00) v1.0

Protocol State: Draft

Protocol Owner: James White

Sample Design: Stream Gauge Monitoring and Data Distribution - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2017	3/1/2017	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2017	3/1/2017	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2017	2/28/2018	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	3/1/2017	2/28/2018	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Field measurements	3/1/2017	2/28/2018	Completed	Field Measurements: The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
F. Data processing and publishing	3/1/2017	2/28/2018	Completed	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Realtime Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements. The data collected will also be uploaded onto Streamflow Gage Network.
Deliverable: G. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/28/2018	Completed	*See the Deliverable Specification above*

L: 162. Analyze/Interpret Data

Title: Analyze Data

Description: The Walla Walla M&E plan (Mahoney and Schwartz 2014) was developed to address key performance indicators relevant to the Tribes Spring Chinook Program, and to provide a system for evaluating performance to support adaptive management. The objectives and rational of the plan were developed based on the requirements of the

	Walla Walla Spring Chinook Hatchery Master Plan (HMP, CTUIR 2013), and the information requirements of the funding agency and co-managers. These are identified in the BPA Strategies (Council, 2014), Reasonable and Prudent Alternatives (RPA's) of the Columbia Power System Biological Opinion (Fisheries, 2014), and the existing comprehensive fish restoration program (County & Council, 2004; CRITFC, 1996; CTUIR, 2013; Jones et al, 2011; Walla Walla County et al, 2004). Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for our M & E objectives and technical methodology. These foundational documents were used to develop minimum requirements of the plan objectives, which were then expanded upon to address the specific information requirements of the Walla Walla program. Project objectives are to: 1. Monitor and evaluate salmonid performance in the natural environment 2. Monitor and evaluate performance in the hatchery 3. Monitor and evaluate ecological conditions These objectives will address local information and management requirements, and will support learning in the Walla Walla Subbasin. In addition, our activities will contribute to scientific knowledge throughout the Columbia Basin, and will help support numerous Basin-wide Required and Prudent Actions. These milestones are focused on Chinook, but will address steelhead and bull trout through direct study and collaboration. This project will be responsible for the facilitation, analysis, and reporting required to provide the co-managers with a nexus for the decision making process based on best available science. The Walla Walla Subbasin is a tightly managed system, and the coordination, evaluation and management of adult returns or spawning, and water management regimes, are expensive endeavors that are continually scrutinized. For some stocks in some years, success can depend on a handful of naturally produced fish escaping to the spawning grounds. The principle task under this work element is to put together all available data (from work elements listed above, or elsewhere) to construct cohort lineages and run returns and survivals for both spring Chinook salmon and summer steelhead. Representative samples of multiple age and abundance samples can be used to determine year class abundance and assess cohort strength. This process, often termed "run re-construction", is the foundation for developing productivity performance indicators. Life-stage specific estimates of productivity provide common units for comparing population performance across geographic and temporal scales. Age, abundance, and distribution information will be used to assign fractions to cohorts, and reconstruct brood years. Brood year by life-stage information will be used to calculate the standard life-history performance metrics such as adult-to-adult, smolt-to-adult productivity. This may enable predictions of run timing and abundance and would be powerful tools for managing fisheries and flow regimes within the Walla Walla Basin. WDFW will also compile bull trout spawning data for the Touchet Basin, and assist as necessary in upper Mill Creek, as an index of adult abundance and trends.
Deliverable Specification:	The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA. Project data will be analyzed to produce smolt-to-adult, adult-to-adult, and run reconstruction estimates.
Work Element Budget:	$62500 (6.25%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery
Locations:	
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	**NPCC Subbasin:**
State:	**HUC5 Watershed:**
County:	**HUC6 Name:**
Salmonid ESUs Present:	
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized

395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA

Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2017	3/1/2017	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Coordinate analysis with WDFW and WDFW Snake River Lab	3/1/2017	2/28/2018	Completed	Work with WDFW to analyze all available data and summarize results.
C. Analyze adult enumeration data	3/1/2017	2/28/2018	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Analyze smolt and PIT-tag data	3/1/2017	2/28/2018	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.

Milestone Title	Start Date	End Date	Status	Milestone Description
E. Analyze Spawner / Carcass data	10/1/2017	2/28/2018	Completed	Analyze and interpret spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
F. Estimate & evaluate power & precision of all monitored variables	9/1/2017	11/30/2017	Completed	Sample size requirements for in-situ monitoring are expected to change through time. Therefore, statistical power will be estimated for all metrics on an annual basis as part of the adaptive management process. Sample size, sampling schedules, and expected Power for each metric will be included in the annual operating plan.
G. Anayze juvenile steelhead scales	3/1/2017	2/28/2018	Completed	Scale samples are collected from about 30% of juvenile steelhead to estimate the age composition of emigrants. The goal is to collect about 500 readable scales from about 2,000 fish (assuming a 78% readable scale rate; Mayer and Shuck 2009). All scale samples are handled according to CTUIR protocols. CTUIR personnel made age determinations by counting annuli as described by DeVries and Frie (1996).
Deliverable: H. Analyzed data		2/28/2018	Completed	*See the Deliverable Specification above*

M: 202. Produce BiOp RPA Report

Title: BiOp RPA Report for Steelhead CY 2017

Description: This project is associated with RPA 64.2. CTUIR is the lead on this report. WDFW is in the support role for this report. The CTUIR and WDFW will work together and coordinate on this report. The report will be submitted under this CTUIR contract. This report only includes Spring Chinook.

Projects that have claimed that they support one or more RM&E RPAs (i.e., RPAs 50-73) under the FCRPS BiOp are required to report their results. To facilitate the summary of these results across the entire Columbia River Basin, and to provide more clarity as to the format required under the BiOp, these reports are required to be completed online. If desired, the required information can be prepared in MS Word, and pasted into Taurus. For more guidance see https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf.

BiOp RPA Reporting Requirements.

This project supports an ESA BiOp RPA (RPA64.2), therefore the CTUIR and WDFW are required to electronically submit a Final Annual BiOp RPA Report of work conducted for calendar year 2017 for upload into Taurus. This BiOp RPA report is required annually on all declared BiOp RPA associations.

The online BiOp RPA report in Taurus (www.cbfish.org) should include the data, analyses, and data management completed by your project by December 31, 2017. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent RPA report.

For each RPA, follow the directions in Taurus for each of the three sections and as appropriate input graphical or tabular data, accompanied by explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

For detailed information on how to access and produce this report please see "Sponsor Reporting Procedural Guidance" in Pisces. To find this procedural guidance document go to www.cbfish.org, select the "Login In" link at the upper right of corner. Enter your project number or name in the upper right of the search box. Select "Reports & Documents tab on left. Select "BiOp Annual Report." The "Sponsor Reporting Procedural Guidance" is a link directly below "1. Enter Basic Report Information." If you need further assistance please contact your PM/COTR.

Deliverable Specification: The online BiOp RPA report in Taurus (https://www.cbfish.org/BiologicalOpinionAction.mvc/Index/2014/BiOpRpaStatus) should include the data, analyses, and data management completed no later than December 31st. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the scale analyses, you will report the preliminary data (# of redds), but not (incomplete) age distributions of carcasses, which would be reported in the subsequent CY report.

For each RPA, follow the directions in Taurus for each of the three sections and, input completed graphical or tabular data, accompanied by any complete explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

Work Element Budget: $3500 (0.35%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Lead project proponent will download RPA questions from cbfish.org	8/1/2017	9/30/2017	Completed	To prepare for your RPA report, 1) Go to www.cbfish.org and log in, 2) Navigate to your project and select "BiOp Annual Report" from the menu on the left, 3) Click on "Input Needed" for each applicable RPA to find your RPA reporting requirements so you will know how much time to set aside for this task. You may also click the "download RPA doc" button to get all RPA questions in one MS Word document. 4) Use "Request Review" link to email COTR or BPA RM&E RPA lead to request help or for review of draft content. For further guidance, see: https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2014.pdf (Milestone start/end: July 1 – September 30)
B. Lead project proponent will draft calendar year report in cbfish.org	10/1/2017	12/31/2017	Completed	For guidance on completing your report, see: https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2014.pdf. If you have questions or would like BPA to review your draft, you may email RMEsupport@bpa.gov and your COTR to send them your working draft in Word or notify them to review in cbfish.org by using the "Request Review" email icon link to e-mail your COTR & BPA RM&E RPA lead. (Milestone start/end: September 30 - February 28)
C. Lead project proponent will finalize calendar year report in cbfish.org	1/1/2018	2/28/2018	Completed	The final version is due by March 15. (Milestone start/end: December 31 - March 15)
D. Coordinate with WDFW on report	8/1/2017	2/28/2018	Completed	The CTUIR is the lead for this report and will coordinate with WDFW who will provide support.
Deliverable: E. Submit BiOp RPA Report in Taurus		2/28/2018	Completed	*See the Deliverable Specification above*

N: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: All administrative tasks shall be fulfilled on time and with quality products. Timely responses to requests for more information are required. Proactive communication between the contractor and BPA's Contracting Officer (CO) and Contracting Officer Technical Representative (COTR) is required if a significant lag in scheduled delivery is expected.

Work Element Budget: $56037 (5.60%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Begin drafting contract renewal documents and conduct internal review as needed	10/1/2017	10/31/2017	Completed	Your statement of work, line-item budget, and (if required) property inventory for your next contract are due to BPA at least 5 months prior to the contract start date (longer if your internal processes require more time to get the contract signed and in place prior to the start date).
B. Submit contract renewal package (SOW, Excel budget, property inventory) to BPA COTR	11/1/2017	11/30/2017	Completed	Once your statement of work (SOW) in Pisces is complete, and you have attached your line-item budget (LIB) and property inventory (PI) (if required), click the "Submit" button on the SOW tab to notify your COTR the package is ready for review.
C. Address comments and revise SOW, LIB, and PI as needed to get BPA manager approval	12/1/2017	12/31/2017	Completed	Once your COTR and his or her BPA manager have reviewed your contract renewal package and returned any comments to you, you will need to provide responses and changes as needed to achieve approval from the BPA manager, who will then forward the package to the Contracting Officer. This should be completed at least two months prior to the next contract start date, but may need to be 3 or 4 months depending on your internal processing time for contract signatures. If you have subcontracts that need to be signed prior to the contract start, it should be a minimum of 4 months.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Return signed contract to BPA's Contracting Officer within 30 days	1/1/2018	1/31/2018	Completed	Respond to the CO and COTR indicating any problems with the contract within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days.
E. Submit final invoice for prior contract within 90 days to facilitate contract closeout	3/1/2017	5/31/2017	Completed	Within 90 days of the last day of the PRIOR contract, the contractor shall issue a final invoice. In instances where more than 90 days is needed (e.g., because subcontractors have not invoiced), the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount shall be emailed to FWinvoices@bpa.gov and the COTR.
F. Accrual - Submit September estimate to BPA	8/10/2017	9/10/2017	Canceled	Provide BPA with an estimate of contract work that will occur prior to September 30 but will not be billed until October 1 or later. Data must be input in to Pisces by September 10 (begins Aug 10, ends Sep 10).
G. Facilitate inputting Cost Share information into Pisces at the Project level	9/30/2017	11/15/2017	Completed	(a) I am the sole contractor under this project. I will enter previous federal FY's Cost Share information on the Project's Cost Share tab by Nov 15. (Milestone starts Sep. 30 and ends Nov. 15)
H. Comply with all applicable federal, state, tribal and local safety requirements, including reporting	3/1/2017	3/1/2017	Completed	As described in the contract's Terms and Conditions, the contract manager and contractor shall comply with all applicable federal, state, tribal and local safety laws, rules, regulations and requirements.
I. Coordinate w/ COTR & WDFW on next year's SOW	10/1/2017	11/30/2017	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
J. Attend AFS Western Chapter meeting	5/22/2017	5/25/2017	Completed	Attend AFS Western Chapter annual meeting at Missoula, MT, to present project findings. All WWM&E member will attend this meeting. Abstract: Walla Walla spring Chinook reintroduction with continued research, monitoring and evaluation. The goals of the Confederated Tribes of the Umatilla Indian Reservation for Walla Walla Basin spring Chinook are to provide treaty and non-treaty fisheries in the basin, and to restore natural spawning. The purpose of the proposed hatchery program is to contribute to harvest and natural spawning in the near term. This is to be done in a manner consistent with the longer-term goal of re-establishing a self-sustaining, naturally spawning population through an "all-H" approach that includes hatchery production and improvements in habitat and fish passage. The program's design is proposed to end the current dependence on imported broodstock, improve survival through local adaptation, and meet harvest and natural spawning objectives. Implementation is proposed to occur in three phases: 1) establishment of local stock, 2) transition, and 3) natural production focused with integrated harvest. Transitions from one phase to another will be based on the performance of hatchery and naturally spawning fish as measured by the proposed Walla Fish Production, Research, Monitoring & Evaluation Plan. This work is being funded under a contractual agreement with the Bonneville Power Administration which includes the implementation of artificial production in support of mitigation efforts related to Columbia River dams.
K. Adaptive management	3/1/2017	2/28/2018	Completed	The Adaptive Management process requires quarterly and annual updates of key management assumptions to revise in-season and long-term estimates of program performance and future outcomes. The parameters used in the adaptive management process are defined by the in-season and forecasting models. Each of these models has implicit hypotheses expressed in their structure and function that are described in their documentation or annual operating procedure. As learning occurs the structure and function of the in-season and long-term management models will be reviewed and revised to reflect current understanding.
L. Annual Operation Plan	10/1/2017	2/28/2018	Completed	CTUIR will support an adaptive management and decision making process for the spring Chinook program. The adaptive management process will support in-season management by facilitating three quarterly in-season reviews, and one annual adaptive management workshop culminating in an Annual Operating Plan (AOP). The AOP will incorporate current information to provide updated sampling plans, details regarding implementation of the program, and revised operational criteria as agreed upon.
Deliverable: M. All		2/28/2018	Completed	*See the Deliverable Specification above*

administrative tasks fulfilled with timely quality products				

O: 122. Provide Technical Review and Recommendation

Title: Quantitative Science and technical support for M & E plan implementation

Description: Provide quantitative science and technical support for M & E plan implementation. Participate in review and development of technical details, power analysis, annual operating procedures, monitoring methods, habitat capacity modeling and annual technical reports by Walla Walla M & E staff.

We will develop methods to monitor Parentage and the characteristics of adaptation that are not already addressed in the VSP parameters. We will develop methods and a protocol for monitoring adaptation of Walla Walla spring Chinook. During the first year on this work element we will develop techniques and protocols for observing adaptation in terms of life history, morphology, physiology, and behavior. This Work Element is divided into three phases:
1) Review and development of annual operating procedures and methods
2) Baseline monitoring of characteristics prior to implementation of a local hatchery program
3) Continuing M & E after implementation of a local hatchery program

Deliverable Specification: The methods, protocols, and annual operating procedures for all monitored metrics for the Walla Walla M & E Plan will be developed by Walla Walla M & E staff. CTUIR staff will review and provide input on all aspects M & E implementation Plan .

Work Element Budget: $61989 (6.19%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review and update Annual technical reports	5/1/2017	2/28/2018	Completed	Collaborate with WW M & E staff to review and update CY Annual technical reports.
B. Develope protocols and methods for monitoring adaptation	3/1/2017	8/31/2017	Completed	During 2017 we will work with CRITIFC and regional partners to develop protocols and methods for monitoring parentage in the Walla Walla. Development of a locally produced stock is intended to increase survival, and to help nurture a locally adapted stock. Fish adapted to the Walla Walla River are expected to have life history traits, morphologies, and behavior that are better suited to conditions that are specific to the Walla Walla when compared to Carson Stock fish. Adaptation, coupled with local acclimation and a local program, is expected to result in increased survival in comparison to Carson stock fish. Although it will not be possible to determine causation between fish attributes and survival, it will be practical to monitor adaptation and to relate adaption to survival based on correlation. We will develop methods and a protocol for monitoring adaptation of Walla Walla spring Chinook. In 2017 we will focus on the existing methods for monitoring adaptation, and will develop techniques and protocols for observing adaptation in terms of life history, morphology, and behavior.
C. Review and Update Annual Operating Procedures	9/1/2017	9/30/2017	Completed	Review and update annual operating procedures (i.e. methods and protocols) for addressing natural and hatchery fish performance (i.e. abundance, productivity, spatial structure and diversity (parentage and adaptation) in Walla Walla spring Chinook.
D. Perform power analysis for all monitored metrics	7/1/2017	11/30/2017	Completed	Provide power and error estimates for all monitored metrics
Deliverable: E. Provide Technical Review of M & E Implementation Plan		2/28/2018	Completed	*See the Deliverable Specification above*

P: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (1-1-2015) to (12-31-2015) Late Annual Report

Description: The progress report summarizes the project goal, objectives, hypotheses (for research), completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning. Examples of long-term planning include future improvements, new directions, or any ramping up or ramping down of contract components or of the project as a whole.

RM&E Technical Progress reports must conform to BPA guidelines. See the "RME Technical Reporting" link at: http://www.cbfish.org/Help.mvc/GuidanceDocuments.

Deliverable Specification: Uploading the 2015 annual report.

Work Element Budget: $500 (0.05%)

Planned Metrics:
* Start date of reporting period : 1/1/2015
* End date of reporting period : 12/31/2015

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Upload finalized RM&E Technical Report (MS Word) for BPA to publish	3/16/2017	3/31/2017	Completed	Upload final calendar year 2015 annual report into Pisces.
Deliverable: B. Completion of overdue report for 2015		3/31/2017	Completed	*See the Deliverable Specification above*

Q: 132. Produce (Annual) Progress Report

Title: Submit technical Progress Report for the period 1-1-16 to 12-31-16

Description: Work with the WDFW (CR 303799) to draft CY 2016 technical annual report.

The progress report summarizes the project goal, objectives, hypotheses (for research), completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning. Examples of long-term planning include future improvements, new directions, or any ramping up or ramping down of contract components or of the project as a whole.

RM&E Technical Progress reports must conform to BPA guidelines. See the "RME Technical Reporting" link at: http://www.cbfish.org/Help.mvc/GuidanceDocuments.

Deliverable Specification: This annual report was originally due in the previous contract. This WE is being added in case this report is not completed in time to upload under previous contract 72135. The report will be drafted with WDFW.

Work Element Budget: $500 (0.05%)

Planned Metrics:
* Start date of reporting period : 1/1/2016
* End date of reporting period : 12/31/2016

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Work with WDFW drafting technical CY 2016 report	3/1/2017	1/16/2018	Completed	Work with the WDFW to draft CY 2016 technical progress report.
Deliverable: B. Upload into Pisces annual progress report for calendar year 2016		7/1/2017	Active	*See the Deliverable Specification above*

R: 132. Produce (Annual) Progress Report

Title: DRAFT Annual Technical Progress Report (1-1-2017) to (12-31-2017)

Description: DRAFT Technical Annual Progress Reporting Requirements: The final APR report for calendar year2017 will be due in the following 2018 contract.

Due to BPA RM&E reporting needs WDFW (CR 303799) & CTUIR will submit a joint RME DRAFT Annual Technical Progress Report (Report) for calendar year 2017 (1-1-17 thru12-31-17). This Report should be submitted using the template available in Taurus (https://www.cbfish.org, go to your project, click on Reports & Documents, then go to the RM&E Technical Report tab).

The Report will be a deliverable under this CTUIR contract and will be drafted in coordination with WDFW (CR-303799).

This report will summarize results from 1-1-17 through 12-31-17 time frame. The progress report summarizes the project goal, objectives, hypotheses, completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning. Examples of long-term planning include future improvements, new directions, or level of effort for contract implementation, including any ramping up or ramping down of contract components or of the project as a whole.

If desired, additional reporting of information relating to this contract can be added at the end of the report.

Deliverable Specification: The Deliverable is considered complete when the final report is posted. It usually takes BPA 30-45 days to post the final PDF version of a report. This milestone's end date should therefore be 45 days after the final version is uploaded in Pisces. You will receive an email from BPA confirming that your report has been finalized and posted to the web. Mark this milestone complete when you have confirmed your final report has been posted. If you do not receive such an email after 45 days, contact your COTR.

Work Element Budget: $25500 (2.55%)

Planned Metrics:
* Start date of reporting period : 1/1/2017
* End date of reporting period : 12/31/2017

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Prepare for RM&E Technical Report. Review the revised (2014) guidance & template	10/1/2017	11/1/2017	Active	Review the newly-revised guidance & template for your RME Technical Report. BPA Fish and Wildlife project sponsors who have the following work elements in their contracts are required to complete a RM&E technical report: 156 Develop RM&E Methods and Designs, 157 Collect/Generate/Validate Field and Lab Data, 158 Mark and Tag Animals, and/or 162 Analyze/Interpret Data. Reports must show cumulative results and synthesis for the duration data collection/analysis studies. Final RME reports are due in March to align with regulatory reporting timelines.
B. Draft technical report in coordination with WDFW	12/1/2017	1/31/2018	Active	Coordinate with WDFW in drafting technical report.
C. RM&E Technical: Upload finalized RM&E Technical Report (MS Word) for BPA to publish	2/1/2018	2/28/2018	Active	Complete and upload draft annual report into Pisces for BPA to publish.
Deliverable: D. Completed Annual Report		2/28/2018	Active	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	73982 REL 45	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$821,442	**Perf. Period:**	3/1/2018 - 2/28/2019
Contract Type:	Release	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 03/13/2018 with 0 problems, and 0 reviewable items		
Contract Documents:	There are no contract document attachments		

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and https://www.bpa.gov/efw/FishWildlife/Pages/default.aspx.

The Walla Walla subbasin supports ESA listed populations of steelhead and bull trout, and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Spring Chinook were extirpated from the Walla Walla in the early 20th century. For the past 25 years the CTUIR and others have implemented numerous passage, flow, and habitat to improve salmonid production in the Subbasin.

The Tribes Walla Walla Spring Chinook program began in 2000 with the outplanting of hatchery adults collected from the Ringold Hatchery, Carson National Fish Hatchery, and the Umatilla River at Three Mile Falls Dam. Direct stream release of hatchery reared juveniles began in 2005 using Carson stock from the Carson National Fish Hatchery. Monitoring & Evaluation of the Spring Chinook Program began in 2000. The work included assessment of spring Chinook and steelhead natural production, and evaluation of fish passage based on adult steelhead and bull trout. In 2007 CTUIR, WDFW, and BPA developed a collaborative M & E program in the Subbasin based on salmonid VSP Parameters of abundance, productivity, diversity, and spatial structure. The expanded project was designed to provide high level indicators of fish population status and trends for spring Chinook, steelhead, and bull trout. This information is used to inform the CTUIR first foods management, and to address BPA fish and wildlife program strategies.

The purpose of this M & E project is to address the adaptive management requirements of the Spring Chinook Program, and to maintain the baseline monitoring needed by the existing management system. This effort includes an ecosystem-based scientific framework for adaptive management and performance evaluation based on measurements of success and monitors of risk to other species and populations. The techniques and designs used for implementation and detailed methodology can be found online at www.monitoringmethods.org. This collaborative effort is funded by the Columbia River Fish Accords. Our M & E objectives were developed based on the requirements of the Walla Walla Spring Chinook Hatchery Master Plan (HMP), BPA's Fish Management Sub-strategies, the Reasonable and Prudent Alternatives (RPA's) of the Columbia Power System Biological Opinion, and the existing comprehensive fish restoration program. Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for the objectives and technical methodology.

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (https://www.bpa.gov/efw/FishWildlife/Pages/default.aspx).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Gary James	Interested Party	Umatilla Confederated Tribes (CTUIR)	(541) 429-7285 / (541) 966-2397	garyjames@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Julie Burke	Administrative Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7292 / (429) 429-7292	julieburke@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Gene Shippentower	Supervisor	Umatilla Confederated Tribes (CTUIR)	(541) 429-7287 / (541) 966-2397	geneshippentower@ctuir.org	Confederated Tribes of the Umatilla Indian Reservation DNR Fisheries Program 46411 Timíne Way Pendleton OR 97801
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Craig Contor	Contract Manager	Umatilla Confederated Tribes (CTUIR)	(541) 429-7279 / (541) 429-7279	craigcontor@ctuir.org	46411 Timíne Way Pendleton OR 97801
Travis Olsen	Technical Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7542 / (541) 429-7542	travisolsen@ctuir.org	CTUIR 46411 Timíne Way Pendleton OR 97801
Brenda Aguirre	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5928 / NA	baguirre@bpa.gov	PO Box 3621 Mail Stop ECF-4 Portland OR 97208
Lisa Dexter	Contracting Officer	Bonneville Power Administration	(503) 230-3893 / NA	lldexter@bpa.gov	905 NE 11th Ave. Portland 97232
Tybee Sheidler	CO Assistant	Bonneville Power Administration	(503) 230-3820 / NA	tasheidler@bpa.gov	P.O. Box 3621 Mail Stop NSSP-4 Portland OR 97208-3621
Christopher Roper	CO Assistant	Bonneville Power Administration	(503) 230-3514 / NA	cproper@bpa.gov	P.O. Box 3621 Mail Stop NSSP-4 Portland OR 97208-3621
Timothy Ludington	COTR	Bonneville Power Administration	(503) 230-4988 / NA	tsludington@bpa.gov	

Work Element Budget Summary:

	Work Element - Work Element Title	EC Needed*	Estimate	(%)
A :	185. Produce Pisces Status Report - Periodic Status Reports for BPA		$2,000	(0.20%)
B :	165. Produce Environmental Compliance Documentation - Compliance for WEs C thru K		$3,000	(0.30%)
C :	28. Trap and Haul - Fish Salvage	*	$34,000	(3.50%)
D :	158. Mark/Tag Animals - PIT Tag Spring Chinook smolts (out-migrant tagging)	*	$50,000	(5.15%)
E :	158. Mark/Tag Animals - PIT Tag steelhead smolts (out-migrant tagging)	*	$17,675	(1.82%)
F :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$17,675	(1.82%)
G :	157. Collect/Generate/Validate Field and Lab Data - Adult fish counts at Nursery Bridge Dam (video work)	*	$125,000	(12.89%)
H :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates	*	$124,000	(12.79%)
I :	157. Collect/Generate/Validate Field and Lab Data - Out-migrant monitoring for population estimates, survival, and migration	*	$257,000	(26.51%)
J :	157. Collect/Generate/Validate Field and Lab Data - Maintain and operate PIT Arrays	*	$80,050	(8.25%)
K :	157. Collect/Generate/Validate Field and Lab Data - Stream Monitoring and Data Distribution	*	$29,000	(2.99%)
L :	162. Analyze/Interpret Data - Analyze Data		$52,000	(5.36%)
M :	174. Produce Plan - Finalize the Walla Walla Fish Production, Research, Monitoring and Evaluation Plan	*	$11,900	(1.22%)
N :	202. Produce BiOp RPA Report - BiOp RPA Report for Steelhead CY 2017		$5,000	(0.51%)
O :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$50,000	(5.15%)
P :	122. Provide Technical Review and Recommendation - Finalize Comprehensive Wallla Walla River Production, Research, Monitoring and Evaluation Plan		$11,000	(1.13%)
Q :	132. Produce (Annual) Progress Report - Submit Progress Report for the period (1-1-2016) to (12-31-2017) Combined progress reports		$50,000	(5.15%)
R :	132. Produce (Annual) Progress Report - DRAFT Annual Technical Progress Report (1-1-2018) to (12-31-2018)		$50,000	(5.15%)
		Total:	$969,300	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $2000 (0.21%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2018 (3/1/2018 - 6/30/2018)	7/1/2018	7/15/2018	Completed	
B. Jul-Sep 2018 (7/1/2018 - 9/30/2018)	10/1/2018	10/15/2018	Completed	
C. Oct-Dec 2018 (10/1/2018 - 12/31/2018)	1/1/2019	1/15/2019	Completed	
D. Final Jan-Feb 2019 (1/1/2019 - 2/28/2019)	2/14/2019	2/28/2019	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C thru K

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through K. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $3000 (0.31%)

Planned Metrics: * Are herbicides used as part of work performed under this contract?: No

* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. HIP3 Risk Determination: Contact BPA EC Lead for risk determination	3/1/2018	3/30/2018	Completed	The EC Lead will determine if work under this work element may be able to have full ESA-coverage (NOAA & USFWS) under the 2013 Habitat Improvement Program Biological Opinion (HIP3). The HIP3 has expanded coverage for projects that may pose a moderate to high risk of impacting an ESA-listed species or critical habitat that would normally require a Biological Assessment. For work that qualifies, projects will undergo a review by the BPA-internal Restoration Review Team (RRT). Before conceptual design commences, contact the EC lead for HIP3 consideration, instruction, and information needs and requirements for coverage eligibility. The HIP3 activity categories and risk criteria are located in the “Note” section of the work element background page here: https://www.cbfish.org/WorkElement.mvc/Summary/165 . For additional specific guidance or questions, consult the BPA EC lead or the HIP3 BO.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Determine if contract work could adversely affect Pacific lamprey	3/1/2018	3/30/2018	Completed	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best %20Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf (BMPs).
C. Report lamprey observation and catch data to USFWS by Feb. 15	2/1/2019	2/15/2019	Completed	Report lamprey observations or catch, including by Feb 15 for the previous calendar year's work. A data template is available at: (https://www.cbfish.org/EfwDocument.mvc/DownloadFile/11) As per instructions on the form, email your data to christina_wang@fws.gov at US Fish and Wildlife Service and CC your COTR. For identification of lamprey life stages see page 10 of USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best %20Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf.
D. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2018	2/28/2019	Completed	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.westernais.org -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.anstaskforce.gov/stateplans.php
E. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2018	2/28/2019	Completed	Prevent spread of invasive species
F. Complete and document public involvement activities and provide to EC Lead	3/1/2018	2/28/2019	Completed	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
G. Participate in ESA Consultation	3/1/2018	2/28/2019	Completed	Work may include drafting BA, completing HIP III BO Project Notification Form, submitting high risk project designs to Restoration Review Team (RRT), providing copy of Section 10, 4(d), or 6 permit, etc., or submitting Hatchery Genetic Management Plan to BPA for ESA consultation initiation, and providing input for the ensuing consultation.
H. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2018	2/28/2019	Completed	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits.
Deliverable: I. Compliance achieved and documented		2/28/2019	Completed	*See the Deliverable Specification above*

C: 28. Trap and Haul

Title: Fish Salvage

Description: Cooperate with ODFW, WDFW, and irrigation districts in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. Collection methods will utilize seines and backpack electrofishing gear are used to remove fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location salvaged. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.

Deliverable Specification: Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.

Work Element Budget: $34000 (3.51%)

Planned Metrics: # of fish transported: 1000

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)

Country: US — **NPCC Subbasin:** Walla Walla

State: WA — **HUC5 Watershed:** Middle Walla Walla River

County: Walla Walla — **HUC6 Name:** Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Rescue and haul fish	3/1/2018	2/28/2019	Completed	Rescue and transport fish at risk from desiccation through dewatering or injury associated with maintenance and operations of diversion dams in the Walla Walla Basin. Salvage may also occur for other reasons in various locations depending on conditions. Salvaged fish will be hauled to the closest river access within the basin where conditions are suitable for fish survival.
Deliverable: C. Salvaged fish and related data		2/28/2019	Completed	*See the Deliverable Specification above*

D: 158. Mark/Tag Animals

Title: PIT Tag Spring Chinook smolts (out-migrant tagging)

Description: PIT tag up to 10,000 spring Chinook out-migrants collected at smolt traps to estimates of smolt run timing, abundance, and survival (status and trend monitoring, VSP and SARs). Data will be used to evaluate the BPA-funded measures to restore fish and habitat in the subbasin. CTUIR will PIT-tag run of the river out-migrant spring Chinook for life cycle studies.

CTUIR will maintain three rotary screw traps. One in the upper Walla Walla River (Basel cellars site river miile39) and in lower Mill Creek (river mile 3). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating spring Chinook. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
10,000 natural origin out-migrant spring Chinook

Work Element Budget: $50000 (5.16%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 10000

Locations: 2

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US — **NPCC Subbasin:** Walla Walla

State: WA — **HUC5 Watershed:** Multiple

County: Walla Walla — **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	9/3/2018	10/31/2018	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag spring Chinook out-migrants - spring	3/1/2018	5/31/2018	Completed	PIT tag spring Chinook out-migrants caught in the smolt trap in the spring (March 1-May 31). Fish will be released above the trap to estimate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag sprng Chinook out-migrants - fall	11/1/2018	2/28/2019	Completed	PIT tag spring Chinook captured in the smolt traps in the fall and winter (November-February) provided adequate stream flow and conditions, allow. PIT-tagged fish will be released upstream to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. Submit PIT-tag data to PTAGIS-spring	3/1/2018	6/15/2018	Completed	Submit PIT tag data PTAGIS within 15 days (usually daily), according to latest PTAGIS guidelines.
F. Submit PIT-tag data to PTAGIS-fall	11/1/2018	2/28/2019	Completed	Submit PIT tag data PTAGIS within 15 days (usually daily), according to latest PTAGIS guidelines.
Deliverable: G. PIT tagged spring Chinook out-migrants		2/28/2019	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag steelhead smolts (out-migrant tagging)

Description: PIT tag juveniles steelhead to estimate smolt run timing, abundance, and survival, VSP, SAR and status and trend monitoring.

CTUIR will maintain two rotary screw traps and PIT-tag up to 3,000 run of the river out-migrant Summer steelhead. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 3), The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Steelhead will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy summer steelhead (> 125 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by project collaborator WDFW in the Touchet River. These tagging levels will allow for estimates of smolt survivals and run timing to the lower Walla Walla, McNary Dam, and for smolt to adult survival back to the subbasin.

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating summer steelhead. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 natural origin out-migrant summer steelhead

Work Element Budget: $17675 (1.82%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 5000

Locations: 2
Primary Focal Species: Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	9/3/2018	10/31/2018	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag steelhead out-migrants - spring	3/1/2018	5/31/2018	Completed	PIT tag out-migrant summer steelhead release upstream to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag steelhead out-migrants - fall	11/1/2018	2/28/2019	Completed	PIT-tag and release juvenile steelhead out-migrants to estimate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
E. Submit PIT-tag data to PTAGIS-spring	3/1/2018	6/15/2018	Completed	Submit PIT tag data to PTAGIS within 15 days, according to latest PTAGIS manual.
F. Submit PIT-tag data to PTAGIS-fall	11/1/2018	2/28/2019	Completed	Submit PIT tag data to PTAGIS within 15 days (often daily) in accordance with PTAGIS guidelines.
Deliverable: G. PIT tagged juvenile steelhead out-migrants		2/28/2019	Completed	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title: PIT Tag smolts (hatchery tagging)

Description: PIT tag hatchery spring Chinook at the hatchery prior to release. Use PIT tag detections to estimates of out migrant run timing, abundance, and survival to determine the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Subbasin. This information is also critical for viable salmonid population (VSP) monitoring to determine production within the watershed or subbasin.

This WE is an in-kind collaboration between the USFWS and the CTUIR. The CTUIR supplies 10,000 PIT-tags and pays to have a PIT-trailer delivered to the Hatchery tagging site (e.g. Carson NFH). The USFWS then provides labor and ancillary support to PIT-tag 10,000 spring Chinook smolts. This marking effort represents about 4% of the 250,000 total fish released to the South Fork Walla Walla River each year for the Tribe. These tagging levels will allow for estimates of smolt survivals and run timing to McNary Dam, and for smolt to adult survival back to the subbasin. Power analysis that incorporates PIT tag detection data from previous years shows that 10,000 tags are needed for sufficient adult detections (survival is currently low). USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 10,000 hatchery spring Chinook and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $17675 (1.82%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 10000

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US — **NPCC Subbasin:** Walla Walla

State: OR — **HUC5 Watershed:** Upper Walla Walla River

County: Umatilla — **HUC6 Name:** Lower South Fork Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Order PIT tags in TDI system	9/3/2018	10/31/2018	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag hatchery spring Chinook	11/1/2018	11/30/2018	Completed	PIT tag up to 10,000 hatchery spring Chinook at Carson National Fish Hatchery for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: D. PIT tag Hatchery smolts		11/30/2018	Completed	*See the Deliverable Specification above*

G: 157. Collect/Generate/Validate Field and Lab Data

Title: Adult fish counts at Nursery Bridge Dam (video work)

Description: Estimate adult abundance at index areas using video counts in fish ladders at Nursery Brdige Dam. CTUIR works in collaboration with USACE and WDFW. USACE counts adults in the ladder at Bennington Lake Dam (Mill Creek (at Bennington Dam), Washington counts adults at the Dayton Dam (rkm 86.9) on the Touchet River and Coppei Creek.

Data collected from the video counting included date, time, species, size (e.g., jack or adult for spring Chinook salmon), life stage (e.g., steelhead kelts), origin (e.g., adipose clip or unclipped) and migration direction for bull trout. Video counts are not reliable for fish less than 30.5 cm. Notations were also made of other species encountered and general fish condition. Daily fish tallies from both ladders were posted to an onsite tally board for the public. The deliverable for this work was an error-checked database of daily fish counts.

At video facilities an underwater video camera activated by a motion detector was linked to a DVR at each site to capture a video image of passing fish. Overhead dusk-to-dawn lights are operated at each site. The stations will be checked and downloaded daily. Downloaded video clips will be archived with CTUIR and housed in the data repository.

Deliverable Specification: The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam. Data will be combined with data from collaborators monitoring adults at Bennington Lake Dam, and Dayton Dam, This contract only covers Nursery Bridge Dam.

Work Element Budget: $125000 (12.90%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla

State: OR **HUC5 Watershed:** Middle Walla Walla River

County: Umatilla **HUC6 Name:** Garrison Creek-Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Adult fish counts at Nursery Bridge Dam (video work) - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized

109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA

Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2018	10/31/2018	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2018	2/28/2019	Completed	Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged.
D. Yearly upload of error-checked datasets	7/2/2018	2/28/2019	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - spring/summer	3/1/2018	7/31/2018	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). Maintain video monitoring equipment in Nursery Bridge Dam fish ladder from March Through July

Milestone Title	Start Date	End Date	Status	Milestone Description
F. Maintain video monitoring equipment @ Nursery Bridge Dam - fall/Winter	10/1/2018	2/28/2019	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). Maintain video monitoring equipment in Nursery Bridge Dam fish ladder from September through February
G. Process field video from fish ladders	3/1/2018	2/28/2019	Completed	Process recorded video from Nursery Bridge Dam. Record fish by species and direction (upstream and downstream) moving through Nursery Bridge Ladders. Download, review and tally Salmon-soft video-tracking result. Collate and distribute NBD fish counts. Update NBD fish tally board.
H. Review, organize and summarize video results	11/1/2018	2/28/2019	Completed	Summarize Nursery Bridge Dam fish count methods, results, and discussion for BPA annual report.
Deliverable: I. Adult fish count from Nursery Bridge Dam		2/28/2019	Completed	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Spawner / Carcass Surveys for run reconstruction estimates

Description: A critical uncertainty of the Tribe's Spring Chinook Management Plan is how reintroduced spring Chinook use natural spawning habitat and how use might change through time. Visual multi-pass ground surveys will be used to assess spawner abundance (redds per mile) and performance (adults per redd). Annual fish counts (see WE C, adult enumeration) combined with redd and carcass counts (Crawford et al. 2007; Gallagher et al. 2007) will be used to assess spawning success (fish per redd). Based on previous redd surveys in the upper mainstem and South Fork Walla Walla rivers, surveys are designed to census the spring Chinook spawning population.

Walla Walla River - The Tribe will conduct multiple-pass ground surveys for spring Chinook in the upper mainstem and South Fork Walla Walla rivers and Mill Creek in August and September. A total of47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys.

Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded. Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. Care is taken not to disturb spawning fish or redds.

Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Fin clips from carcasses will be collected for genetic analysis. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked spawning survey databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.

Work Element Budget: $124000 (12.79%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 4

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US — **NPCC Subbasin:** Walla Walla

State: Multiple — **HUC5 Watershed:** Multiple

County: Umatilla | Walla Walla — **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery

CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2018	10/31/2018	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2018	2/28/2019	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged.

Milestone Title	Start Date	End Date	Status	Milestone Description
D. Yearly upload of error-checked datasets	7/31/2018	10/31/2018	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Pre-spawn carcass survey in lower walla walla river	7/2/2018	8/31/2018	Completed	Survey the lower Walla Walla River and lower Mill Creek to count and examine pre-spawn carcasses and to locate fish that do not ascend into the spawning grounds.
F. Spring Chinook redd/carcass surveys	8/1/2018	10/12/2018	Completed	Conduct redd surveys to locate (GPS), count and document redds & carcasses every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers, and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spring Chinook carcasses.
G. Process field carcass and redd survey data	7/2/2018	12/21/2018	Completed	Organize, summarize and post survey information to CTUIR database and forward coded wire tag data and other information collected for ODFW, WDFW, and Pacific States Marine Fisheries Commission. Forward bull trout redd numbers and distribution to ODFW & USFWS.
Deliverable: H. Spring Chinook spawner/ carcass survey data		2/28/2019	Completed	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Out-migrant monitoring for population estimates, survival, and migration

Description: Smolt escapement to the mouth of the Walla Walla and to McNary Dam will be estimated for spring Chinook and steelhead by applying an estimated Cormack-Jolly Seber survival probability to fish injected with a PIT tag. Prior to each tagging season the Sample Size 1.3 program will be used to determine the number of tags needed to estimate survival rates at the desired levels of precision. We estimate a sample size of 3,600 to 6,200 spring Chinook should provide a 10% coefficient of variation (CV) to Burlingame and McNary Dams, respectively.

Smolt production monitoring will be conducted in the mainstem Walla Walla River near the Oregon state line and in lower Mill Creek (Volkhardt et al. 2007, Mahoney et al. 2013, Mendel et al. 2014). Out-migrating naturally produced salmonids captured at the smolt traps will be PIT tagged so we can evaluate juvenile run timing and survival to McNary Dam, as well as to evaluate adult return timing and survival. A sub-sample of tagged fish will be scale-sampled, weighed, and photographed for growth and morphometric information.

Multiple PIT tag arrays have been deployed in the Walla Walla River and Mill Creek to help us understand run timing, survival, and to estimate adult returns, adult-to-adult productivity or smolt to adult survival. Previously used smolt trapping sites in the lower Walla Walla River have been abandoned because of maintenance and debris issues but may be revised in the future (Mahoney et al. 2012).

Natural smolt abundance will be estimated for both the upper Walla Walla River (i.e. Basel Cellars site) and lower Mill Creek trap locations. Screw traps will be installed by October and run continuously as stream conditions allow into June. The traps are not operated during periods of high/low stream flow (e.g. between 2000 and 200 CFS), peak hatchery releases, and extreme cold and ice. To estimate potential juvenile migrants passing when the trap was not operated for short intervals (= 5 days) we will calculate the mean number of fish trapped for three days before and three days after non-trapping periods. To estimate numbers of fish emigrating past the trap when the trap was not operated for long durations (6 days or more), we used a within year regression of daily stream flow and daily number of natural-origin outmigrants (by size category) captured for the following periods: October-December, January-March, and April-May. The mean number of fish passed is then divided by the estimated trap efficiency to calculate daily fish passage.

Natural salmonid abundance is estimated for the Walla Walla River using a stratified Petersen/Darroch estimator (DARR 2.02, Bjorkstedt 2005 and 2009). DARR 2.02 uses Darroch's (1961) stratified Peterson estimator for estimating abundance and associated variance (SE) from stratified mark-recapture data (http://santacruz.nmfs.noaa.gov/publications/software/439/). Trap efficiency (TE) is determined by releasing a known number of PIT-tagged fish above each trap and enumerating recaptures. TE results are organized into bi-weekly strata for analysis in DARR. Mark recapture estimators generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging; (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

In this study, we release all healthy PIT-tagged fish roughly 1000 m above the trap. Our previous TE tests showed that most recaptures occurred within 24 hours of release. Thus, TE tests are done daily up to 24 hours prior to a scheduled trap shut down. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not pit-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals. Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). All captured salmonids will be scanned for PIT-tags and processed using a Biomark PIT Tag station. Data collected from juvenile salmonids include: number, species, length, weight, scales from steelhead for age structure and age at migration. Healthy, spring Chinook (> 65 mm, F.L.), summer steelhead (> 124 mm, F.L.), and bull trout (120 mm <> 220 mm F.L.) are manually PIT-Tagged and released on site (Prentice et al. 1990). The downstream movement of Chinook salmon fry and parr (< 65 mm), age-0 summer steelhead (< 124 mm) are presumed not to be out-migrants. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A 5-foot rotary screw trap will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (RM38) and Mill Creek just above Bennington Dam (RM 10),

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Fish meeting protocol criteria be PIT tagged. Data entry, compilation, and quality control of field data will be performed. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $257000 (26.51%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 2
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized

110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA

Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2018	2/28/2019	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2018	2/28/2019	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged.
D. Yearly upload of error-checked datasets	7/31/2018	2/28/2019	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Monitor salmonids leaving the upper Walla Walla River - spring/summer	3/1/2018	5/31/2018	Completed	Operate 5-foot rotary screw trap in the Walla Walla River during the spring
F. Monitor salmonids leaving the upper Walla Walla River - fall	11/1/2018	2/28/2019	Completed	Operate 5-foot rotary screw trap in the Walla Walla River during the fall
G. Monitor salmonids leaving Mill Creek - spring	3/1/2018	5/31/2018	Completed	Operate 5-foot rotary screw trap in Mill Creek during the spring
H. Monitor salmonids leaving lower Mill Creek - fall	11/1/2018	2/28/2019	Completed	Operate 5-foot rotary screw trap in Mill Creek during the fall.
I. Process field samples/specimens	3/1/2018	2/28/2019	Completed	Process PIT tag, fish, and trap data from the Walla Walla and Mill Creek Traps.

Milestone Title	Start Date	End Date	Status	Milestone Description
J. Review, organize and summarize results	11/1/2018	2/28/2019	Completed	Review, organize and summarize results for migration year.
Deliverable: K. Smolt monitoring and PIT-tagging data		2/28/2019	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Maintain and operate PIT Arrays
Description: CTUIR will continue to maintain and operate PIT tag Arrays in the Walla Walla subbasin.
Deliverable Specification: Maintained PIT tag arrays. PIT tag detection data from each array will be downloaded to PTAGIS.

Work Element Budget: $80050 (8.26%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
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Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Maintain and operate PIT Arrays - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
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115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized

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145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
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Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery

Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CRITFC Cloud Secure Tribal Repository (CCSTR) (http://www.critfc.org/)
PTAGIS Website (http://www.ptagis.org/)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2018	2/28/2019	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2018	2/28/2019	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged.
D. Yearly upload of error-checked datasets	7/31/2018	2/28/2019	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain and operate PIT Array systems	3/1/2018	2/28/2019	Completed	Daily system status checks will be made to ensure the remote PIT tag detection system is uploading data to the PTAGIS database and to CTUIR office in Walla Walla. Site visits will ensure proper system operation. Biomark will be maintaining the PIT Arrays.
Deliverable: F. Produce accessible, error-checked datasets		2/28/2019	Completed	*See the Deliverable Specification above*

K: 157. Collect/Generate/Validate Field and Lab Data

Title: Stream Monitoring and Data Distribution

Description: Stream Gauge Monitoring and Data Distribution

The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in 2011 began a local discussion in regards to the Washington Department of Ecology pulling back from its' commitment to monitoring the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road (through the summer low flow period). As fish enhancement projects focused on listed species continue to occur within the Walla Walla Watershed the Walla Walla River discharge information continues to be a vital tool in the understanding of how much water is available and when it's available within the watershed. The WWBWC proposes to continue the gauging activity at the Pepper Bridge gauge, Beet Road Bridge gauge, Grove School Bridge gauge, McDonald Road Bridge gauge, at the Pierce RV Park gauge, and Touchet River

The McDonald Road Bridge site has been listed as an area of concern by the WDFW during the low flow periods.

The location downstream of the last major diversion (Garden City) and upstream of the Walla Walla River and Touchet River confluence and typically during low flow periods have flow levels below 20 cubic feet per second (cfs). In 2012 the Bergevin-Williams Diversion which was directly downstream of the McDonald Road Bridge was moved upstream as part of a diversion consolidation project. Of the 20 cfs in river at McDonald Road Bridge a portion of that flow was taken at the Bergevin-Williams diversion leaving very low surface flow remaining instream below the diversion. With the last major diversion upstream of McDonald Road Bridge starting in 2013 additional low surface flow pressure was placed on the McDonald Road reach. During one the WWBWC seepage assessments (July 17, 2013) the two immediate reaches below the McDonald Road Bridge gauge recorded flows of less than 5cfs.

Project Phases: The project is divided into three phases: Field Measurements, Data Processing and Publishing, and Analysis/reporting.

Coordination and Planning: WWBWC will coordinate and plan all tasks with CTUIR. WWBWC is a subcontractor under this contract.

Deliverable Specification: WWBWC will maintain and install two air temperature sensors at the McDonald Road Bridge and the Pierce RV Park site and install a turbidity sensor at the Pierce RV Park site. We will provide continuous streamflow data for five gauge stations on the Walla Walla River. The WWBWC will also publish provisional and confirmed data to the WWBWC website, which is available to all agency partners. The WWBWC will also provide an annual report on the five Walla Walla River gauge sites at the end of the contract period. Data will also be uploaded into the Streamflow Gage Network.

Work Element Budget: $29000 (2.99%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5
Primary Focal Species: Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: Multiple **HUC5 Watershed:** Multiple
County: Umatilla | Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Stream Gauge Supplementation (2010-051-00) v1.0
Study Plan Owner: James White
Protocol: Stream Gauge Supplementation (2010-051-00) v1.0
Protocol State: Draft
Protocol Owner: James White
Sample Design: Stream Monitoring and Data Distribution - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	3/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2018	2/28/2019	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2018	2/28/2019	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged.
D. Yearly upload of error-checked datasets	7/31/2018	2/28/2019	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Field measurements	3/1/2018	3/1/2018	Completed	Field Measurements: The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
F. Stream temperature monitoring, Touchet River	4/2/2018	11/30/2018	Completed	Monitor water temperatures in the Touchet River. Calibrate and deploy temperature loggers April, monitor three or four times throughout the summer. In November, recover loggers, download data, check calibration, upload to regional database.
G. Data processing and publishing	3/1/2018	2/28/2019	Completed	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Realtime Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements. The data collected will also be uploaded onto Streamflow Gage Network.
Deliverable: H. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/28/2019	Completed	*See the Deliverable Specification above*

L: 162. Analyze/Interpret Data

Title:	Analyze Data
Description:	Analyze the data collected from the Walla Walla River Watershed for spawning surveys as well as out-migration, flow and water temperatures.
Deliverable Specification:	The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA.
Work Element Budget:	$52000 (5.36%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring

* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations:
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: **NPCC Subbasin:**
State: **HUC5 Watershed:**
County: **HUC6 Name:**
Salmonid ESUs Present:
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized

144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River

Bull Trout Critical Habitat - Stream	Yellowhawk Creek
Note:	

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	3/1/2018	2/28/2019	Completed	The Protocol (including temporal and spatial design) and methods for this work element are stored at monitoringmethods.org and need to be finalized (i.e., "Published" through monitoringmethods.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Coordinate analysis with WDFW and WDFW Snake River Lab	3/1/2018	2/28/2019	Completed	Work with WDFW to analyze all available data and summarize results.
C. Analyze adult enumeration data	3/1/2018	2/28/2019	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
D. Analyze smolt and PIT-tag data	10/1/2018	2/28/2019	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
E. Analyze Redd, Spawner and Carcass data	10/1/2018	2/28/2019	Completed	Analyze and interpret redd, spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
F. Estimate & evaluate power & precision of all monitored variables	9/3/2018	2/28/2019	Completed	Sample size requirements for in-situ monitoring are expected to change through time. Therefore, statistical power will be estimated for all metrics on an annual basis as part of the adaptive management process. Sample size, sampling schedules, and expected Power for each metric will be included in the annual operating plan.
Deliverable: G. Analyzed data		2/28/2019	Completed	*See the Deliverable Specification above*

M: 174. Produce Plan

Title:	Finalize the Walla Walla Fish Production, Research, Monitoring and Evaluation Plan
Description:	Finalize the Walla Walla Fish Production, Research, Monitoring and Evaluation Plan. Develop and deliver a formal presentation of the plan to managers, BPA and IRSP. Complete a RM&E plan that has addressed the issues and concerns identified by managers, ISRP and BPA.
Deliverable Specification:	Completed and approved comprehensive Walla Walla Fish Production, Research, Monitoring and Evaluation Plan.
Work Element Budget:	$11900 (1.23%)
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2018	4/30/2018	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Discuss HIP3 ESA coverage with BPA EC lead; obtain risk determination	3/1/2018	4/30/2018	Completed	The EC Lead will determine if work under this work element may be able to have full ESA-coverage (NOAA & USFWS) under the 2013 Habitat Improvement Program Biological Opinion (HIP3). The HIP3 has expanded coverage for projects that may pose a moderate to high risk of impacting an ESA-listed species or critical habitat that would normally require a Biological Assessment. For work that qualifies, projects will undergo a review by the BPA-internal Restoration Review Team (RRT). Before conceptual design commences, contact the EC lead for HIP3 consideration, instruction, and information needs and requirements for coverage eligibility.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Finalize the Walla Walla RM&E Plan	3/1/2018	12/31/2018	Completed	Finalize the comprehensive Walla Walla Fish Production, Research, Monitoring and Evaluation Plan. This plan was developed in conjunction with the approved spring Chinook Hatchery Master Plan and the associated HGMP submitted to NFMFS.
D. Submit the finalized RM&E Plan and deliver a presentation detailing the new MRM&E plan to managers, BPA and ISRP	3/1/2018	12/31/2018	Completed	Submit the RM&E Plan to fisheries managers, BPA and ISRP. Develop and deliver a formal presentation detailing the new comprehensive Walla Walla Fish Production, Research, Monitoring and Evaluation Plan to fisheries managers, BPA and ISRP.
E. Addresses the issues and concerns identified by managers, ISRP and BPA with complete the RM&E Plan	4/2/2018	11/30/2018	Completed	Addresses the issues and concerns identified by managers, ISRP and BPA and complete the comprehensive Walla Walla Fish Production, Research, Monitoring and Evaluation Plan.
Deliverable: F. Comleted and Approved Walla Walla RM&E Plan		12/28/2018	Completed	*See the Deliverable Specification above*

N: 202. Produce BiOp RPA Report

Title: BiOp RPA Report for Steelhead CY 2017

Description: This project is associated with RPA 64.2. CTUIR is the lead on this report. WDFW is in the support role for this report. The CTUIR and WDFW will work together and coordinate on this report. The report will be submitted under this CTUIR contract. This report only includes Spring Chinook.

Projects that have claimed that they support one or more RM&E RPAs (i.e., RPAs 50-73) under the FCRPS BiOp are required to report their results. To facilitate the summary of these results across the entire Columbia River Basin, and to provide more clarity as to the format required under the BiOp, these reports are required to be completed online. If desired, the required information can be prepared in MS Word, and pasted into Taurus. For more guidance see https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf.

BiOp RPA Reporting Requirements.

This project supports an ESA BiOp RPA (RPA64.2), therefore the CTUIR are required to electronically submit a Final Annual BiOp RPA Report of work conducted for calendar year 2017 for upload into Taurus. This BiOp RPA report is required annually on all declared BiOp RPA associations.

The online BiOp RPA report in Taurus (www.cbfish.org) should include the data, analyses, and data management completed by your project by December 31, 2017. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent RPA report.

For each RPA, follow the directions in Taurus for each of the three sections and as appropriate input graphical or tabular data, accompanied by explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

For detailed information on how to access and produce this report please see "Sponsor Reporting Procedural Guidance" in Pisces. To find this procedural guidance document go to www.cbfish.org, select the "Login In" link at the upper right of corner. Enter your project number or name in the upper right of the search box. Select "Reports & Documents tab on left. Select "BiOp Annual Report." The "Sponsor Reporting Procedural Guidance" is a link directly below "1. Enter Basic Report Information." If you need further assistance please contact your PM/COTR.

Deliverable Specification: The online BiOp RPA report in Taurus (https://www.cbfish.org/BiologicalOpinionAction.mvc/Index/2014/BiOpRpaStatus) should include the data, analyses, and data management completed no later than December 31st. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the scale analyses, you will report the preliminary data (# of redds), but not (incomplete) age distributions of carcasses, which would be reported in the subsequent CY report.

For each RPA, follow the directions in Taurus for each of the three sections and, input completed graphical or tabular data, accompanied by any complete explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

Work Element Budget: $5000 (0.52%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Lead project proponent will download RPA questions from cbfish.org	8/1/2018	9/28/2018	Completed	To prepare for your RPA report, 1) Go to www.cbfish.org and log in, 2) Navigate to your project and select "BiOp Annual Report" from the "Views/Action" menu button, 3) Click on "Input Needed" for each applicable RPA to find your RPA reporting requirements so you will know how much time to set aside for this task. You may also click the "download RPA doc" button to get all RPA questions in one MS Word document. 4). For further guidance or to request help, email BPA RM&E RPA support RMESupport@bpa.gov or email your COTR. (Milestone start/end: July 1 – September 30)
B. Lead project proponent will finalize calendar year report in cbfish.org	1/2/2019	2/28/2019	Completed	The final version is due by March 15. (Milestone start/end: December 31 - March 15)
C. Coordinate with WDFW on report	8/1/2018	2/28/2019	Completed	CTUIR is the lead for this report and will coordinate with WDFW who will provide support.
Deliverable: D. Submit BiOp RPA Report in Taurus		2/28/2019	Completed	*See the Deliverable Specification above*

O: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: Provide effective implementation and administration: a) evaluate current workload and monitor implementation progress; b) develop work plan consistent with expected budget availability and potential tasks or projects; and c) integrate and manage the planning, permitting, environmental compliance, and coordinated implementation of contract actions.

Work Element Budget: $50000 (5.16%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. WE Budget Tab: Error-check and update actual spending (reflect contract close-out value)	3/1/2018	10/31/2018	Completed	After a final invoice is submitted to BPA (in order to close the contract): (a) open the prior-year contract SOW at the "WE Budget" tab; and (b) redistribute the "Updated" WE budget amounts to reflect the final contract close-out amount actually spent by the contractor.
B. Begin drafting contract renewal documents and conduct internal review as needed	10/1/2018	10/31/2018	Completed	Your statement of work, line-item budget, and (if required) property inventory for your next contract are due to BPA at least 5 months prior to the contract start date (longer if your internal processes require more time to get the contract signed and in place prior to the start date).
C. Submit contract renewal package (SOW, Excel budget, property inventory) to BPA COTR	11/1/2018	11/21/2018	Completed	Once your statement of work (SOW) in Pisces is complete, and you have attached your line-item budget (LIB) and property inventory (PI) (if required), click the "Submit" button on the SOW tab to notify your COTR the package is ready for review.
D. Address comments and revise SOW, LIB, and PI as needed to get BPA manager approval	11/21/2018	12/21/2018	Completed	Once your COTR and his or her BPA manager have reviewed your contract renewal package and returned any comments to you, you will need to provide responses and changes as needed to achieve approval from the BPA manager, who will then forward the package to the Contracting Officer. This should be completed at least five months prior to the next contract start date.
E. Return signed contract to BPA's Contracting Officer within 30 days	12/21/2018	1/31/2019	Active	Respond to the CO and COTR indicating any problems with the contract within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days.

Milestone Title	Start Date	End Date	Status	Milestone Description
F. Submit final invoice for prior contract within 90 days to facilitate contract closeout	3/1/2018	5/31/2018	Completed	Within 90 days of the last day of the PRIOR contract, the contractor shall issue a final invoice. In instances where more than 90 days is needed (e.g., because subcontractors have not invoiced), the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount shall be emailed to FWinvoices@bpa.gov and the COTR.
G. Facilitate inputting Cost Share information into Pisces at the Project level	9/28/2018	11/15/2018	Completed	There are multiple contractors under this project and I am the lead project Proponent. I will solicit cost share information for the previous federal FY from project partners and enter previous FY's Cost Share information on the Project Cost Share tab by Nov 15 for all project partners. (Milestone starts Sep. 30 and ends Nov. 15)
H. Comply with all applicable federal, state, tribal and local safety requirements, including reporting	3/1/2018	2/28/2019	Completed	As described in the contract’s Terms and Conditions, the contract manager and contractor shall comply with all applicable federal, state, tribal and local safety laws, rules, regulations and requirements.
I. Coordinate w/ COTR & WDFW on next year's SOW	10/1/2018	11/30/2018	Completed	Coordinate with COTR to revise and finalize the new contract package, including SOW, environmental compliance requirements, budget and property inventory.
J. Adaptive management	3/1/2018	2/28/2019	Completed	The Adaptive Management process requires quarterly and annual updates of key management assumptions to revise in-season and long-term estimates of program performance and future outcomes. The parameters used in the adaptive management process are defined by the in-season and forecasting models. Each of these models has implicit hypotheses expressed in their structure and function that are described in their documentation or annual operating procedure. As learning occurs the structure and function of the in-season and long-term management models will be reviewed and revised to reflect current understanding.
K. Annual Operation Plan	10/1/2018	2/28/2019	Completed	CTUIR will support an adaptive management and decision making process for the spring Chinook program. The adaptive management process will support in-season management by facilitating three quarterly in-season reviews, and one annual adaptive management workshop culminating in an Annual Operating Plan (AOP). The AOP will incorporate current information to provide updated sampling plans, details regarding implementation of the program, and revised operational criteria as agreed upon.
Deliverable: L. Effective implementation management and timely contract administration		2/28/2019	Completed	*See the Deliverable Specification above*

P: 122. Provide Technical Review and Recommendation

Title: Finalize Comprehensive Wallla Walla River Production, Research, Monitoring and Evaluation Plan

Description: Finalize CTUIR's Comprehensive Walla Walla River Production, Research, Monitoring and Evaluation Plan completed in the previous fiscal year. During FY 2018, CTUIR will present and submit the plan to comanagers, ISRP and BPA for review. Once the plan has been reviewed, CTUIR will address issues and concerns and produce the final comprehensive plan.

Deliverable Specification: Present and submit the Comprehensive Production and RM&E Plan to comanagers, ISRP and BPA for review; address issues and concerns, and produce the final comprehensive plan. This process may be repeated several times before the plan is finalized.

Work Element Budget: $11000 (1.13%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Present and submitt Comprehensive Production, Research, Monitoring, and Evaluaioni Plan	3/1/2018	2/28/2019	Completed	Present and submit CTUIR's Comprehensive Production, Research, Monitoring, and Evaluation Plan to comanagers, ISRP and BPA for review (this may take several iterations).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Address comanagers, ISRP and BPA issues and concerns with the plan	3/1/2018	2/28/2019	Completed	Address comanagers, ISRP and BPA issues and concerns with the plan (this may take several iterations).
C. Finalize the Comprehensive Production, RM&E Plan	9/3/2018	2/28/2019	Completed	Finalize the Comprehensive Production, RM&E Plan
Deliverable: C. Finalize Comprehensive Walla Walla River Production, Research, Monitoring and Evaluation Plan		2/28/2019	Completed	*See the Deliverable Specification above*

Q: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (1-1-2016) to (12-31-2017) Combined progress reports

Description: Combine and complete 2016 and 2017 progress reports. The report will report summarizes the project goals and objectives, completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning for the two calendar years.

RM&E Technical Progress reports must conform to BPA guidelines. See the "RME Technical Reporting" link at: http://www.cbfish.org/Help.mvc/GuidanceDocuments.

Deliverable Specification: Uploading the combined 2016-2017 progress report

Work Element Budget: $50000 (5.16%)

Planned Metrics:
* Start date of reporting period : 1/1/2016
* End date of reporting period : 12/31/2017

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review the revised guidance & template	3/1/2018	3/15/2018	Completed	Review the newly-revised guidance & template for the RME Technical Report.
B. Distribute2016-2017 Progress Report for Internal Contractor Review	3/1/2018	3/15/2018	Completed	Internal review will be conducted by CTUIR Fisheries program staff (Craig Contor) before being reviewed externally or being uploaded.
C. Upload draft RM&E Technical Report for 2016-2016 for BPA review	3/1/2018	10/26/2018	Completed	Upload the draft RM&E report into the Pisces Attachments tab as an MS Word document as a "Technical, Draft" for BPA review. BPA will review the draft RM&E report. If your Word file is too big to be uploaded, contact Pisces Support (support@cbfish.org). 2016 report will be combined with 2017 and completed by March 15, 2018.
D. Upload finalized 2016-2077 RM&E Technical Report for BPA to publish	3/1/2018	10/26/2018	Completed	Address any BPA comments on the draft and re-upload finalized report into the Pisces Attachments tab as an MS Word document as a "Technical, draft."
Deliverable: E. Completion of overdue report for 2016 in combination with 2017 annual progress report		10/26/2018	Completed	*See the Deliverable Specification above*

R: 132. Produce (Annual) Progress Report

Title: DRAFT Annual Technical Progress Report (1-1-2018) to (12-31-2018)

Description: DRAFT Technical Annual Progress Reporting Requirements: The final APR report for calendar year2018 will be due in the following 2019 contract.

Due to BPA RM&E reporting needs WDFW (CR 303799) & CTUIR will submit a joint RME DRAFT Annual Technical Progress Report (Report) for calendar year 2018 (1-1-18 thru12-31-18). This Report should be submitted using the template available in Taurus (https://www.cbfish.org, go to your project, click on Reports & Documents, then go to the RM&E Technical Report tab).

Deliverable Specification: The Deliverable is considered complete when the final report is posted. It usually takes BPA 30-45 days to post the final PDF version of a report. This milestone's end date should therefore be 45 days after the final version is uploaded in Pisces. You will receive an email from BPA confirming that your report has been finalized and posted to the web. Mark this milestone complete when you have confirmed your final report has been posted. If you do not receive such an email after 45 days, contact your COTR.

Work Element Budget: $50000 (5.16%)

Planned Metrics:
* Start date of reporting period : 1/1/2018
* End date of reporting period : 12/31/2018

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Prepare for RM&E Technical Report. Review the revised (2014) guidance & template	8/1/2018	8/31/2018	Completed	Review the newly-revised guidance & template for the RME Technical Report. Final RME reports are due in March to align with regulatory reporting timelines.
B. Distribute Progress Report for Internal Contractor Review	12/3/2018	12/31/2018	Completed	Internal review will be conducted by CTUIR staff (Craig Contor and perhaps others) before being reviewed externally or being uploaded.
C. RM&E Technical: Upload draft RM&E Technical Report (MS Word) for BPA review	3/1/2018	1/15/2019	Active	Upload your draft RM&E report into the Pisces Attachments tab as an MS Word document as a "Technical, Draft" for BPA review. BPA will review the draft RM&E report. If your Word file is too big to be uploaded, contact Pisces Support (support@cbfish.org). The final technical report will be uploaded by March 15, 2019 in the following contract year.
Deliverable: D. Completed Annual Report		1/15/2019	Active	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	73982 REL 73 [ISSUED]	**Amendment #:**	1
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$1,075,425	**Perf. Period:**	3/1/2019 - 2/29/2020
Contract Type:	Release	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	Amd1		
SOW Validation:	Last validated 09/12/2019 with 0 problems, and 0 reviewable items		
Contract Documents:	Transmittal Memo (09/03/2019)	CCR Transmittal Memo for CCR-42919	
	Budget - Contract (09/05/2019)	CCR-42919 Budget	

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and https://www.bpa.gov/efw/FishWildlife/Pages/default.aspx.

The Walla Walla subbasin supports ESA listed populations of steelhead and bull trout, and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Spring Chinook were extirpated from the Walla Walla in the early 20th century. For the past 25 years the CTUIR and others have implemented numerous passage, flow, and habitat to improve salmonid production in the Subbasin.

The Tribes Walla Walla Spring Chinook program began in 2000 with the outplanting of hatchery adults collected from the Ringold Hatchery, Carson National Fish Hatchery, and the Umatilla River at Three Mile Falls Dam. Direct stream release of hatchery reared juveniles began in 2005 using Carson stock from the Carson National Fish Hatchery. Monitoring & Evaluation of the Spring Chinook Program began in 2000. The work included assessment of spring Chinook and steelhead natural production, and evaluation of fish passage based on adult steelhead and bull trout. In 2007 CTUIR, WDFW, and BPA developed a collaborative M & E program in the Subbasin based on salmonid VSP Parameters of abundance, productivity, diversity, and spatial structure. The expanded project was designed to provide high level indicators of fish population status and trends for spring Chinook, steelhead, and bull trout. This information is used to inform the CTUIR first foods management, and to address BPA fish and wildlife program strategies.

The purpose of this M & E project is to address the adaptive management requirements of the Spring Chinook Program, and to maintain the baseline monitoring needed by the existing management system. This effort includes an ecosystem-based scientific framework for adaptive management and performance evaluation based on measurements of success and monitors of risk to other species and populations. The techniques and designs used for implementation and detailed methodology can be found online at www.monitoringmethods.org. This collaborative effort is funded by the Columbia River Fish Accords. Our M & E objectives were developed based on the requirements of the Walla Walla Spring Chinook Hatchery Master Plan (HMP), BPA's Fish Management Sub-strategies, the Reasonable and Prudent

Alternatives (RPA's) of the Columbia Power System Biological Opinion, and the existing comprehensive fish restoration program. Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for the objectives and technical methodology.

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (https://www.bpa.gov/efw/FishWildlife/Pages/default.aspx).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Gary James	Interested Party	Umatilla Confederated Tribes (CTUIR)	(541) 429-7285 / (541) 966-2397	garyjames@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Julie Burke	Administrative Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7292 / (429) 429-7292	julieburke@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Gene Shippentower	Supervisor	Umatilla Confederated Tribes (CTUIR)	(541) 429-7287 / (541) 966-2397	geneshippentower@ctuir.org	Confederated Tribes of the Umatilla Indian Reservation DNR Fisheries Program 46411 Timíne Way Pendleton OR 97801
David Kaplowe	F&W Approver	Bonneville Power Administration	(503) 230-5365 / (503) 230-4564	djkaplowe@bpa.gov	P.O. Box 3621 EWM-4 Portland OR 97208-3621
Craig Contor	Contract Manager	Umatilla Confederated Tribes (CTUIR)	(541) 429-7279 / (541) 429-7279	craigcontor@ctuir.org	46411 Timíne Way Pendleton OR 97801
Travis Olsen	Technical Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7542 / (541) 429-7542	travisolsen@ctuir.org	CTUIR 46411 Timíne Way Pendleton OR 97801
Brenda Aguirre	Interested Party	Bonneville Power Administration	(503) 230-5928 / NA	baguirre@bpa.gov	PO Box 3621 Mail Stop ECF-4 Portland OR 97208
Lisa Dexter	Contracting Officer	Bonneville Power Administration	(503) 230-3893 / NA	lldexter@bpa.gov	905 NE 11th Ave. Portland 97232
Timothy Ludington	COTR	Bonneville Power Administration	(503) 230-4988 / NA	tsludington@bpa.gov	
Carolyn Sharp	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5206 / NA	casharp@bpa.gov	P.O. Box 3621 Mail Stop ECF-4 Portland OR 97208-3621

Desmond Gelman	CO Assistant	Bonneville Power Administration	(503) 230-4960 / NA	dxgelman@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland OR 97208-3621
Robert Hogg	Technical Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7541 / (541) 429-7541	RobertHogg@ctuir.org	Confederated Tribes of the Umatilla Indian Reservation 500 Tausick Way Walla Walla WA 99362

Work Element Budget Summary:

	Work Element - Work Element Title	EC Needed*	Estimate	(%)
A :	185. Produce Pisces Status Report - Periodic Status Reports for BPA		$2,000	(0.18%)
B :	165. Produce Environmental Compliance Documentation - Compliance for WEs C thru K		$2,000	(0.18%)
C :	28. Trap and Haul - Fish Salvage	*	$36,000	(3.34%)
D :	158. Mark/Tag Animals - PIT Tag Spring Chinook smolts (out-migrant tagging)	*	$50,000	(4.64%)
E :	158. Mark/Tag Animals - PIT Tag steelhead smolts (out-migrant tagging)	*	$20,000	(1.85%)
F :	158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$10,000	(0.92%)
G :	157. Collect/Generate/Validate Field and Lab Data - Enumerate adult salmon, steelhead and bull trout at Nursery Bridge Dam (video work)	*	$130,000	(12.08%)
H :	157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Redd and Carcass Surveys	*	$136,000	(12.64%)
I :	157. Collect/Generate/Validate Field and Lab Data - Out-migrant monitoring for population estimates, survival, and migration	*	$226,133	(21.02%)
J :	157. Collect/Generate/Validate Field and Lab Data - Maintain and operate PIT Arrays	*	$273,292	(25.41%)
K :	157. Collect/Generate/Validate Field and Lab Data - Stream Monitoring and Data Distribution	*	$30,000	(2.78%)
L :	162. Analyze/Interpret Data - Analyze Data		$50,000	(4.64%)
M :	202. Produce BiOp RPA Report - BiOp RPA Report for Steelhead CY 2018		$5,000	(0.46%)
N :	119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$50,000	(4.64%)
O :	132. Produce (Annual) Progress Report - Submit Progress Report for the period (1-1-2018) to (12-31-2018) Combined progress reports		$5,000	(0.46%)
P :	132. Produce (Annual) Progress Report - DRAFT Annual Technical Progress Report (1-1-2019) to (12-31-2019)		$50,000	(4.64%)
		Total:	$1,075,425	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $2000 (0.19%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2019 (3/1/2019 - 6/30/2019)	7/1/2019	7/15/2019	Completed	
B. Jul-Sep 2019 (7/1/2019 - 9/30/2019)	10/1/2019	10/15/2019	Completed	
C. Oct-Dec 2019 (10/1/2019 - 12/31/2019)	1/1/2020	1/15/2020	Completed	
D. Final Jan-Feb 2020 (1/1/2020 - 2/29/2020)	2/15/2020	2/29/2020	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C thru K

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through K. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $2000 (0.19%)

Planned Metrics:

* Are herbicides used as part of work performed under this contract?: No

* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Determine if contract work could adversely affect Pacific lamprey	3/1/2019	3/31/2019	Completed	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf (BMPs).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Report lamprey observation and catch data to USFWS by Feb. 15	2/1/2020	2/15/2020	Completed	[IF ALL WORK UNDER THE SOW IS IN SUBBASINS BLOCKED TO ANADROMOUS SPECIES, ASK YOUR COTR TO CANCEL THIS MILESTONE.] All contractors doing instream work (e.g., surveys, habitat improvements, electrofishing, screwtraps, etc.) in anadromous fish areas are required to annually report lamprey observations or catch, including zero, by Feb 15 for the previous calendar year's work. A data template is available at: (https://www.cbfish.org/EfwDocument.mvc/DownloadFile/11) As per instructions on the form, email your data to christina_wang@fws.gov at US Fish and Wildlife Service and CC your COR. For identification of lamprey life stages see page 10 of USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20 Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf.
C. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2019	2/28/2020	Completed	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.westernais.org -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.anstaskforce.gov/stateplans.php
D. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2019	2/28/2020	Completed	Prevent spread of invasive species by identifying and removing invasive species from work vehicles and equipment. Consult resources such as the Plants Database (http://plants.usda.gov/index.html) or the NatureServe Explorer (http://www.natureserve.org/explorer/) with assistance identifying invasive plants. Other resources include state natural resource offices (https://www.fws.gov/offices/statelinks.html) or a local U.S. Fish and Wildlife Service Office (https://www.fws.gov/offices/).
E. Complete and document public involvement activities and provide to EC Lead	3/1/2019	2/28/2020	Completed	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
F. Participate in ESA Consultation	3/1/2019	2/28/2020	Completed	Work may include drafting BA (or other ESA documentation), completing HIP forms, submitting high risk project designs to the EC Lead, providing copies of Section 10, 4(d), or 6 permits, etc., or submitting Hatchery Genetic Management Plan to BPA for review and ESA consultation initiation, and providing input for the ensuing consultation. Once the program has completed Section 7 consultation and has obtained relevant permits or authorizations (Section 10, 4 (d), etc), be familiar with and follow all terms and conditions, including annual reporting, associated with the ESA consultation or permit. Notify BPA immediately of any instances when take has been exceeded or terms and conditions or conservation measures have been violated.
G. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2019	2/28/2020	Completed	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits. Send copies of final permits to EC Lead as requested.
Deliverable: H. Compliance achieved and documented		2/28/2020	Completed	*See the Deliverable Specification above*

C: 28. Trap and Haul

Title: Fish Salvage

Description: Cooperate with ODFW, WDFW, and irrigation districts in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. Collection methods will utilize seines and backpack electrofishing gear to remove fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location. Fish collected during salvage operations are returned directly to the river to an area with

	suitable river conditions.
Deliverable Specification:	Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.
Work Element Budget:	$36000 (3.35%)
Planned Metrics:	# of fish transported: 1000
Locations:	1
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)
Country:	US
NPCC Subbasin:	Walla Walla
State:	WA
HUC5 Watershed:	Middle Walla Walla River
County:	Walla Walla
HUC6 Name:	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Rescue and haul fish	3/1/2019	2/28/2020	Completed	Rescue and transport fish at risk from desiccation through dewatering or injury associated with maintenance and operations of diversion dams in the Walla Walla Basin. Salvage may also occur for other reasons in various locations depending on conditions. Salvaged fish will be hauled to the closest river access within the basin where conditions are suitable for fish survival.
Deliverable: C. Salvaged fish and related data		2/28/2020	Completed	*See the Deliverable Specification above*

D: 158. Mark/Tag Animals

Title:	PIT Tag Spring Chinook smolts (out-migrant tagging)
Description:	PIT tag up to 10,000 spring Chinook out-migrants collected at smolt traps to estimate smolt run timing, abundance, and survival (status and trend monitoring, VSP and SARs). Data will be used to evaluate the BPA-funded measures to restore fish and habitat in the basin. CTUIR will maintain two rotary screw traps. One in the upper Walla Walla River (Basel cellars site river miile39) and in lower Mill Creek (river mile 11.8). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 100 mm, F.L.), and bull trout (>120 mm) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by WDFW in the Touchet River.
Deliverable Specification:	CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating spring Chinook. PIT-tag files will be submitted to PTAGIS within 15 days of release. Targets: Up to 10,000 natural origin out-migrant spring Chinook
Work Element Budget:	$50000 (4.65%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery * # fish tagged with PIT: 10000
Locations:	2
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Country:	US
NPCC Subbasin:	Walla Walla
State:	WA
HUC5 Watershed:	Multiple
County:	Walla Walla
HUC6 Name:	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	8/1/2019	10/31/2019	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders will be placed during September and October.
C. PIT-Tag spring Chinook out-migrants - spring	3/1/2019	5/31/2019	Completed	PIT tag spring Chinook out-migrants caught in the smolt trap in the spring (March 1-May 31). Fish will be released above the trap to estimate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag sprng Chinook out-migrants - fall and winter	9/15/2019	2/28/2020	Completed	PIT tag spring Chinook captured in the smolt traps in the fall and winter (November-February) provided adequate stream flow and conditions, allow. PIT-tagged fish will be released upstream to estimate the probability of capture, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: E. PIT tagged spring Chinook out-migrants		2/28/2020	Completed	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag steelhead smolts (out-migrant tagging)

Description: PIT tag juvenile steelhead to estimate smolt run timing, abundance, and survival for VSP, SAR and status and trend monitoring. CTUIR will maintain two rotary screw traps and PIT-tag up to 5,000out-migrant summer steelhead. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 11.8), The traps will be operated continuously during fall through spring as stream conditions allow. Steelhead will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy summer steelhead (> 100 mm, F.L.), and bull trout (>120 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004).

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating summer steelhead. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 natural origin out-migrant summer steelhead

Work Element Budget: $20000 (1.86%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 5000

Locations: 2

Primary Focal Species: Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US | **NPCC Subbasin:** Walla Walla

State: WA | **HUC5 Watershed:** Multiple

County: Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	8/1/2019	10/31/2019	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. PIT-Tag steelhead out-migrants - spring	3/1/2019	5/31/2019	Completed	PIT tag out-migrant summer steelhead release upstream to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag steelhead out-migrants - fall	9/15/2019	2/28/2020	Completed	PIT-tag and release juvenile steelhead out-migrants to estimate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: E. PIT tagged juvenile steelhead out-migrants		2/28/2020	Completed	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title: PIT Tag smolts (hatchery tagging)

Description: PIT tag hatchery spring Chinook prior to release. Use PIT tag detections to estimate run timing, abundance, and survival to determine the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Basin. Power analysis that incorporates PIT tag detection data from previous years shows that 10,000 tags are needed for sufficient adult detections (survival is currently low). USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.

Deliverable Specification: PIT-tag up to 10,000 hatchery spring Chinook and submit tagging files to PTAGIS within 15 days of release.

Work Element Budget: $10000 (0.93%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 10000

Locations: 1

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU

Country: US | **NPCC Subbasin:** Walla Walla

State: OR | **HUC5 Watershed:** Upper Walla Walla River

County: Umatilla | **HUC6 Name:** Lower South Fork Walla Walla River

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	8/1/2019	10/31/2019	Completed	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag hatchery spring Chinook	11/1/2019	11/30/2019	Completed	PIT tag up to 10,000 hatchery spring Chinook at Carson National Fish Hatchery for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: D. PIT tag Hatchery smolts		11/30/2019	Completed	*See the Deliverable Specification above*

G: 157. Collect/Generate/Validate Field and Lab Data

Title: Enumerate adult salmon, steelhead and bull trout at Nursery Bridge Dam (video work)

Description: Estimate adult abundance at index areas using video counts in fish ladders at Nursery Brdige Dam. Data collected from the video counting included date, time, species, size (e.g., jack or adult for spring Chinook salmon), life stage (e.g., steelhead kelts), origin (e.g., adipose clip or unclipped) and migration direction for bull trout. Video counts are not reliable for fish less than 30.5 cm. Daily fish tallies from both ladders are posted onsite for the public. The deliverable for this work is an error-checked database of daily fish counts. Underwater video camera activated by a motion detector is linked to a DVR at each site to capture a video image of passing fish. Overhead dusk-to-dawn

	lights are operated at each site. The stations are checked and downloaded daily. Downloaded video clips ate be archived with CTUIR and housed in the data repository for 2 years.
Deliverable Specification:	The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam. Data will be combined with data from collaborators monitoring adults at Bennington Lake Dam, and Dayton Dam, This contract only covers Nursery Bridge Dam.
Work Element Budget:	$130000 (12.09%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery
Locations:	1
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:	US	**NPCC Subbasin:**	Walla Walla
State:	OR	**HUC5 Watershed:**	Middle Walla Walla River
County:	Umatilla	**HUC6 Name:**	Garrison Creek-Walla Walla River

Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Adult fish counts at Nursery Bridge Dam (video work) - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized

133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	11/1/2019	12/31/2019	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2019	2/28/2020	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	1/1/2020	2/28/2020	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - spring/summer	3/1/2019	7/31/2019	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). Maintain video monitoring equipment in Nursery Bridge Dam fish ladder from March Through July
F. Maintain video monitoring equipment @ Nursery Bridge Dam - fall/Winter	9/1/2019	2/28/2020	Completed	This contract period spans parts of two adult return years (i.e. March to July and September to February). Maintain video monitoring equipment in Nursery Bridge Dam fish ladder from September through February
G. Review, organize and summarize video results	3/1/2019	2/28/2020	Completed	Read video, review data, summarize Nursery Bridge Dam fish counts. Summarize results and discussion in the BPA annual report.
Deliverable: H. Adult fish count from Nursery Bridge Dam		2/28/2020	Completed	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Redd and Carcass Surveys

Description: Conduct redd and carcass surveys in the Walla Walla Basin including the Walla Walla River, the South Fork Walla Walla River, and Mill Creek. Some reaches cannot be surveyed because of private land access restrictions. Visual multi-pass ground surveys will enumerate redds per mile and pre-spawn mortality rates. A total of 47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys. Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded (GPS). Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. Care is taken not to disturb spawning fish or redds. Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Fin clips from carcasses will be collected for genetic analysis. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked spawning survey databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.

Work Element Budget:	$136000	(12.65%)	
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery		
Locations:	4		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	Multiple	**HUC5 Watershed:**	Multiple
County:	Umatilla | Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized

134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	11/1/2019	12/31/2019	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2019	2/28/2020	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	1/1/2020	2/28/2020	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Pre-spawn carcass survey in lower walla walla river	6/1/2019	8/31/2019	Completed	Survey the lower Walla Walla River and lower Mill Creek to count and examine pre-spawn carcasses and to locate fish that do not ascend into the spawning grounds.
F. Spring Chinook redd/carcass surveys	7/15/2019	9/30/2019	Completed	Conduct redd surveys to locate (GPS), count and document redds & carcasses every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers, and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spring Chinook carcasses.
Deliverable: G. Spring Chinook spawner/ carcass survey data		12/31/2019	Completed	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Out-migrant monitoring for population estimates, survival, and migration

Description: Smolt escapement to the mouth of the Walla Walla and to McNary Dam will be estimated for spring Chinook and steelhead by applying an estimated Cormack-Jolly Seber survival probability to PIT tagged fish. We estimate a sample size of 3,600 to 6,200 spring Chinook should provide a 10% coefficient of variation (CV) to Burlingame and McNary Dams, respectively. Smolt production monitoring will be conducted in the mainstem Walla Walla River near the Oregon state line and in lower Mill Creek (Volkhardt et al. 2007, Mahoney et al. 2013, Mendel et al. 2014). Out-migrating naturally produced salmonids captured at the smolt traps will be PIT tagged so we can evaluate juvenile run timing and survival to McNary Dam, as well as to evaluate adult return timing and survival. A sub-sample of tagged fish will be scale-sampled, weighed, and photographed for growth and morphometric information. Multiple PIT tag arrays have been deployed in the Walla Walla River and Mill Creek to help us understand run timing, survival, and to estimate adult returns, adult-to-adult productivity or smolt to adult survival. Previously used smolt trapping sites in the lower Walla Walla River have been abandoned because of maintenance and debris issues but may be revised in the future (Mahoney et al. 2012). Natural smolt abundance will be estimated for both the upper Walla Walla River (i.e. Basel Cellars site) and lower Mill Creek trap locations. Screw traps will be installed by October and run continuously as stream conditions allow into June. The traps are not operated during periods of high/low stream flow (e.g. between 2000 and 200 CFS), peak hatchery releases, and extreme cold and ice. To estimate potential juvenile migrants passing when the trap was not operated for short intervals (= 5 days) we will calculate the mean number of fish trapped for three days before and three days after non-trapping periods. To estimate numbers of fish emigrating past the trap when the trap was not operated for long durations (6 days or more), we used a within year regression of daily stream flow and daily number of natural-origin outmigrants (by size category) captured for the following periods: October-December, January-March, and April-May. The mean number of fish passed is then divided by the estimated trap efficiency to calculate daily fish passage. Natural salmonid abundance is estimated for the Walla Walla River using a stratified Petersen/Darroch estimator (DARR 2.02, Bjorkstedt 2005 and 2009). DARR 2.02 uses Darroch's (1961) stratified Peterson estimator for estimating abundance and associated variance (SE) from stratified mark-recapture data (http://santacruz.nmfs.noaa.gov/publications/software/439/). Trap efficiency (TE) is determined by releasing a known number of PIT-tagged fish above each trap and enumerating recaptures. TE results are organized into bi-weekly strata for analysis in DARR (and/or PITPRO). Mark recapture estimators generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging; (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned. In this study, we release all healthy PIT-tagged fish roughly 1000 m above the trap. Our previous TE tests showed that most recaptures occurred within 24 hours of release. Thus, TE tests are done daily up to 24 hours prior to a scheduled trap shut down. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not pit-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals. Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). All captured salmonids will be scanned for PIT-tags and processed using a Biomark PIT Tag station. Data collected from juvenile salmonids include: number, species, length, weight, scales from steelhead for age structure and age at migration. Healthy, spring Chinook (> 65 mm, F.L.), summer steelhead (> 100 mm, F.L.), and bull trout (>120 mm F.L.) are manually PIT-Tagged and released on site (Prentice et al. 1990). The downstream movement of Chinook salmon fry and parr (< 65 mm), age-0 summer steelhead (< 100 mm) are presumed not to be out-migrants. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A rotary screw traps will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (8 foot trap at RM38) and Mill Creek just above Bennington Dam (5 foot trap at RM 10),

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Fish meeting protocol criteria be PIT tagged. Data entry, compilation, and quality control of field data will be performed. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $226133 (21.03%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 2
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized

110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA

Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	11/1/2019	12/31/2019	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2019	2/28/2020	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	1/1/2020	2/28/2020	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Monitor salmonids leaving the upper Walla Walla River - spring/summer	3/1/2019	5/31/2019	Completed	Operate 8-foot rotary screw trap in the Walla Walla River during the spring
F. Monitor salmonids leaving the upper Walla Walla River - fall	9/1/2019	2/28/2020	Completed	Operate 8-foot rotary screw trap in the Walla Walla River during the fall
G. Monitor salmonids leaving Mill Creek - spring	3/1/2019	5/31/2019	Completed	Operate 5-foot rotary screw trap in Mill Creek during the spring
H. Monitor salmonids leaving lower Mill Creek - fall	9/1/2019	2/28/2020	Completed	Operate 5-foot rotary screw trap in Mill Creek during the fall.

Milestone Title	Start Date	End Date	Status	Milestone Description
I. Review, organize and summarize results	11/1/2019	2/28/2020	Completed	Review, organize and summarize results for migration year.
Deliverable: J. Smolt monitoring and PIT-tagging data		2/28/2020	Completed	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Maintain and operate PIT Arrays

Description: CTUIR will install two new PIT tag arrays and continue to maintain and operate existing arrays in the Walla Walla subbasin.

Deliverable Specification: PIT tag data collected by the PIT tag arrays will be uploaded to PITAGIS and archived there and will be available to the public.

Work Element Budget: $273292 (25.41%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla

State: WA **HUC5 Watershed:** Multiple

County: Walla Walla **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Maintain and operate PIT Arrays - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized

195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery

Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CRITFC Cloud Secure Tribal Repository (CCSTR) (http://www.critfc.org/)
PTAGIS Website (http://www.ptagis.org/)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	2/28/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	11/1/2019	12/31/2019	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2019	2/28/2020	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	1/1/2020	2/28/2020	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Install and operate two new floating vertical PIT tag arrays in the lower Walla Walla River	8/1/2019	11/30/2019	Completed	Install and operate two new floating vertical PIT tag arrays in the lower Walla Walla River. Proof of concept test was conducted in the spring of 2018 during high flows with a West Fork Environmental floating PIT tag array. Detection rates were high and the array installation and operations were easy even during high flows.
F. Maintain and operate PIT Array systems	3/1/2019	2/28/2020	Completed	Daily system status check will be made to ensure the remote PIT tag detection systems are operational, and bi-weekly checks to visually assure arrays are in place and secure. Biomark is contracted to download, quality check the datasets (clock drift/ site id/ detection errors) and upload to PTAGIS servers. In addition, Biomark will provide technical support of software and hardware at each remote array site (10).
Deliverable: G. Produce accessible, error-checked datasets		2/28/2020	Completed	*See the Deliverable Specification above*

K: 157. Collect/Generate/Validate Field and Lab Data

Title: Stream Monitoring and Data Distribution

Description: The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) agreed to collaborate with stream discharge monitoring beginning in 2011. The Washington Department of Ecology's terminated their monitoring the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road. The WWBWC continues flow monitoring at Pepper Bridge gauge, Beet Road Bridge gauge, Grove

School Bridge gauge, McDonald Road Bridge gauge, at the Pierce RV Park gauge, and Touchet River. Flows at all these sites can be too low for salmonids to migrate and survive to the headwaters without management. The project is divided into three phases: Field Measurements, Data Processing and Publishing, and Analysis/reporting. WWBWC coordinates and plans all tasks with CTUIR contributing through a subcontract with WWBWC for this work.

Deliverable Specification: WWBWC will maintain and install two air temperature sensors at the McDonald Road Bridge and the Pierce RV Park site and install a turbidity sensor at the Pierce RV Park site. They will provide continuous streamflow data for five gauge stations on the Walla Walla River. The WWBWC will also publish provisional and confirmed data to the WWBWC website, which is available to all agency partners. The WWBWC will also provide an annual report on the five Walla Walla River gauge sites at the end of the contract period. Data will also be uploaded into the Streamflow Gage Network.

Work Element Budget: $30000 (2.79%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5

Primary Focal Species: Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US
NPCC Subbasin: Walla Walla
State: Multiple
HUC5 Watershed: Multiple
County: Umatilla | Walla Walla
HUC6 Name: Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Stream Gauge Supplementation (2010-051-00) v1.0

Study Plan Owner: James White

Protocol: Stream Gauge Supplementation (2010-051-00) v1.0

Protocol State: Draft

Protocol Owner: James White

Sample Design: Stream Monitoring and Data Distribution - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2019	3/15/2019	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	11/1/2019	12/31/2019	Completed	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2019	2/28/2020	Completed	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	1/1/2020	2/28/2020	Completed	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Field measurements	3/1/2019	2/28/2020	Completed	Field Measurements: The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
F. Stream temperature monitoring, Touchet River	4/1/2019	11/30/2019	Completed	Monitor water temperatures in the Touchet River. Calibrate and deploy temperature loggers April, monitor three or four times throughout the summer. In November, recover loggers, download data, check calibration, upload to regional database.
G. Data processing and publishing	3/1/2019	2/28/2020	Completed	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Realtime Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements. The data collected will also be uploaded onto Streamflow Gage Network.
Deliverable: H. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/28/2020	Completed	*See the Deliverable Specification above*

L: 162. Analyze/Interpret Data

Title: Analyze Data

Description: Analyze the data collected from the Walla Walla River Watershed for spawning surveys as well as out-migration, flow and water temperatures.

Deliverable Specification: The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA.

Work Element Budget: $50000 (4.65%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations:

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:

NPCC Subbasin:

State:

HUC5 Watershed:

County:

HUC6 Name:

Salmonid ESUs Present:
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and publish Study Design and Methods in monitoringmethods.org	11/1/2019	12/31/2019	Active	The Study Design (including temporal and spatial design) and Methods for this work element are stored at monitoringresources.org and need to be finalized (i.e., "Published" through monitoringresources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Study Design/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Analyze adult enumeration data	10/1/2019	1/15/2020	Completed	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
C. Analyze smolt and PIT-tag data	10/1/2019	1/15/2020	Completed	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
D. Analyze Redd, Spawner and Carcass data	10/1/2019	1/15/2020	Completed	Analyze and interpret redd, spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
E. Analyze water flow, temperature, and turbidity data.	11/1/2019	1/10/2020	Completed	Walla Walla Watershed Council will analyze water flow, temperature, and turbidity data through a subcontract with CTUIR (this project).
Deliverable: F. Analyzed data		1/15/2020	Completed	*See the Deliverable Specification above*

M: 202. Produce BiOp RPA Report

Title: BiOp RPA Report for Steelhead CY 2018

Description: This project is associated with RPA 64.2. CTUIR is the lead on this report. This report only includes Spring Chinook. The required information can be prepared in MS Word, and pasted into Taurus. For more guidance see https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf. BiOp RPA Reporting Requirements. This project supports an ESA BiOp RPA (RPA 64.2), therefore the CTUIR are required to electronically submit a Final Annual BiOp RPA Report of work conducted for calendar year 2018 for upload into Taurus. This BiOp RPA report is required annually on all declared BiOp RPA associations. The online BiOp RPA report in Taurus (www.cbfish.org) should include the data, analyses, and data management completed by your project by December 31, 2018. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent RPA report. For each RPA, follow the directions in Taurus for each of the three sections and as appropriate input graphical or tabular data, accompanied by explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next. For detailed information on how to access and produce this report please see "Sponsor Reporting Procedural Guidance" in Pisces. To find this procedural guidance document go to www.cbfish.org, select the "Login In" link at the upper right of corner. Enter your project number or name in the upper right of the search box. Select "Reports & Documents tab on left. Select "BiOp Annual Report." The "Sponsor Reporting Procedural Guidance" is a link directly below "1. Enter Basic Report Information." If you need further assistance please contact your PM/COTR.

Deliverable Specification: The online BiOp RPA report in Taurus (https://www.cbfish.org/BiologicalOpinionAction.mvc/Index/2014/BiOpRpaStatus) should include the data, analyses, and data management completed no later than December 31st. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the scale analyses, you will report the preliminary data (# of redds), but not (incomplete) age distributions of carcasses, which would be reported in the subsequent CY report.

For each RPA, follow the directions in Taurus for each of the three sections and, input completed graphical or tabular data, accompanied by any complete explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

Work Element Budget: $5000 (0.46%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Lead project proponent will download RPA questions from cbfish.org	12/15/2019	1/15/2020	Completed	To prepare for your RPA report, 1) Go to www.cbfish.org and log in, 2) Navigate to your project and select "BiOp Annual Report" from the "Go to..." menu button, 3) Click on "Input Needed" for each applicable RPA to find your RPA reporting requirements so you will know how much time to set aside for this task. You may also click the "download RPA doc" button to get all RPA questions in one MS Word document. 4). For further guidance or to request help, email BPA RM&E RPA support RMESupport@bpa.gov or email your COTR. (Milestone start/end: July 1 – September 30)
B. Lead project proponent will finalize calendar year report in cbfish.org	1/15/2020	2/28/2020	Completed	The final version is due by March 15. (Milestone start/end: December 31 - March 15)
Deliverable: C. Submit BiOp RPA Report in Taurus		2/28/2020	Completed	*See the Deliverable Specification above*

N: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: Provide effective implementation and administration: a) evaluate current workload and monitor implementation progress; b) develop work plan consistent with expected budget availability and potential tasks or projects; and c) integrate and manage the planning, permitting, environmental compliance, and coordinated implementation of contract actions.

Work Element Budget: $50000 (4.65%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Error-check & update actual WE budget spending w/in 4 months (reflect contract close-out value)	3/1/2019	7/31/2019	Completed	No later than 4 months after the end of the previous contract, (a) open the prior-year contract SOW at the "WE Budget" tab; and (b) enter "Updated" WE budget amounts to reflect the final contract close-out amount actually spent by the contractor.
B. Begin drafting contract renewal documents and conduct internal review as needed	8/10/2019	10/31/2019	Completed	Your statement of work, line-item budget, and (if required) property inventory for your next contract are due to BPA at least 5 months prior to the contract start date (longer if your internal processes require more time to get the contract signed and in place prior to the start date).
C. Submit contract renewal package (SOW, Excel budget, property inventory) to BPA COTR	11/1/2019	12/31/2019	Completed	Once your statement of work (SOW) in Pisces is complete, and you have attached your line-item budget (LIB) and property inventory (PI) (if required), click the "Submit" button on the SOW tab to notify your COTR the package is ready for review.
D. Address comments and revise SOW, LIB, and PI as needed to get BPA manager approval	12/1/2019	1/31/2020	Completed	Once your COTR and his or her BPA manager have reviewed your contract renewal package and returned any comments to you, you will need to provide responses and changes as needed to achieve approval from the BPA manager, who will then forward the package to the Contracting Officer. This should be completed at least five months prior to the next contract start date.
E. Return signed contract to BPA's Contracting Officer within 30 days	1/1/2020	2/28/2020	Active	Respond to the CO and COTR indicating any problems with the contract within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days.
F. Submit final invoice for prior contract within 90 days to facilitate contract closeout	3/1/2019	5/31/2019	Completed	Within 90 days of the last day of the PRIOR contract, the contractor shall issue a final invoice. In instances where more than 90 days is needed (e.g., because subcontractors have not invoiced), the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount shall be emailed to FWinvoices@bpa.gov and the COTR.

Milestone Title	Start Date	End Date	Status	Milestone Description
G. Facilitate inputting Cost Share information into Pisces at the Project level	10/1/2019	11/15/2019	Completed	Cost share information can be input anytime during the contract (e.g., concurrent with quarterly status reports) but no later than November 15 for each fiscal year. (a) I am the sole contractor under this project. I will enter previous federal FY's Cost Share information on the Project's Cost Share tab by Nov 15. (Milestone starts Sep. 30 and ends Nov. 15) (b) There are multiple contractors under this project and I am the lead project Proponent. I will solicit cost share information for the previous federal FY from project partners and enter previous FY's Cost Share information on the Project Cost Share tab by Nov 15 for all project partners. (Milestone starts Sep. 30 and ends Nov. 15) (c) There are multiple contractors under this project, and I am not the lead project Proponent. I will email federal FY Cost Share information for my contract to the lead project Proponent by Nov 1. (Milestone starts Sep. 30 and ends Nov. 1)
H. Comply with all applicable federal, state, tribal and local safety requirements, including reporting	3/1/2019	2/28/2020	Completed	As described in the contract’s Terms and Conditions, the contract manager and contractor shall comply with all applicable federal, state, tribal and local safety laws, rules, regulations and requirements.
I. Adaptive management	3/1/2019	2/28/2020	Completed	The Adaptive Management process requires quarterly and annual updates of key management assumptions to revise in-season and long-term estimates of program performance and future outcomes. The parameters used in the adaptive management process are defined by the in-season and forecasting models. Each of these models has implicit hypotheses expressed in their structure and function that are described in their documentation or annual operating procedure. As learning occurs the structure and function of the in-season and long-term management models will be reviewed and revised to reflect current understanding.
J. Annual Operation Plan	3/1/2019	2/28/2020	Completed	CTUIR will support an adaptive management and decision making process for the spring Chinook program. The adaptive management process will support in-season management by facilitating three quarterly in-season reviews, and one annual adaptive management workshop culminating in an Annual Operating Plan (AOP). The AOP will incorporate current information to provide updated sampling plans, details regarding implementation of the program, and revised operational criteria as agreed upon.
Deliverable: K. Effective implementation management and timely contract administration		2/28/2020	Completed	*See the Deliverable Specification above*

O: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (1-1-2018) to (12-31-2018) Combined progress reports

Description: Complete 2018 progress report. The report summarize the project goals and objectives, completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning for the calendar year. RM&E Technical Progress reports must conform to BPA guidelines. See the "RME Technical Reporting" link at: http://www.cbfish.org/Help.mvc/GuidanceDocuments.

Deliverable Specification:

Work Element Budget: $5000 (0.46%)

Planned Metrics:
* Start date of reporting period : 1/1/2016
* End date of reporting period : 12/31/2017

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Prepare for RM&E Technical Report. Review the revised (2014) guidance & template	3/1/2019	3/10/2019	Completed	Review the newly-revised guidance & template for your RME Technical Report. BPA Fish and Wildlife project sponsors who have the following work elements in their contracts are required to complete a RM&E technical report: 156 Develop RM&E Methods and Designs, 157 Collect/Generate/Validate Field and Lab Data, 158 Mark and Tag Animals, and/or162 Analyze/Interpret Data. Reports must show cumulative results and synthesis for the duration data collection/analysis studies. Final RME reports are due in March to align with regulatory reporting timelines. (Milestone start/end: August 1 - September 14)
B. Distribute Progress Report for Internal Contractor Review	1/1/2020	2/28/2020	Completed	Internal review will be conducted by CTUIR staff before being reviewed externally or being uploaded.
C. RM&E Technical: Upload draft 2019 RM&E Technical Report (MS Word) for BPA review	12/1/2019	1/15/2020	Completed	Upload your draft RM&E report into the Pisces Attachments tab as an MS Word document as a "Technical, Draft" for BPA review. BPA will review the draft RM&E report. If your Word file is too big to be uploaded, contact Pisces Support (support@cbfish.org). For more information on structure and content of your report, please use the newly-revised guidance & template for RME Reports located at https://www.cbfish.org/Help.mvc/GuidanceDocuments. (Milestone start/end: September 15 - January 15).
D. RM&E Technical: Upload finalized 2018 RM&E Technical Report (MS Word) for BPA to publish	3/1/2019	3/15/2019	Completed	Address any BPA comments on the draft and re-upload finalized report into the Pisces Attachments tab as an MS Word document as a "Technical, draft." (Note: This MS Word format is a change in policy. BPA staff will now convert it to a PDF.) (Milestone start/end: Jan 16 - Mar 15)

P: 132. Produce (Annual) Progress Report

Title: DRAFT Annual Technical Progress Report (1-1-2019) to (12-31-2019)

Description: DRAFT Technical Annual Progress Reporting Requirements: The final report for calendar year 2019 will be due in the following 2020 contract. This report should be submitted using the template available in Taurus (https://www.cbfish.org, go to your project, click on Reports & Documents, then go to the RM&E Technical Report tab).

Deliverable Specification: Draft 2019 annual report is due to BPA January 15, 2020

Work Element Budget: $50000 (4.65%)

Planned Metrics:
* Start date of reporting period : 1/1/2018
* End date of reporting period : 12/31/2018

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Prepare for RM&E Technical Report.	11/1/2019	11/30/2019	Completed	Review the newly-revised guidance & template for your RME Technical Report. BPA Fish and Wildlife project sponsors who have the following work elements in their contracts are required to complete a RM&E technical report: 156 Develop RM&E Methods and Designs, 157 Collect/Generate/Validate Field and Lab Data, 158 Mark and Tag Animals, and/or162 Analyze/Interpret Data. Reports must show cumulative results and synthesis for the duration data collection/analysis studies. Final RME reports are due in March to align with regulatory reporting timelines.
B. Distribute Progress Report for Internal Contractor Review	12/1/2019	12/31/2019	Completed	Internal review will be conducted by CTUIR staff before being reviewed externally or being uploaded.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. RM&E Technical: Upload draft RM&E Technical Report (MS Word) for BPA review	1/1/2020	1/15/2020	Completed	Upload your draft RM&E report into the Pisces Attachments tab as an MS Word document as a "Technical, Draft" for BPA review. BPA will review the draft RM&E report. If your Word file is too big to be uploaded, contact Pisces Support (support@cbfish.org). For more information on structure and content of your report, please use the newly-revised guidance & template for RME Reports located at https://www.cbfish.org/Help.mvc/GuidanceDocuments. (Milestone start/end: September 15 - January 15).
Deliverable: D. Submitted Draft 2019 Annual Report		1/15/2020	Completed	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Statement of Work Report

Data Current as of: 07/17/2020
Report Printed: 07/17/2020

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)		
Project #:	2000-039-00		
Contract Title:	2000-039-00 EXP WALLA WALLA SALMONID PRODUCTION M&E		
Contract #:	73982 REL 99 [ISSUED]		
Province:	Columbia Plateau	**Subbasin:**	Walla Walla
Workorder Task(s):	WO: 00122522 Task: 1		
Perf. Period Budget:	$931,415	**Perf. Period:**	3/1/2020 - 2/28/2021
Contract Type:	Release	**Pricing Type:**	Cost Reimbursement (CNF)
Contractor(s):	Umatilla Confederated Tribes (CTUIR) (Prime - UMATILLA00)		
BPA Internal Ref:	73982 REL 99		
SOW Validation:	Last validated 02/27/2020 with 0 problems, and 0 reviewable items		
Contract Documents:	Transmittal Memo (02/18/2020)	Transmittal Memo for CR-338055	
	Budget - Contract (02/18/2020)	CCR-338055 Budget WWSME	
	Property Inventory (02/18/2020)	CR-338055 Capital Equipment	

Contract Description:

This research, monitoring and evaluation project was established in 2007 as a collaborative accord between the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW), and Bonneville Power Administration (BPA). In January 2007, BPA requested of this project an amended collaborative proposal; one that emphasized salmonid status and trend monitoring. Tribal and state partners agreed to collaborate on the project proposal, budget, statement of work and annual report; but, retained their individual contracts with BPA. Prior to this collaboration, the CTUIR and WDFW conducted separate studies under BPA project numbers 200003900 & 199802000; see http://data.umatilla.nsn.us/, http://wdfw.wa.gov/conservation/, and ...

The Walla Walla subbasin supports ESA listed populations of steelhead and bull trout, and a reintroduced population of spring Chinook. These populations are depressed relative to historic levels. Spring Chinook were extirpated from the Walla Walla in the early 20th century. For the past 25 years the CTUIR and others have implemented numerous passage, flow, and habitat to improve salmonid production in the Subbasin.

The Tribes Walla Walla Spring Chinook program began in 2000 with the outplanting of hatchery adults collected from the Ringold Hatchery, Carson National Fish Hatchery, and the Umatilla River at Three Mile Falls Dam. Direct stream release of hatchery reared juveniles began in 2005 using Carson stock from the Carson National Fish Hatchery. Monitoring & Evaluation of the Spring Chinook Program began in 2000. The work included assessment of spring Chinook and steelhead natural production, and evaluation of fish passage based on adult steelhead and bull trout. In 2007 CTUIR, WDFW, and BPA developed a collaborative M & E program in the Subbasin based on salmonid VSP Parameters of abundance, productivity, diversity, and spatial structure. The expanded project was designed to provide high level indicators of fish population status and trends for spring Chinook, steelhead, and bull trout. This information is used to inform the CTUIR first foods management, and to address BPA fish and wildlife program strategies.

The purpose of this M & E project is to address the adaptive management requirements of the Spring Chinook Program, and to maintain the baseline monitoring needed by the existing management system. This effort includes an ecosystem-based scientific framework for adaptive management and performance evaluation based on measurements of success and monitors of risk to other species and populations. The techniques and designs used for implementation and detailed methodology can be found online at www.monitoringmethods.org. This collaborative effort is funded by the Columbia River Fish Accords. Our M & E objectives were developed based on the requirements of the Walla Walla Spring Chinook Hatchery Master Plan (HMP), BPA's Fish Management Sub-strategies, the Reasonable and Prudent

Alternatives (RPA's) of the Columbia Power System Biological Opinion, and the existing comprehensive fish restoration program. Existing plans for the Umatilla River, Grande Ronde River, Johnson Creek, and the Okanogan River were reviewed to develop the structure and content requirements for the objectives and technical methodology.

Project work emphasizes Mill Creek, Walla Walla and Touchet rivers, and is coordinated with local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla Subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts and other public and private groups).

CTUIR project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College, while the WDFW South East Washington District Offices are located in Dayton, Washington. Previously, CTUIR and WDFW conducted separate studies and reported to BPA in separate annual reports, under project numbers 199802000 and 200003900. Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (https://www.bpa.gov/efw/FishWildlife/Pages/default.aspx).

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Gary James	Interested Party	Umatilla Confederated Tribes (CTUIR)	(541) 429-7285 / (541) 966-2397	garyjames@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Julie Burke	Administrative Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7292 / (429) 429-7292	julieburke@ctuir.org	CTUIR DNR Fisheries Program 46411 Timine Way Pendleton OR 97801
Gene Shippentower	Supervisor	Umatilla Confederated Tribes (CTUIR)	(541) 429-7287 / (541) 966-2397	geneshippentower@ctuir.org	Confederated Tribes of the Umatilla Indian Reservation DNR Fisheries Program 46411 Timíne Way Pendleton OR 97801
David Kaplowe	F&W Approver	Bonneville Power Administration	(503) 230-5365 / (503) 230-4564	djkaplowe@bpa.gov	P.O. Box 3621 EWM-4 Portland OR 97208-3621
Craig Contor	Technical Contact	Umatilla Confederated Tribes (CTUIR)	(541) 429-7279 / (541) 429-7279	craigcontor@ctuir.org	46411 Timíne Way Pendleton OR 97801
Travis Olsen	Contract Manager	Umatilla Confederated Tribes (CTUIR)	(541) 429-7542 / (541) 429-7542	travisolsen@ctuir.org	CTUIR 46411 Timíne Way Pendleton OR 97801
Lisa Dexter	Contracting Officer	Bonneville Power Administration	(503) 230-3893 / NA	lldexter@bpa.gov	905 NE 11th Ave. Portland 97232
Timothy Ludington	COTR	Bonneville Power Administration	(503) 230-4988 / NA	tsludington@bpa.gov	
Carolyn Sharp	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5206 / NA	casharp@bpa.gov	P.O. Box 3621 Mail Stop ECF-4 Portland OR 97208-3621
Desmond Gelman	CO Assistant	Bonneville Power Administration	(503) 230-4960 / NA	dxgelman@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland OR 97208-3621

Robert Hogg	Contract Manager	Umatilla Confederated Tribes (CTUIR)	(541) 429-7541 / (541) 429-7541	RobertHogg@ctuir.org	Confederated Tribes of the Umatilla Indian Reservation 500 Tausick Way Walla Walla WA 99362

Work Element Budget Summary:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		$1,000	(0.10%)
B : 165. Produce Environmental Compliance Documentation - Compliance for WEs C thru K		$4,000	(0.42%)
C : 28. Trap and Haul - Fish Salvage	*	$25,000	(2.68%)
D : 158. Mark/Tag Animals - PIT Tag Spring Chinook smolts (out-migrant tagging)	*	$50,000	(5.36%)
E : 158. Mark/Tag Animals - PIT Tag steelhead smolts (out-migrant tagging)	*	$50,000	(5.36%)
F : 158. Mark/Tag Animals - PIT Tag smolts (hatchery tagging)	*	$25,000	(2.68%)
G : 157. Collect/Generate/Validate Field and Lab Data - Enumerate adult salmon, steelhead and bull trout at Nursery Bridge Dam (video work)	*	$99,000	(10.62%)
H : 157. Collect/Generate/Validate Field and Lab Data - Spring Chinook Redd and Carcass Surveys	*	$128,000	(13.74%)
I : 157. Collect/Generate/Validate Field and Lab Data - Out-migrant monitoring for population estimates, survival, and migration	*	$120,000	(12.88%)
J : 157. Collect/Generate/Validate Field and Lab Data - Maintain and operate PIT Arrays	*	$227,000	(24.37%)
K : 157. Collect/Generate/Validate Field and Lab Data - Stream Monitoring and Data Distribution	*	$30,000	(3.22%)
L : 162. Analyze/Interpret Data - Analyze Data		$25,000	(2.68%)
M : 202. Produce BiOp RPA Report - BiOp RPA Report for Steelhead CY 2020		$4,415	(0.47%)
N : 119. Manage and Administer Projects - Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project		$130,000	(13.95%)
O : 132. Produce (Annual) Progress Report - Annual Technical Progress Report (1-1-2020) to (12-31-2020)		$10,000	(1.07%)
P : 132. Produce (Annual) Progress Report - Submit Progress Report for the period Jan 2019 to Dec 2019		$3,000	(0.32%)
	Total:	$931,415	

* Environmental Compliance (EC) needed before work begins.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

Work Element Budget: $1000 (0.11%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Mar-Jun 2020 (3/1/2020 - 6/30/2020)	7/1/2020	7/15/2020	Active	
B. Jul-Sep 2020 (7/1/2020 - 9/30/2020)	10/1/2020	10/15/2020	Active	
C. Oct-Dec 2020 (10/1/2020 - 12/31/2020)	1/1/2021	1/15/2021	Active	
D. Final Jan-Feb 2021 (1/1/2021 - 2/28/2021)	2/14/2021	2/28/2021	Active	

B: 165. Produce Environmental Compliance Documentation

Title: Compliance for WEs C thru K

Description: The statement of work for this project includes activities that require environmental clearance from the BPA Compliance Group, including Work Elements C through K. Support provided includes any updates that might be needed to cover any new activities not already covered.

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group for project, and other work needed to obtain needed permits, such as a USFWS section 10 scientific take permit, Annual Report of Activities for USFWS and NOAA-Fisheries.

Work Element Budget: $4000 (0.43%)

Planned Metrics:
* Are herbicides used as part of work performed under this contract?: No
* Will water craft, heavy equipment, waders, boots, or other equipment be used from outside the local watershed as part of work performed under this contract?: No

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Determine if contract work could adversely affect Pacific lamprey	3/1/2020	3/31/2020	Active	Contractor will review work proposed under this contract and determine the following: 1) Will field work take place in any area where lamprey may be present? (Any tributary or subbasin where anadromous fish exist is also accessible Pacific lamprey habitat.) 2) Are there any stream disturbing activities or instream activities that could adversely impact Pacific lamprey? Examples of activities posing a threat to lamprey may include (this list is not intended to be all-inclusive): aquatic habitat improvements, fish passage improvements, culvert replacements, water diversions, altered management of water flows, dewatering of any portions of streams, or alteration of irrigation practices. If the answer is yes to BOTH 1 and 2, the contractor must implement USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20Management%20Practices%20for%20Pacific%20Lamprey%20April%202010%20Version.pdf(BMPs).

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Report lamprey observation and catch data to USFWS by Feb. 15	2/1/2021	2/15/2021	Active	[IF ALL WORK UNDER THE SOW IS IN SUBBASINS BLOCKED TO ANADROMOUS SPECIES, ASK YOUR COR TO CANCEL THIS MILESTONE.] All contractors doing instream work (e.g., surveys, habitat improvements, electrofishing, screwtraps, etc.) in anadromous fish areas are required to annually report lamprey observations or catch, including zero, by Feb 15 for the previous calendar year's work. A data template is available at: (https://www.cbfish.org/EfwDocument.mvc/DownloadFile/11) As per instructions on the form, email your data to christina_wang@fws.gov at US Fish and Wildlife Service and CC your COR. For identification of lamprey life stages see page 10 of USFWS Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus) http://www.fws.gov/pacific/Fisheries/sphabcon/lamprey/pdf/Best%20 Management%20Practices%20for%20Pacific%20Lamprey%20April %202010%20Version.pdf.
C. Inspect water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	3/1/2020	2/28/2021	Active	Aquatic invasive Species Guidance: Uniform Decontamination Procedures: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Best management guidance for boaters: http://www.westernais.org -- Aquatic Nuisance Species newsletter: http://www.aquaticnuisance.org/newsletters -- State Aquatic Invasive Species Management Plans: Oregon: http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf -- Washington: http://www.wdfw.wa.gov/publications/pub.php?id=00105 -- Montana: http://www.anstaskforce.gov/Montana-FINAL_PLAN.pdf -- Idaho: http://www.anstaskforce.gov/stateplans.php
D. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	3/1/2020	2/28/2021	Active	Prevent spread of invasive species by identifying and removing invasive species from work vehicles and equipment. Consult resources such as the Plants Database (http://plants.usda.gov/index.html) or the NatureServe Explorer (http://www.natureserve.org/explorer/) with assistance identifying invasive plants. Other resources include state natural resource offices (https://www.fws.gov/offices/statelinks.html) or a local U.S. Fish and Wildlife Service Office (https://www.fws.gov/offices/).
E. Complete and document public involvement activities and provide to EC Lead	3/1/2020	2/28/2021	Active	Public involvement is any outreach to the public or landowners about specific actions that are proposed. This could be public letters, meetings, newspaper notices, posted notices at local facilities, or information booths at local events.
F. Participate in ESA Consultation	3/1/2020	2/28/2021	Active	Work may include drafting BA (or other ESA documentation), completing HIP forms, submitting high risk project designs to the EC Lead, providing copies of Section 10, 4(d), or 6 permits, etc., or submitting Hatchery Genetic Management Plan to BPA for review and ESA consultation initiation, and providing input for the ensuing consultation. Once the program has completed Section 7 consultation and has obtained relevant permits or authorizations (Section 10, 4 (d), etc), be familiar with and follow all terms and conditions, including annual reporting, associated with the ESA consultation or permit. Notify BPA immediately of any instances when take has been exceeded or terms and conditions or conservation measures have been violated.
G. Obtain/Renew applicable local, state, federal and tribal environmental permits	3/1/2020	2/28/2021	Active	Work done to obtain permits such as Sec. 401 or 404 (including RGP process), shoreline, NPDES, or any other required federal, state, or local permits. Send copies of final permits to EC Lead as requested.
Deliverable: H. Compliance achieved and documented		2/28/2021	Active	*See the Deliverable Specification above*

C: 28. Trap and Haul

Title: Fish Salvage

Description: Cooperate with ODFW, WDFW, and irrigation districts in salvaging fish from the Walla Walla River at diversion dams, irrigation canals, and other locations as needed. Collection methods will utilize seines and backpack electrofishing gear to remove fish from isolated pools in dewatered channels. The number and species of fish collected are recorded from each location. Fish collected during salvage operations are returned directly to the river to an area with suitable river conditions.

Deliverable Specification: Summary of fish salvaged by species, date and location. Report fish salvage results in annual report to BPA.

Work Element Budget: $25000 (2.68%)

Planned Metrics: # of fish transported: 1000

Locations: 1
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS | Trout, Bull (S. confluentus)
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Middle Walla Walla River
County: Walla Walla **HUC6 Name:** Garrison Creek-Walla Walla River
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Rescue and haul fish	3/1/2020	2/28/2021	Active	Rescue and transport fish at risk from desiccation through dewatering or injury associated with maintenance and operations of diversion dams in the Walla Walla Basin. Salvage may also occur for other reasons in various locations depending on conditions. Salvaged fish will be hauled to the closest river access within the basin where conditions are suitable for fish survival.
Deliverable: C. Salvaged fish and related data		2/28/2021	Active	*See the Deliverable Specification above*

D: 158. Mark/Tag Animals

Title: PIT Tag Spring Chinook smolts (out-migrant tagging)
Description: PIT tag up to 10,000 spring Chinook out-migrants collected at smolt traps to estimate smolt run timing, abundance, and survival (status and trend monitoring, VSP and SARs). Data will be used to evaluate the BPA-funded measures to restore fish and habitat in the basin. CTUIR will maintain two rotary screw traps. One in the upper Walla Walla River (Basel cellars site river miile39) and in lower Mill Creek (river mile 11.8). The traps will be operated continuously during fall through spring as stream conditions allow. We intend to PIT-tag actively migrating fish. Salmonids will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy spring Chinook (> 65 mm, F.L.), summer steelhead (> 100 mm, F.L.), and bull trout (>120 mm) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004). These tagging efforts will supplement those conducted by WDFW in the Touchet River.
Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating spring Chinook. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
Up to 10,000 natural origin out-migrant spring Chinook
Work Element Budget: $50000 (5.37%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 5000

Locations: 2
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	8/1/2020	10/31/2020	Active	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag spring Chinook out-migrants - spring	3/1/2020	6/15/2020	Active	PIT tag spring Chinook out-migrants caught in the smolt trap in the spring (March 1-May 31). Fish will be released above the trap to estimate trap efficiencies, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag sprng Chinook out-migrants - fall and winter	10/1/2020	12/31/2020	Active	PIT tag spring Chinook captured in the smolt traps in the fall and winter (November-February) provided adequate stream flow and conditions, allow. PIT-tagged fish will be released upstream to estimate the probability of capture, estimate abundance, run timing, and survival of natural spring Chinook. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: E. PIT tagged spring Chinook out-migrants		2/28/2021	Active	*See the Deliverable Specification above*

E: 158. Mark/Tag Animals

Title: PIT Tag steelhead smolts (out-migrant tagging)

Description: PIT tag juvenile steelhead to estimate smolt run timing, abundance, and survival for VSP, SAR and status and trend monitoring. CTUIR will maintain two rotary screw traps and PIT-tag up to 5,000out-migrant summer steelhead. Traps will be fished in the upper Walla Walla River (i.e. Basel cellars site rm 39) and in lower Mill Creek (rm 11.8), The traps will be operated continuously during fall through spring as stream conditions allow. Steelhead will be scanned for PIT-tags and processed using a Biomark PIT-tag station. Healthy summer steelhead (> 100 mm, F.L.), and bull trout (>120 mm F.L.) will be manually PIT-tagged and released on site. Bull trout are tagged to assist concurrent USFWS bull trout research. Tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days (Stien et al 2004).

Deliverable Specification: CTUIR will operate up to two screw traps to capture and PIT-tag out-migrating summer steelhead. PIT-tag files will be submitted to PTAGIS within 15 days of release.

Targets:
5,000 natural origin out-migrant summer steelhead

Work Element Budget: $50000 (5.37%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery
* # fish tagged with PIT: 5000

Locations: 2

Primary Focal Species: Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US | **NPCC Subbasin:** Walla Walla

State: WA | **HUC5 Watershed:** Multiple

County: Walla Walla | **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	8/1/2020	10/31/2020	Active	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. PIT-Tag steelhead out-migrants - spring	3/1/2020	6/15/2020	Active	PIT tag out-migrant summer steelhead release upstream to calibrate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
D. PIT-Tag steelhead out-migrants - fall	9/1/2020	2/28/2021	Active	PIT-tag and release juvenile steelhead out-migrants to estimate trap efficiencies, estimate abundance, run timing, and survival of natural summer steelhead. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: E. PIT tagged juvenile steelhead out-migrants		2/28/2021	Active	*See the Deliverable Specification above*

F: 158. Mark/Tag Animals

Title:	PIT Tag smolts (hatchery tagging)
Description:	PIT tag hatchery spring Chinook prior to release. Use PIT tag detections to estimate run timing, abundance, and survival to determine the success of the Tribe's spring Chinook program and other BPA-funded measures to restore the fishery in the Walla Walla Basin. Power analysis that incorporates PIT tag detection data from previous years shows that 10,000 tags are needed for sufficient adult detections (survival is currently low). USFWS tagging crews will submit the appropriate tagging and release files to PTAGIS within 15 days.
Deliverable Specification:	PIT-tag up to 10,000 hatchery spring Chinook and submit tagging files to PTAGIS within 15 days of release.
Work Element Budget:	$25000 (2.68%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery * # fish tagged with PIT: 10000
Locations:	1
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Country:	US
NPCC Subbasin:	Walla Walla
State:	OR
HUC5 Watershed:	Upper Walla Walla River
County:	Umatilla
HUC6 Name:	Lower South Fork Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Order PIT tags in TDI system	8/1/2020	10/31/2020	Active	Submit tag request in the Tag Distribution and Inventory application (TDI) at http://www.ptagis.org/services/tag-distribution-inventory indicating when the tags are needed (one or multiple shipments). Tag orders should be placed during September and October for shipment any time during the fiscal year. Funding for the tags occurs at the project level.
C. PIT-Tag hatchery spring Chinook	10/15/2020	11/30/2020	Active	PIT tag up to 10,000 hatchery spring Chinook at Carson National Fish Hatchery for life cycle studies. Error check and submit PIT-tag files to PTAGIS within 15 days of PIT-tagging.
Deliverable: D. PIT tag Hatchery smolts		11/30/2020	Active	*See the Deliverable Specification above*

G: 157. Collect/Generate/Validate Field and Lab Data

Title:	Enumerate adult salmon, steelhead and bull trout at Nursery Bridge Dam (video work)
Description:	Estimate adult abundance at index areas using video counts in fish ladders at Nursery Brdige Dam. Data collected from the video counting included date, time, species, size (e.g., jack or adult for spring Chinook salmon), life stage (e.g., steelhead kelts), origin (e.g., adipose clip or unclipped) and migration direction for bull trout. Video counts are not reliable for fish less than 30.5 cm. Daily fish tallies from both ladders are posted onsite for the public. The deliverable for this work is an error-checked database of daily fish counts. Underwater video camera activated by a motion detector is linked to a DVR at each site to capture a video image of passing fish. Overhead dusk-to-dawn

	lights are operated at each site. The stations are checked and downloaded daily. Downloaded video clips ate be archived with CTUIR and housed in the data repository for 2 years.	
Deliverable Specification:	The deliverables are the error checked databases and data summaries including: annual escapement totals of adult steelhead, spring Chinook, and bull trout past Nursery Bridge Dam. Data will be combined with data from collaborators monitoring adults at Bennington Lake Dam, and Dayton Dam, This contract only covers Nursery Bridge Dam.	
Work Element Budget:	$99000	(10.63%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations:	1		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	OR	**HUC5 Watershed:**	Middle Walla Walla River
County:	Umatilla	**HUC6 Name:**	Garrison Creek-Walla Walla River
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Adult fish counts at Nursery Bridge Dam (video work) - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized

133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	11/1/2020	12/31/2020	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2020	2/28/2021	Active	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	3/1/2020	12/31/2020	Active	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain video monitoring equipment @ Nursery Bridge Dam - spring/summer	3/1/2020	7/31/2020	Active	This contract period spans parts of two adult return years (i.e. March to July and September to February). Maintain video monitoring equipment in Nursery Bridge Dam fish ladder from March Through July
F. Maintain video monitoring equipment @ Nursery Bridge Dam - fall/Winter	9/1/2020	2/28/2021	Active	This contract period spans parts of two adult return years (i.e. March to July and September to February). Maintain video monitoring equipment in Nursery Bridge Dam fish ladder from September through February
G. Review, organize and summarize video results	3/1/2020	2/28/2021	Active	Read video, review data, summarize Nursery Bridge Dam fish counts. Summarize results and discussion in the BPA annual report.
Deliverable: H. Adult fish count from Nursery Bridge Dam		2/28/2021	Active	*See the Deliverable Specification above*

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Spring Chinook Redd and Carcass Surveys

Description: Conduct redd and carcass surveys in the Walla Walla Basin including the Walla Walla River, the South Fork Walla Walla River, and Mill Creek. Some reaches cannot be surveyed because of private land access restrictions. Visual multi-pass ground surveys will enumerate redds per mile and pre-spawn mortality rates. A total of 47 river miles will be surveyed. Each reach will be surveyed two to four times, or until no new fish or redds are observed. Redd longevity and observer efficiency in redd detection are estimated by tracking the condition of individual redds observed during previous surveys. Surveyors walk downstream from the upstream end of each reach and count all redds, live fish, and carcasses observed. New redds are flagged and the location recorded (GPS). Flagging is marked with observation date, observer initials, species, and redd number. To document sex ratios, dead fish are identified, sexed, inspected for tags, and measured. Care is taken not to disturb spawning fish or redds. Carcass counts will provide information including scales for fish aging, length measurements, origin (e.g. CWTs) and sex composition data. Carcasses are measured from the middle of the eye to the hypural plate (MEHP) in mm. Fin clips from carcasses will be collected for genetic analysis. Females with egg retention estimated near 100% and males with full gonads are classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling. All carcasses are scanned for the presence of coded-wire tags (CWT). Fish snouts with CWT and the accompanying biological data are sent to ODFW's Mark Process Center in Clackamas, Oregon, for CWT extraction and reading.

Deliverable Specification: The deliverables are the error checked spawning survey databases and data summaries. Data collected will be used to estimate temporal abundance of spawners, total spawning population, and spawning distribution in the upper Walla Walla drainage.

Work Element Budget:	$128000	(13.74%)	
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery		
Locations:	4		
Primary Focal Species:	Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU		
Country:	US	**NPCC Subbasin:**	Walla Walla
State:	Multiple	**HUC5 Watershed:**	Multiple
County:	Umatilla | Walla Walla	**HUC6 Name:**	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)		
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0		
Study Plan Owner:	Brian Mahoney		
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0		
Protocol State:	Draft		
Protocol Owner:	Travis Olsen		
Sample Design:	Spring Chinook Spawner / Carcass Surveys - Umatilla Confederated Tribes (CTUIR) v1.0		

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized

134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	3/1/2020	6/30/2020	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Process field samples/specimens	6/1/2020	9/30/2020	Active	Chinook carcass are scanned for PIT and CWT Tags in the field. CWT detections we remove the fish snout and save for reading. PIT detections, ID numbers are scanned, saved, entered into PITAGIS database.
D. Secure data back-up	3/1/2020	2/28/2021	Active	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
E. Yearly upload of error-checked datasets	3/1/2020	2/28/2021	Active	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
F. Pre-spawn carcass survey in lower walla walla river	6/1/2020	7/15/2020	Active	Survey the lower Walla Walla River and lower Mill Creek to count and examine pre-spawn carcasses and to locate fish that do not ascend into the spawning grounds.
G. Spring Chinook redd/carcass surveys	7/15/2020	9/30/2020	Active	Conduct redd surveys to locate (GPS), count and document redds & carcasses every 7-14 days throughout the spawning season in the upper Walla Walla & South Fork Walla Walla rivers, and Mill Creek. Collect vital fisheries statistics (e.g. sex, egg retention, scale sample, size, marks/tags etc.) from spring Chinook carcasses.
Deliverable: H. Spring Chinook spawner/ carcass survey data		12/31/2020	Active	*See the Deliverable Specification above*

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Out-migrant monitoring for population estimates, survival, and migration

Description: Smolt escapement to the mouth of the Walla Walla and to McNary Dam will be estimated for spring Chinook and steelhead by applying an estimated Cormack-Jolly Seber survival probability to PIT tagged fish. We estimate a sample size of 3,600 to 6,200 spring Chinook should provide a 10% coefficient of variation (CV) to Burlingame and McNary Dams, respectively. Smolt production monitoring will be conducted in the mainstem Walla Walla River near the Oregon state line and in lower Mill Creek (Volkhardt et al. 2007, Mahoney et al. 2013, Mendel et al. 2014). Out-migrating naturally produced salmonids captured at the smolt traps will be PIT tagged so we can evaluate juvenile run timing and survival to McNary Dam, as well as to evaluate adult return timing and survival. A sub-sample of tagged fish will be scale-sampled, weighed, and photographed for growth and morphometric information. Multiple PIT tag arrays have been deployed in the Walla Walla River and Mill Creek to help us understand run timing, survival, and to estimate adult returns, adult-to-adult productivity or smolt to adult survival. Previously used smolt trapping sites in the lower Walla Walla River have been abandoned because of maintenance and debris issues but may be revised in the future (Mahoney et al. 2012). Natural smolt abundance will be estimated for both the upper Walla Walla River (i.e. Basel Cellars site) and lower Mill Creek trap locations. Screw traps will be installed by October and run continuously as stream conditions allow into June. The traps are not operated during periods of high/low stream flow (e.g. between 2000 and 200 CFS), peak hatchery releases, and extreme cold and ice. To estimate potential juvenile migrants passing when the trap was not operated for short intervals (= 5 days) we will calculate the mean number of fish trapped for three days before and three days after non-trapping periods. To estimate numbers of fish emigrating past the trap when the trap was not operated for long durations (6 days or more), we used a within year regression of daily stream flow and daily number of natural-origin outmigrants (by size category) captured for the following periods: October-December, January-March, and April-May. The mean number of fish passed is then divided by the estimated trap efficiency to calculate daily fish passage. Natural salmonid abundance is estimated for the Walla Walla River using a stratified Petersen/Darroch estimator (DARR 2.02, Bjorkstedt 2005 and 2009). DARR 2.02 uses Darroch's (1961) stratified Peterson estimator for estimating abundance and associated variance (SE) from stratified mark-recapture data (http://santacruz.nmfs.noaa.gov/publications/software/439/). Trap efficiency (TE) is determined by releasing a known number of PIT-tagged fish above each trap and enumerating recaptures. TE results are organized into bi-weekly strata for analysis in DARR (and/or PITPRO). Mark recapture estimators generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging; (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned. In this study, we release all healthy PIT-tagged fish roughly 1000 m above the trap. Our previous TE tests showed that most recaptures occurred within 24 hours of release. Thus, TE tests are done daily up to 24 hours prior to a scheduled trap shut down. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catch-ability. Only wild steelhead and Chinook are used for TE tests; we do not pit-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals. Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). All captured salmonids will be scanned for PIT-tags and processed using a Biomark PIT Tag station. Data collected from juvenile salmonids include: number, species, length, weight, scales from steelhead for age structure and age at migration. Healthy, spring Chinook (> 65 mm, F.L.), summer steelhead (> 100 mm, F.L.), and bull trout (>120 mm F.L.) are manually PIT-Tagged and released on site (Prentice et al. 1990). The downstream movement of Chinook salmon fry and parr (< 65 mm), age-0 summer steelhead (< 100 mm) are presumed not to be out-migrants. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004).

Deliverable Specification: The deliverables are: 1) calibration of trap efficiency; 2) the error checked databases and data summaries; 3) number of fish tagged by location; 3) sum of PIT-tagged detections at in-basin and mainstem interrogation sites; and 4) estimates of smolt abundance, run timing and survival through the Walla Walla River to McNary Dam.

A rotary screw traps will be operated to PIT tag out-migrant salmonids at the following locations:
Upper Walla Walla River near the old Milton-Freewater highway bridge (8 foot trap at RM38) and Mill Creek just above Bennington Dam (5 foot trap at RM 10),

Sampled fish will be identified to species and origin and biological data collected on Chinook, steelhead and bull trout. Fish meeting protocol criteria be PIT tagged. Data entry, compilation, and quality control of field data will be performed. In and out-of-basin PIT tag detections will be used to estimate survival, migration timing, and abundance.

Work Element Budget: $120000 (12.88%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 2
Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country: US **NPCC Subbasin:** Walla Walla
State: WA **HUC5 Watershed:** Multiple
County: Walla Walla **HUC6 Name:** Multiple
Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)
Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner: Brian Mahoney
Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State: Draft
Protocol Owner: Travis Olsen
Sample Design: Outmigrant monitoring - Umatilla Confederated Tribes (CTUIR) v1.0
Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized

112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA

Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	3/1/2020	6/30/2020	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2020	2/28/2021	Active	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	3/1/2020	2/28/2021	Active	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Monitor salmonids leaving the upper Walla Walla River - spring/summer	3/1/2020	6/12/2020	Active	Operate 8-foot rotary screw trap in the Walla Walla River during the spring
F. Monitor salmonids leaving the upper Walla Walla River - fall	9/1/2020	2/28/2021	Active	Operate 8-foot rotary screw trap in the Walla Walla River during the fall
G. Monitor salmonids leaving Mill Creek - spring	3/1/2020	6/11/2020	Active	Operate 5-foot rotary screw trap in Mill Creek during the spring

Milestone Title	Start Date	End Date	Status	Milestone Description
H. Monitor salmonids leaving lower Mill Creek - fall	9/1/2020	2/28/2021	Active	Operate 5-foot rotary screw trap in Mill Creek during the fall.
I. Review, organize and summarize results	11/1/2020	2/28/2021	Active	Review, organize and summarize results for migration year.
Deliverable: J. Smolt monitoring and PIT-tagging data		2/28/2021	Active	*See the Deliverable Specification above*

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Maintain and operate PIT Arrays

Description: CTUIR will continue to maintain and operate existing arrays in the Walla Walla subbasin. once new array is scheduled for installation summer 2020 in lower Mill Creek.

Deliverable Specification: PIT tag data collected by the PIT tag arrays will be uploaded to PITAGIS and archived there and will be available to the public.

Work Element Budget: $227000 (24.37%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations: 5

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country: US **NPCC Subbasin:** Walla Walla

State: WA **HUC5 Watershed:** Multiple

County: Walla Walla **HUC6 Name:** Multiple

Salmonid ESUs Present: Middle Columbia River Steelhead DPS (Accessible)

Study Plan: Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0

Study Plan Owner: Brian Mahoney

Protocol: Walla Walla Salmonid Monitoring and Evaluation Project v1.0

Protocol State: Draft

Protocol Owner: Travis Olsen

Sample Design: Maintain and operate PIT Arrays - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized

115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural

Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories:	CRITFC Cloud Secure Tribal Repository (CCSTR)	(http://www.critfc.org/)
	PTAGIS Website	(http://www.ptagis.org/)
	CRITFC Technical Reports and Research Website	(http://www.critfc.org/fish-and-watersheds/fishery-science/scientific-reports/)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	3/1/2020	6/30/2020	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
C. Secure data back-up	3/1/2020	2/28/2021	Active	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	3/1/2020	2/28/2021	Active	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Maintain and operate PIT Array systems	3/1/2020	2/28/2021	Active	Daily system status check will be made to ensure the remote PIT tag detection systems are operational, and bi-weekly checks to visually assure arrays are in place and secure. Biomark is contracted to download, quality check the datasets (clock drift/ site id/ detection errors) and upload to PTAGIS servers. In addition, Biomark will provide technical support of software and hardware at each remote array site (10).
Deliverable: F. Produce accessible, error-checked datasets		2/28/2021	Active	*See the Deliverable Specification above*

K: 157. Collect/Generate/Validate Field and Lab Data

Title:	Stream Monitoring and Data Distribution
Description:	The Walla Walla Basin Watershed Council (WWBWC), Walla Walla Watershed Management Partnership, Washington Department of Fish and Wildlife (WDFW), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) agreed to collaborate with stream discharge monitoring beginning in 2011. The Washington Department of Ecology's terminated their monitoring the stream discharge on the Walla Walla River at Pepper Bridge and Beet Road. The WWBWC continues flow monitoring at Pepper Bridge gauge, Beet Road Bridge gauge, Grove

	School Bridge gauge, McDonald Road Bridge gauge, at the Pierce RV Park gauge, and Touchet River. Flows at all these sites can be too low for salmonids to migrate and survive to the headwaters without management. The project is divided into three phases: Field Measurements, Data Processing and Publishing, and Analysis/reporting. WWBWC coordinates and plans all tasks with CTUIR contributing through a subcontract with WWBWC for this work.
Deliverable Specification:	WWBWC will maintain and install two air temperature sensors at the McDonald Road Bridge and the Pierce RV Park site and install a turbidity sensor at the Pierce RV Park site. They will provide continuous streamflow data for five gauge stations on the Walla Walla River. The WWBWC will also publish provisional and confirmed data to the WWBWC website, which is available to all agency partners. The WWBWC will also provide an annual report on the five Walla Walla River gauge sites at the end of the contract period. Data will also be uploaded into the Streamflow Gage Network.
Work Element Budget:	$30000 (3.22%)
Planned Metrics:	* Primary R, M, and E Focal Strategy : Population Status * Primary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Type : Status and Trend Monitoring * Secondary R, M, and E Focal Strategy : Hatchery
Locations:	5
Primary Focal Species:	Chinook (O. tshawytscha) - Upper Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS
Country:	US
State:	Multiple
County:	Umatilla | Walla Walla
NPCC Subbasin:	Walla Walla
HUC5 Watershed:	Multiple
HUC6 Name:	Multiple
Salmonid ESUs Present:	Middle Columbia River Steelhead DPS (Accessible)
Study Plan:	Stream Gauge Supplementation (2010-051-00) v1.0
Study Plan Owner:	James White
Protocol:	Stream Gauge Supplementation (2010-051-00) v1.0
Protocol State:	Draft
Protocol Owner:	James White
Sample Design:	Stream Monitoring and Data Distribution - Umatilla Confederated Tribes (CTUIR) v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
504	Computation of Discharge v1.0	Data Analysis/Interpretation	No	N/A	Draft
508	Natural Spawner Abundance v1.0	Data Analysis/Interpretation	No	N/A	Finalized
319	Water Temperature - Data Logger v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
	Hydrology/Water Quantity	Flow (ID: 104)	NA	NA
	Water Quality	Water Temperature (ID: 162)	NA	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	3/1/2020	3/31/2020	Completed	On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff.
B. Review, revise, and publish Protocol and Methods in MonitoringResources.org	3/1/2020	6/30/2020	Active	The Protocol (including temporal and spatial design) and Methods for this work element are stored at MonitoringResources.org and need to be finalized (i.e., "Published" through MonitoringResources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Protocols/Methods to ensure that they are consistent with how work will be done in any subsequent contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
C. Secure data back-up	3/1/2020	2/28/2021	Active	Minimum requirements: Hard copies of field sheets and original dataloggers secured against fire and flood. At least daily data back-up of electronic data on a separate hard drive. Secure cloud-based or off-site location data back-up to preclude catastrophic data loss at least weekly. More frequent cloud/off-site back-up is greatly encouraged. [Timing guidance: from beginning to end of contract]
D. Yearly upload of error-checked datasets	1/1/2021	2/28/2021	Active	Upload datasets with associated metadata to a publicly accessible site each year as soon as they have been QA/QC checked. This generally happens within 6 months for direct field-to-database input, but may be longer if laboratory analysis is required (e.g., scale reading or genetic analyses). If data is not QA/QCed within 1 year, data must be made accessible with acknowledgement of QA/QC limitations. Periods for dataset collection should be no longer than a year, and coincide with the logical biology of the data collection, which may not be on a calendar year. Example of a dataset: redd counts for one species for one season for a particular brood year. Dataset upload requirements apply to both original and derived data, which should be at a level of quality suitable for release to resource co-managers to make decisions – not the rigor required as if you were going to use the data for a peer-reviewed publication.
E. Field measurements	3/1/2020	2/28/2021	Active	Field Measurements: The WWBWC will visit each location twice a month. The field visits will include cross sectional discharge measurements (as needed for rating curve), stage readings, elevation measurements, and general maintenance to each gauge location. The WWBWC follows the WDOE Quality Assurance Monitoring Plan for Streamflow Gauging Network (Steve Butkus, WDOE, 2007).
F. Stream temperature monitoring, Touchet River	4/1/2020	11/30/2020	Active	Monitor water temperatures in the Touchet River. Calibrate and deploy temperature loggers April, monitor three or four times throughout the summer. In November, recover loggers, download data, check calibration, upload to regional database.
G. Data processing and publishing	3/1/2020	2/28/2021	Active	The WWBWC will process all collected field data, build rating tables and curves, and publish the provisional data to the WWBWC website for data distribution. Continuous data will be collected using the WWBWC Streamflow Near-Realtime Monitoring Network. The data is collected by the network on an hourly basis either by GOES satellite transmission or by a local spread spectrum radio network. The collected continuous stage data is processed and stored using AQUARIUS software. The stage data is converted into discharge data through the developed rating curve built from the field measurements. The data collected will also be uploaded onto Streamflow Gage Network.
Deliverable: H. Walla Walla River Stream Gauge Monitoring and Data Distribution		2/28/2021	Active	*See the Deliverable Specification above*

L: 162. Analyze/Interpret Data

Title: Analyze Data

Description: Analyze the data collected from the Walla Walla River Watershed for spawning surveys as well as out-migration, flow and water temperatures.

Deliverable Specification: The deliverables are the quantitative and qualitative results produced from summary or analysis and interpretation of project data in the Annual Report to BPA.

Work Element Budget: $25000 (2.68%)

Planned Metrics:
* Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Focal Strategy : Hatchery

Locations:

Primary Focal Species: Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU | Steelhead (O. mykiss) - Middle Columbia River DPS

Country:
NPCC Subbasin:
State:
HUC5 Watershed:
County:
HUC6 Name:

Salmonid ESUs Present:	
Study Plan:	Walla Walla Salmonid Monitoring & Evaluation Walla Walla Salmonid Monitoring and Evaluation Project v1.0 v1.0
Study Plan Owner:	Brian Mahoney
Protocol:	Walla Walla Salmonid Monitoring and Evaluation Project v1.0
Protocol State:	Draft
Protocol Owner:	Travis Olsen
Sample Design:	Analyze Data - Umatilla Confederated Tribes (CTUIR): Walla Walla Subbasin v1.0

Methods:

ID	Title	Type	Optional	Customized Based On	Status
380	Adult Run Timing v1.0	Data Analysis/Interpretation	No	N/A	Finalized
136	Basic Snorkel Survey Procedures v1.0	Data Collection	No	N/A	Finalized
395	Calculating the smolt to adult return rate (SAR) v1.0	Data Analysis/Interpretation	No	N/A	Finalized
109	Carcass Count: Mark-Recapture Analysis v1.0	Data Analysis/Interpretation	No	N/A	Finalized
112	Carcass Count: Scale Sampling v1.0	Data Collection	No	N/A	Finalized
110	Carcass Count: Site Selection and Sampling Frequency v1.0	Data Collection	No	N/A	Finalized
107	Carcass Count: Survey v1.0	Data Collection	No	N/A	Finalized
118	Electrofishing - Backpack - Mark v1.0	Data Collection	No	N/A	Finalized
119	Electrofishing - Backpack - Recapture v1.0	Data Collection	No	N/A	Finalized
115	Electrofishing - Determine Electrofisher Settings v1.0	Data Collection	No	N/A	Finalized
931	Estimate Steelhead Abundance at Weirs Using Kelts as Recaptures v1.0	Data Collection	No	N/A	Finalized
195	Estimating Adult Spawner Abundance v1.0	Data Collection	No	N/A	Finalized
447	Fish Salvage v1.0	Data Collection	No	N/A	Draft
335	Pre-smolt Survival v1.0	Data Analysis/Interpretation	No	N/A	Draft
131	Redd Count Survey v1.0	Data Collection	No	N/A	Finalized
133	Rotary Screw Trap v1.0	Data Collection	No	N/A	Finalized
357	Smolt-to-adult return estimate v1.0	Data Analysis/Interpretation	No	N/A	Draft
847	Stream Discharge v1.0	Data Collection	No	N/A	Finalized
134	Trap Efficiency Testing v1.0	Data Collection	No	N/A	Finalized
143	Video Methodology - Field Setup and Operation v1.0	Data Collection	No	N/A	Finalized
144	Video Methodology - Footage Review v1.0	Data Collection	No	N/A	Finalized
145	Weirs v1.0	Data Collection	No	N/A	Finalized

Metrics:

Title	Category	Subcategory	Subcategory focus 1	Subcategory focus 2
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Hatchery
CJS Survival Estimate for Outmigrant steelhead & Spring Chinook	Fish	Survival Rate: Fish (ID: 99)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Natural
Estimate outmigrant abundance for steelhead and spring Chinook	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Juvenile - Migrant	Fish Origin: Both
Mark adults at traps for trap efficiency estimates	Fish	Mark/Tag Application (ID: 201)	NA	NA
Mark/Tag steelhead, spring Chinook and bull trout with PIT tags	Fish	Mark/Tag Application (ID: 201)	NA	NA
Steelhead and Spring Chinook Adult to Adult Return (AAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Adult to Adult	NA
Steelhead and Spring Chinook Smolt to Adult Return (SAR)	Fish	Progeny-per-Parent Ratio (P:P) (Productivity) (ID: 86)	Fish Life Stage: RANGE: Juvenile to Adult	NA
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Natural
Steelhead, Spring Chinook and Bull Trout Adult Return	Fish	Abundance of Fish (ID: 46)	Fish Life Stage: Adult - Returner	Fish Origin: Hatchery
Steelhead, Spring Chinook, and Bull Trout passing PIT tag reader	Fish	Mark/Tag Recovery or Detection (ID: 381)	NA	NA
Use spawning surveys to estimate adult abundance & distribution	Fish	Spawning/Nesting (ID: 507)	Fish Origin: Both	NA

Data Repositories: CTUIR GIS Program Databases (https://cdms.ctuir.org)

Area of Inference:

Name	Value
NPPC Subbasins	TUCANNON
NPPC Subbasins	WALLA WALLA
Rivers - Streams 24k	17070102001234
HUC6 - Sub Watershed	Lower Mill Creek
HUC5 - Watershed	Mill Creek-Walla Walla River
HUC4 - Sub Basin	WALLA WALLA
Steelhead Summer-Winter Interior Columbia Pop. Bound	Walla Walla River
Bull Trout Critical Habitat - Stream	Yellowhawk Creek

Note:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and publish Study Design and Methods in monitoringmethods.org	3/1/2020	6/30/2020	Active	The Study Design (including temporal and spatial design) and Methods for this work element are stored at monitoringresources.org and need to be finalized (i.e., "Published" through monitoringresources.org), preferably prior to data collection. Preparations for contract renewals must include reviewing any previously published Study Design/Methods to ensure that they are consistent with how work will be done in any subsequent contract.
B. Analyze adult enumeration data	10/1/2020	1/15/2021	Active	Analyze and interpret adult escapement counts. Data will be used to estimate smolt-to-adult-return, adult-to-adult return, and run reconstruction.
C. Analyze smolt and PIT-tag data	10/1/2020	1/15/2021	Active	Analyze and interpret smolt monitoring and evaluation results. Analyze and interpret results including condition at tagging, number of fish tagged by location, summary of PIT tag detections at in-basin and hydrosystem interrogation sites. Data will be used to estimate abundance, survival, and run timing. Results will also be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
D. Analyze Redd, Spawner and Carcass data	10/1/2020	1/15/2021	Active	Analyze and interpret redd, spawner and carcass densities and distributions. Report results including estimated total redds, redd distribution, fish per redd, sex ratio, age composition, size frequency, spawn timing. Data will be used to estimate smolt-to-adult return, adult-to-adult return, and run reconstruction.
E. Analyze water flow, temperature, and turbidity data.	11/1/2020	1/15/2021	Active	Walla Walla Watershed Council will analyze water flow, temperature, and turbidity data through a subcontract with CTUIR (this project).
Deliverable: F. Analyzed data		1/15/2021	Active	*See the Deliverable Specification above*

M: 202. Produce BiOp RPA Report

Title: BiOp RPA Report for Steelhead CY 2020

Description: This project is associated with RPA 64.2. CTUIR is the lead on this report. This report only includes Spring Chinook. The required information can be prepared in MS Word, and pasted into Taurus. For more guidance see https://www.cbfish.org/Content/tutorials/Reporting_Guidance_BiOp_2013.pdf. BiOp RPA Reporting Requirements. This project supports an ESA BiOp RPA (RPA 64.2), therefore the CTUIR are required to electronically submit a Final Annual BiOp RPA Report of work conducted for calendar year 2020 for upload into Taurus. This BiOp RPA report is required annually on all declared BiOp RPA associations. The online BiOp RPA report in Taurus (www.cbfish.org) should include the data, analyses, and data management completed by your project by December 31, 2018. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the analyses, you will report the preliminary data (# of redds). You do not need to rush your analyses; they may be reported in the subsequent RPA report. For each RPA, follow the directions in Taurus for each of the three sections and as appropriate input graphical or tabular data, accompanied by explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next. For detailed information on how to access and produce this report please see "Sponsor Reporting Procedural Guidance" in Pisces. To find this procedural guidance document go to www.cbfish.org, select the "Login In" link at the upper right of corner. Enter your project number or name in the upper right of the search box. Select "Reports & Documents tab on left. Select "BiOp Annual Report." The "Sponsor Reporting Procedural Guidance" is a link directly below "1. Enter Basic Report Information." If you need further assistance please contact your PM/COTR.

Deliverable Specification: The online BiOp RPA report in Taurus (https://www.cbfish.org/BiologicalOpinionAction.mvc/Index/2014/BiOpRpaStatus) should include the data, analyses, and data management completed no later than December 31st. Any activity after the last day of the Calendar Year should be included in a subsequent BiOp report. For example, if you have completed redd surveys, but have not completed the scale analyses, you will report the preliminary data (# of redds), but not (incomplete) age distributions of carcasses, which would be reported in the subsequent CY report.

For each RPA, follow the directions in Taurus for each of the three sections and, input completed graphical or tabular data, accompanied by any complete explanatory text. These are cumulative summary reports and should show relevant results for the life of your project. Each year, note trends and whether they are changing from one year (or groups of years) to the next.

Work Element Budget: $4415 (0.47%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Lead project proponent will download RPA questions from cbfish.org	12/15/2020	1/15/2021	Active	To prepare for your RPA report, 1) Go to www.cbfish.org and log in, 2) Navigate to your project and select "BiOp Annual Report" from the “Go to...” menu button, 3) Click on "Input Needed" for each applicable RPA to find your RPA reporting requirements so you will know how much time to set aside for this task. You may also click the “download RPA doc” button to get all RPA questions in one MS Word document. 4). For further guidance or to request help, email BPA RM&E RPA support RMESupport@bpa.gov or email your COTR. (Milestone start/end: July 1 – September 30)
B. Lead project proponent will finalize calendar year report in cbfish.org	1/15/2021	2/28/2021	Active	The final version is due by March 15. (Milestone start/end: December 31 - March 15)
Deliverable: C. Submit BiOp RPA Report in Taurus		2/28/2021	Active	*See the Deliverable Specification above*

N: 119. Manage and Administer Projects

Title: Manage & Administer Walla Walla Salmonid Monitoring and Evaluation Project

Description: Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an SOW package (includes SOW, budget, property inventory). Covers all project management and administrative work related to the contract.

Deliverable Specification: Provide effective implementation and administration: a) evaluate current workload and monitor implementation progress; b) develop work plan consistent with expected budget availability and potential tasks or projects; and c) integrate and manage the planning, permitting, environmental compliance, and coordinated implementation of contract actions.

Work Element Budget: $130000 (13.96%)

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Error-check & update actual WE budget spending w/in 4 months (reflect contract close-out value)	3/1/2020	7/31/2020	Active	No later than 4 months after the end of the previous contract, (a) open the prior-year contract SOW at the “WE Budget” tab; and (b) enter “Updated” WE budget amounts to reflect the final contract close-out amount actually spent by the contractor.
B. Begin drafting contract renewal documents and conduct internal review as needed	6/28/2020	9/28/2020	Active	Your statement of work, line-item budget, and (if required) property inventory for your next contract are due to BPA at least 5 months prior to the contract start date (longer if your internal processes require more time to get the contract signed and in place prior to the start date).
C. Submit contract renewal package (SOW, Excel budget, property inventory) to BPA COTR	6/28/2020	9/28/2020	Active	Once your statement of work (SOW) in Pisces is complete, and you have attached your line-item budget (LIB) and property inventory (PI) (if required), click the “Submit” button on the SOW tab to notify your COTR the package is ready for review.
D. Address comments and revise SOW, LIB, and PI as needed to get BPA manager approval	12/1/2020	1/31/2021	Active	Once your COTR and his or her BPA manager have reviewed your contract renewal package and returned any comments to you, you will need to provide responses and changes as needed to achieve approval from the BPA manager, who will then forward the package to the Contracting Officer. This should be completed at least five months prior to the next contract start date.
E. Return signed contract to BPA’s Contracting Officer within 30 days	12/1/2020	2/28/2021	Active	Respond to the CO and COTR indicating any problems with the contract within 20 days, or return the signed contract to the BPA Contracting Officer (CO) within 30 days.
F. Submit final invoice for prior contract within 90 days to facilitate contract closeout	3/1/2020	6/30/2020	Active	Within 90 days of the last day of the PRIOR contract, the contractor shall issue a final invoice. In instances where more than 90 days is needed (e.g., because subcontractors have not invoiced), the contractor shall: 1. review records, 2. estimate all outstanding costs, and 3. provide BPA with a single, cumulative estimate of all completed, but uninvoiced work. This amount shall be emailed to FWinvoices@bpa.gov and the COTR.

Milestone Title	Start Date	End Date	Status	Milestone Description
G. Facilitate inputting Cost Share information into Pisces at the Project level	9/30/2020	11/15/2020	Active	Cost share information can be input anytime during the contract (e.g., concurrent with quarterly status reports) but no later than November 15 for each fiscal year. (a) I am the sole contractor under this project. I will enter previous federal FY's Cost Share information on the Project's Cost Share tab by Nov 15.
H. Comply with all applicable federal, state, tribal and local safety requirements, including reporting	3/1/2020	2/28/2021	Active	As described in the contract's Terms and Conditions, the contract manager and contractor shall comply with all applicable federal, state, tribal and local safety laws, rules, regulations and requirements.
I. Adaptive management	3/1/2020	2/28/2021	Active	The Adaptive Management process requires quarterly and annual updates of key management assumptions to revise in-season and long-term estimates of program performance and future outcomes. The parameters used in the adaptive management process are defined by the in-season and forecasting models. Each of these models has implicit hypotheses expressed in their structure and function that are described in their documentation or annual operating procedure. As learning occurs the structure and function of the in-season and long-term management models will be reviewed and revised to reflect current understanding.
J. Annual Operation Plan	3/1/2020	2/28/2021	Active	CTUIR will support an adaptive management and decision making process for the spring Chinook program. The adaptive management process will support in-season management by facilitating three quarterly in-season reviews, and one annual adaptive management workshop culminating in an Annual Operating Plan (AOP). The AOP will incorporate current information to provide updated sampling plans, details regarding implementation of the program, and revised operational criteria as agreed upon.
Deliverable: K. Effective implementation management and timely contract administration		2/28/2021	Active	*See the Deliverable Specification above*

O: 132. Produce (Annual) Progress Report

Title: Annual Technical Progress Report (1-1-2020) to (12-31-2020)

Description: Technical Annual Progress Reporting Requirements: The final report for calendar year 2020 will be due in the following 2021 contract. This report should be submitted using the template available in Taurus (https://www.cbfish.org, go to your project, click on Reports & Documents, then go to the RM&E Technical Report tab).

Deliverable Specification: The Deliverable is considered complete when the final report is posted. It usually takes BPA 30-45 days to post the final PDF version of a report. This milestone's end date should therefore be 45 days after the final version is uploaded in Pisces. You will receive an email from BPA confirming that your report has been finalized and posted to the web. Mark this milestone complete when you have confirmed your final report has been posted. If you do not receive such an email after 45 days, contact your COTR.

Work Element Budget: $10000 (1.07%)

Planned Metrics:
* Start date of reporting period : 1/1/2020
* End date of reporting period : 12/31/2020

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Prepare for RM&E Technical Report. Review the revised (2014) guidance & template	8/1/2020	9/14/2020	Active	[DELETE THIS MILESTONE IF YOUR PROJECT DOES NOT INCLUDE ANY RM&E WORK ELEMENTS AND DOES NOT NEED TO PRODUCE AN RM&E TECHNICAL REPORT] Review the newly-revised guidance & template for your RME Technical Report. BPA Fish and Wildlife project sponsors who have the following work elements in their contracts are required to complete a RM&E technical report: 156 Develop RM&E Methods and Designs, 157 Collect/Generate/Validate Field and Lab Data, 158 Mark and Tag Animals, and/or162 Analyze/Interpret Data. Reports must show cumulative results and synthesis for the duration data collection/analysis studies. Final RME reports are due in March to align with regulatory reporting timelines. (Milestone start/end: August 1 - September 14)

Milestone Title	Start Date	End Date	Status	Milestone Description
B. RM&E Technical: Upload draft RM&E Technical Report (MS Word) for BPA review	9/15/2020	1/15/2021	Active	[DELETE THIS MILESTONE IF YOUR PROJECT DOES NOT INCLUDE ANY RM&E WORK ELEMENTS AND DOES NOT NEED TO PRODUCE AN RM&E TECHNICAL REPORT] Upload your draft RM&E report into the Pisces Attachments tab as an MS Word document as a "Technical, Draft" for BPA review. BPA will review the draft RM&E report. If your Word file is too big to be uploaded, contact Pisces Support (support@cbfish.org). For more information on structure and content of your report, please use the newly-revised guidance & template for RME Reports located at https://www.cbfish.org/Help.mvc/GuidanceDocuments. (Milestone start/end: September 15 - January 15).
C. Distribute Progress Report for Internal Contractor Review	12/1/2020	1/14/2021	Active	Internal review will be conducted by CTUIR Research Monitoring & Evaluation Supervisor before being reviewed externally or being uploaded.
Deliverable: D. Completed Annual Report		2/28/2021	Active	*See the Deliverable Specification above*

P: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period Jan 2019 to Dec 2019

Description: The progress report summarizes the project goal, objectives, hypotheses (for research), completed and uncompleted deliverables, problems encountered, lessons learned, and long-term planning. Examples of long-term planning include future improvements, new directions, or any ramping up or ramping down of contract components or of the project as a whole.

RM&E Technical Progress reports must conform to BPA guidelines. See the "RME Technical Reporting" link at: http://www.cbfish.org/Help.mvc/GuidanceDocuments.

Deliverable Specification: The Deliverable is considered complete when the final report is posted. It usually takes BPA 30-45 days to post the final PDF version of a report. This milestone's end date should therefore be 45 days after the final version is uploaded in Pisces. You will receive an email from BPA confirming that your report has been finalized and posted to the web. Mark this milestone complete when you have confirmed your final report has been posted. If you do not receive such an email after 45 days, contact your COTR.

Work Element Budget: $3000 (0.32%)

Planned Metrics:
* Start date of reporting period : 1/1/2020
* End date of reporting period : 12/31/2020

Milestone Title	Start Date	End Date	Status	Milestone Description
A. RM&E Technical: Upload finalized RM&E Technical Report (MS Word) for BPA to publish	3/1/2020	3/15/2020	Active	Address any BPA comments on the draft and re-upload finalized report into the Pisces Attachments tab as an MS Word document as a "Technical, draft." (Note: This MS Word format is a change in policy. BPA staff will now convert it to a PDF.) (Milestone start/end: Jan 16 - Mar 15)
Deliverable: B. Completed Annual Report		3/15/2020	Active	*See the Deliverable Specification above*

Inadvertent Discovery Instructions

BPA is required by section 106 of the National Historic Preservation Act (NHPA) to consider the effects of its undertakings on historic properties (16 USC 470). Prior to approving the expenditure of funds or conducting a federal undertaking, BPA must follow the section 106 process as described at 36 CFR 800. Even though BPA has completed this process by the time an undertaking is implemented, if cultural materials are discovered during the implementation of a project, work within the immediate area must stop and the significance of the materials must be evaluated and adverse effects resolved before the project can continue (36 CFR 800.13(b)(3)). The Inadvertent Discovery of Cultural Resources Procedure form outlines the steps to be taken and notifications to be made. If the undertaking takes place on tribal lands (16 USC 470w), BPA must also "comply with applicable tribal regulations and procedures and obtain the concurrence of the Indian tribe on the proposed action" (36 CFR 800.13(d)).

Inadvertent Discovery of Cultural Resources Procedure form:

https://www.bpa.gov/efw/FishWildlife/InformationforContractors/IFCDocuments/InadvertentDiscoveryProcedure.pdf

Proposal Summary

Proposal Training Handout
FAQ on Proposals
Proposal Text Field Instructions
Useful External Documents

This page provides a read-only view of a Proposal. The sections below are organized to help review teams quickly and accurately review a proposal and therefore may not be in the same order as the proposal information is entered.

Proposal RMECAT-00063 - Walla Walla River Basin Monitoring and Evaluation (M&E) PRINT PDF VIEW

Please Note: This project is the product of one or more merges and/or splits from other projects. Historical data automatically included here are limited to the current project and previous generation (the "parent" projects) only. The Project Relationships section details the nature of the relationships between this project and the previous generation. To learn about the complete ancestry of this project will require reviewing the Project Relationships section on the Project Summary page of each parent project. Follow this via RSS feed. Need help setting up RSS feeds?

Collapse All Expand All Remember

Basics

Proposal Number:	RMECAT-00063
Proposal Status:	In Assessment
Review:	RME / AP Categorical Review
Portfolio:	RM&E Cat. Review - RM&E
Type:	Existing Project: 2000-039-00
Primary Contact:	Brian Mahoney (brianmahoney@ctuir.org)
Created:	5/26/2010 by Bryan Mercier (bkmercier@bpa.gov)
Proponent Organizations:	Umatilla Confederated Tribes (CTUIR) Washington Department of Fish and Wildlife (WDFW)

Project Title:	Walla Walla River Basin Monitoring and Evaluation (M&E)
Proposal Short Description:	To provide ecological information and technical services to decision makers in support of adaptive management for restoration, conservation, and preservation of cultural, social, and economic salmonid resources.

Proposal Executive Summary:

The Walla Walla River Basin Monitoring and Evaluation Project (WWM & E) is funded by Bonneville Power Administration (BPA, project No. 2000-039-00) under the 2008 Columbia Basin Fish Accords Memorandum of Agreement between the Three Treaty Tribes and Federal Columbia River Power System. The purpose of this collaborative project is to conduct natural production, tributary habitat, and hatchery Research, Monitoring and Evaluation. Our goal is to provide ecological information and technical services to decision makers in support of adaptive management for restoration, conservation, and preservation of cultural, social, and economic salmonid resources. We plan to do this by collecting Viable Salmonid Population (VSP) criteria including estimates of abundance, productivity, survival rates, and distribution of reintroduced spring Chinook (Oncorhynchus tshawytscha) salmon, ESA-listed summer steelhead (O. mykiss), and bull trout (Salvelinus confluentus). Project results, including fish per redd, smolts per redd, smolt-to-adult return, recruit per spawner, etc. are used to help inform and adapt salmonid management and recovery goals.

This collaborative project is conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through 2017. The work location is the Walla Walla River Basin and tributaries (e.g. Touchet River, South Fork, and Mill Creek). Project methods were adapted from the Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmonid and Trout Populations (http://www.stateofthesalmon.org/fieldprotocols/). A major focus of ours is to estimate "adults in" and "juveniles out" as a measure of salmonid population viability; for example, adult salmonids entering the basin to spawn are enumerated using weirs and video, spawning fish and carcasses are enumerated by multiple pass ground surveys, while the juvenile emigrant population is estimated using rotary screw traps and PIT-tags.

Previous project reports, data and metadata are found at the CTUIR website www.data.umatilla.nsn.us/fisheries/index.aspx, or WDFW website at www.wdfw.wa.gov, or the BPA website (www.efw.bpa.gov).

Purpose:	Programmatic
Emphasis:	RM and E
Species Benefit:	Anadromous: 90.0% Resident: 10.0% Wildlife: 0.0%
2009 F&W Program	Yes
Fish Accords:	Fish Accord - LRT - Umatilla
Biological Opinions:	FCRPS 2008 (RPA 56.1, RPA 50.1, RPA 50.2, RPA 50.3, RPA 50.8, RPA 64.2, ~~RPA 50.6~~)

Proposal History

Date	Time	Type	From	To	By	Archive
7/29/2010	3:19 PM	Status	Draft	In Assessment	Glen Mendel	Download

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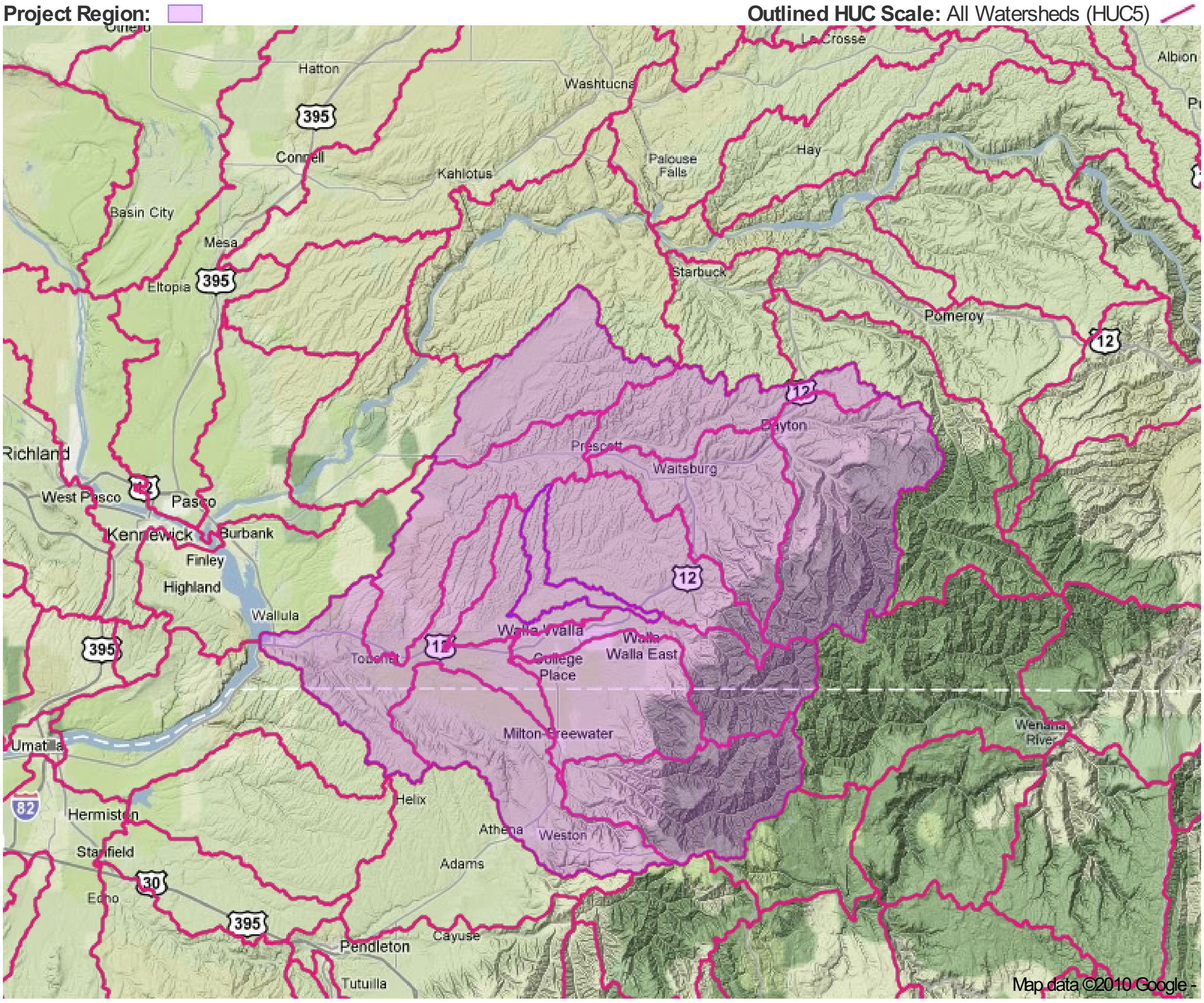
Location

Project Region: **Outlined HUC Scale:** All Watersheds (HUC5)



Region	HUC Level	HUC#	HUC Name
Tributaries / Watersheds	HUC4	17070102	WALLA WALLA

Project Significance & Problem Statement

Project Significance to Regional Programs:

This project is the measuring tool of salmonid restoration efforts in the Walla Walla Basin. This project collects population status, life history and other data on both naturally spawning and hatchery populations.

A full understanding of the Walla Walla basin salmonid life histories and their productive capacity is needed. There remains doubt by some about the original and continued need to provide protection for Mid-Columbia steelhead under the ESA. Data collected by this project will inform managers to the true status (relevant to Viable Salmonid Population, or VSP, criteria) of Walla Walla basin steelhead and salmon. Such information is critical to allow decision makers to direct limited State and Federal funds to the most appropriate locations and projects; whether Watershed type habitat improvements, hatchery supplementation, or a combination of both. Such data will help ensure maximum benefit for the fish. The specific performance metrics addressed by this proposal were taken directly from the Walla Walla Subbasin Plan (Walla Walla County, 2004), the Washington State Snake River Salmon Recovery Plan (Snake River Salmon Recovery Board 2006), the mid Columbia River Steelhead Recovery Plan (NMFS 2009), the Anadromous Salmonid Monitoring Strategy (draft June 2010), the Councils' Draft Columbia River Basin Monitoring, Evaluation, Research and Reporting (MERR) Plan (2010), NMFS draft Guidance for Monitoring Recovery of Salmon and Steelhead (Crawford and Rumsey 2009), and the RPAs of FCRPS BiOP (2008 -see above section that lists applicable RPAs) that are all critical components of the Council's 2009 Fish and Wildlife Program at the broadest scales. The ISRP retrospective also highlighted the importance of these technical efforts to the achievement of overall programmatic goals, and cited implementation of a regionally standardized RM&E program in the Walla Walla as a critical priority (ISRP 2005).

The Walla Walla Subbasin Plan (WWSBP): The Walla Walla Subbasin may represent a unique opportunity to implement portions of the NWPPC Fish and Wildlife Plan. Significant portions of the upper basin in both Oregon and Washington retain spawning populations of wild steelhead. These populations have shown a resiliency to habitat degradation and a persistence of viable numbers during recent years when other steelhead populations have been forced toward extinction. Because the basin lies above only the four lower Columbia River dams, these steelhead may be able to persist under moderate survival conditions and possibly rebuild themselves under good habitat conditions.

The WWSBP and the Snake River Salmon Recovery Plan for SE WA (SRSRB 2006) outline a suite of priority actions to be employed in priority geographic areas and to imminent threats based on a limiting factors analysis, and results from the Walla Walla Subbasin EDT model run. The WWSBP describes an adaptive recovery and implementation approach by presenting habitat goals and biological objectives in the form of working hypotheses. The hypotheses relate management actions to changes in fish abundance and production quantitatively and qualitatively, thus requiring monitoring and evaluation to validate the efficacy of those actions (pgs 127-188 of WWSBP). The strategies, methods, and techniques for studying the working hypotheses are generally described in the plan body (WWSBP pgs 204-207) and in much greater detail in the draft RM&E plans submitted to the Council (AD3, M and N). It goes on to prescribe a collaborative approach to RM&E that will empower local and regional agencies and authorities. Specifically, the subbasin plan describes the measurements of abundance, productivity, spatial structure, and diversity that are needed to 1) describe status and trends, 2) evaluate project/program performance, and 3) facilitate continued prescriptive and predictive modeling and updates to the Walla Walla Subbasin Plan.

The WW Subbasin Plan (2004, Addendum AD3, pages 86-87) lists conclusions and recommendations for research, monitoring and evaluation that directly relate to our project: Conclusion 2 of that plan's RM&E section states that "Population status monitoring must occur in a systematic manner that will allow managers to evaluate progress towards delisting from ESA. Criteria established by NOAA and the TRTS under VSP will be used with the subbasin as well as attributes (from USFWS) necessary for bull trout recovery planning. These metrics will be useful with EDT, and provide a direct relationship between the habitat and population monitoring efforts, through model outputs." The Plan recommendation was to continue to fund existing monitoring and evaluation actions with the subbasin that fulfill critical VSP needs (pg AD3-86). The second recommendation for the population status conclusion was to "Fund additional actions to complete basic population status monitoring needs for the subbasin (e.g. monitor adult escapement into the three major basins of the Walla Walla (Touchet R, Mill Cr, and Walla Walla above Mill Creek), and the smolt emigration from those basins." The Plan then lists six actions that may be needed: "1) adult counting or trap at Bennington Dam, 2) Improved passage and counting or trap at Dayton, 3) fix trap/ladder/passage at Nursery Bridge Dam, 4) smolt trap in the middle or upper Touchet River, 5) adult counting in Coppei Creek, 6) remote sensing or removable fish weir in the lower Walla Walla River for adult counts." It also notes that "additional VSP related action may be required/recommended as the full RME plan is completed." Another conclusion (#4) discusses critical uncertainties that will be identified in the comprehensive RME Plan and coordinated with other regional forums. The related recommendation is to fund research on critical uncertainties unique to the Walla Walla as a priority for recovery actions in the subbasin, and for broader ESU relevance. Also, strategy 12 in the final addendum (pg 20) where it says to collect data and monitor trends it specifically includes stream flow and water temperature monitoring. Our project is meeting the intent of the Walla Walla Subbasin Plan and its research, monitoring and evaluation needs or recommendations. Our project emphasizes meeting VSP monitoring needs, especially for adult and smolt abundance, distribution and origin, and for productivity monitoring and survival estimates (e.g. SARs, adult to adult). A few examples include our effort to improve adult counting at Dayton Dam, Nursery Bridge and in Coppei Creek, plus operating a smolt trap in the Touchet River and evaluating alternatives and the feasibility of counting in the lower Walla Walla River at either Burlingame Dam or further downstream.

The Snake River Salmon Recovery Plan (SRSRP, by SRSRB 2006) includes the Walla Walla Subbasin and all of southeast Washington. It was based on the WWSBP, but it is more fully developed and specific for restoration of listed salmonids than the subbasin plan. It provides fish recovery goals for ESA and generally describes fish population restoration goals that far exceed ESA abundance goals. The Technical Document of the plan describes management strategies for habitat, harvest, hatchery and hydroelectric impacts and provides actions plans and an research, monitoring and evaluation plan. In Table 9-2 (pgs 370-372) it identifies management objectives, assumptions and critical uncertainties for the recovery region. There it lists population responses at one of the management domains and indicates the hypotheses, data gaps and required effort. Data gaps indentified include; a) abundance of recruits by stock, b) productivity by brood year or age class, c) run timing and life history information by stock, d) distribution of spawners relative to intrinsic potential, and e) genetic diversity and other genetic factors. In Table 9-4 (pg 377), it identifies the critical uncertainties, the RM&E objective, methods, design and desired statistical power (generally 0.8). The uncertainties that specifically relate to our project in the Walla Walla Subbasin are; a) abundance of spawners in the MSA (major spawning area), b) adult productivity of MSA by brood year or age class, smolt productivity, c) life-history and genetic diversity by MSA, and d) spatial structure by MSA. On page 383 the plan recommends intensive biological monitoring in the Walla Walla River, Touchet River, and possibly Mill Creek. Intensive monitoring includes a) smolt production estimates of abundance and smolts per adult (which the SRSRB believe are critical for determining the effectiveness of proposed recovery area actions and tracking plan progress), and b) adult returns by type or origin, juvenile and adult age composition, distribution of spawners and juveniles, SARs, adult recruitment rates, etc. The recently developed provisional 3 year workplan for RM&E specifically lists project actions and VSP parameters. An example of some pertinent project actions:

- Touchet River adult counts at Dayton Dam
- Estimate total salmonid returns to the Walla Walla Subbasin
- Estimate salmonid production in the Walla Walla Subbasin
- Bull trout distribution and abundance surveys

Our proposed project is strongly supported by the SRSRP and our project is intended to fill many of the data gaps identified in that plan.

The mid-Columbia River Steelhead DPS Recovery Plan (2009) notes that the Umatilla/Walla Walla MPG does not meet viability criteria because all three populations have moderate risk for both abundance/productivity and spatial structure/diversity. The Touchet River steelhead population status/risk rating is provisional and should be interpreted with caution because the annual abundance data series is relatively short and missing several years. This plan identifies a gap as "there is sufficient information available to estimate gaps for only two of the three populations within the Umatilla/Walla Walla MPG" (excluding the Touchet River). Specific recommendations for monitoring in the Touchet River include; a) "improve adult trap to improve management of adult hatchery steelhead, b) install weir in Coppei Creek to monitor escapement. In section 10.4.1 for monitoring abundance and productivity it says, "Improve or collect SAR and juvenile productivity (smolts/spawner)." "In addition, measures representing survival from spawning to smolts would aid in partitioning productivity between freshwater and ocean." The plan also recommends collecting specific spawner composition information including proportion and source of hatchery spawners (section 10.4.2).

Monitoring actions in our project allow us to evaluate improvements within the Walla Walla Subbasin for smolt and adult abundance, population productivity and stream temperatures and flows in late spring and summer. Our project, in association with the LSRCP funded Snake River Lab. are beginning to substantially improve empirical data for adult and smolt abundance, productivity and survivals for naturally produced steelhead, as well as evaluate the three annual hatchery steelhead groups (Lyons Ferry Hatchery stock and Touchet endemic stock in the Touchet River and LFH stock in the Walla Walla River).

The Council's draft Columbia River Basin Monitoring, Evaluation, Research and Reporting (MERR) Plan (2010) identified how RME and reporting are to be conducted under the Fish and Wildlife Program. This MERR Plan indicates the Council gives higher priority to status and trend monitoring related to: a) Basinwide status and trend data for priority species and habitat characteristics, b) assessing performance of habitat actions and projects, and c) assessing effectiveness of program implementation actions. This project will contribute Walla Walla Subbasin fish and habitat data that can be used for a and b above. In Appendix 2, it lists the Council's Quantitative Performance Standards and indicates that SARs should be in the 2-6% range. Our project will contribute to monitoring salmon and steelhead SARs from the Walla Walla Subbasin. Our Walla Walla Subbasin PIT tags also contribute to larger scale Columbia Basin evaluations. Appendix 3 of that plan lists the management questions and the associated high level indicators and the fish and wildlife program indicators. Our project specifically contributes to the following three management questions:

1. Are Columbia River Basin fish and wildlife abundant, diverse, and productive…?

The high level indicator is the abundance of fish and wildlife and the F&W indicator is the abundance of salmon and steelhead, and SARs, abundance of focal resident species and ESA listed and non-listed status and trend.

Our project specifically addresses this management question and focuses on abundance and productivity of adult and smolt salmon and steelhead, abundance of bull trout spawners or redds, as well as the survival rates between smolt to adult, and adult to adult for spring Chinook and steelhead (spring Chinook, steelhead and bull trout were all listed in the MERR as priority focal species in Appendix 4).

3. Are Columbia River Basin Ecosystems Healthy?

The high level indicator is ecosystem health and the F&W program indicators are watershed health for fish and wildlife and non-native species distribution.

Our project contributes to an understanding of ecosystem health by collecting low stream discharge levels and water temperature data to supplement WDOE monitoring efforts of water quantity and quality. We have identified several stream reaches with thermal or low stream discharge barriers to migration or rearing in the lower Walla Walla and Touchet rivers, as well as elsewhere (e.g. see summary in Mendel et al 2007).

5. Are actions implemented by the Council Fish and Wildlife Program having the expected biological effect …?

The high level indicator is the abundance of fish and wildlife. The Fish and Wildlife indicators include production of wild fish related to habitat improvement actions.

Our project emphasis on estimating the abundance of naturally produced fish (adults and smolts) from the Touchet and Walla Walla Basins directly contributes to achieving this indicator and answering this management question.

The draft Anadromous Salmonid Monitoring Strategy (ASMS, June 2010) provides general VSP monitoring guidelines (section 4.1, pg 15). These guidelines indicate that lower precision annual adult status and trend data of known certainty and power will be conducted for every population, and that at least one population per MPG will have high precision annual adult status and trend monitoring. For abundance monitoring it indicates that the proportion of hatchery-origin fish in a population should be monitored where feasible. For productivity it states that annual estimates of adult:adult productivity of known certainty for each population and annual estimates of juvenile migrants of known certainty and power for a least one population per MPG. For spatial structure it calls for periodic surveys of adult and juvenile distribution at the population and/or MPG scale and consideration of genotyping wild populations on a rotating five year basis. For diversity criteria it includes periodic sampling of population genetic diversity, with a five year rotating schedule for genotyping to evaluate genetic population structure and diversity. It also suggests periodic monitoring of phenotypic diversity such as adult timing, spawn timing, age distribution, etc.

The preferred quality standards are spawner abundance with a CV of 15% or less for all natural origin ESA listed populations. Productivity criteria should strive for standards for all juvenile migrant populations of < 15% for salmon and < 30% for steelhead. They recommend a power analysis for each migrant population being monitored for the ability to detect change.

Our project strives to meet the general VSP monitoring guidance for salmon and steelhead in the Walla Walla Subbasin. Section 5.2 (pg 20) for the Mid Columbia River Basin calls for high precision status and trends monitoring for steelhead for at least one population per MPG and specifically names the Touchet River steelhead for meeting this need. Habitat effectiveness for steelhead in the Touchet River is also specifically listed there. Our project meets the intent here and also incorporates recommendations used in the upper Columbia River (section 8.1.1) by using PIT tag arrays to determine PHOS (proportion of hatchery origin spawners) and PNOS (proportion natural origin spawners). They also recommend smolt trapping in all primary populations for the upper Columbia River tributaries and we intend to do the same in the Umatilla/Walla Walla MPG.

Appendix B outlines the mid-Columbia monitoring strategy and in section 9.1.1. it specifies the following for steelhead monitoring: a) maintain moderate to high precision estimation monitoring approaches that are currently in place for abundance, productivity, spatial structure and diversity. It then specifically names and describes the intent of our project. The second bullet under 9.1.2 says to conduct tributary redd counts to detect spawner distribution. In section 9.7.1 it again specifically names and describes our project for spring Chinook monitoring in the Walla Walla Subbasin and states "maintain moderate to high precision estimation monitoring approaches that are currently in place for abundance, productivity, spatial structure and diversity. In 9.7.2 it specifically lists maintaining the video monitoring at Nursery Bridge Dam and Bennington Dam, weir counts at Dayton Dam and census redd counts when spring Chinook are present in the Touchet River, PIT tagging at smolt traps and maintaining a basin wide PIT array system in multiple locations. Our project is working on all these aspects.

NMFS Guidance for Monitoring Recovery of Salmon and Steelhead

Many of the VSP monitoring recommendations from this document were incorporated into the ASMS document. For example, for adult abundance monitoring NMFS guidance includes a) incorporate a robust unbiased adult spawner abundance sampling design that has known precision, b) monitor ratio of marked hatchery salmon and steelhead with an external adipose clip to unmarked in all adult surveys, c) calculate mean coefficient of variation (CV) and strive for adult spawner data with CV on average of less than 15%, d) conduct a power analysis to evaluate the ability to detect change, and e) utilize protocols in the AFS Field Protocols Handbook (Johnson et al. 2007). NMFS's guidance also noted that the highest priority for monitoring was adult abundance and that VSP juvenile abundance was considered a very high priority, and that it was critical in order to estimate freshwater productivity and survival. VSP productivity monitoring was considered a very high priority and should include spawner to spawner ratios. Monitoring threats due to hatcheries was considered as a high priority and they noted confounding effects by lack of spawning ground data on hatchery fish straying into natural production areas, or the lack of marking of all hatchery fish. Our project specifically emphasizes the same VSP priorities as those listed by NMFS with abundance of adults and juveniles as our highest priority monitoring efforts for natural production. Our project also incorporates their recommendations for methods and objectives.

Problem Statement:

The specific need of this study addresses was to strengthen the overall effectiveness of salmonid restoration efforts in the Walla Walla Basin, and develop a baseline for population status and trend monitoring. Focal species were spring Chinook (*Oncorhynchus tshawytscha*) salmon, ESA-listed summer steelhead (*O. mykiss*), and bull trout (*Salvelinus confluentus*). The primary emphasis of this project was to estimate the adult returns and spawning abundance for steelhead, spring Chinook and bull trout, and estimate smolt production. Previously, fish managers were unable to provide adequate annual estimates of total steelhead or spring Chinook returns to the Walla Walla to address Viable Salmonid Population monitoring or Endangered Species Act recovery needs.r for evaluation of. This information is also necessary for evaluation of the hatchery & habitat programs and their effects on naturally produced fish in the basin. Other data collection efforts of this project are of secondary importance but are useful for understanding fish movements and passage, or current conditions and changes to fish distribution and habitat.

This project collects Viable Salmonid Population metrics for fish abundance, productivity and diversity as recommended in the Walla Walla Subbasin Plan, the Middle Columbia River Steelhead Distinct Population Segment Recovery Plan, and the Snake River Salmon Recovery Plan for Southeast Washington. Stock status for ESA recovery planning for Touchet steelhead had been identified as unknown because of insufficient data over a long enough period of time, and the Walla Walla population has a 34% median survival gap before recovery can be achieved. We report cumulative time series data (e.g., 2000 – 2009) to describe the current state of the available information and to evaluate trends, where possible.

The Walla Walla Basin is located in southeast Washington and northeast Oregon and drains an area of about 4,551 square kilometers. The Walla Walla River flows about 129 rkm in a northwesterly direction meeting with the Columbia River near Wallula Gap, Washington, some 33.8 rkm above McNary Dam and 506.8 rkm above the Pacific Ocean. Major tributaries originate from the west and north sides of the Blue Mountains, at a maximum elevation of about 1,818 meters, and include the major drainages of North and South Fork Walla Walla rivers, Mill Creek and the Touchet River Watershed.

The Walla Walla Subbasin has faced significant agricultural, municipal, and industrial development pressures throughout its modern history. Since the early 1900's the system extirpated its spring Chinook run, and has depressed its bull trout and summer steelhead production. Today the Walla Walla Subbasin supports ESA listed bull trout and summer steelhead, state listed margined sculpin and Umatilla dace, and a recently re-introduced spring Chinook stock.

The Walla Walla headwaters are an important salmonid production area for spring Chinook, summer steelhead, rainbow trout, bull trout, and mountain whitefish. Flow and water quality in the upper watershed is good to excellent. The upper Walla Walla River above Milton-Freewater, Oregon, provides fair to good spawning and rearing habitat. Water quality and quantity are excellent through this reach, although habitat has been significantly altered by municipal activities and flood control levees. Habitat downstream through the mainstem Walla Walla River has been severely impacted by water extractions, diversion structures, upland land practices, flood control structures and urban or rural development; as such, habitat conditions in the lower reach are generally poor with low summer flows, high stream temperatures and substantial channelization.

Numerous flow, habitat and passage restoration projects, as well as artificial production actions, are currently or have been previously implemented in the system. The expense of these activities and the need to guide or document progress have increased the importance of monitoring information in the system. Managers, planners, and implementers need status and trend information to support short-term adaptive processes. At the same time managers and funding agencies have asked for powerful and informative evaluation of project and program effectiveness.

Recent habitat improvements to the basin have included maintenance of minimum in stream flows, removal of decommissioned diversion structures, ditch consolidation projects, new or improved juvenile screen and bypass facilities, new and upgraded fish ladders, and many riparian habitat improvement projects; with a number of additional improvement projects planned. Funding for habitat improvement projects comes from a variety of sources, including BPA. In addition, the Tribe and the State of Washington are committed to increased long term flow augmentation. Proposed flow improvement alternatives include a Columbia River exchange, shallow aquifer recharge, irrigation efficiency, and increased storage, as well as purchasing and trusting water rights, and consolidating diversions.

The management questions this M & E project intends to address:

1. Are Columbia River Basin fish and wildlife abundant, diverse, productive, spatially distributed, and sustainable? We will do this by collecting VSP metrics on the status and trend of Walla Walla salmonids.
2. Are Columbia River Basin ecosystems healthy? We do this by providing VSP data for salmoinds. We also contribute data on Habitat condtions (e.g flow & temperature) and link fish population information to our pending Bio-monitoring plan (2009-014-00).
3. Are fish, wildlife and their habitat responding to the implemented actions as anticipated? We do this by providing data for the Tribes fish passage, habitat and Bio-monitoring plans.
4. Does artificial production complement resident and anadromous fish recovery and harvest goals within the Columbia River Basin? We do this by conduction Natural Production M& E and by providing data to the Tribes Walla Walla Hatchery Master plan and contibuting data for the LSRCP Steelhead Hatchery Evaluation..

Objectives & Project Deliverables

OBJ-1. Fish Productivity

Description: Assess salmonid productivity in the Walla Walla River Subbasin River Subbasin.

Deliverable:	DELV-1: Assesment of Salmonid Population Status and Trend: 2000-2017 Walla Walla Basin		
Description:	The purpose of this collaborative project is to conduct natural production, tributary habitat (currently limited, to expand ~ 2015) and hatchery monitoring and evaluation. Our Project goal is to provide ecological information in support of adaptive management of salmonid resources. We do this by collecting Viable Salmonid Population criteria including estimates of abundance, productivity, survival rates, and distribution. Monitoring indicators including fish per redd, smolts per redd, smolt-to-adult return, recruit per spawner are used to inform and adapt salmonid management and recovery goals.		
Start:	2012	End: 2017	Budget: $8,430,687
Assoc. Work Elements:	157: Collect/Generate/Validate Field and Lab Data; 160: Create/Manage/Maintain Database; 162: Analyze/Interpret Data; 70: Install Fish Monitoring Equipment; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 161: Disseminate Raw/Summary Data and Results		
Env. Metrics/Methods:	Abundance of Fish	Carcass Count: Scale Sampling (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Survey Description (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tags and markers (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tissue Samples for DNA Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Redd Count Survey (Sean P. Gallagher, Peter K. Hahn, and David H. Johnson, 2007) Field Setup and Operation - Video (Jennifer S. O'Neal, 2007) Office Methods for Video Footage Review (Jennifer S. O'Neal, 2007) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007) Carcass Count: Mark-Recapture Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Sample Reach Information (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) WDFW SE WA Redd Surveys (none)	
	Productivity: Intra-Life Stage	Backpack Electrofishing-Mark (Gabriel M. Temple and Todd N. Pearsons, 2007) Backpack Electrofishing-Recapture (Gabriel M. Temple and Todd N. Pearsons, 2007) Determine Settings for Backpack Electofisher (Gabriel M. Temple and Todd N. Pearsons, 2007) Electrofishing Fish Processing and Recovery (Gabriel M. Temple and Todd N. Pearsons, 2007) Electrofishing Site Selection and Setup (Gabriel M. Temple and Todd N. Pearsons, 2007) Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Basic Snorkel Survey Procedures (Jennifer S. O'Neal, 2007) Mark-Recapture Estimates from Snorkeling Data (Jennifer S. O'Neal, 2007) Parr (Tracy W. Hillman, 2006)	
	Progeny-per-Parent Ratio (P:P) (Productivity)	Carcass Count: Scale Sampling (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tags and markers (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Field Setup and Operation - Video (Jennifer S. O'Neal, 2007) Office Methods for Video Footage Review (Jennifer S. O'Neal, 2007) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007) Adult Escapement to Tributary (Beasley, C.A. (and ten others), 2008) Adult Returns (none) Adult Run Timing (Beasley, C.A. and 10 co-authors, 2008) Carcass Count: Sample Reach Information (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007)	

	Carcass Count: Survey Description (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tissue Samples for DNA Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Survival Rate: Intra-Life Stage	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Walla Walla Smolt Monitoring (none) ODFW Umatilla River PIT tag Experiments (none) ODFW Umatilla River Smolt Monitoring (none) ODFW Umatilla River Survival and Productivity (none)
Mark	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Walla Walla Smolt Monitoring (none)
Progeny-per-Parent Ratio (P:P) (Productivity)	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Adult Returns (none) Estimation of Hatchery Strays (none) ODFW Umatilla River PIT tag Experiments (none) Smolt to adult return rate (Beasley, C.A. (and ten others), 2008) Smolt-to-adult return estimate (Marsh, D.M., N.N. Paasch, K.W. McIntyre, B.P. Sandford, W.D. Muir, and G.M. Matthews, 2010)

OBJ-3. Fish Abundance and Distribution

Description: Assess and detect changes in status and trends in abundance and spatial structure of salmonids in the Walla Walla River Subbasin throughout their life history.

Deliverable:	DELV-1: Assesment of Salmonid Population Status and Trend: 2000-2017 Walla Walla Basin				
Description:	The purpose of this collaborative project is to conduct natural production, tributary habitat (currently limited, to expand ~ 2015) and hatchery monitoring and evaluation. Our Project goal is to provide ecological information in support of adaptive management of salmonid resources. We do this by collecting Viable Salmonid Population criteria including estimates of abundance, productivity, survival rates, and distribution. Monitoring indicators including fish per redd, smolts per redd, smolt-to-adult return, recruit per spawner are used to inform and adapt salmonid management and recovery goals.				
Start:	2012	End:	2017	Budget:	$8,430,687
Assoc. Work Elements:	157: Collect/Generate/Validate Field and Lab Data; 160: Create/Manage/Maintain Database; 162: Analyze/Interpret Data; 70: Install Fish Monitoring Equipment; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 161: Disseminate Raw/Summary Data and Results				

Env. Metrics/Methods:		
	Abundance of Fish	Carcass Count: Scale Sampling (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Survey Description (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tags and markers (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tissue Samples for DNA Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Redd Count Survey (Sean P. Gallagher, Peter K. Hahn, and David H. Johnson, 2007) Field Setup and Operation - Video (Jennifer S. O'Neal, 2007) Office Methods for Video Footage Review (Jennifer S. O'Neal, 2007) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007) Carcass Count: Mark-Recapture Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Sample Reach Information (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) WDFW SE WA Redd Surveys (none)
	Productivity: Intra-Life Stage	Backpack Electrofishing-Mark (Gabriel M. Temple and Todd N. Pearsons, 2007) Backpack Electrofishing-Recapture (Gabriel M. Temple and Todd N. Pearsons, 2007) Determine Settings for Backpack Electofisher (Gabriel M. Temple and Todd N. Pearsons, 2007) Electrofishing Fish Processing and Recovery (Gabriel M. Temple and Todd N. Pearsons, 2007) Electrofishing Site Selection and Setup (Gabriel M. Temple and Todd N. Pearsons, 2007) Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Basic Snorkel Survey Procedures (Jennifer S. O'Neal, 2007) Mark-Recapture Estimates from Snorkeling Data (Jennifer S. O'Neal, 2007) Parr (Tracy W. Hillman, 2006)
	Progeny-per-Parent Ratio (P:P) (Productivity)	Carcass Count: Scale Sampling (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tags and markers (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Field Setup and Operation - Video (Jennifer S. O'Neal, 2007) Office Methods for Video Footage Review (Jennifer S. O'Neal, 2007) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007) Adult Escapement to Tributary (Beasley, C.A. (and ten others), 2008)

	Adult Returns (none) Adult Run Timing (Beasley, C.A. and 10 co-authors, 2008) Carcass Count: Sample Reach Information (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Survey Description (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Carcass Count: Tissue Samples for DNA Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson, 2007) Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Survival Rate: Intra-Life Stage	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Walla Walla Smolt Monitoring (none) ODFW Umatilla River PIT tag Experiments (none) ODFW Umatilla River Smolt Monitoring (none) ODFW Umatilla River Survival and Productivity (none)
Mark	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Walla Walla Smolt Monitoring (none)
Progeny-per-Parent Ratio (P:P) (Productivity)	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Adult Returns (none) Estimation of Hatchery Strays (none) ODFW Umatilla River PIT tag Experiments (none) Smolt to adult return rate (Beasley, C.A. (and ten others), 2008) Smolt-to-adult return estimate (Marsh, D.M., N.N. Paasch, K.W. McIntyre, B.P. Sandford, W.D. Muir, and G.M. Matthews, 2010)

Project History

Financials

Budgets

Expense	SOY	Working Budget	Contracted Amount	Expenditures
FY2004	$522,546	$535,123		$472,041
General	$0	$535,123		$472,041
FY2005	$522,546	$522,546		$518,279
General	$0	$522,546		$518,279
FY2006	$522,546	$522,546		$462,660
General	$0	$522,546		$462,660
FY2007	$713,796	$713,796	$20,200	$553,805
General	$0	$713,796	$20,200	$553,805
FY2008	$713,796	$793,280	$29,600	$747,528
Fish Accord - LRT - Umatilla	$713,796	$793,280	$29,600	$747,528
FY2009	$713,796	$941,179	$941,179	$837,656
Fish Accord - LRT - Umatilla	$713,796	$941,179	$941,179	$837,656
FY2010	$731,641	$815,000	$821,700	$723,635
Fish Accord - LRT - Umatilla	$731,641	$815,000	$821,700	$723,635

Total Expense Budget (FY2004-FY2009): $4,028,470; Total Expense Expenditures (FY2004-FY2009): $3,591,969

No Capital budgets

Project Cost Share: FY2009 60 % FY2008 75 % FY2007 53 %

Fiscal Year	Cost Share Partner	Total Proposed Contribution	Total Confirmed Contribution
FY2008	Utah State University	$24,000	$24,000
FY2008	US Fish and Wildlife Service (USFWS)	$102,275	$298,000
FY2008	Walla Walla Community College		$2,500
FY2008	Whitman College	$4,500	$0
FY2008	Washington Department of Fish and Wildlife (WDFW)	$120,000	$1,483,000
FY2008	US Army Corps of Engineers (COE)	$19,917	$24,000

FY2008	National Oceanic and Atmospheric Administration (NOAA)	$210,000	$0
FY2008	Gardena Farms Irrigation District #13	$6,750	$6,750
FY2008	Oregon Department Of Fish and Wildlife (ODFW)		$4,800
FY2008	Umatilla Confederated Tribes (CTUIR)	$8,960	$360,000
FY2008	Tri-State Steelheaders	$1,200	$169,000
FY2009	Utah State University	$24,000	$0
FY2009	US Fish and Wildlife Service (USFWS)	$103,553	$1,162,600
FY2009	Washington Department of Ecology		$20,000
FY2009	Whitman College	$4,500	$0
FY2009	Washington Department of Fish and Wildlife (WDFW)	$120,000	$120,000
FY2009	National Oceanic and Atmospheric Administration (NOAA)	$225,000	$0
FY2009	Gardena Farms Irrigation District #13	$6,750	$6,750
FY2009	Tri-State Steelheaders	$1,200	$69,000
FY2009	US Army Corps of Engineers (COE)	$19,917	$24,000
FY2009	Umatilla Confederated Tribes (CTUIR)	$8,960	$22,000

Explanation of Recent Financial Performance:

CTUIR's recent Financial performance as shown above has not experienced any significant differences between the Working Budget, Contracted Amount and Expenditures. The total budget expenditure ($ 3,880,909) was roughly 96% of 2004-2009 project budgets.

WDFW's financial performance for the Walla Walla Basin monitoring project prior to joining into a collaborative monitornig project with CTUIR in 2007 has been good. Budget expenditures for 2005-2007 were approximately 95% of available funds. NOTE: that the project history for the WDFW project prior to 2007 (Project 1998-020-00) is not included or shown above and can't be included within the CBFWA proposal structure here(see http://www.cbfish.org/Project.mvc/Display/1998-020-00 for more information regarding our separate project prior to 2007, that is now incorporated into this collaborative project with CTUIR). Since 2007, WDFW has under spent the contracted amounts; sometimes with substantial funds remaining. In 2007 WDFW had an inflated budget because BPA provided additional funds and a contract extension while contract negotiations continued for the next year. Then WDFW was granted a full year's funding for the remaining 9 months of the contract. However, by the time the annual contract was available it was too late to plan for, or implement, many of the tasks or work elements. WDFW has now lost a full time employee that we have not been able to replace, and we have been uable to purchase some materials or equipment in a timely manner because of frequent WA state hiring and spending freezes, and delays caused by more stringent requirements of the approval process for hiring or spending. These freezes and prolonged approval processes are associated with the severe WA State financial situation.

Explanation of Financial History:

This project's historical performance since its inception has been conservative given the project's scope. In 2004 and 2005 CTUIR's BPA approved budgets were in line with the Counsel Expense Budget Recommendations. In 2006 an 18-month “bridge-budget” was necessary for CTUIR during the project's 2007-2009 proposal approval period. WDFW project financial history is not available above prior to 2007 as only one project can be incorporated into this proposal framework. WDFW received a three month bridge contract extension in 2007 during contract negotiations, and then in June 2007 received the full annual funding with approximately 9 months remaining in the contract period. For more detail regarding WDFW's financial history please see http://www.cbfish.org/Project.mvc/Display/1998-020-00. Beginning in 2007, project funds shown above reflect the new collaborative M & E project between CTUIR & WDFW; and thus the total collaborative BPA-funded budget and expenditures for both parties. Also, beginning with the Fish Accords in 2009, this project began to “ramp-up” it’s financials to meet pre-treatment M & E for the anticipated full hatchery implementation and habitat bio-monitoring in 2012-13.

Reporting & Contracted Deliverables Performance

Annual Progress Reports		**Status Reports**	
Expected (since FY2004):	9	**Completed:**	36
Completed:	4	**On time:**	18
On time:	4	**Avg Days Early:**	4

Earliest Contract	Subsequent Contract(s)	Title	Contractor	Start	End	Status	Accepted Reports	Count of Contract Deliverables: Complete	Green	Yellow	Red	Total	% Green and Complete	Canceled
13171	20678, 41915, 46155, 36928, 33613, 25722	2000-039-00 EXP WALLA WALLA SALMONID M&E - CTUIR	Umatilla Confederated Tribes (CTUIR)	01/2003	02/2011	Issued	19	73	0	0	3	76	96.05%	0
33657	46440, 41736, 37130	2000-039-00 EXP WDFW - WALLA2 SALMONID M&E	Washington Department of Fish and Wildlife (WDFW)	06/2007	02/2011	Issued	12	32	13	0	9	54	83.33%	4
BPA-3328		PIT tags	Bonneville Power Administration	06/2007	02/2008	Active	2	1	0	0	0	1	100.00%	0
BPA-4290		PIT tags	Bonneville Power Administration	03/2008	02/2009	Active	1	1	0	0	0	1	100.00%	0
BPA-4337		PIT Tags - Walla Walla River Basin Monitoring	Bonneville Power Administration	03/2009	02/2010	Active	1	2	0	0	0	2	100.00%	0
BPA-4882		PIT tags - 2010 WW River Basin M&E	Bonneville Power Administration	03/2010	02/2011	Active	0	0	0	0	0	0		0
						Project Totals	**35**	**109**	**13**	**0**	**12**	**134**	**91.04%**	**4**

Elevated Contracted Deliverables in Pisces (2004 to present)

Projects that are the product of merges and/or splits from other projects may not have the complete list of historical deliverables included below. If you wish to highlight deliverables that are not listed, please refer to Pisces to determine the complete list and describe the missing deliverables in the Major Accomplishments section.

Contract	WE Ref	Contracted Deliverable Title	Due	Completed
25722	M: 157	Radio Telemetry studies	5/31/2007	5/31/2007
33657	D: 157	Steelhead redd surveys	2/29/2008	2/29/2008

33657	E: 157	Bull Trout redd surveys	2/29/2008	2/29/2008
37130	B: 157	Adult enumeration / video monitoring	2/28/2009	2/28/2009
37130	D: 157	Steelhead redd surveys	2/28/2009	2/28/2009
37130	E: 157	Bull Trout redd surveys	2/28/2009	2/28/2009
37130	H: 157	Outmigrant monitoring and PIT-tagging	2/28/2009	2/28/2009
41915	D: 157	Spring Chinook spawner/carcass surveys	9/16/2009	9/16/2009
41915	C: 157	Adult enumeration	1/28/2010	1/28/2010
41915	F: 157	Outmigrant monitoring and PIT-tagging	1/28/2010	1/28/2010
41736	C: 157	Adult enumeration	2/28/2010	2/28/2010
41736	F: 157	Bull Trout redd surveys	2/28/2010	2/28/2010
41736	H: 157	Outmigrant monitoring and Evaluation	2/28/2010	2/28/2010
41915	E: 158	PIT Tag smolts	2/28/2010	2/28/2010
41736	G: 158	PIT tag smolts	2/28/2010	2/28/2010

View full Project Summary report (lists all Contracted Deliverables and Quantitative Metrics)

Explanation of Performance:

CTUIR's contracted deliverable performance has been very good. The three Red deliverables listed under the CTUIR above all had to do with postponing annual reports into the subsequent contracts. At present this project is current on our annual progress reports.

WDFW was successful at collecting lots of status and trends data and our contracted deliverable performance was quite good until 2007. The Red Contract deliverables on the WDFW ledger were due to several factors: 1) spring Chinook spawner surveys in the Touchet River were not conducted in years when few spring Chinook had returned to the trap in Dayton (often less than a dozen fish); 2) electrofishing was not conducted one year, although we had anticipated a need may arise for very limited electrofishing when the statement of work was submitted; 3) WDFW was late on the annual report for 2006 because we took the opportunity to compile and analyze many years of data together; 4) we shifted funds from habitat data summaries to complete genetic analyses for steelhead and bull trout groups or populations(reported in 2007)after collecting the tissue samples for several years; 5) we deferred some analyses and reporting to wait for CTUIR to catch up to the same reporting schedule so we could do our first collaborative report together. That collaborative report was then submitted covering two years, so we were ahead of schedule on the subsequent year's report, 6)high turbid spring flows one year precluded conducting steelhead spawning surveys, 7) the first year of the collaborative project (2007)we had anticipated assisting CTUIR with radio tracking efforts, but no fish could be captured or tagged and that telemetry effort was terminated and excluded from the next contract, 8) lastly some delays occurred the first year (2007) of the collaborative effort because BPA required CTUIR and WDFW to completely redevelop and submit a new proposal in January 2007 (because of "in lieu" concerns by BPA)and BPA severely restricted WDFW activities (limited to only repeating tasks included in our 2006 statement of work, even though our modified, collaborative project proposal had been recommended for funding by the ISRP and Council). While contract negotiations continued, WDFW was on a bridge contract for three months that severely limited WDFW actions and created substantial uncertainty and disarray regarding future funding or approved activities. Many WDFW staff found other employment because of the funding uncertainty created by BPA and planning for field sampling was disrupted. When the remaining 2007 contract was activated in June 2007 it provided the entire annual funding request even though 3 months of the normal contract cycle had passed and many staff had left our project. Unfortunately, because of the earlier uncertainty of whether WDFW was going to be funded, or at what level and for what actions, it was too late to implement many of the planned actions (e.g. could not secure landowner approval for access) and substantial funding remained at the end of the contract. The funding and contracting uncertainties since 2007, and the subsequent frequent WA state financial and hiring freezes since about 2008 have made it very difficult for WDFW to get back on track and complete all the salmonid status and trend monitoring intended or needed, and use the full funding available.

Major Accomplishments

Major Accomplishments:

2010	Adult Enumeration, Spawner Surveys, Out-migrant monitoring, PIT-tagging, Technical Progress Report.
2009	Adult Enumeration, Spawner Surveys, Out-migrant monitoring, PIT-tagging, Technical Progress Report.
2008	Adult Enumeration, Spawner Surveys, Out-migrant monitoring, PIT-tagging, Radio-Telemtry, Technical Progress Report.
2007	Adult Enumeration, Spawner Surveys, Out-migrant monitoring, PIT-tagging, Radio-Telemetry, Technical Progress Report.

Major Accomplishments: This collaborative project is presently conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through at least 2017. Historically, the work associated with this project was part of two separate projects conducted independently by WDFW (Project #1998-020-00) and CTUIR (#2000-039000). The separate projects merged into a combined collaborative monitoring effort in 2007. The work location is the Walla Walla River Basin and tributaries (e.g. Touchet River, South Fork Walla Walla River, and Mill Creek).

The previous separate projects had different primary goals and objectives. CTUIR emphasized data collection for monitoring spring Chinook reintroduction efforts and evaluation of fish passage improvement success, including radio telemetry studies of adult bull trout, steelhead and spring Chinook migrations or movements. WDFW emphasized data collection in the Washington portion of the basin for the following: 1) document and evaluate two major low flow habitat limiting factors (water quantities and water temperatures, by stream reach), 2) identify fish passage barriers, and 3) obtain basic stock status information for steelhead and bull trout; with limited monitoring of a small number of returning spring Chinook in the Touchet River. In 1998, when WDFW began this project, little was known or documented regarding basic habitat conditions (low stream flows and when and where dewatering occurred, water temperatures present, or salmonid and other fish species low flow distributions or relative abundances, or salmonid spawning distribution, timing or relative abundance. WDFW's sampling effort was initially planned to be mostly exploratory in nature to learn basic information about habitat conditions and salmonid stock status.

WDFW's major project accomplishments prior to 2007 (when the project became a joint effort by CTUIR and WDFW) are summarized briefly by objective here.

Objective 1: Assess habitat conditions for anadromous and resident salmonids.

- WDFW and WDOE collaboratively deployed, collected, and summarized data from continuous stream flow monitoring gauges at up to six sites per year. WDFW took periodic manual stream flow measurements at these gauge sites as calibration flows, as well as up to 50 other sites throughout the subbasin in Washington, to provide information on water availability throughout the low flow period (late spring, summer and fall each year). This information substantially improved knowledge of where and when reaches were water limited. We also participated in “seepage runs” with other partners to account for all tributary or spring inflows and water use, or loss, for the mainstem Walla Walla River from Milton-Freewater, Oregon to the mouth of the river. This was completed during late spring and summer when irrigation demands are highest to develop a water budget model (directed by the Walla Walla Basin Watershed Council). This water budget work has now been incorporated into larger studies to develop a complete understanding of Walla Walla Basin hydrology (including ground water – contact WWBWC for more details). WDFW provided stream flow monitoring guidance to WDOE and other managers within the basin, and now several of our flow monitoring sites are used by WDOE for year round flow monitoring. Our data and other flow data have been used by agencies and local participants to set stream discharge management points, as well as to establish minimum instream flow requirements in Washington State regulations, and for recommended flow restoration targets.

- This project initiated planning for IFIM flow modeling, and sub-contracted and assisted WDOE and WDFW flow specialists with implementation of IFIM flow modeling studies in lower Mill Creek and for specific reaches of the main-stem Walla Walla River (Caldwell et al. 2002). These studies were later expanded by WDOE/WDFW using other funding, and further expanded by the Walla Walla Basin Watershed Council (WWBWC), Walla Walla County and Columbia County (with WDOE or OWEB funding) for use in setting minimum instream flows in various reaches of the Walla Walla River, Touchet River, and Mill Creek, as well as for discussions regarding instream flow needs and the court settlement agreement with the irrigators near the Oregon state line.
- This project annually deployed, operated and summarized data from up to 74 temperature monitors throughout the Washington portion of the Walla Walla Subbasin. These data substantially improved understanding of the distribution of suitable and unsuitable salmonid spawning, migration and summer rearing areas or time periods, and why these areas are or are not used. These temperature data also aided us in determining the timing, frequency and duration of potential thermal blocks to migrating salmonids in lower river areas during late spring, early summer and fall. A summary of apparent thermal barriers was presented in our 2006 annual report (pages 27-40 of Mendel et al. 2007). WDFW's temperature monitoring was used to develop the Total Maximum Daily Load (TMDL) monitoring and assessment study plan by WDOE and Oregon Water Resources TMDL studies of the basin. WDOE has now developed "Lead Entity" groups that have developed water quality and water quantity restoration plans for the Washington portion of the Walla Walla Basin. WDFW now supplements WDOE water temperature monitoring by sampling in otherwise unsampled stream reaches.
- This project discovered and reported frequent chemical fish kills in lower Mill Creek caused by inappropriate chlorine use and uncoordinated government regulations. These regulations were changed and WDOE increased monitoring requirements, thereby substantially reducing or eliminating chemical fish kills in lower Mill Creek.
- Habitat conditions were inventoried and documented in Coppei Creek, the Washington portion of East Little Walla Walla River, and lower Titus Creek to provide empirical data and a better understanding of habitat conditions there.
- More than a dozen permanent and seasonal fish barriers that were previously undocumented have been identified by this project since 1998. We opened seasonal barriers to allow passage and reported them to appropriate habitat or enforcement staff for long term resolution. Permanent barriers were reported to habitat managers so they could develop projects and secure funding for removal or modification to provide adequate fish passage. For example, a barrier dam was located on lower Lewis Creek (North Fork Touchet River tributary). It was then removed by the Columbia County Conservation District. Another dam was located in lower Whiskey Creek. WDFW removed that dam with other funding. In both cases, this project was able to locate these barriers and have them removed. This project has been documenting how successful these removal projects have been by monitoring steelhead and bull trout reestablishment in Lewis Creek, and recent steelhead use of upper Whiskey Creek. In 2006, WDFW took the lead to develop a list of known and potential barriers and circulated it to all resource managers and others in the basin.
- Our understanding of salmonid distribution, fish kills, water availability and water quality issues have been substantially improved in the Mill Creek Flood Control Channel. We provided fish and habitat data summaries for a multiple agency test of adding water flows during summer to benefit fish in the upper portion of the flood channel. Results showed that adding up to 10 cfs to the flood channel during summer actually caused fish kills in the downstream concrete channel where fish were surviving in cool ground water. Overland flows from the wide, shallow weir section of the channel reached nearly 90^{o}F before entering the concrete channel that has groundwater inputs of about 55^{o}F. This information was used by members of the Mill Creek Workgroup to initiate an engineering study of the fish passage issues in the flood channel and consideration of means to alleviate the physical barriers, thermal and low water flow issues that limit passage or rearing. The engineering design work should be complete in 2010 fall and restoration actions should be initiated with multiple projects in 2011.
- A court settlement agreement was reached between the USFWS and irrigators that added water to a dewatered reach of the mainstem Walla Walla River. WDFW was fortunate to be able to collect pre and post treatment data for stream flows, water temperatures and fish use in the Washington reaches affected by this agreement. Stream flows have increased near the Washington-Oregon state line, but water temperatures have not improved substantially because warm overland flow is mixing with cooler groundwater that was the only water available before the settlement agreement. Salmonid use and distribution has improved because of more water, with greater surface area and volume, even though water temperatures remain marginal for salmonid rearing.

Objective 2: Determine salmonid distribution and relative abundance.

- Field sampling during summer and fall has substantially improved knowledge of bull trout distribution and relative abundance in the Touchet River and its tributaries. We expanded annual spawning survey distribution and increased the number of surveys per year. We discovered bull trout in previously undocumented areas such as Lewis Creek (North Fork Touchet tributary) and Burnt Fork (South Fork Touchet tributary). Previously, bull trout were documented spawning only in the North Fork and Wolf Fork watersheds. We have been able to add to the known spawning distribution and abundance of bull trout (Figures 1 and 2) in the Wolf Fork of the Touchet River (approximately 5 miles) and refine it further in the North Fork Touchet (approximately 2.5 miles).

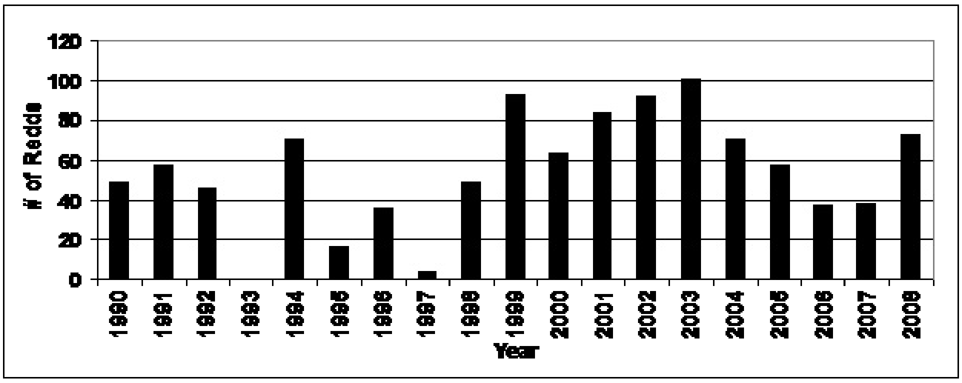


Figure 1. Bull trout redd counts for the Wolf Fork of the Touchet River, 1990-2008 (from Mahoney et al 2009).

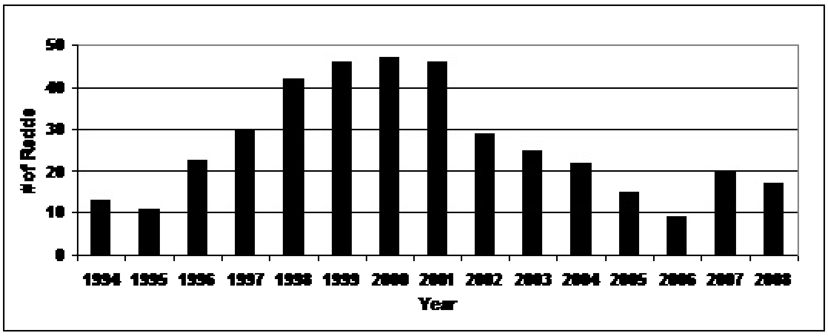


Figure 2. Bull trout redd counts for the North Fork Touchet River, 1994-2008 (from Mahoney et al. 2009).

- After many years of absence, spring chinook periodically have been documented entering the Touchet River since 1997. We have been able to document timing, distribution, relative abundance and frequency of periodic spring chinook returns to the Touchet River Watershed during trapping at the Dayton Dam (mostly under LSRCP funding), through summer electrofishing and snorkel surveys, and by conducting spawning surveys when appropriate. These fish are generally unmarked and presumably from out-of-basin, although a few marked spring chinook from the Tucannon River have been documented in the Touchet River in recent years.
- WDFW initiated and coordinated a Mill Creek Flood Channel fish salvage effort in 2004 with the USACE and several other agencies and organizations. The salvage area covered approximately two miles of channel and captured and transported over 600 salmonids. WDFW has participated as necessary in several smaller fish salvage efforts since 1998 in the Walla Walla Subbasin to try to move fish from dewatered stream reaches to suitable habitat. The results of this salvage and other sampling efforts for fish distribution and abundance, stream flows and water temperatures provided important data used by the USFWS and NMFS in the development of the Mill Creek Biological Opinions regarding the USACE's operation of the Mill Creek Flood project and its effects on ESA listed salmonids.
- WDFW has been able to document steelhead spawning and relative abundance in many reaches or tributaries where they were not known to spawn, or where they spawn in higher numbers than previously expected. For example, we have documented up to 47 steelhead redds in the Coppei Creek Watershed (Touchet River tributary near Waitsburg) where we previously thought only a few steelhead spawned each year. WDFW also conducts steelhead spawning surveys in upper Mill Creek to estimate redd and spawner abundance and distribution. WDFW now generally conducts spawning surveys in Coppei Creek annually to estimate spawning escapement (Figure 3). WDFW tested adult trapping in Coppei Creek in 2005 and in 2010 successfully operated an adult steelhead trap on Coppei Creek throughout the migration period. We observed 128 steelhead, and estimate that a total of 139 adult steelhead migrated upstream of the trap site, with 94 estimated downstream of the trap (233 fish total). The 2010 run is much higher than any of the previous years or estimates.

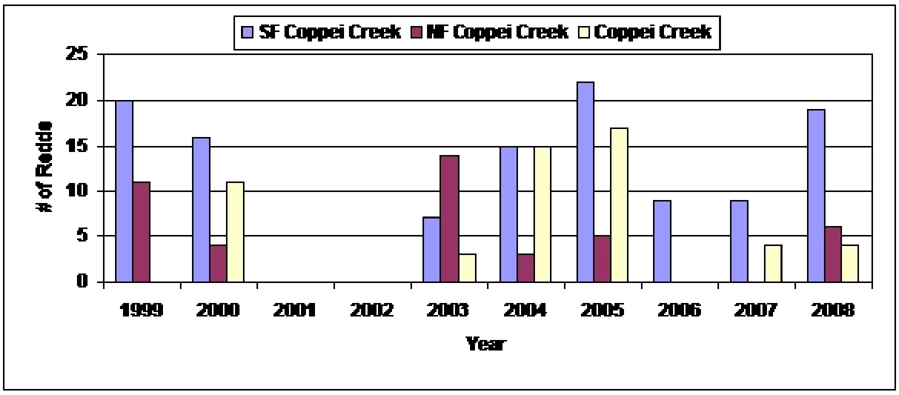


Figure 3. Steelhead redd counts observed in the South Fork, North Fork and mainstem Coppei Creek, 1999-2008 (from Mahoney et al. 2009).

- Summer electrofishing and snorkel surveys (usually 50-135 sites per year) have enabled WDFW to estimate juvenile steelhead summer rearing densities and population abundance for all areas of the Washington portion of the Walla Walla Subbasin. This information was very helpful for determining priority protection and restoration areas for the Subbasin Plan and the Snake River Salmon Recovery Plan in Southeast Washington (2006). These sampling efforts also improved knowledge regarding distribution and relative abundance for other salmonid species. Summaries of distribution and relative abundance, by stream or stream reach, were compiled for salmonids and lamprey for the duration of this project on pages 58-66 in the 2006 annual report (Mendel et al. 2007), http://www.cbfish.org/Project.mvc/Display/1998-020-00 . Salmonids rarely rear during summer low flows in the lower Walla Walla (below Mill Creek or Dry Creek) or Touchet rivers (below Waitsburg), or in lower Dry or lower Mill creeks, because of unsuitable water temperatures and low stream flows.
- This project has monitored steelhead spawning in Mill Creek upstream of Bennington Dam, a U.S. Army Corps of Engineers (USACE) flood control dam (Figure 4). After few steelhead redds or fish were found the first couple years of surveys, and CTUIR radio telemetry indicated few or no fish were passing upstream of the fish ladder, WDFW approached the USACE and worked with them and others to improve operation of the fishway and low flow channel at the dam and to coordinate temporary modifications to the fish ladder entrance to improve passage. Steelhead passage appears to be improved as reflected by substantially more redds and fish documented after fishway modification. WDFW is now working with the USACE as a sponsor of an 1135 project to build a new fishway to provide fish passage that meets current state and federal passage criteria. That project should have feasibility designs and NEPA complete by early 2011, with construction planned for 2012. Data WDFW collected was used to develop requirements for the USACE to improve fish passage in the NMFS (draft) and USFWS Mill Creek Biological Opinions. WDFW has continued steelhead redd surveys in upper Mill Creek (to the state line) until we have a more accurate means of counting steelhead adults passing upstream at Bennington Dam, or at a weir and trap slightly upstream of Bennington Dam.

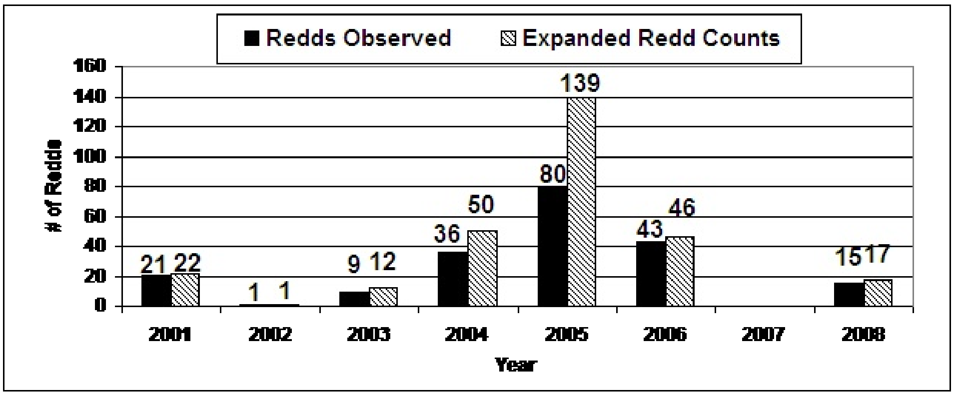


Figure 4. Steelhead redd counts in Mill Creek from Bennington Dam to the state line, 2001-2008 (from Mahoney et al. 2009).

- WDFW has been monitoring reestablishment of bull trout and steelhead after Lewis Creek dam was removed, and steelhead reestablishment in Whiskey Creek after a small dam was modified to improve fish passage. Both of these passage improvement projects appear to have been successful at allowing reestablishment of salmonid populations in many miles of streams that had been blocked by these dams.
- At the Dayton Dam on the Touchet River, WDFW has used a variety of funding sources to improve adult fish passage and enumeration with a new fish ladder, consolidation of three water diversions with new fish screens that meet current screening criteria, and improved weir panels to reduce fish bypassing the fish ladder and fish counts since 2008. This site provides an opportunity to adequately enumerate upstream migrating salmonids, reduce the proportion of hatchery steelhead spawning on the spawning grounds (PHOS) , collect broodstock for testing (or potentially expanding) the use of endemic adult steelhead for hatchery broodstock for continued releases as endemic stock smolts into the Touchet River. It also enables WDFW to mark or tag fish for study purposes. This effort is lead by the Lower Snake River Compensation Plan (LSRCP) hatchery evaluation staff at the WDFW Snake River Lab, but it is integrated with this project for adult enumeration and sampling for fish origin (hatchery or wild). Our project has cost shared some of the maintenance and operations at this site to meet the goals and needs of both WDFW lead projects.
- WDFW has operated a smolt trap in the Touchet River at Dayton since 2008. This trap site enables us to PIT tag juvenile steelhead, bull trout and spring Chinook to evaluate their movements and survival to downstream detection sites, and for their return to the adult trap in Dayton. Juvenile out-migration abundance is estimated for steelhead and survival is evaluated to the lower Walla Walla River smolt trap by CTUIR, or to McNary Dam on the Columbia River. Operation of this trap and at the new fish ladder and trap in Dayton enables WDFW to annually estimate adult steelhead, spring Chinook and bull trout migrating downstream and their returns as adults. This effort has only been possible since 2008. This is a collaborative effort with WDFW's Snake River Lab. staff conducting LSRCP hatchery evaluation. The LSRCP program has released over 93,000 PIT tagged hatchery fish and with help from our project we have PIT tagged nearly 3,000 natural origin steelhead in the Touchet River. This combined effort is to evaluate the movements of these fish and estimate survivals to downriver sites, as well as for determining smolt to adult survivals. Natural smolt estimates from the Touchet River have varied from over 62,000 in 2008 to just over 8,000 smolts in 2009. The 2010 estimate is not yet available.
- Our summer electrofishing and snorkel sampling efforts also have enabled us to determine non-salmonid fish distribution, species composition and relative abundance by reach throughout much of the Washington portion of the subbasin.

Objective 3: Identify and characterize genetic stocks or populations of steelhead and bull trout.

- We have collected tissue samples from adult steelhead at traps in the Walla Walla River in Oregon (from ODFW sampling), Mill Creek (from USFS sampling), and the Touchet River (WDFW sampling), as well as from juvenile steelhead in Washington streams, to genetically characterize population structure (Figure 5, Blankenship et al 2007). Many of these samples were combined with other samples from CTUIR and analyzed and published by Narum et al. in 2004. Tissues we collected were combined with other WDFW (LSRCP funded) sampling and collaborated on analyses and reporting in WDFW annual reports to LSRCP and BPA (Mendel et al. 2007, http://www.cbfish.org/Project.mvc/Display/1998-020-00). Both the WDFW and Narum et al. studies found that Touchet River steelhead and Walla Walla steelhead are genetically distinct and NMFS now recognizes these as two separate populations.

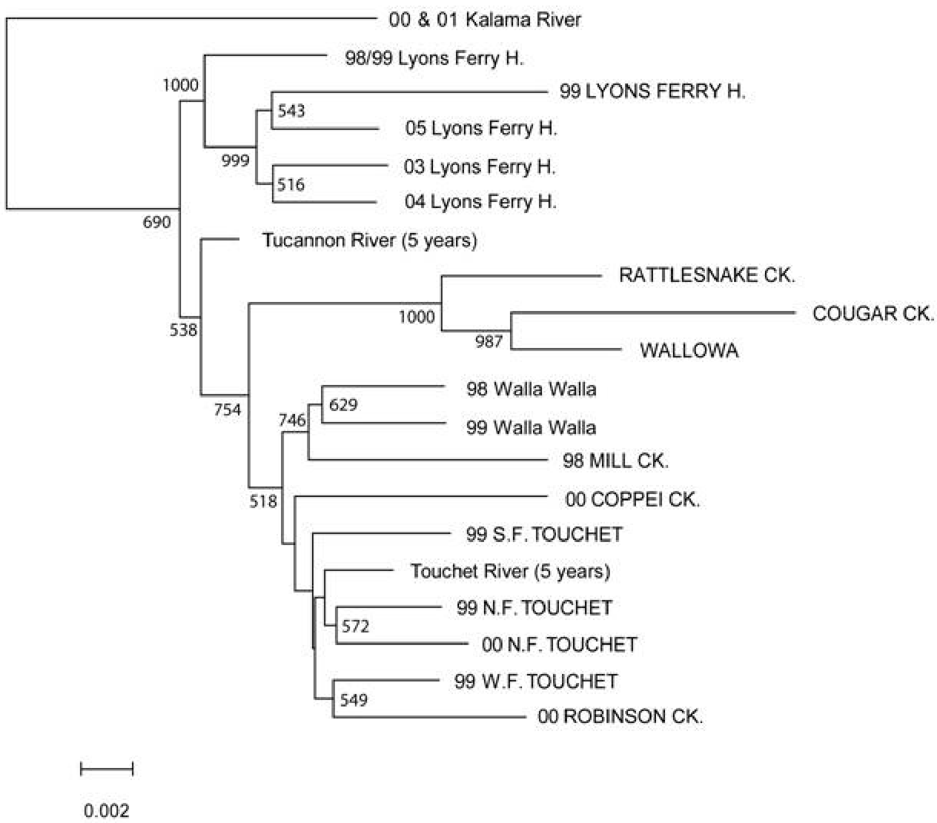


Figure 5. Chord distance tree from steelhead samples from Lower Columbia River (Kalama River), Walla Walla River Basin, and Snake River Basin (Grande Ronde tributaries, Tucannon River and Lyons Ferry Hatchery). Sample labels with all letters capitalized are juvenile samples. Node support number are values from bootstrap analysis (1,000 bootstraps)- from Mendel et al. 2007.

The WDFW genetics study did not find evidence of hatchery introgression from Lyons Ferry in the Touchet or Walla Walla populations. WDFW published a modified steelhead genetics analysis that compared Touchet, Tucannon and Lyons Ferry stocks that further assesses the genetic composition and stability of steelhead in the Walla Walla Subbasin and elsewhere in southeast Washington (Blankenship et al. 2009).

- We have collected tissue samples from numerous migrating bull trout captured in each of the three major drainages (Walla Walla River through ODFW sampling, Mill Creek through USFS sampling, and Touchet River through other WDFW sampling) in the Walla Walla Subbasin for multiple years. We have also collected genetic samples from juvenile bull trout in each of the spawning areas of the Touchet River drainage. Our WDFW genetics lab assisted us by analyzing these samples in 2006 to genetically characterize these different groups and enable us to evaluate the fine scale population structure and reproductive interactions of bull trout within several areas of the Walla Walla Subbasin.

The bull trout genetic results are summarized in the 2006 annual report (pages 87-94 of Mendel et al. 2007, http://www.cbfish.org/Project.mvc/Display/1998-020-00). The Walla Walla, Touchet and Mill Creek samples were genetically distinct, as were sample groups from separate regions of the upper Touchet River (Figures 6-9). This genetic information is very important for helping determine the number of separate populations for bull trout recovery planning purposes.

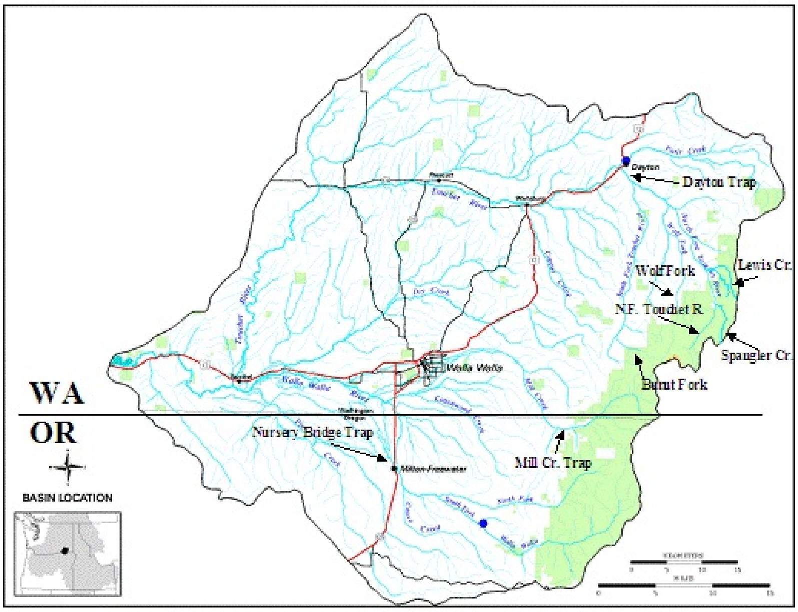


Figure 6. Bull trout tissue collection sites for genetic analyses in the Walla Walla Basin.

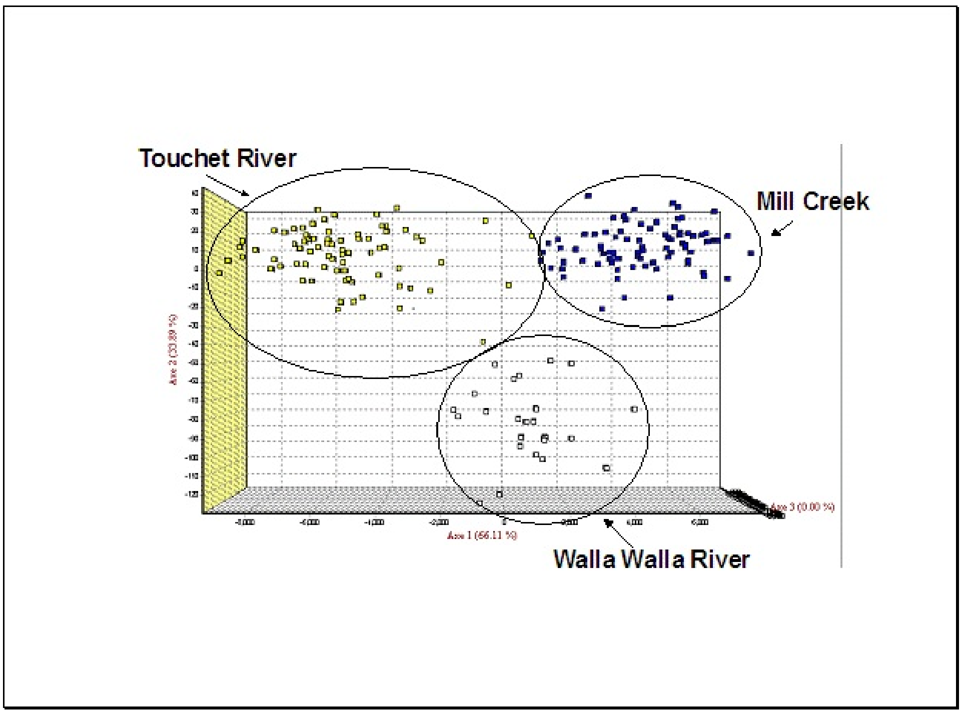


Figure 7. Factorial correspondence analysis conducted with GENETIX showing the distribution of individual migratory adult bull trout form three primary watersheds of the Walla Walla River Basin. All the variation is distributed on axes 1 and 2.

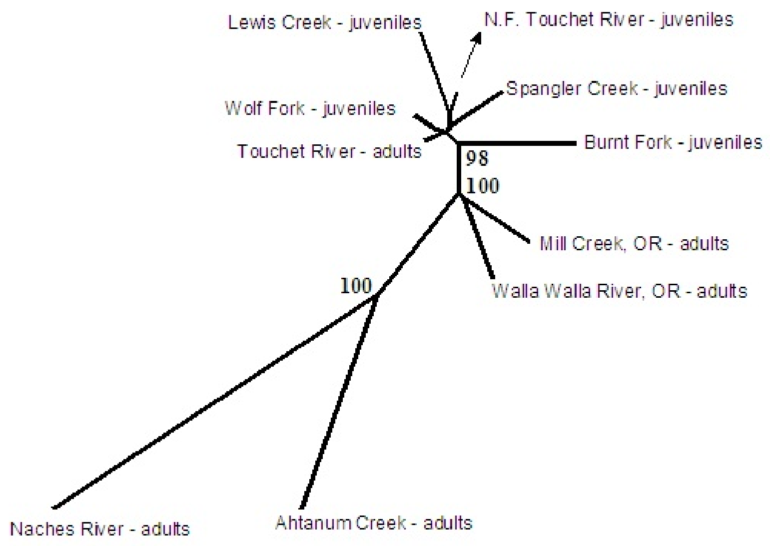
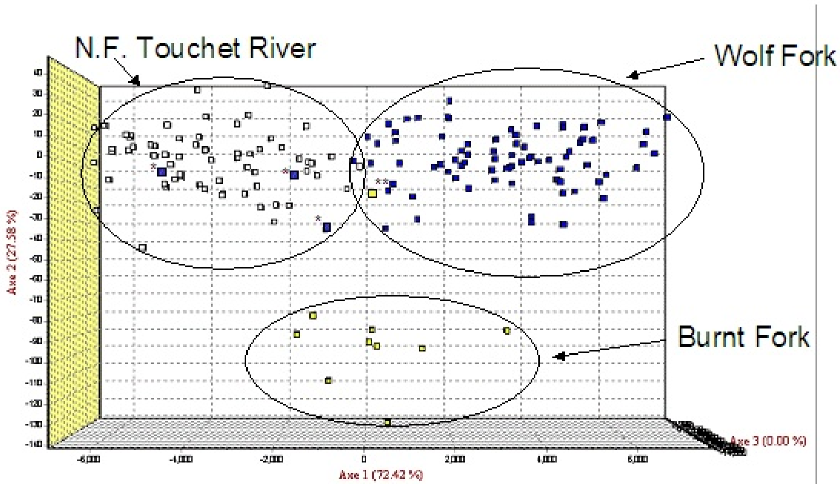


Figure 8. Relationship of adult migratory bull trout from the Walla Walla River and Yakima River basins, and juvenile bull trout from the Touchet River Basin, based on the genetic distance matrix using Cavalli-Sforza and Edwards (1967) chord distance. Clusters with bootstrap values over 90% are shown.



*Three samples from the Wolf Fork that fall within the N.F. Touchet River polygon
**One individual from Burnt Fork that falls within the Wolf Fork polygon.

Figure 9. Factorial correspondence analysis conducted with GENETIX showing the distribution of individual juvenile bull trout from three primary watersheds in the

Touchet River drainage. All the variation is distributed on axes 1 and 2.

- WDFW has collected tissue samples from spring Chinook adults returning to the Touchet River and archived them for possible later analysis.

Objective 4: Compile and disseminate results and conclusions to guide fish management and subbasin planning.

- WDFW completed nine annual project reports (1998-2007), as well as initiated (Kassler and Mendel 2007) or contributed to two genetic analyses (Blankenship et al. 2007) and an IFIM flow modeling study (Caldwell et al. 2002) prior to the combined annual report with CTUIR for 2007 and 2008. We have shared the annual reports in hardcopy and electronic formats with the large number of management entities or interested parties in the Walla Walla Subbasin, and elsewhere. These reports are posted on the BPA and WDFW websites and they have provided crucial information for numerous planning and habitat implementation processes in the Walla Walla Basin.
- WDFW contributed numerous genetic samples included in a genetics study published by Narum et al. 2004 and provided edits of the draft manuscript. WDFW later completed an additional genetics study that assesses genetic stability and compares Touchet, Tucannon and Lyons Ferry Hatchery stocks in southeast Washington (Blankenship et al. 2009) that indicates the Touchet population has variable allele frequencies from year to year but the genetic differentiation was stable over time between Touchet and Lyons Ferry Hatchery fish that have been stocked near Dayton for many years.
- This project has contributed data and summary information for the draft Bull Trout Recovery Plan (USFWS 2002,2004), Walla Walla Subbasin Summary for the NPCC in 2001, Walla Walla Subbasin Plan (2004), Washington State Limiting Factors Report for the Walla Walla Basin (Kuttle 2001, http://www.scc.wa.gov/index.php/Download-document/582-WRIA-32-Salmon-Habitat-Limiting-Factors-Final-Report.html), the Snake River Salmon Recovery Plan for Southeast Washington (includes the Walla Walla Subbasin, http://www.snakeriverboard.org/resources/library.htm) in 2006, and the mid Columbia Steelhead Recovery Plan (NMFS 2009, http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Interior-Columbia/Mid-Col-Plan.cfm), as well as other planning efforts such as: the WDOE Watershed Planning and Lead Entity process and the Total Maximum Daily Load (TMDL) studies by OWRD and WDOE, and the NMFS and USFWS Mill Creek BiOps for USACE flood control operations, the Walla Walla Basin Watershed Council's hydrology studies for the Walla Walla River Basin, and WDFW's Salmonid Stock Inventory (SaSI, WDFW 2002, http://wdfw.wa.gov/fish/sasi/index.htm) stock inventory process, etc.
- The URLs for WDFW's annual reports (project 1998-020-00) prior to 2007 are shown below because they could not be linked to this collaborative report with CTUIR.

Additional accomplishments of importance since 2004 included CTUIR's radio telemetry assessments of adult bull trout, Chinook and steelhead migration timing, distribution and passage at fish passage improvements for multiple years.

We used radio telemetry (Mahoney et al. 2009) to assess run timing, migration delay and upstream distribution for adult bull trout (2001-2005), steelhead (2002-2008) and spring Chinook (2004-2008). Understanding fish use at BPA and other funded fish passage facilities is a necessary and mandated component for determining success of fish passage restoration actions, the Tribe's spring Chinook program, and for assessing potential ESA take at each site for listed steelhead and bull trout.

Methods used for these studies were previously described in Mahoney et al. 2009. Radio-tagged fish were located by aerial and ground telemetry and at fixed site detection stations. Mobile surveys were conducted one to three times per month to locate each radio-tag. Transmitter locations were recorded by GPS coordinate. Fish movement was assessed by comparing subsequent detections and tag recovery. Fish ladder delay was estimated as total time a fish spent below the site.

Bull trout – We surgically implanted radio-transmitters in 91 adult bull trout in the mainstem and South Fork Walla Walla River. Eighty-three percent survived, and were relocated in the upper mainstem, and North and South Fork Walla Walla Rivers, from 20 days to three years after tagging. We observed three distinct seasonal movement patterns: 1) over-wintering and rearing in the upper mainstem, North and South Fork Walla Walla rivers, from December to early June; 2) summer rearing and upstream spawning migration, from June through September; and 3) fall return to rearing areas (with high area fidelity) in October and November. Although adult bull trout were found to make significant annual migrations between the upper mainstem, North, and South Fork, the lower distribution for adult fish seemed to be Burlingame Dam (rkm 59). Thus, suggesting a truncated migratory life history, the extent of which was uncertain with no documented expression to the Columbia River. However, recent studies by the USFWS (Anglin et al. 2008) suggest some connectivity between the Walla Walla and Mill Creek populations, in addition to documenting sub-adult migration to the Columbia River (Darren Gallion, USFWS, Personal Communication 2009).

Steelhead –Radio-tagged hatchery and wild steelhead were captured and radio-tagged in the lower Walla Walla River, between September 2002 and December 2007. We gastricly implanted transmitters in 170 fish. Upon release, fish rarely moved directly upstream, but instead usually held near the release site for a few days (presumably to recover from handling).

Roughly 61% of tagged fish were later located upstream in a spawning area. Loss of study fish was attributed to: sport harvest (12%); left study area (11%), handling mortality (7%), tag regurgitation (7%); and (9%) unknown; i.e. un-documented harvest, tag regurgitation, or pre-spawn loss. Fish were located in known spawning areas between January and April (Figure 10). They remained on the spawning grounds from a few days to a few weeks; and moved back downstream between February and May (Figure 10). Roughly 55% of the steelhead located in a spawning area later re-entered the Columbia River presumably as "live" post-spawned kelts; their fate in the hydrosystem thereafter was unknown.

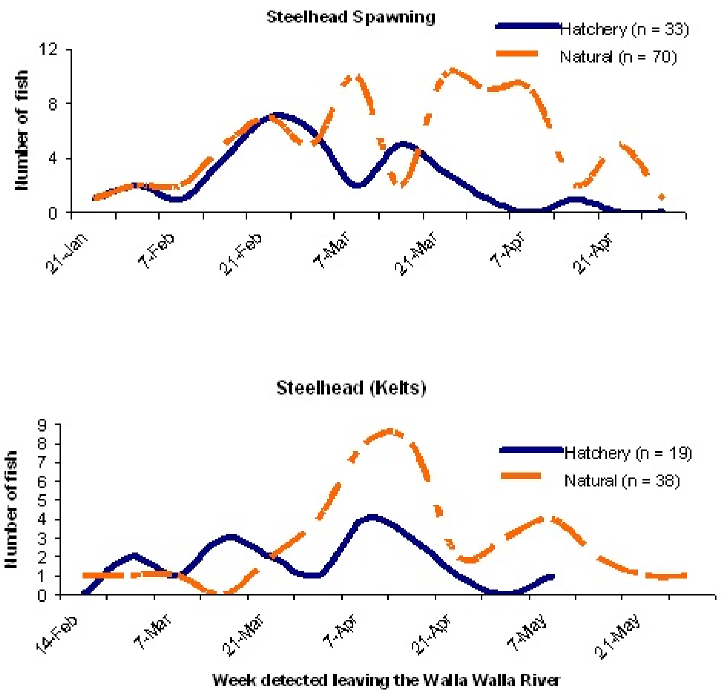


Figure 10. Week that radio-tagged steelhead presumably arrived on the spawning grounds and telemetry detections of steelhead kelts leaving the Walla Walla Subbasin, 2001-2008.

Based on radio-tag detections, steelhead moved between 37.1 and 134.8 km above the Columbia River to spawn (mean 88.1 km; SE 2.6). Mean daily movement of radio-tagged steelhead was 0.7 km per day (range 0.2 to 1.7 km per day) and mean upstream travel time to a spawning reach was roughly 116.3 days after release (SE 3.7; range 21.0 to 207.4 days).

Upstream fish passage and delay to tagged steelhead varied widely at the various in-basin fish facilities and showed little correlation when plotted against date of detection, mean daily discharge or mean stream temperature. Passage delay may have been related to periodic and indeterminate ladder inefficiencies due to both natural and artificial causes.

Pre-spawn loss or "take" to migrating fish (estimated as the portion of unsuccessful ladder passage) ranged from 100% to 60% at Gose Street and Mill Creek Diversion dams, respectively, and 3% to 13% at Hofer, Burlingame, Nursery Bridge and Little Walla Walla (Figure 11). Documented delay and "take" were used to support significant structural and operational changes for improved fish passage at Hofer, Mill Creek Diversion, Gose, and Nursery Bridge fish ladders.

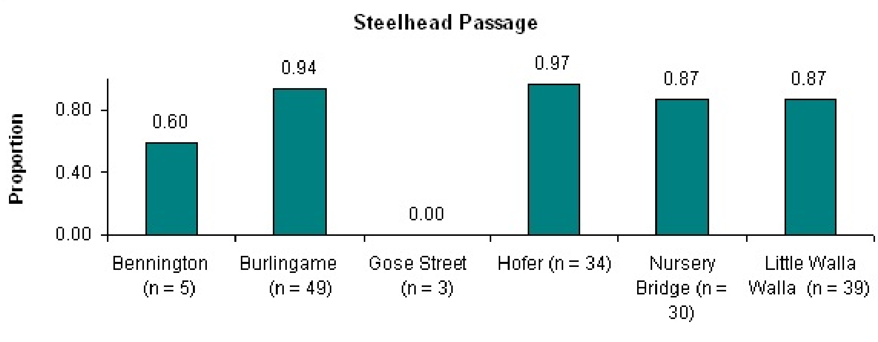


Figure 11. Proportion successful fish passage by radio-tagged adult steelhead in the Walla Walla Subbasin, 2001-2008.

Radio-tagged steelhead distributed upstream to the upper and lower Walla Walla and Touchet Rivers (Figure 12). Hatchery fish appeared to have spawned primarily in the lower Walla Walla (< rkm 59) and Touchet drainages (94%; < rkm 96)); while, natural fish distributed upstream to the upper Walla Walla (32.9%) and lower Touchet (44.3%) drainages, respectively (Figure 12).

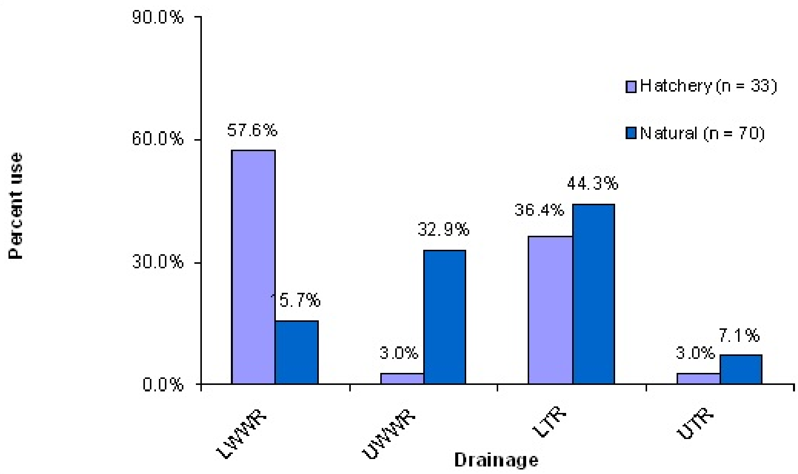


Figure 12. Upstream distribution of radio tagged adult summer steelhead by origin in the Walla Walla Subbasin, 2001-2008. LWWR = Lower Walla Walla River, UWWR = Upper Walla Walla River (rkm 59.1), LTR = Lower Touchet River, Upper Touchet River (rkm 89.9)

Spring Chinook – Between 2004 and 2008, we gastricly inserted transmitters in 32 adult spring Chinook. Study fish were capture using a variety of methods in both the upper and lower Walla Walla River (Mahoney et al. 2009). Roughly 72% of radio-tagged Chinook (n = 23) retained the transmitter and were located upstream in a spawning area between early August and September. Loss of study fish was due to both study effects and natural causes (Figure 13). Future telemetry would be highly desirable if 50 to 120 Walla Walla origin spring Chinook could be captured and tagged in the lower Walla Walla River.

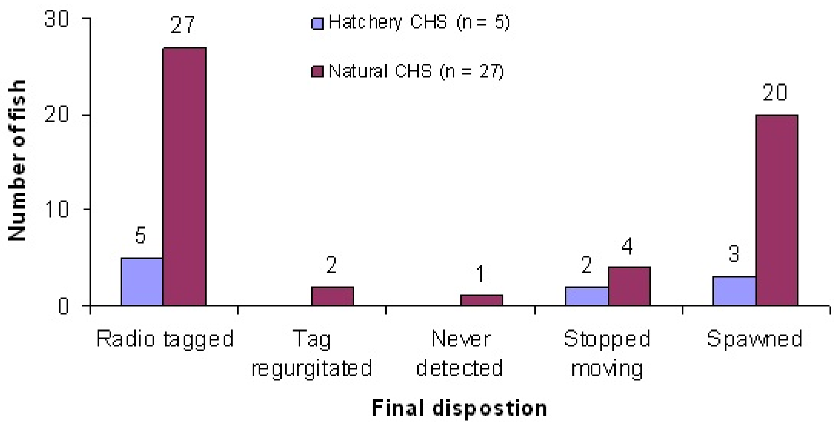


Figure 13. Final disposition of radio-tagged spring Chinook, 2004-2007. Note: never detected may have been harvested, experienced tag malfunction or left system.

Radio-tagged spring Chinook migrated through the lower Walla Walla River between May and June and spawned in the upper Walla Walla and South Fork Walla Walla Rivers between mid August and mid September. Adult return timing to our fixed station receiver in the lower Walla Walla River (rkm 15) was 50% of the observed passage by 12 May, 75% by 23 May, and 90% by 26 May. Run timing through the lower river was likely truncated in late May by low water and high stream temperatures. Return timing to the upper Walla Walla River (i.e., NBD, rkm 71.9) was 50% complete by 23 May, 75% by 10 June, and 90% by 19 June. On average, radio-tagged spring Chinook migrated 91.2 km (n = 23) upstream of the Columbia River and spawned in the upper South Fork Walla Walla River.

Upstream delay at the various in-basin fish facilities was highly variable ranging from a few hours up to two weeks and showed little correlation when plotted against date of detection, mean daily discharge or mean stream temperature. Passage delay may have been related to periodic and indeterminate ladder inefficiencies due to both natural and artificial causes. The percent of successful ladder passage was high at 100% at the various in-basin fish facilities except at Bennington Dam (60%; Figure 14). Although based on a very small sample (n = 5), fish delay at Bennington Dam was likely due to inadequate ladder design causing excessive in-ladder water velocities, low attraction flow; and high water temperatures.

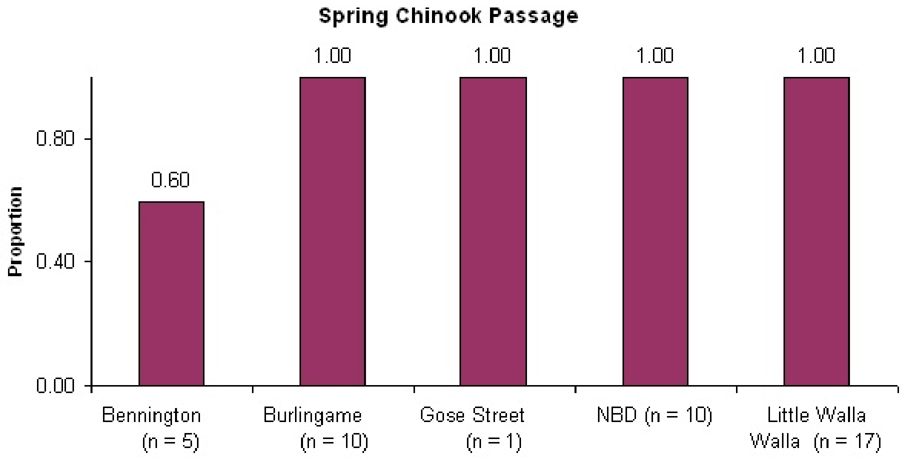


Figure 14. Proportion successful fish passage by radio-tagged adult spring Chinook in the Walla Walla Subbasin, 2004-2005 and 2007. No spring Chinook were tagged in 2006 and 2008.

By 2006, a substantial amount of baseline information concerning habitat and salmon and steelhead stocks was available from this study for the Walla Walla Basin and included in many planning documents (e.g. Subbasin Summary, Subbasin Plan, Walla Walla Limiting Factors Report for WRIA 32, draft Bull Trout Recovery Plan, Snake River Salmon Recovery Plan for SE WA), but there were significant data gaps regarding adult population abundance, population productivity and survivals, especially for steelhead. WDFW and CTUIR joined forces and began the collaborative monitoring project in the Walla Walla Basin in 2007. This project enables us to collaboratively identify priority fish monitoring data gaps and determine appropriate methods of data collection, and assist one another to collect and analyze the data, as well as jointly report the results. In the 2007 proposal to BPA we focused our efforts to prioritize the following high level salmonid indicators: 1) estimating adult salmonid abundance, composition and spawning, 2) population productivity (e.g. smolt production and parent to progeny rates), and 3) survivals.

The purpose of this new collaborative project (circa 2007) is to conduct natural production status and trend monitoring (Mahoney et al. 2009). In the future our project will contribute to CTUIR habitat effectivness montoring project (see Stillwater Sciences 2010), and The CTUIR Walla Walla Hatchery monitoring project (CTUIR and Jones & Stokes 2008). We anticapte the full development of the habitat effectiness monitoring to occur in 2015.

Salmonid performance indicators (Table 1) were adapted from the Councils (NPCC) Working List of High-Level Implementation Indicators http://www.nwcouncil.org/fw/program/hli/Indicators.htm to describe total abundance (i.e. number of salmonids returns) and life-cycle mortality (i.e. mortality at a particular life stage: smolt & freshwater return, including SAR & parent: progeny) to the Walla Walla Basin. The monitoring priorities for our project are consistent with the draft Anadromous Salmonid Monitoring Strategy (ASMS, 2010), the draft Columbia River Basin Monitoring, Evaluation, Research, and Reporting (MERR) Plan (NPPC 2010), and the draft NOAA Fisheries Guidance for Monitoring Recovery of Salmon and Steelhead (Crawford and Rumsey 2009, http://www.nwr.noaa.gov/Salmon-Recovery-Planning/upload/Draft-RME-Guidance.pdf).

Table 1. Current performance indicators and metrics used by the Walla Walla Salmonid Monitoring and Evaluation Project to describe total abundance and life-cycle mortality.

Performance indicators

a Adult abundance

- Adult Returns and Spawning Escapement (spawning surveys and/or adult counts at dams, weir and traps)
- Total population abundance
- Fish per Redd
- Redds per Mile

b Life-cycle mortality

- Population Smolt production annually from the Walla Walla and Touchet rivers
- Smolts per Redd
- Survival & Run Timing
- Smolt to Adult Return (SAR)
- Recruits per Spawner (P:P)

Recent and current primary Project Work Elements (i.e. Deliverables) include: 1) **Adult Enumeration** (i.e. adult salmonids entering the basin to spawn are enumerated using weirs and video; 2) **Spawner Surveys** (i.e. spawning fish and carcasses are enumerated by multiple pass ground surveys; 3) **Out-migrant Monitoring** (i.e. juvenile emigrant population is estimated using rotary screw traps and PIT-tags. Primary project performance indicators describe adults-in and juveniles-out and help inform and adapt salmonid management and recovery actions in the Walla Walla Basin. Current project methods were adapted from the Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmonid and Trout Populations http://www.stateofthesalmon.org/fieldprotocols/.

Beging in 2007, project accomplishments include development of trapping and spawning survey summaries for salmon, steelhead and bull trout from several locations, over many years in the Walla Walla Basin, and improvement of trapping or adult counting efforts for steelhead. A primary focus of our collaborative project is to describe the current state of our knowledge regarding adult abundance and productivity, with an emphasis on improving adult abundance estimates for steelhead, in particular. We also describe and compare the age at return and run composition (e.g. proportion of hatchery origin) for steelhead populations within the basin. In 2007/2008 WDFW began out-migrant monitoring in the Touchet River and will continue that effort to assess production and smolt-to-adult survivals for steelhead from the Touchet River. CTUIR began smolt monitoring in the Walla Walla River in 2002. Steelhead smolt production estimates for the Touchet River in 2008 and 2009 were 62,730 (CL of 43,925-98,298) and 8,188 (CL of 6,602-10,607), respectively. Walla Walla River steelhead smolt production estimates in 2008 were 17,775 ($\pm$2,727) at the upper trap site and 47,894 ($\pm$ 4,771) from the lower trap site.

Below we describe some project results from our collaborative effort in terms of the quantifiable biological objectives including summary tables and graphs of key indicators, with an emphasis on spring Chinook, from Mahoney et al. 2009, http://data.umatilla.nsn.us/fisheries/index.aspx. Previous project reports, data and metadata can be found at the CTUIR website, WDFW website at http://wdfw.wa.gov/fish/papers/se_wash_reports/index.htm, and at www.efw.bpa.gov .

Adults-in. Adult abundance information is incomplete for all stocks in the Walla Walla Basin, especially for steelhead; however, the most complete estimates we have are from the Nursery Bridge Dam (NBD) Fish Ladder. Recent steelhead and spring Chinook returns have increased and are trending up; with roughly 1,100 and 1,200 returns; respectively in 2010 (Figure 15). Improved trapping and counting facilities were completed at the Dayton Dam on the upper Touchet River in spring of 2009. The 2010 preliminary returns at that site are over 750 adult steelhead, plus over 200 steelhead estimated in Coppei Creek in 2010. Some major accomplishments include: steelhead abundance solely at NBD having exceeded the Walla Walla steelhead ESA recovery goal of 1,000 twice since 2000; and a nearly six fold increase in Chinook returns since the start of the program in 2000 (Figure 15). It is a priority for this project to improve accounting for returning steelhead, Chinook and bull trout. Future work includes implementation of additional fish counting sites lower in the basin to better estimate total returns.

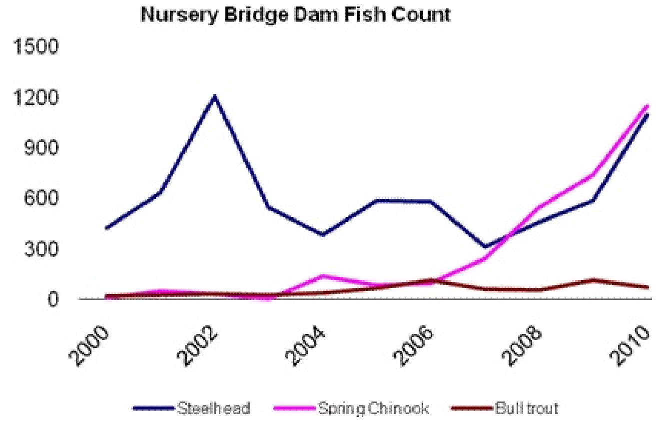


Figure 15. Count of adult fish passage at Nursery Bridge Dam fish ladder on the Walla Walla river (river mile 44.7) in Milton-Freewater, Oregon, 2000 to 2010.

Spawning Escapement (CHS example): The Tribes spring Chinook reintroduction goal is to meet a return average of 5,500 adults back to the mouth of the Walla Walla River and 2,750 spawners (Table 2). Our initial results indicate the program to be trending towards our goal. Spring Chinook were extirpated from the basin early in the 20th century; their reintroduction to the basin began in 2000 with the Tribe releasing surplus adults. 2004 was the first time in nearly eighty years that Walla Walla origin spring Chinook returned in significant numbers (Figure 16). Since 2005, roughly 250,000 Carson stock spring Chinook smolts have been allocated (under US v. Oregon) for annual release to the basin; and in 2007, the first 4-year fish returned from these smolts. Adult returns to NBD are promising, with nearly a six-fold increase in Chinook since 2004 (Figure 16). The relatively high proportion of hatchery returns shown in Figure 16 is a direct result of the smolt release. In point of order, the usage here of the terms "natural and hatchery" refer to whether the fish were spawned in gravel or not; regardless of their genetics. In other words, natural returns are progeny of adults that spawned over gravel in the river. Moreover, we consider all subsequent generations of reintroduced fish to be naturalized or natural regardless of their parentage or pedigree. Thus, all the fish shown in Figure 16 could also be considered hatchery-origin fish, with "natural" returns having come from the stream gravel; while, hatchery returns were reared on concrete and then direct released to the stream as smolts.

Table 2. CTUIR Walla Walla River Spring Adult Chinook Return Goals.

Return Goal Type	**Upper Mainstem/ South Fork**	**Mill Creek**	**Touchet River**	**Total Return Goal (to WWR mouth)**
Hatchery	2,750	N/A	N/A	2,750
Natural	1,100	750	900	2,700
Total	3,850	750	900	5,500
Total Return Goal (to WWR mouth)	**All Harvest***	**Hatchery Broodstock**	**Pre-Spawning Mortality**	**Spawners**
5,500	2,100	350	300	2,750

* Includes both Indian and non-Indian (Oregon and Washington) harvest assumed at 50% each.

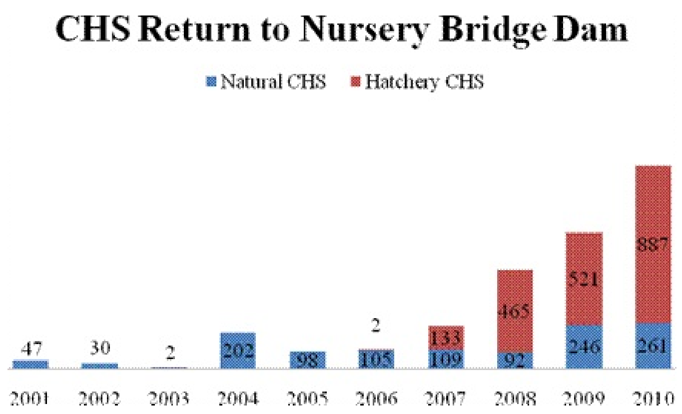


Figure 16. Number and origin of Spring Chinook return to Nursery Bridge Dam, 2001 to 2010.

Spring Chinook spawning escapement was estimated as the sum of all returns plus outplants and has ranged between roughly 100 and 1,200 fish since 2000 (Figure 17). Pre-spawn mortality above NBD (i.e. the headwaters) was considered negligible. Fish per redd was estimated as spawning escapement divided by the number of redds observed during multiple-pass census surveys yielding a mean adult per redd estimate of 2.1; suggesting, that most fish are spawning.

In the near future, we expect an even higher adult production by using local brood stock and onsite full term rearing as proposed in the Walla Walla Spring Chinook Hatchery Master Plan (CTUIR & Jones and Stokes 2008).

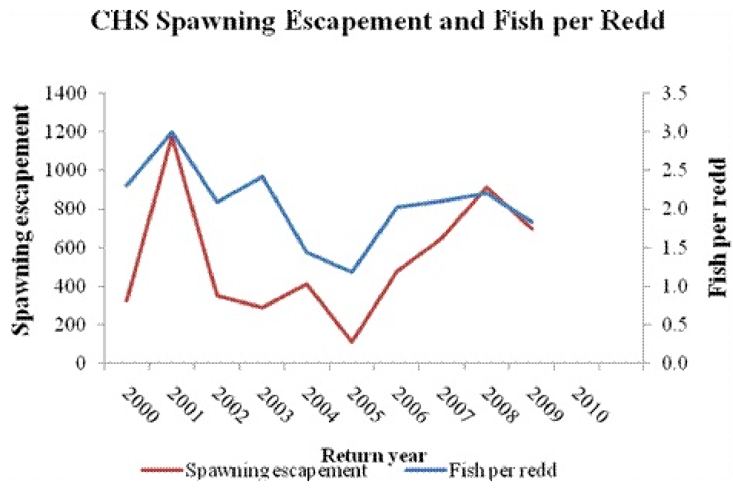


Figure 17. Spring Chinook spawning escapement and fish per redd in the Walla Walla Basin 2000 – 2009.

Redds per Mile. Spring Chinook spawner density in Walla Walla Basin ranged from roughly 2 to 35 redds/mile (Figure 18). Most fish spawned in the South Fork Walla Walla Rivers between river mile five and fourteen. At present, roughly 11 miles of fully seeded spawning habitat has a mean of 28.5 redds per mile (Figure 18, mile 5 thru 14). As future returns increase we expect spawning to be fully seeded throughout all 70.3 miles of available habitat (Table 3).

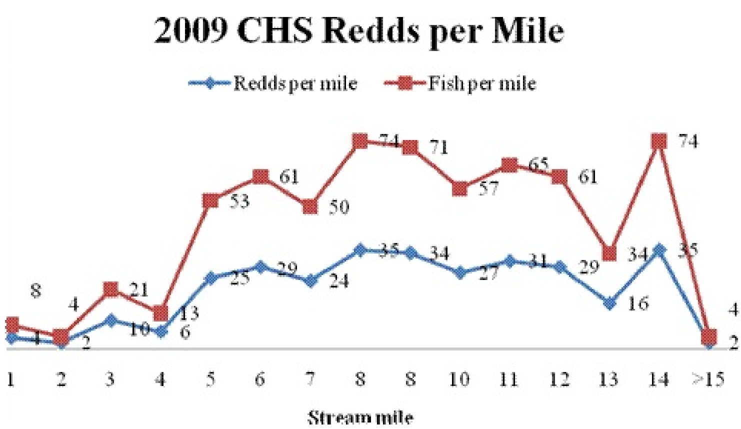


Figure 18. Number of redds per mile and fish per mile for spring Chinook spawning in the South Fork Walla Walla River, 2009.

Table 3. Estimated miles of spring Chinook spawning habitat in the Walla Walla Basin.

Miles-Stream

18.8 - South Fork Walla Walla River [river mile 50.5 to 68.5]

10.7 – Upper Mainstem: [river mile 39.8 – 50.5]

13.1 – Mill Creek [river mile 15.4 to 26.6]

22.7 – Touchet Tributaries [8.7 in the Wolf Fork and estimated 14 miles available in the North Fork Touchet R.]

5.0 – Upper Touchet Mainstem [river miles surveyed by WDFW 5.0 in the Upper Touchet R.]

70.3 – Total Miles

Recruits per Spawner. Spring Chinook recruit per spawner has averaged roughly 0.5 adult returns to McNary Dam, since 2000; reflecting the need for continued hatchery supplementation. Adult replacement was achieved in 2009 for the 2005 Brood (Figure 19). As future adult returns from the direct smolt releases increase and subsequently spawn we expect to trend towards and exceed replacement regularly; especially, given the excellent spawning and rearing habitat available in the upper basin and acknowledging the ongoing stream flow and habitat recovery in the lower Walla Walla.

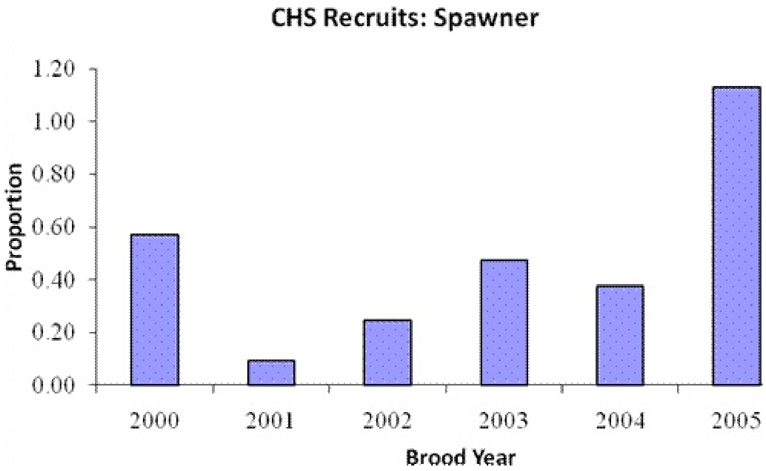


Figure 19. Walla Walla origin spring Chinook recruits per spawner brood year 2000 to 2005.

Juveniles-out. Outmigrant monitoring in the basin has expanded and improved in recent years. Most of the juvenile life history information for this project is collected using PIT-Tags and the Pacific States Fisheries Marine Commission PTAGIS data base. We use up to six rotary screw traps and 10 to 12 in-basin arrays to sample and monitor PIT-tagged smolts (Figure 20). Since 2002, CTUIR has PIT-tagged roughly 68,000 outmigrants (Figure 21). WDFW has PIT tagged an additional 2,800 naturally produced steelhead in the Touchet River, and over 93,000 hatchery steelhead (since 2001) in the Touchet and Walla Walla rivers. In 2011, CTUIR and WDFW expect to PIT-Tag at least 15,000 natural and 25,000 hatchery smolts. Based on PIT-tag recapture at rotary traps, Chinook smolt production from the basin has increased from about 15,000 to 32,000 between 2005 and 2009 (Figure 22).

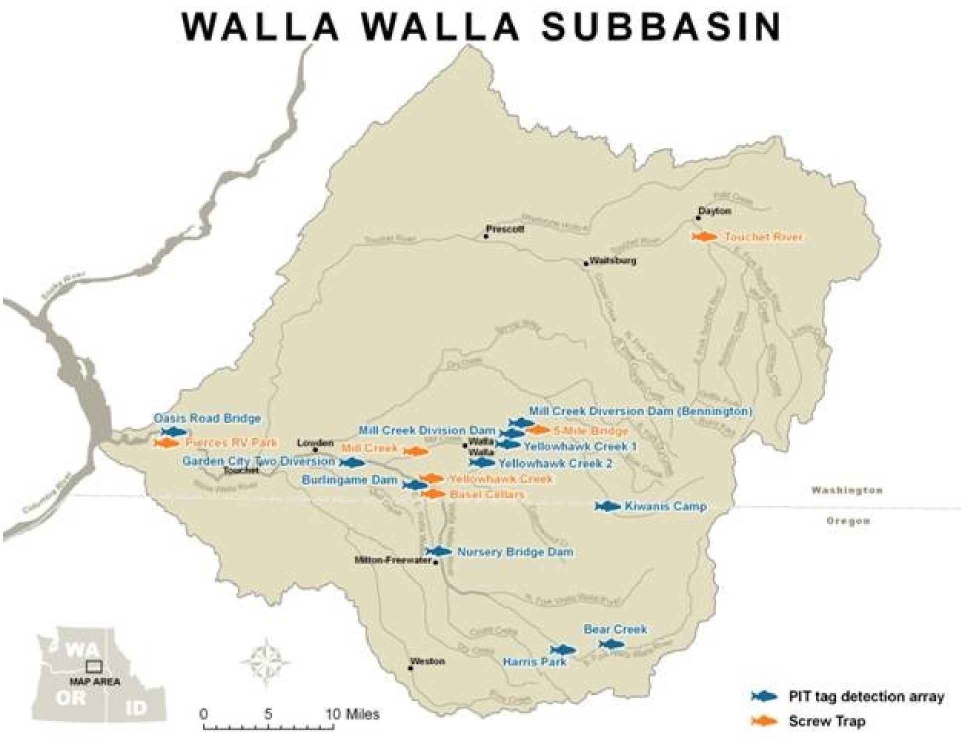


Figure 20. Location of screw traps and PIT-arrays in the Walla Walla Subbasin March 2010. Traps and arrays were operated by CTUIR, WDFW, USFS, and USFWS.

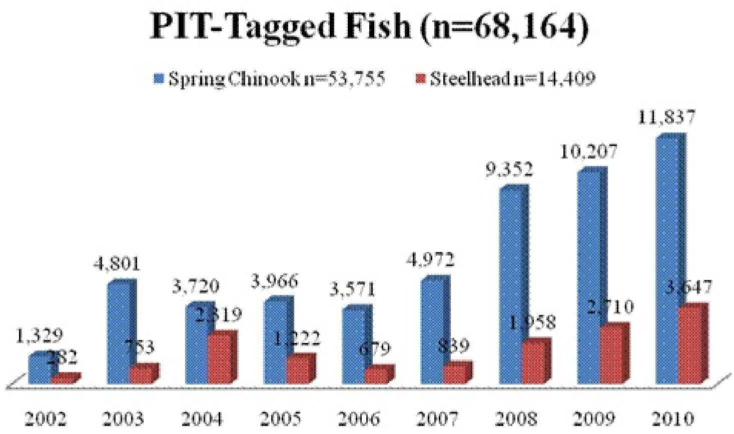


Figure 21. Number of PIT-tagged smolts released by CTUIR in the Walla Walla Basin, 2002 – 2010.

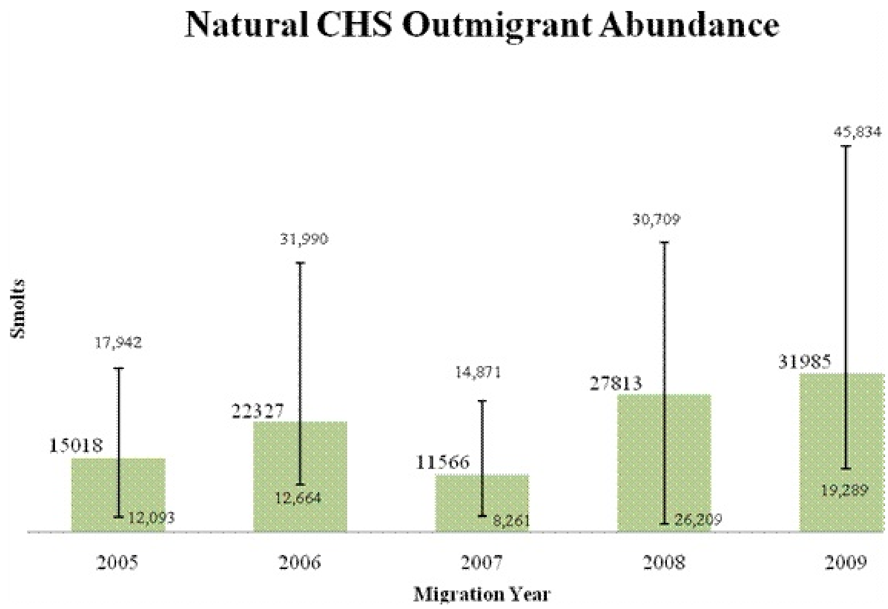


Figure 22. Smolt abundance estimates (95% C.I.) for natural origin spring Chinook emigrating from the Walla Walla Subbasin 2005 -2009. Smolt abundance based on PIT-tag recapture at the lower Walla Walla screw trap (RM 9).

Smolts per Redd. Based on smolt emigrant abundance at the lower Walla Walla screw trap (i.e. total smolt production from the basin) spring Chinook smolt to redd production has varied from 125 to 78 smolts per redd (Figure 23). Smolts per redd production has been flat probably due to low outmigrant survival in the lower Walla Walla River and not due to a lack of carrying capacity in the upper basin.

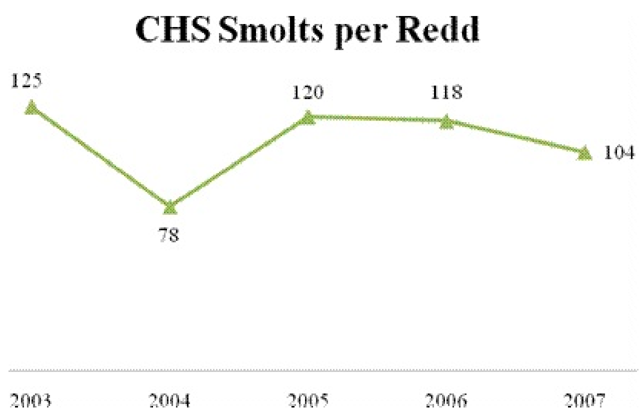


Figure 23. Walla Walla origin spring Chinook smolts per redd brood year 2003 to 2007; based on smolt emigrant abundance at the lower Walla Walla screw trap (RM 9).

Survival and Run Timing. Since 2002, we have operated a number of rotary screw traps in the upper and lower Walla Walla River. Based on recaptures, PIT-tagged yearling Chinook migrated in the fall from the South Fork Walla Walla River and over-wintered in the mainstem Walla Walla River. We approximate overwinter mortality at about 34%. Fish sampled in the spring at the lower Walla Walla screw trap (RM 9) were detected at McNary Dam usually within two weeks of release.

Mean survival to McNary Dam was 38% and 29% for natural and hatchery smolts; respectively (Figure 24). Mean survival from the upper and lower basin to McNary Dam was 21% and 55%; respectively (Figure 25). Based on PIT-tag detections to McNary Dam, on average 84% and 91% of natural and hatchery smolts had passed the dam by mid-May (Figure 26); smolts arriving later than this probably have little chance of reaching the ocean.

Mean travel time to McNary between the 10th and 90th percentiles was 31 and 21 days for natural and hatchery smolts; respectively. This significantly shorter travel time (t-test one-tailed: P <.01) by hatchery fish was likely due to their later release timing (usually) in early April.

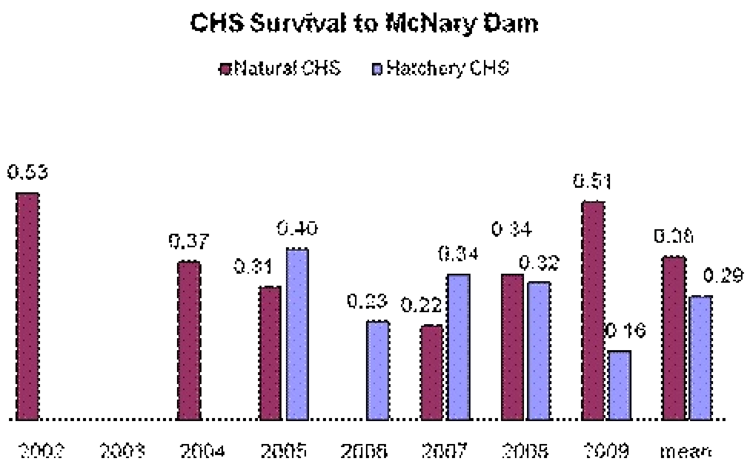


Figure 24. Natural and hatchery origin survival for spring Chinook smolts from the Walla Walla basin 2002 – 2009.

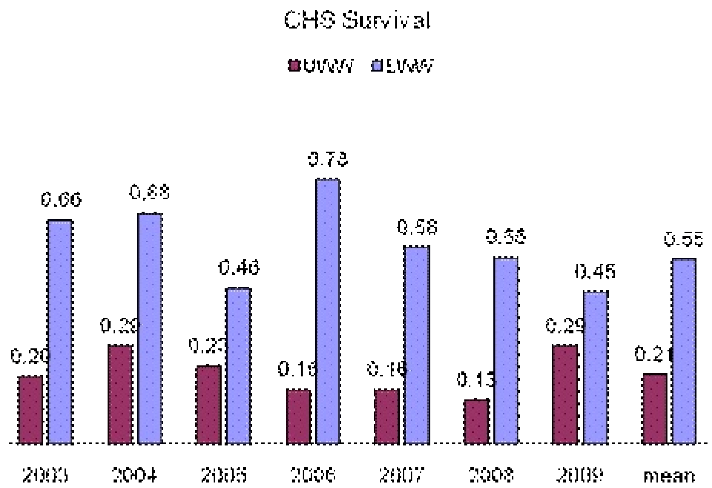


Figure 25. Survival of natural spring Chinook smolts from the upper and lower Walla Walla basin 2002 – 2009.

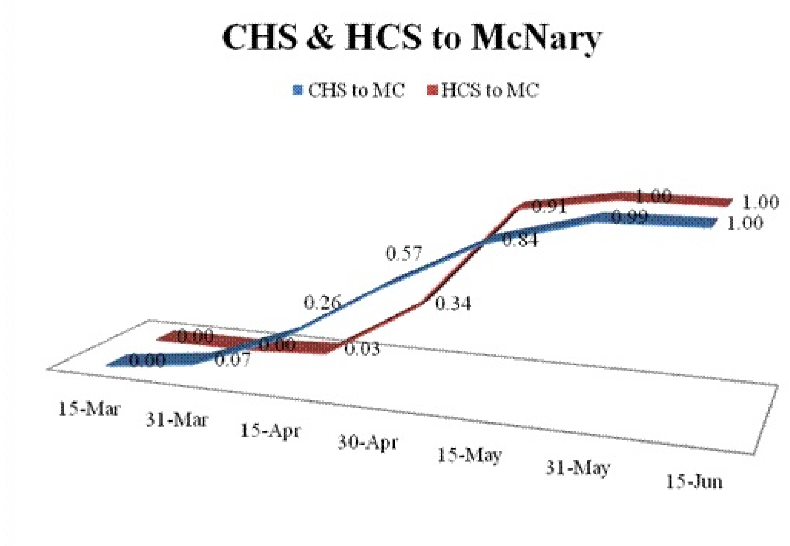


Figure 26. Cumulative run timing of natural (CHS) and hatchery (HCS) spring Chinook to McNary Dam. Based on PIT-tag detections between 2005 and 2009.

Smolt to Adult Return (SAR). Our SAR goal is predicated on the theory that current conditions in the basin support rearing densities and loading rates, adequate to meet a mean SAR of 0.55% as identified under the Preferred Alternative (i.e. a new South Fork Walla Walla Hatchery) in The Walla Walla Hatchery Master Plan (CTUIR & Jones and Stokes 2008). Our initial results show a mean SAR to Bonneville Dam of 0.36% and 0.32 % for natural and hatchery spring Chinook smolts; respectively. Mean adult loss between Bonneville and McNary dams was 6% for both natural and hatchery adults; likewise, mean SAR back to the Walla Walla River was 0.25% and 0.22% (Figure

27). Annual SAR from the Walla Walla back to McNary Dam has ranged from 0.10% (n=5) to 0.63% (n=51, Figure 28). In the future, we expect to achieve higher SARs via a combination of robust habitat and hatchery actions including stream flow augmentation and adaptive hatchery management.

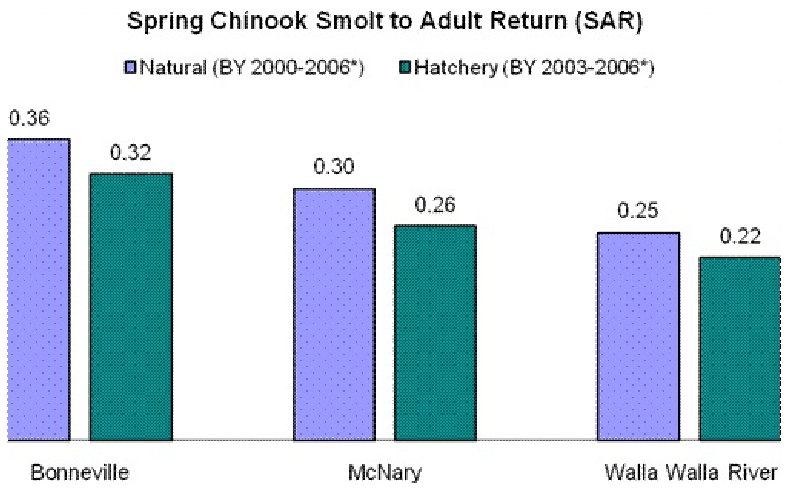


Figure 27. Smolt to Adult Return for natural and hatchery spring Chinook smolts PIT-tagged and released in the Walla Walla River.

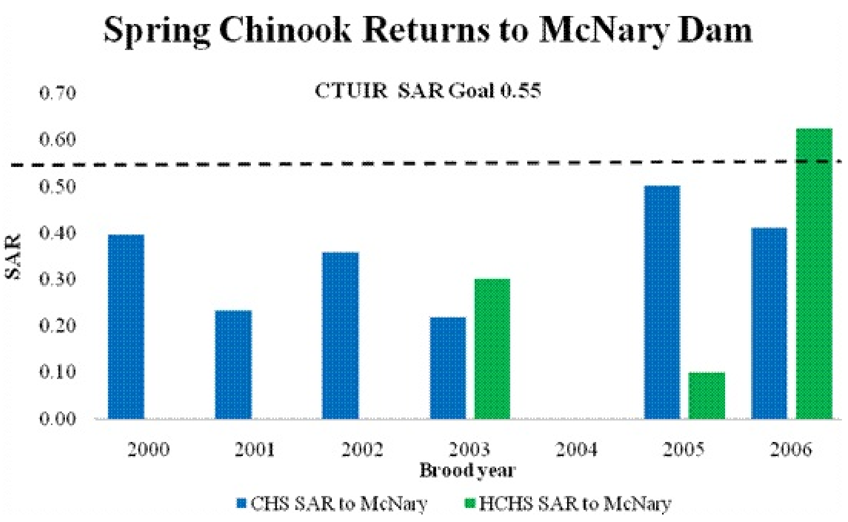


Figure 28. Walla Walla spring Chinook SAR based on PIT-tag returns to to McNary Dam, brood year 2000-2006.

Assessments

Independent Scientific Review Panel Assessment:

Completed Date:	8/31/2006
Review:	FY07-09 Solicitation Review
Final ISRP Rating:	Meets Scientific Review Criteria (Qualified) (View Comments)
BPA Response Rating:	<none>

Council Budget Recommendation:

Completed Date:	10/23/2006
Review:	FY07-09 Solicitation Review
Recommendation:	Fund (View Comments)

Response to past ISRP and Council comments and recommendations:

Our project has been modified to respond to the ISRP recommendations to 1) prioritize M & E actions to answer key management questions; 2) provide quantitative data of findings to date that provide detailed specifics on the scientific rigor of this collaborative project; 3) the need for this and directly related projects to undergo a site review; 4) provide justification for continuing this project based on its results; and finally 5) link project objectives to a clear program of data driven adaptive management. We respond to these five points as follows:

1) In December of 2005, WDFW, ODFW and CTUIR agreed to collaborate on a fish monitoring project proposal to the Northwest Power and Conservation Council's FY2007 F&W Program Solicitation. Expanded and modified fish monitoring plans that we proposed were recommended for funding by the ISRP and the co-manager reviews, but BPA required WDFW and CTUIR to submit a new, limited proposal in January 2007 that led to a Prioritized M & E project that focused on the key management questions of what is the adult abundance and natural production, and how far are we from ESA recovery or other goals for salmonids. We did this by collecting Viable Salmonid Population (VSP) criteria including estimates of abundance, productivity, survival rates, and distribution of reintroduced spring Chinook (O. tshawytscha) salmon, ESA-listed summer steelhead (O. mykiss), as well as for bull trout (S. confluentus) relative abundance.

2) Formerly, fish managers were unable to provide adequate annual estimates of total steelhead or spring Chinook abundance or production in the Walla Walla Basin. These

are needed to address primary VSP monitoring needs for ESA recovery or to provide trend data for evaluation of hatchery and habitat programs and their effects on naturally produced fish. We present quantitative project results in the form of Chinook standardized primary performance measures (see above) to summarize Adults-in and Juveniles –out between 2000 and 2009. Above under Major Accomplishments we describe results in terms of the quantifiable biological objectives including summary tables and graphs of key metrics as taken from Mahoney et al. 2009 , http://data.umatilla.nsn.us/fisheries/index.aspx .

3) This program welcomes the opportunity during this 2010 Categorical review for an independent, comprehensive, site review to assess the integration of M&E data with management decisions.

4) Project results were used to help describe salmonid status and trends and adapt salmonid management and recovery goals in the basin. Our findings are applied to a variety of planning and recovery efforts, most notably the Walla Walla Spring Chinook Hatchery Master Plan (CTUIR 2008) and Draft Spring Chinook Reintroduction Hatchery and Genetic Management Plan (CTUIR 2009a), Walla Walla Subbasin Flow Augmentation Recommendations (CTUIR 2009b), the Walla Walla and Touchet Steelhead HGMPs (WDFW 2009), Snake River Salmon Recovery Planning for Southeast Washington (SRSRB 2007), Middle Columbia River Steelhead Distinct Populations Segment Recovery Plan (NMFS 2009), the Walla Walla Water Management Initiative (House Bill 1580), the Walla Walla Watershed Plan, Walla Walla Management Partnership (RCW 90.92), and the Walla Walla Management Plan Implementation (2005-2009) (WWW.wallawallawatershed.org). The Lower Snake River Compensation Plan (LSRCP) hatchery steelhead evaluation activities by WDFW in the Walla Walla and Touchet rivers (Bumgarner et al. 2009) are integrated and coordinated with this collaborative project between CTUIR and WDFW.

Moreover regarding justification for continuing this project, adaptive fisheries management simply is not possible without applied monitoring and evaluation. Put simply, you can't get where you going if you don't know where you are.

An applied example how this projects results relate in terms of the quantifiable biological objectives of the Fish and Wildlife Program, is that after nearly a century of no spring Chinook or salmon fishing in the Walla Walla River, CTUIR opened a tribal fishing opportunity in June 2010. For the past 20 years, the CTUIR and BPA has been working to bring back spring Chinook to the Walla Walla River by sponsoring and implementing water and fish restoration projects in the basin. The tribe began releasing spring Chinook in 2000 and adult returns from these efforts began in 2004. Adult returns have rapidly increased from about 200 in 2004 to nearly 1,200 in 2010. Our monitoring and evaluation project is both "speedometer and barometer" for these ongoing efforts; in other words, we describe program status and trends.

5) And finally, our initial findings indicate that spring Chinook reintroduction to the basin is a viable management strategy. This projects primary product has been both quantitative and qualitative information; which, in turn has been used to benefit fish and wildlife and the ecosystem.

Adaptive Management

Management Changes:
As stated above: This project conducts monitoring and evaluation of natural production, limited tributary habitat conditions, and hatchery research, in order to provide data in support of salmonid management. Our results have driven the Tribes Spring Chinook Reintroduction Program, The Walla Walla Hatchery Master Plan, USACE/CTUIR Flow Augmentation Strategy, and development of The Tribes Habitat and Bio-monitoring plan, as well as contributed substantially to the Salmon Recovery Plan for southeast Washington, the Walla Walla Subbasin Plan, the Walla Walla Limiting Factors Report, the Mid-Columbia Steelhead Recovery Plan and other planning or implementation documents. These Tribal Accords funded actions are intended to protect and rebuild the fish and wildlife populations affected by federal hydropower development in the Columbia River Basin. A few examples of smaller "on the ground" actions taken in response to project findings include: structural modification to Bennington Dam and replacement of the Gose Street fish ladders to improve (open) adult fish passage in Mill Creek; modification to spring Chinook adult out planting strategy to reduce redd superimposition; modification of the smolt outplanting schedule to improve tributary survival, identification and subsequent removal of numerous passage barriers; Tribal harvest monitoring; fish salvage and adult fish trap and haul. Minimum stream flows were set in the Walla Walla Basin partly based on our IFIM initiated studies.

Project Documents & Reports

Public Attachments in Pisces

ID	Title	Type	Period	Contract	Uploaded
00013171-1	Walla Walla River Basin Natural Production Monitoring and Evaluation Project	Progress (Annual) Report	9/1998 - 12/2002	13171	6/2/03
00020678-1	Walla Walla River Basin Natural Production Monitoring and Evaluation Project	Progress (Annual) Report	1/2004 - 12/2005	20678	11/1/06
P103731	Assessment of Salmonids and their habitat conditions in the Walla Walla River Basin within WA	Progress (Annual) Report	3/2006 - 3/2007	33657	9/26/07
P105899	Walla Walla Basin Natural Production Monitoring and Evaluation Project	Progress (Annual) Report	1/2006 - 5/2007	33613	3/14/08
P114492	2007 - 2008 The Walla Walla Subbasin Collaborative Salmonid Monitoring and Evaluation Project	Progress (Annual) Report	3/2007 - 2/2009	41915	12/11/09
P116984	Walla Walla River Basin Natural Production Monitoring & Evaluation Project 2003 Report	Progress (Annual) Report	1/2003 - 12/2003	13171	7/7/10

Other Project Documents on the Web

CTUIR Fisheries reports & database
WDFW website with fish reports for SE WA, including the Walla Walla Basin annual reports
Assessment of Salmonids and Their Habitat Conditions In the Walla Walla River Basin within Washington: 2006 Annual Report
Genetic Characterization of Bull Trout from the Walla Walla River Basin, April 2007
Assessment of Salmonids and Their Habitat Conditions In the Walla Walla River Basin within Washington: 2005 Annual Report
Assessment of Salmonids and Their Habitat Conditions In the Walla Walla River Basin within Washington: 2004 Annual Report
Assessment of Salmonids and Their Habitat Conditions In the Walla Walla River Basin within Washington: 2003 Annual Report
Assessment of Salmonids and Their Habitat Conditions In the Walla Walla River Basin within Washington: 2002 Annual Report
Assessment of Salmonids and Their Habitat Conditions In the Walla Walla River Basin within Washington: 2001 Annual Report
Assessment of Salmonids and Their Habitat Conditions In the Walla Walla River Basin of Washington: 2000 Annual Report
Assessment of Salmonid Fishes and Their Habitat Conditions In the Walla Walla River Basin of Washington: 1999 Annual Report
Assessment of Salmonid Fishes and Their Habitat Conditions In the Walla Walla River Basin: 1998 Annual Report

Project Relationships

Project Relationships: This project Merged From 2000-038-03 effective on 11/30/2009
Relationship Description: Project 2000-038-03 is an expansion of Walla Walla Hatchery M&E work. Therefore for contract efficiencies, all M&E work should be combined into a single project. The expanded work will still need ISRP review.

Additional Relationships Explanation:

The CTUIR, WDFW and Oregon Department of Fish and Wildlife (ODFW), share fish and wildlife co-management responsibility with the Federal Caucus, regional authorities, and local governments in the Walla Walla Basin. In December of 2005, WDFW, ODFW and CTUIR agreed to collaborate on a fish monitoring project proposal to the Northwest Power and Conservation Council's FY2007 F&W Program Solicitation. Expanded and modified fish monitoring plans that we proposed were recommended for funding by the Independent Science Review Panel and the co-manager reviews, but BPA required WDFW and CTUIR to submit a new, abridged proposal in January 2007 for continuation of their existing contracts with BPA. ODFW did not have an existing BPA contract so they did not remain one of the collaborators on this project.

This CTUIR and WDFW collaborative monitoring project is a modification and continuation of two BPA funded monitoring projects in the Walla Walla Subbasin (Projects #199802000 and 200003900) implemented by WDFW and CTUIR, respectively. This revised collaborative project is a more focused and logical adaptation of the existing projects to ensure a coordinated, comprehensive monitoring effort in the basin and it is an integral part of the Walla Walla salmonid restoration efforts. It is the appropriate monitoring component to measure the tributary natural production benefit from local and regional habitat (for spring Chinook), hatchery, harvest, and hydrosystem efforts. The project cooperates and coordinates with the Walla Walla Basin Watershed Council (WWBWC), the Hudson Bay District Improvement Company (HBDIC), the Walla Walla River Irrigation District (WWRID), the Gardena Farms Irrigation District (GFID), the Washington Department of Ecology (WDOE), Oregon Department of Environmental Quality (ODEQ), the Tri-State Steelheaders (TSS), Snake River Salmon Recovery Board, Columbia County Conservation District and the Walla Walla County Conservation District, WDOE funded Watershed Lead Entities, and other local entities, as well as a large federal collaboration including the USFWS, LSRCP, USFS, NOAA, USACE, USFS, as well as ODFW and USGS/Utah State University.

Many aquatic habitat enhancement projects have been implemented with state or federal funds in the basin in the past 10-15 years. The NPCC has approved and funded several habitat enhancement projects with the CTUIR, WDFW, and the Walla Walla and Columbia Conservation Districts. The WWBWC has implemented habitat restoration projects in the Oregon portion of the basin (some with OWEB funding) and the Walla Walla Watershed Alliance, TSS, WDFW, WDOE, conservation districts and others have completed many restoration projects on the Washington side of the basin with both state and other federal funding. In addition, the Columbia County Conservation District has used state funding for Instream flow and water quality studies in the Touchet River. WDFW and DOE have used both state and BPA funding for IFIM studies in parts of the Walla Walla River and Mill Creek. State and federal funding has been used by WDOE and OWRD for total maximum daily load (TMDL) studies. There is a current effort to implement a bi-state agreement to conserve and protect instream water and develop a Habitat Conservation Plan (HCP) between local governments, irrigators, citizens and the USFWS and NMFS. The BPA and Washington's Salmon Recovery Funding Board (SRFB) have funded many habitat restoration projects, including hundreds of water intake screens, and other fish passage restoration efforts throughout the basin. All these efforts in the Walla Walla subbasin are for planning or implementing watershed and fish stock restoration programs, collecting additional habitat or fish information, or for providing and protecting instream flows and naturally produced salmonids.

Two other fish monitoring and evaluation projects in the Walla Walla Subbasin are closely connected and integrated with our project. These studies include the WDFW steelhead hatchery evaluation efforts funded by the USFWS under the LSRCP, and the USFWS bull trout studies in the subbasin.

The LSRCP hatchery operated by WDFW releases, and associated WDFW hatchery evaluation program, monitors marked and tagged hatchery steelhead from Lyons Ferry Hatchery. These hatchery fish include a native stock (Touchet endemic) and an out of area stock produced at Lyons Ferry Hatchery (LFH stock). The monitoring program also includes some monitoring of natural steelhead production in the Touchet River. That program does adult trapping, and steelhead redd surveys upstream of Dayton, which is also the hatchery release location within the Touchet River watershed. Our project currently cost shares smolt trapping efforts with the WDFW Snake River Lab. in Dayton. We plan to fund one Touchet River smolt trap as a cooperative effort under state/LSRCP funding and another smolt trap under our BPA project. Operating both traps should enable us to finally reach our PIT tagging goals for naturally produced steelhead so that we will be able to estimate adult steelhead abundance in the Touchet based on smolt production estimates and SARs from PIT tagged natural origin steelhead. Our project is working with the WDFW Snake River Lab. to improve monitoring efforts for naturally produced fish at Dayton, or upstream, as well as filling data gaps in their study by including monitoring downstream of Dayton and in the Walla Walla and Mill Creek portions of the subbasin. Many of the same strategies and methods for estimating adult steelhead abundance, productivity, or producing survival estimates (from upper smolt trap to lower, SAR and adult:adult), that are being used by WDFW in the Tucannon River (including the expanded Tucannon PIT tagging: Fast track Project 2010-042-00) and the upper Columbia River are being implemented in the Touchet River steelhead monitoring. We are able to cost share efforts to provide smolt production estimates and improve adult return estimation or escapement, and survival estimates based on PIT tags. Our BPA funded project is filling many VSP data gaps for naturally produced steelhead, bull trout and spring Chinook.

The USFWS bull trout monitoring project (funded by USFWS) is focused on the mainstem Walla Walla River and Mill Creek. This project emphasizes the use of PIT tagged bull trout and establishing and operating a series of PIT arrays within the subbasin. CTUIR and WDFW are working with the USFWS to share PIT tagging effors and data as well as cost share installation and operation of PIT arrays. This partnership benefits both the USFWS and CTUIR/WDFW studies by improving data collection, reducing data gaps and expanding capabilities of each study without increasing costs to each study. A recent example of our partnership is WDFW and USFWS are currently coordinating to cost share installation and maintenance of a PIT array in the Touchet River downstream of Dayton or Waitsburg to be installed in 2010. This array should enable the USFWS to determine whether bull trout PIT tagged in Dayton by WDFW are moving downstream into the middle or lower Touchet River during winter/spring. It should also enable WDFW's LSRCP and BPA funded projects to determine steelhead survivals (e.g. SAR) and adult abundance in the Touchet River using PIT tags. Similar cooperation and partnerships exist in the Walla Walla River and Mill Creek between CTUIR and USFWS studies.

Below is a partial listed of other related projects that are mostly BPA funded (excludes many projects funded by SRFB, OWEB, WDOE, USFWS, etc.- see SRSRB Three year implementation list for more project specific details (SRSRB, http://www.snakeriverboard.org/leadentity/Feb103yrplan.pdf):

Salmonid Research Monitoring and Evaluation
• CTUIR Biomonitoring of Fish Habitat Enhancement (2009-014-00)- (We will provide data for this project in about three years).
• CTUIR Hyporheic Flow Assessment (2007-252-00)
• USACE Mill Creek Fish Passage Enumeration (Mill Creek BiOp)
• USFWS/USFS Bull Trout Research
& WDFW Tucannon R steelhead monitoring (2010-042-00)

Lamprey and Mussel Research and Restoration
• CTUIR Pacific Lamprey Research and Restoration (1994-026-00)
• CTUIR Freshwater Mussel Research and Restoration (2002-037-00)

Watershed Enhancement and Rehabilitation Projects
• CTUIR Walla Walla River Fish Habitat Enhancement (1996-046-01)
• Columbia County Conservation District Habitat Enhancement

Passage Facility Construction and Operation on the Walla Walla River
• Walla Walla River Fish Passage Operations (2000-033-00)
• Walla Walla Juvenile and Adult Passage improvements (1996-011-06)
• Umatilla Tribe In-stream Flow Restoration (2008-206-00)
• Measure stream discharge and contribute to "seepage runs" for water budget modeling
• Walla Walla Fish Passage Operations and Maintenance (Gardena Farms Irrigation District (2007-217-00)

Hatchery Construction and Operations Projects
• CTUIR Walla Walla Spring Chinook Hatchery (2000-038-00)
• CTUIR Walla Walla Steelhead Hatchery (2008-209-00)
• WDFW Lower Snake River Compensation Program (Touchet River & Walla Walla River Hatchery Steelhead Evaluations)

Wildlife
• CTUIR Rainwater Wildlife Area Operations (2000-026-00)

Outreach
• Develop Plan for Outreach and Education about CTUIR Fish and Wildlife Projects

Focal Species

Primary Focal Species

Chinook (O. tshawytscha) - Mid-Columbia River Spring ESU
Steelhead (O. mykiss) - Middle Columbia River DPS (threatened)

Secondary Focal Species

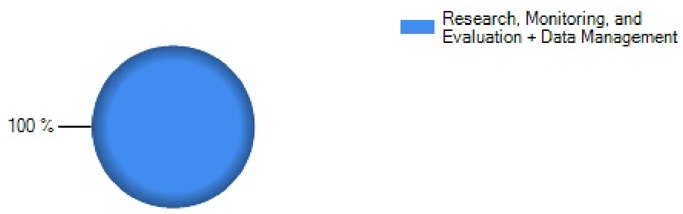
Trout, Bull (S. confluentus) (threatened)

Emerging Limiting Factors

Yes; but, these limiting factors are well beyond the scope of our project.

Types of Work

Work Classes



Work Elements

157. Collect/Generate/Validate Field and Lab Data
160. Create/Manage/Maintain Database
162. Analyze/Interpret Data
70. Install Fish Monitoring Equipment
158. Mark/Tag Animals
159. Transfer/Consolidate Regionally Standardized Data
161. Disseminate Raw/Summary Data and Results

RM&E

What type(s) of RM&E will you be doing?

Status and Trend Monitoring

Where will you post or publish the data your project generates?

Name	URL
RMIS - Regional Mark Information System	http://www.rmis.org
DART - Data Access in Real Time	http://www.cbr.washington.edu/dart/
PTAGIS	http://www.ptagis.org/ptagis/index.jsp
SalmonScape	http://www.wdfw.wa.gov/mapping/salmonscape/
StreamNet	http://www.streamnet.org/datastore_search.cfm
CTUIR Fisheries Web Site	www.data.umatilla.nsn.us/fisheries/index.aspx
WDFW Web site	www.wdfw.wa.gov

Tagging

Please explain why the tagging technology used in this project was selected. Include a discussion of how the cost and applicability of the selected tagging technology influenced your selection. Enter "NA" if not applicable to your project.

Since the late 1980s, PIT-tags have been the main tool used for monitoring salmonid survival, migratory behavior, and timing in the Basin. We use the FDX PIT tag technology as this is the tag used in the Basin for anadromous salmonid research and monitoring. Starting with the 2007 salmon outmigration year, the standard 12-mm PIT-tag model became the SST tag (TX1400SST) manufactured by Digital Angel. This tag was designed to work in large antennas better than the ST tag, which has been the standard tag for the Basin since 2003.

Tag cost. Tags are relatively inexpensive (about $2/tag). A cheaper tag means that large numbers of fish can be tagged. This enables the fisheries community to tag groups of fish from the same hatcheries every year to learn more about year-to-year variation in migration and survival.BPA and the USACE have negotiated fixed prices for the tags they will purchase until 2010. The price per SST tag in 2007 was $1.90, will be $1.80 in 2008 and 2009, and $1.70 in 2010.

Describe any of the innovative approaches that your projects proposes that are in direct support of the ISAB/ISRP's recommendations to improve techniques for surgical insertion of internal tags, or external attachment of acoustic, radio, or data storage tags that reduce handling time, fish injury and stress. Enter "NA" if not applicable to your project.

CTUIR recently, moved from manual insertion via hyperemic syringe to using the pre-loaded tag trays and needles and Bio-mark implant gun. Pre-loads and the implant gun make for quick, easy, and clean surgical insertion of PIT-tags; with less apparent fish injury and higher tag retention.

For specific tagging technologies, please address the tagging report's recommendations for genetic markers, otolith thermal marking, PIT tags, acoustic tags and radio tags for improving technologies in any way applicable. Enter "NA" if not applicable to your project.

Below we address the tagging report's six questions:

1) Outmigrant monitoring in the Walla Walla Basin has expanded and improved in recent years. Most of the juvenile life history information for this project is collected using PIT-Tags and the PSFMC PTAGIS data base. Archiving and sharing of PIT-tag data are coordinated by the PSMFC. Currently, our PIT tagging is associated with specific in-basin studies. However, our tagging project designs are robust, allowing tagged fish to also be used for integrated life-cycle monitoring of hydrosystem survival, hatchery straying, and tributary restoration effectiveness.

2) Project results could be used to evaluate and monitor the effects of handling stress and tagging on salmon growth, survival, migratory behavior, and other biological characteristics and to determine whether estimates of vital rates using data from tagged hatchery fish are representative of wild fish.

3) N/A

4) Fish counts from Nursery Bridge, Mill Creek Division, and Dayton dams are used to estimate adult return to the Walla Walla, Touchet and Mill Creek drainages; respectively. Although, counts at these sites are incomplete, due to some upstream passage without detection and downstream spawning, these sites represent the best index of adult return currently available. Our long-term goal is to establish additional sites lower in the system to better enumerate total

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returns. In addtion, we are proposing to add an addtional smolt trap to the Touchet River to achieve our tagging
targets.

5) Most of the juvenile life history information for this project is collected using PIT-Tags and the Pacific States
Marine Fisheries Commission PTAGIS data base.

6) Beginning in 2011, the USFWS will PIT-Tag roughly 15,000 hatchery smolts at the Carson Nation Fish Hatchery (using
Mitchell Act funds) at a significant cost savings to this project.  We are currently cost-sharing PIT-tagging w/ LSRCP
& USFWS projects.
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If your project involves ocean port sampling and lower river sampling for coded wire tag (CWT) recovery, address the tagging and tag recovery issues (statistical validity of tagging rates, tag recovery rates, and fishery sampling rates) presented in the Pacific Salmon Commission's Action Plan to Address the CWT Expert Panel (PSC Tech. Rep. No. 25, March 2008).

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NA
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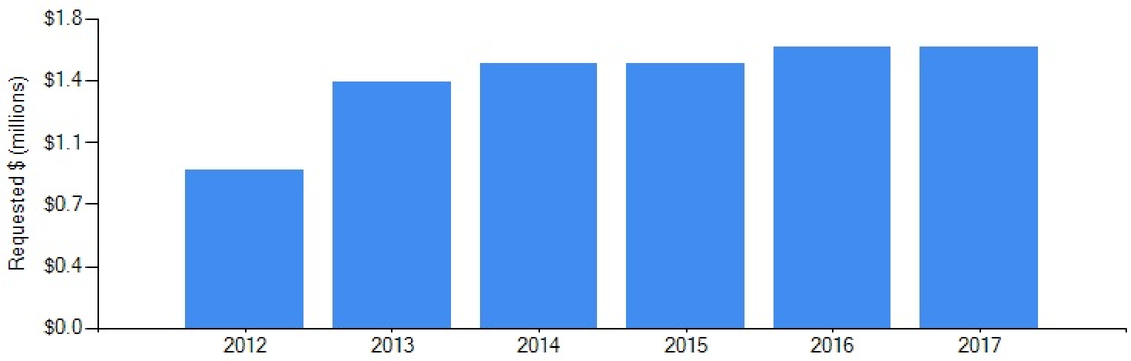
Explain how your tagging and tag recovery rates ensure a statistically valid result for your project. Enter "NA" if not applicable to your project.

Sample size. Outmigrant survival and run timing is estimated using The University of Washington Columbia Basin Research PIT-Pro model to estimate in-basin and out-of-basin survivals based on number of tagged fish released and capture probability (www.cbr.washington.edu). PIT-Pro generates a Cormack-Jolley-Seber point estimate and associated variance (SE). Results give differential survival to downstream detection sites (e.g. Nursery Bridge Dam, Burlingame Dam, Oasis Road Bridge, McNary Dam, and Bonneville Dam) from several large tag groups (e.g. 500 to 15,000 fish). Based on ODFW work in the Umatilla River (White et al. 2007) that used the Sample Size 1.3 application in SURPH (www.cbr.washington.edu) we estimated a sample size of 6,200 to provide a 10% CV for survival to McNary Dam. We are proposing to increase the number of screw traps to capture enough naturaly produced fish to better meet our desired tagging goal.

Project Deliverables & Budget

Project Deliverable	Objectives	Work Elements	Start	End	Budget
DELV-1 Assesment of Salmonid Population Status and Trend: 2000-2017 Walla Walla Basin The purpose of this collaborative project is to conduct natural production, tributary habitat (currently limited, to expand ~2015) and hatchery monitoring and evaluation. Our Project goal is to provide ecological information in support of adaptive management of salmonid resources. We do this by collecting Viable Salmonid Population criteria including estimates of abundance, productivity, survival rates, and distribution. Monitoring indicators including fish per redd, smolts per redd, smolt-to-adult return, recruit per spawner are used to inform and adapt salmonid management and recovery goals.	OBJ-1, OBJ-3	157, 160, 162, 70, 158, 159, 161	2012	2017	$8,430,687
				Total	**$8,430,687**

Requested Budget by Fiscal Year



Fiscal Year	Actual Request	Explanation
2012	$856,259	Accords budget
2013	$1,441,011	Accords budget
2014	$1,477,039	Accords budget
2015	$1,513,963	Accords budget
2016	$1,551,812	Accords budget
2017	$1,590,603	Accords budget
Total	**$8,430,687**	

Item	Notes	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Personnel		$496,630	$835,786	$856,683	$878,099	$900,051	$922,550
Travel		$4,281	$7,205	$7,385	$7,570	$7,759	$7,953
Prof. Meetings & Training		$3,425	$5,764	$5,908	$6,056	$6,207	$6,362
Vehicles		$51,376	$86,461	$88,622	$90,838	$93,109	$95,436
Facilities/Equipment	(See textbox below)	$3,425	$5,764	$5,908	$6,056	$6,207	$6,362
Rent/Utilities		$4,281	$7,205	$7,385	$7,570	$7,759	$7,953
Capital Equipment		$25,688	$43,230	$44,311	$45,419	$46,554	$47,718
Overhead/Indirect		$239,753	$403,485	$413,571	$423,910	$434,507	$445,369
Other		$1,712	$2,881	$2,955	$3,026	$3,105	$3,182
PIT Tags		$25,688	$43,230	$44,311	$45,419	$46,554	$47,718
Total		**$856,259**	**$1,441,011**	**$1,477,039**	**$1,513,963**	**$1,551,812**	**$1,590,603**

Major Facilities and Equipment explanation:
This collaborative project is conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through at least 2017. The work location is the Walla Walla River Basin and tributaries (e.g. Touchet River, South Fork Walla Walla River, and Mill Creek). CTUIR and WDFW project offices are located at the William A. Grant Water and Science Center at Walla Walla Community College and Washington Department of Fish & Wildlife Fish Program-Fish Management Division Offices in Dayton, Washington. Because this proposal is a continuation of the current collaboration we feel we have suitable field equipment; vehicles; laboratory and office space, computers and equipment at

this time. We use up to six rotary screw traps, four mobile PIT-tag tailors, and up 12 pit tag arrays to monitor in-basin movement of tagged fish. We also use four video weirs, and three adult traps to enumerate adult returns. As would be expected, traps and ancillary equipment are repaired and replaced regularly to maintain deployment readiness.

RM&E Metrics, Indicators and Methods

RM&E Metric or Indicator	Deliverable	Method Name and Citation
Fish - Abundance of Fish: Fish Life Stage Strategy (Adult Fish), Fish Origin (Both)	DELV-1	Carcass Count: Survey Description (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Tags and markers (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Mark-Recapture Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Sample Reach Information (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Tissue Samples for DNA Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Scale Sampling (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Redd Count Survey (Sean P. Gallagher, Peter K. Hahn, and David H. Johnson 2007) Field Setup and Operation - Video (Jennifer S. O'Neal 2007) Office Methods for Video Footage Review (Jennifer S. O'Neal 2007) Weirs (Christian E. Zimmerman and Laura M. Zabkar 2007) WDFW SE WA Redd Surveys
Fish - Productivity: Intra-Life Stage: Fish Life Stage Strategy (Juvenile - Stream Type), Fish Origin (Both)	DELV-1	Parr (Tracy W. Hillman 2006) Determine Settings for Backpack Electofisher (Gabriel M. Temple and Todd N. Pearsons 2007) Electrofishing Site Selection and Setup (Gabriel M. Temple and Todd N. Pearsons 2007) Electrofishing Fish Processing and Recovery (Gabriel M. Temple and Todd N. Pearsons 2007) Backpack Electrofishing-Mark (Gabriel M. Temple and Todd N. Pearsons 2007) Backpack Electrofishing-Recapture (Gabriel M. Temple and Todd N. Pearsons 2007) Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Basic Snorkel Survey Procedures (Jennifer S. O'Neal 2007) Mark-Recapture Estimates from Snorkeling Data (Jennifer S. O'Neal 2007)
Fish - Progeny-per-Parent Ratio (P:P) (Productivity): Fish Life Stage Range (Adult to Adult)	DELV-1	Carcass Count: Survey Description (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Tags and markers (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Sample Reach Information (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Tissue Samples for DNA Analysis (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Carcass Count: Scale Sampling (Bruce Crawford, Thaddues R. Mosey, and David H. Johnson 2007) Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Field Setup and Operation - Video (Jennifer S. O'Neal 2007) Office Methods for Video Footage Review (Jennifer S. O'Neal 2007) Weirs (Christian E. Zimmerman and Laura M. Zabkar 2007) Adult Run Timing (Beasley, C.A. and 10 co-authors 2008) Adult Escapement to Tributary (Beasley, C.A. (and ten others) 2008) Adult Returns
Fish - Survival Rate: Intra-Life Stage: Fish Life Stage Strategy (Juvenile - Smolt), Fish Origin (Both)	DELV-1	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) ODFW Umatilla River Smolt Monitoring

		ODFW Umatilla River Survival and Productivity ODFW Umatilla River PIT tag Experiments Walla Walla Smolt Monitoring
Fish - Mark:	DELV-1	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Walla Walla Smolt Monitoring
Fish - Progeny-per-Parent Ratio (P:P) (Productivity): Fish Life Stage Range (Juvenile to Adult)	DELV-1	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) ODFW Umatilla River PIT tag Experiments Smolt-to-adult return estimate (Marsh, D.M., N.N. Paasch, K.W. McIntyre, B.P. Sandford, W.D. Muir, and G.M. Matthews 2010) Estimation of Hatchery Strays Smolt to adult return rate (Beasley, C.A. (and ten others) 2008) Adult Returns

Study Designs

Walla Walla Salmonid Status & Trend

Temporal Design: Complete Revisit Design
Spatial Design: Other Non-probabilistic Sampling
Response Design: Regression Design
Number of Sites: 18

Description:
To facilitate ISRP review we first answer the specific questions posed regarding our study design then provide a protocol narrative:

- This study is not designed to conduct a BACI type study; thus it does not include controls or reference areas.
- It does not include replicates.
- There are no treatment or control sites.
- Sites were selected by necessity (e.g. existing fish ladder) and purpose.
- Action effectiveness research was not applicable
- Yes, There are multiple layers of Quality Assurance to our data collection and entry; see below.

Walla Walla Salmonid Monitoring Protocol Narrative

Background and objectives

The Walla Walla Basin is located in southeast Washington and northeast Oregon and drains an area of about 4,551 square kilometers. The Walla Walla River flows about 129 rkm in a northwesterly direction meeting with the Columbia River near Wallula Gap, Washington, some 33.8 rkm above McNary Dam and 506.8 rkm above the Pacific Ocean. Major tributaries originate from the west and north sides of the Blue Mountains, at a maximum elevation of about 1,818 meters, and include the major drainages of North and South Fork Walla Walla rivers, Mill Creek and the Touchet River Watershed. Approximately 73% of the subbasin is within Washington State.

The Walla Walla Subbasin has faced significant agricultural, municipal, and industrial development pressures throughout its modern history. Since the early 1900's the system extirpated its spring Chinook run, and has depressed its bull trout and summer steelhead production.

Today, the Walla Walla subbasin headwaters are an important salmonid production area for spring Chinook, summer steelhead, rainbow trout, bull trout, and mountain whitefish. Flow and water quality in the upper watersheds is good to excellent. The upper Walla Walla River above Milton-Freewater, Oregon, upper Mill Creek (above Blue Creek) and the upper Touchet River (above Dayton) provide fair to good spawning and rearing habitat. Water quality and quantity are good to excellent through these reaches, although habitat has been altered by rural landuses and some flood control levees. Habitat downstream through the three major watersheds in the Walla Walla Subbasin has been severely impacted by water extractions, diversion structures, upland land practices, flood control structures and urban or rural development; as such, habitat conditions in the lower reach are generally poor with low summer flows, high stream temperatures and substantial channelization.

Numerous flow, habitat and passage restoration projects, as well as artificial production actions, have been implemented in the subbasin. The expense of these activities and the need to guide or document progress has increased the importance of monitoring information.. Managers, planners, and implementers need status and trend information to support both short-term and long-term adaptive processes. At the same time managers and funding agencies have asked for powerful and informative evaluation of project and program effectiveness.

Recent habitat improvements to the subbasin have included maintenance of minimum in stream flows, removal of decommissioned diversion structures, irrigation diversion consolidation projects, new or improved juvenile screen and bypass facilities, new and upgraded fish ladders, and many riparian habitat improvement projects; with a number of additional improvement projects planned. Funding for habitat improvement projects comes from a variety of sources, including BPA. In addition, the Tribe and the State of Washington are committed to increased long term flow augmentation. Proposed flow improvement alternatives include a Columbia River exchange, shallow aquifer recharge, irrigation efficiency, and increased storage, as well as purchasing and trusting water rights, and consolidating diversions.

The CTUIR, WDFW and Oregon Department of Fish and Wildlife (ODFW), share fish and wildlife co-management responsibility with the Federal Caucus, regional authorities, and local governments in the Walla Walla Basin. In December of 2005, WDFW, ODFW and CTUIR agreed to collaborate on a fish monitoring project proposal to the Northwest Power and Conservation Council's FY2007 F&W Program Solicitation. Expanded and modified fish monitoring plans that we proposed were recommended for funding by the Independent Science Review Panel and the co-manager reviews, but BPA required WDFW and CTUIR to submit a new, more limited scope proposal in January 2007.

This collaborative monitoring project is a modification and continuation of two BPA funded monitoring projects implemented by WDFW and CTUIR in the Walla Walla Subbasin (Projects #199802000 and 200003900). This project is a logical adaptation of the existing projects to ensure a coordinated, comprehensive monitoring effort in the basin and it is an integral part of the Walla Walla salmonid restoration efforts. It is the appropriate monitoring component to measure the tributary natural production benefit from local and regional habitat, hatchery, harvest, and hydrosystem efforts.

The specific need this study addresses was to strengthen the overall effectiveness of salmonid restoration efforts in the Walla Walla Basin, and develop a baseline and long-term monitoring for population status and trends. Focal species are spring Chinook (*Oncorhynchus tshawytscha*) salmon, and two populations of ESA-listed summer steelhead (*O. mykiss*), and multiple populations of ESA listed bull trout (*Salvelinus confluentus*). The measurable objectives of this project are to estimate salmonid adult returns or spawning escapement, smolt production and life-history survivals. Previously, fish managers were unable to provide adequate annual estimates of abundance and production to address Viable Salmonid Population monitoring or Endangered Species Act recovery needs. This information is also necessary for evaluation of the hatchery & habitat programs and their effects on naturally produced fish in the basin.

Study design

This collaborative project is conducted by the CTUIR and WDFW as funded by the Columbia River Fish Accords through at least 2017. Our goal is to provide ecological information in support of adaptive salmonid management. We do this by collecting Viable Salmonid Population (VSP) criteria (particularly abundance, productivity), and life-history survivals.

Salmonid performance indicators (Table 1) were adapted from the Councils Working List of High-Level Implementation Indicators http://www.nwcouncil.org/fw/program/hli/Indicators.htm to describe total abundance (i.e. number of salmonids returns), productivity (e.g. smolt abundance), and life-cycle survival (i.e. survival at a particular life stage: smolt & adult return, including SAR & parent: progeny) to the Walla Walla Subbasin.

Table 1. Performance indicators and metrics used by the Walla Walla Salmonid Monitoring and Evaluation Project to describe total abundance, productivity and life-cycle survival that estimates total adults-in and juveniles out.

Performance indicators

Adult abundance

- Spawning Escapement (spawning surveys and/or adult counts at dams, weir and traps)
- Total population abundance
- Fish per Redd
- Redds per Mile

Production and life-cycle survival (juvenile abundance, productivity and survivals)

- Population level smolt production annually from the Walla Walla and Touchet watersheds
- Smolts per Redd
- Survival & Run Timing
- Smolt to Adult Return (SAR)
- Recruits per Spawner (P:P)

Salmonid indicators

Spring Chinook-Spawner abundance is a direct count at a weir of the number of fish on the spawning grounds; and is the sum of spawning escapement upstream of adult weirs, plus adults transported and released above the weirs as outplants. Total population abundance is the sum of Nursery Bridge Dam (NBD) counts plus estimates from Mill Creek and the upper Touchet based on adults per redd (above NBD) and number of redds. Fish per redd is the number of spawners per observed redd. Redds per mile is the number of redds observed by ground surveys and used as absolute data of spawner abundance. Smolts per redd are the estimated number of smolts derived from juvenile abundance estimates at a screw trap and number of redds observed based on cohort analysis.

Bull trout- Index of spawner abundance is based on spawning ground census of redds.

Steelhead- Spawner abundance is estimated by either a direct count at NBD as an index of the Walla Walla population. We will also provide estimates based on smolts produced, SAR from PIT-tags, and PIT-tag detections of adults at Walla Walla and Mill Creek arrays (similar to methods used in the Touchet, Tucannon and upper Columbia Basin). We are exploring alternatives to improve accuracy and precision of adult counts by modifying weir and dam counting methods on Mill Creek and at alternative downstream sites in the Walla Walla River.

Touchet steelhead abundance currently includes counts or estimates from two weirs/traps.The Coppei Weir provides a direct count which is adjusted based on mark recapture, plus expanded estimates for spawners below the weir (based on redd counts below the weir and adults per redd above the weir).

The Dayton Dam trap allows enumeration of most upstream spawners. We will also provide a total spawner escapement estimate based on a combination of smolt production estimates, SARs and age at return from PIT-tags, and PIT-tag detections of adults at Touchet arrays (similar to methods used in the Tucannon and upper Columbia Basin). We can partition spawning escapement by subtracting the results from the two trap and spawning surveys above Dayton and in Coppei Creek from the PIT tag SAR derived total escapemen estimate.

Survival probabilities and run timing were derived from mark-recapture methodology utilizing PIT tags and subsequent detections at in and out of basin sites. We use The University of Washington Columbia Basin Research PIT-Pro model to estimate in-basin and out-of-basin survivals based on number of tagged fish released and capture probability (www.cbr.washington.edu). PIT-Pro generates a Cormack-Jolley-Seber point estimate and associated variance (SE). Results give differential survival to downstream detection sites (e.g. NBD, Burlingame Dam, Oasis Road Bridge, McNary Dam, and Bonneville Dam) from several large tag groups (e.g. 500 to 15,000 fish). Cumulative run timing to the 10^{th} 50^{th} and 95^{th} percentile and travel in days between the 10^{th} and 90^{th} percentiles to McNary is reported.

Population level smolt production: See outmigrant monitoring section below.

Smolt-to-adult ratios (SAR) are estimated for natural & hatchery origin PIT-tag adult returns. In and out of basin, smolt-to-adult return is estimated as:

SAR = AR/A

Where SAR = smolt-adult return, AR = total number of adult PIT tag returns, A = total number of PIT-tagged outmigrants released. The number of adult returns (age 3, 4, 5 fish) is aligned by origin, outmigration year and scale analysis.

Parent: Progeny ratios were estimated by dividing the number of in stream spawners (regardless of origin) in a brood year by the sum of the natural-origin returns 3, 4 and 5 years later.

Field methods

The work location is the Walla Walla River Basin and tributaries (e.g. Touchet River, South Fork Walla Walla River, and Mill Creek). Individual monitoring sites were selected based on judgmental and purposive sampling. Sampling frequency was a complete revisit design.

Project Work Elements include: 1) **Adult Enumeration** (e.g. adult salmonids entering the basin to spawn are enumerated using weirs, traps and video; 2) **Spawner Surveys** (e.g. redds and carcasses are enumerated by multiple pass ground surveys; 3) **Out-migrant Monitoring** (i.e. juvenile emigrant population is estimated using rotary screw traps, PIT-tags, and trap efficiency estimates for both the Touchet and Walla Walla Watersheds). Subsequent PIT-tag detection data are obtained from the PTAGIS data base maintained by Pacific States Marine Fisheries Commission at http://www.ptagis.org. Project methods were adapted from the Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmonid and Trout Populations http://www.stateofthesalmon.org/fieldprotocols/.

Adult Enumeration

Fish counts from NBD, Bennington, and Dayton dams, plus the Coppei Creek trap, are used to provide index estimates of adult return to the Walla Walla, Mill Creek, and Touchet drainages; respectively. Although, counts at these sites are incomplete, due to some upstream passage without detection and downstream spawning, these sites represent the best indices of adult returns currently available and they are the most feasible to operate and monitor the primary spawning areas. We are considering multiple alternatives to improve total adult population abundance estimates. Our long-term goal is to improve the count accuracy and establish additional sites lower in the system to better enumerate total returns. We will also estimate adult returns based on smolt production estimates, and PIT-tag SARs.

Nursery Bridge Dam (NBD)CTUIR and Oregon Department of Fish and Wildlife (ODFW) share fish counting duties at NBD. In the east side ladder, adult salmonids are enumerated using the Salmon-soft fish video-tracking program as they pass a counting window located near the ladder exit. Fish images are captured by a video camera and digital video recorder (DVR) linked to a personal computer. The Salmon-soft video compaction software greatly reduces observer time needed for reviewing fish passage video-files. In the west ladder, we use an underwater video camera, mounted near the ladder exit, and DVR.

Video enumeration occurs continuously from November through July to encompass the known adult migration for summer steelhead, spring Chinook, and bull trout. Data collected from the video includes date, time, species, size (e.g. jack or adult for spring Chinook salmon), life stage (e.g. steelhead kelts), origin (e.g. adipose clip or unclipped) and migration direction for bull trout. Notations are also made of other species encountered and general fish condition. CTUIR compiles the fish count from both ladders and the count is posted to an onsite tally board and in the local paper for the public.

Dayton Dam WDFW operates the new fish trap at Dayton. Due to the configuration of the weir and dam, a small portion of adult salmonids can jump the dam during high stream flow events. Hence, counts of fish at Dayton Dam do not give a complete count of any of the species encountered. Various past attempts to prevent fish from jumping over the dam have had some success, but other alternatives continue to be examined (e.g. PIT-tag SAR adult abundance analysis- described above).

Trapping occurs year-round to encompass the known adult migration for summer steelhead, spring Chinook, and bull trout. The trap is checked daily throughout most of the steelhead run (usually February to mid-May) and at least every two days during other times. Trapped salmonids are inspected for marks or tags, measured and classified as male or female based on external characteristics, and generally have scales collected. Most of the steelhead (wild or hatchery endemic stock) are passed upstream, but each year up to 36 naturally produced steelhead may be removed for use as hatchery brood stock. Hatchery (Lyons Ferry origin) steelhead captured in the trap are transported to the Dayton juvenile fishing pond, or killed outright if the fish has a coded-wire tag.

Bull trout and spring Chinook counts at the dam have been incidental and are incomplete counts as described above. All bull trout captured are measured and scanned for a PIT tag. If no PIT tag is present, a PIT tag is injected in the dorsal sinus and scales are taken for age determination and the fish is released upstream. Trapped spring Chinook are inspected for marks or tags, measured and classified as male or female based on external characteristics, scales are collected, and then the fish are released upstream. Other species such as mountain whitefish and bridgelip suckers are identified, measured and recorded and passed upstream. Brown trout are removed from the system when trapped.

Coppei Creek Trap

The Coppei Creek trap is installed on a lower Touchet River tributary a short distance upstream from Waitsburg, and operated from January to mid May or early June. Captured steelhead are enumerated, measured, scale sampled, checked for tags and marks and then marked with an opercle punch determining trap efficiency through recapture of marked and unmarked steelhead upstream of the trap (mostly as kelts). The trap is checked daily and general operation and sampling is similar to the Dayton Dam trapsite.

Mill Creek Counting

The U.S. Army Corps of Engineers (USACE) operates a cluster of fish counting stations on Mill Creek in Walla Walla, Washington. Fish enumeration sites are the Bennington Dam (Mill Creek Diversion Dam), the Mill Creek Division Dam, and the Yellowhawk Creek weir. An underwater video camera activated by a motion detector is linked to a DVR at each site to capture a video image of passing fish. Overhead dusk-to-dawn lights are operated at each site. The stations are checked and downloaded daily during peak outmigration periods. Downloaded video clips are archived with the USACE. Data on species (steelhead, spring Chinook, and bull trout), date, time, and hatchery vs. wild (based on presence of an adipose fin) is recorded for each fish observed. Miscellaneous observations or comments are also recorded.

Video enumeration occurs from February to early July to encompass the known adult migration for summer steelhead, spring Chinook and bull trout. At the Diversion Dam, the camera is located adjacent to the fish ladder exit (2 feet wide by 4 feet deep). This camera did not cover the entire exit. Detection efficiency at this site is further reduced during periods of higher than normal turbidity. At the Division Works, a submerged camera is located adjacent to the fish ladder exit (1 foot by about 2 ½ feet deep, depending on flow). This camera covers most of the exit, but detection efficiency is reduced when turbidity levels are high. In addition, in flows greater than 400 cfs, the dam gates are raised for flood control, allowing fish to bypass the ladder. The Yellowhawk weir site uses a picket weir across the channel to guide fish through a 6 inch wide by about 12 inch deep opening in front of the camera. A section of the weir is removable to allow steelhead kelt to pass downstream.

Spawner and Carcass Surveys

A critical uncertainty of the Tribe's Spring Chinook program is how reintroduced spring Chinook use natural spawning habitat and how utilization might change through time. Adult counts (see above) and visual multi-pass ground surveys are used to assess spawning escapement, fish per redd, and redds per mile.

Spawning surveys for spring Chinook and (fluvial) bull trout provide a census of these large migratory fall spawners. Spawning surveys are much less reliable for enumerating resident bull trout (easily missed small redds) or steelhead (high turbid flows and many months of spawning). However, spawning surveys for steelhead are sometimes the only estimate of adult abundance available in some areas, such as upstream of Bennington Dam, as those dam counts are currently incomplete and inadequate.

For Chinook and bull trout, we use multiple pass ground survey methods (Gallagher et al. 2007) between early August and mid October. The entire spawning grounds are surveyed at least three times or until no new fish or redds are observed. Most of the stream reaches require a full day to access and sample. Crew members walk alone down smaller tributaries or in pairs on larger streams. Surveyors wear polarized glasses and hats to minimize glare and improve vision. To reduce stress on pre-spawning salmonids, surveyors move carefully and quietly through holding and spawning areas.

Redds are identified and judged to be complete based on redd size and depth, location, and amount and size of rock moved. Flagging is tied to nearby vegetation to mark redds and prevent recounting. The flagging is labeled with the species; redd number, time & date, and surveyor's initials. CTUIR uses a Trimble GPS data logger to record stream reach, redd number, GPS coordinates, date, redd location, and comments.

Spring Chinook carcass data is also recorded: coordinates, time and date, MEHP length (middle of the eye to the terminus of the hypural plate), sex and condition (i.e. pre-spawn mortality). Carcasses are cut open to determine egg retention of the females and spawning success of the males (Crawford et al. 2007). Pre-spawning mortality is defined as death of a fish before spawning. Females that retained about 10% or more of their eggs and males with full and nearly full gonads were classified as pre-spawning mortalities. Tails of sampled fish are removed at the caudal peduncle to prevent re-sampling of the carcass. Carcasses are checked with a metal detector wand for the presence of coded wire tags (CWTs). Snouts are removed from carcasses with CWTs by cutting down to the mouth through or behind the orbit. Snouts are placed in plastic bags and given an individual snout number for identification. The CWT are extracted and read.

Occasionally, bull trout and spring Chinook salmon spawning overlap even though bull trout are generally higher in the basin and spawn later than Chinook. CTUIR surveys the primary Chinook spawning areas in the upper Walla Walla and report any bull trout redds observed to the state and federal biologists. In turn, the state biologists survey the primary bull trout spawning areas and report Chinook redds to CTUIR.

In the Touchet River, WDFW conducts spawning surveys for steelhead, spring Chinook and bull trout using methods previously described in Mendel et al. 2007, and Bumgarner et al. 2002 (for above Dayton). Steelhead spawning surveys upstream of Dayton Dam are conducted weekly or bi-weekly by the WDFW Snake River Lab staff under the LSRCP hatchery evaluation program in index areas to determine redd life, then expanded using one extensive survey of the major tributaries upstream of Dayton that factors in the redd life estimates from the index areas (Bumgarner et al. 2002). Composition of spawners is based on trapping data at the Dayton Dam. WDFW also conducts multiple pass spawning surveys in the primary spawning reaches of Coppei Creek (see Mendel et al. 2007 for description of methods).

WDFW conducts spawning surveys for spring Chinook in likely spawning areas of the Touchet River Basin in years when there are more than 6 to12 adult spring Chinook observed at the Dayton Dam. The results of redd surveys are used to provide an estimate of relative abundance of spring Chinook upstream of Dayton.

Outmigrant Monitoring

PIT tags are used to document juvenile salmonid life history patterns, survival rates and outmigrant production and survival rates from the Walla Walla Subbasin. Rotary screw traps are used to collect fish for PIT-tagging (Volkhardt et al. 2007) and to estimate smolt abundances. The trapping procedures used in this project are similar to those used on the Tucannon, Umatilla and Grande Ronde Rivers (Gallinat et al. 2008; White et al. 2007; and Yanke et al. 2009). Total outmigrant abundance is estimated using smolt emigration software developed by the National Marine Fisheries Service (DARR 2.0; Bjorkstedt 2005) for small populations, and the WDFW software program (Steinhorst et al. 2004, Gallinat and Ross 2008). DARR 2.0 uses Darroch's (1961) stratified Peterson estimator for estimating abundance from stratified mark-recapture data (Bjorkstedt 2005). Outmigrant survival and run timing is estimated using the University of Washington Columbia Basin Research PIT-Pro model based on number of tagged fish released and capture probability (Lady et al. 2001; www.cbr.washington.edu). PIT-Pro generated survival estimates included a Cormack-Jolley-Seber point estimate and associated standard error (SE).

We will use screw traps, tagging equipment and in basin PIT-arrays to sample, tag and monitor salmonids. Traps are run between the fall and spring as conditions allow intercepting migrating juvenile salmonids. When possible, traps fish 24-hours a day, seven days a week, and are checked daily. However, sub sampling is frequently required due to stream conditions or limited staffing. Subsequent PIT-tag detections are obtained from the PTAGIS data base maintained by Pacific States Marine Fisheries Commission at http://www.ptagis.org.

When sub sampling is done, catch per hour is calibrated and used to expand catch estimates for trap down time. The number of fish that passed the trap during un-sampled periods is estimated as:

$N_{hat} = (C/T)$

where, N_{hat} = estimated number of outmigrants missed, C = calibration sample rate, and T = proportion of time sampled.

All captured salmonids are scanned for PIT-tags and processed using a Biomark PIT Tag detector. Data collected from juvenile salmonids includes: number, species, length, weight, scales from steelhead for age structure and age at migration. Body condition factor (K) is calculated as a measure of general health of migrants and calculated as:

$K = W/L^3 \times 100{,}000$

Healthy spring Chinook (> 60 mm, F.L.), summer steelhead (≥ 90-100 mm, F.L.), and bull trout (120 mm - 220 mm F.L.) are PIT-tagged and released on site (Prentice et al. 1990). CTUIR recently, moved from manual insertion via hypodermic syringe to using the pre-loaded tag trays and needles and Bio-mark implant gun. Pre-loads and the implant gun make for quick, easy, and clean surgical insertion of PIT-tags; with less apparent fish injury and higher tag retention.

Fish are PIT-tagged according to standards outlined in the PIT Tag Marking Procedures Manual (CBFWA, PIT Tag Steering Committee, 1999). The downstream movement of Chinook salmon fry and parr (< 60 mm), age-0 summer steelhead (< 120 mm) are presumed not to be outmigrants. Tagging crews submit the appropriate tagging and release files to PTAGIS within 15 days (Stein et al. 2004).

Scale samples are collected from about 30% of juvenile steelhead to estimate the age composition of emigrants. The goal is to collect about 500 readable scales from about 2,000 fish (assuming a 78% readable scale rate; Mayer and Shuck 2009). CTUIR personnel make age determinations by counting annuli as described by DeVries and Frie (1996).

Migrant abundance is estimated in DARR 2.0, or GAUSS program (Steinhorst et al. 2004), by conducting daily or weekly trap efficiency tests throughout the migratory year at each trap site. Trap efficiency (TE) is determined by releasing a known number of PIT-tagged or marked fish above each trap and enumerating recaptures. TE results are organized into bi-weekly strata for analysis in DARR 2.0 (Darroch Analysis with Rank Reduction). DARR 2.0 (http://santacruz.nmfs.noaa.gov/publications/software/439/) Is essentially a stratified mark-recapture estimator.

Mark recapture estimators (such as DARR 2.0) generally must meet a number of assumptions (Bjorkstedt 2005), including (1) a closed population (i.e. that both tagged and untagged fish die and emigrate at the same rates, and no new individuals enter the population after tagging; (2) that tagged and untagged fish are well-mixed in the population at capture (i.e. equal catch-ability); and (3) tags are not lost or missed when scanned.

In this study, we release all healthy PIT-tagged fish above the trap soon following their capture. Our previous TE tests showed that most recaptures occurred within 24 hours of release. Tag retention is assumed to be 100% after release. It is also assumed that all marked and unmarked fish migrate downstream independently of one another and had equal catchability. Only wild steelhead and Chinook are used for TE tests; we do not PIT-tag hatchery salmonids at the traps. On days when a trap stops operating, the number of recaptured fish and the number of marked fish released the previous day are subtracted from the weekly TE totals. Trap efficiency per stratum (j) was estimated by:

$\hat{E}_j = R_j/M_j$

where $\hat{E}_j$ is the estimated trap efficiency for week *j*, *Rj* is the number of marked fish recaptured during week *j,* and *Mj* is the number of marked fish released upstream during week *j.*

Migrant abundance past each trap site is estimated by:

$\hat{A}_j = U_j / \hat{E}_j$

where $\hat{A}_j$ is the estimated number of fish migrating past the trap for the period *j, Uj* is the total number of unmarked fish captured that period, and $\hat{E}_j$ from equation (1), is the estimated trap efficiency for the period/stratum *j*. Total migrant abundance is estimated as the sum of the stratum-specific abundance estimates.

"DARR 2.0 provides stratum-specific estimates of abundance for the aggregated data set, the standard error for each stratum-specific estimate (calculated as the square root of the variance estimated for each stratum-specific estimate of abundance), as well as the estimate of overall abundance and the standard error associated with the estimate of total abundance (calculated as the square root of the estimate of variance for total abundance)."- from Bjorkstedt (2005).

Sample size calculations were made using the Sample Size 1.3 application in SURPH (www.cbr.washington.edu); we estimated a sample size of between 6,200 to provide a 10% CV for survival to McNary Dam.

In addition, hatchery spring Chinook smolts are marked by state and federal collaborators at the hatchery or acclimation facilities prior to release. The USFWS mark juvenile spring Chinook salmon that will be released in the Walla Walla River at Carson National Fish Hatchery, or participating facility, with PIT tags, coded wire tags and adipose fin clips. All hatchery releases receive an adipose clip, coded wire tags (CWT) are implanted in about 20-30% of the fish, and about 3-15% get a PIT-tag. Fish are sampled approximately 30 days later to check tag retention before release.

Data handling, analysis, and reporting

Metadata procedures – The scripts that have been written for uploading data into SQL Server have been designed to capture as much metadata as possible. Information such as field notes, supervising personnel and equipment used during data collection are stored in the database along with the survey data. In addition, the CTUIR GIS Program is making sure that metadata files are attached to all ArcGIS data sets and are viewable with GIS applications such as ArcCatalog.

Overview of database design – The CTUIR Fisheries Program data is stored in relational databases housed in Microsoft SQL Server. This data is accessible through a variety of web pages and ArcGIS applications. CTUIR employees on the local intranet can also view/edit the databases by using Microsoft Access as a front-end program.

Data entry, verification, and editing – Data entry is performed in a variety of ways, depending on what is most efficient for CTUIR staff. The GIS Program has developed web-based tools that can import data by reading through raw log files generated by devices such as telemetry detectors or automated thermograph collectors. For cases where data is manually collected in the field or not generated through an automated process (e.g. chemistry lab data), the GIS Program has built tools that will read through Excel files and import the data into SQL Server. Data verification and editing are largely the responsibility of Fisheries staff. In order to help achieve this goal, the GIS Program has built a variety of web page-based tools that allow Fisheries staff to edit and/or delete the data they have uploaded to SQL Server.

Recommendations for routine data summaries and statistical analyses to detect change – The GIS Program has created tools for providing automatic, on-demand data summaries for water quality data and would be happy to do the same for Fisheries data. Further communication and collaboration between GIS and Fisheries will be necessary to determine what sorts of analysis and summary tools Fisheries would like to have available.

Recommended reporting schedule – Annual progress reports to BPA. In addition, the CTUIR GIS Program is very interested in helping the Fisheries Program by building tools to automatically generate the reports/summaries as needed. We've already built web page based report-generating tools for the thermograph data, including summaries and graphs which are generated on the fly using data in SQL Server.

Recommended methods for long-term trend analysis – In addition to annual reports with sequential results from all years, we recommend 5 year salmonid status and trend retrospective reports.

Data archival procedures – The SQL databases which house the data are backed up to external hard drives on a daily basis.

Cost Share

Source / Organization	Fiscal Year	Proposed Amount	Type	Description
US Fish and Wildlife Service (USFWS)	2011	$104,000	In-Kind	USFWS Umatilla & Walla Walla Bull Trout Project
Washington Department of Fish and Wildlife (WDFW)	2011	$95,000	In-Kind	WDFW Southeast Washington Fish Program-Fish Management Division cost share for biologist involvement in the project, plus approximately $85,000 for operation of second smolt trap in Touchet River
Gardena Farms Irrigation District #13	2011	$2,000	In-Kind	O & M technical assistance
US Army Corps of Engineers (COE)	2011	$12,000	In-Kind	Mill Creek adult fish enumeration
Oregon Department Of Fish and Wildlife (ODFW)	2011	$12,000	In-Kind	NBD adult fish enumeration
Hudson Bay District Improvement Company	2011	$6,750	In-Kind	O & M technical assistance
US Forest Service (USFS)	2011	$12,000	In-Kind	Walla Walla Bull Trout research
Walla Walla Community College	2011	$1,000	In-Kind	Public out reach
National Oceanic and Atmospheric Administration (NOAA)	2011	$24,000	Cash	New Smolt Trap
Washington Department of Fish and Wildlife (WDFW)	2011	$30,000	In-Kind	Maintenance and operation of the Adult Weir and Trap in Dayton WA. Steelhead spawning surveys above Dayton. Funding from LSRCP

Project References or Citations

Citations and associated work documents:

AA, NOAA, NPCC RM&E Workgroup Assessments. 2010. Recommendations for Implementing Research, Monitoring and Evaluation for the 2008 Fisheries FCRPS BiOp.

Anglin, Donald R., Darren Gallion, Marshall Barrows, Courtney Newlon, and Ryan Kock. 2008. Current Status of Bull Trout Abundance, Connectivity, and Habitat Conditions in the Walla Walla Subbasin. U.S. Fish and Wildlife Service Columbia River Fisheries Program Office Vancouver, Washington.

Bennett, S., Bouwe, N. 2009. Southeast Washington Intensively Monitored Watershed Project: Selection Process and Proposed Experimental and Monitoring Design for Asotin Creek. Eco Logical Research Inc. Prepared for State of Washington Recreation and Conservation Office, Olympia, WA.

Bjorkstedt, E. P. 2005. Darr 2.0: Updated software for estimating abundance from stratified mark-recapture data. NOAA-TM-NMFS-SWFSC-368, NOAA Fisheries, Santa Cruz, California. http://santacruz.nmfs.noaa.gov/publications/software/439/.

Blankenship, S.M., M.P. Small, J.D. Bumgarner, M. Schuck, and G. Mendel. 2007. Genetic Relationships Among Tucannon, Touchet, and Walla Walla Summer Steelhead (Oncorhynchus mykiss) Receiving Mitigation Hatchery Fish from Lyons Ferry Hatchery. WDFW Report. Olympia or Dayton, WA 39 pgs.

Blankenship, S.M., M.P. Small, J.D. Bumgarner. 2009. Temporal Stability of Genetic Variation within Natural Populations of Summer Steelhead Receiving Mitigation Hatchery Fish. TAFS 138:1052-1064.

BPA, USACE, and USBR. 2010. Endangered Species Act Federal Columbia River Power System: 2010-2013 Implementation Plan.

Bronson, J.P. and B.B. Duke. 2008. Fish Passage Operations in the Walla Walla River, Annual Progress Report October 2006 –September 2007, prepared for Project No. 2000-033-00. Intergovernmental Agreement No. 25691. Bonneville Power Administration, Portland, Oregon. Appendix A, Walla Walla Basin Passage Annual Operations Plan 2007-08.

Buchanan, David V., Mary L. Hanson, and Robert M. Hooton. 1997. Status of Oregon's Bull Trout. Oregon Department of Fish and Wildlife 2501 S.W. First Avenue P.O. Box 59 Portland, OR 97207.

Budy, P., R. Al-Chokhachy, K. Homel and G.P. Thiede. 2005. Bull trout population assessment in northeast Oregon: a template for recovery planning. Annual Progress Report for 2004. USGS Utah Cooperative Fish and Wildlife Research Unit Department of Aquatic Watershed and Earth Resources. Utah State University Logan, Utah 84 84322-5210.

Bumgarner, J., M. Schuck, S. Martin, J. Dedloff, and L. Ross. 2002. Lyons Ferry Complex Hatchery Evaluation: Summer Steelhead and Trout Report 2001 and 2002 run years. WDFW report to the USFWS Lower Snake River Compensation Plan Offices, Boise, ID.

Bumgarner, Joseph D. and Jerry Dedloff. 2009 Lyons Ferry Complex Hatchery Evaluation: Summer Steelhead Annual Report 2006 and 2007 Run Year. Washington Department of Fish and Wildlife Fish Program / Science Division Hatchery & Wild Interactions Sub-Unit 600 Capital Way North Olympia, Washington 98501. Report to U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office 1387 Vinnell Way, Suite 343 Boise, Idaho 83709 Cooperative Agreements #s 141106J013, 141107J011. http://wdfw.wa.gov/fish/papers/se_wash_reports/fpa_09-09.pdf

Caldwell, B., J. Shedd, and H. Beecher. 2002. Walla Walla River Fish Habitat Analysis Using the Instream Flow Incremental Methodology. Washington State Departments of Ecology and Fish and Wildlife. WDOE Open Technical Report 02-11-009. 38 p.

Columbia Basin Coordinated Anadromous Monitoring Workshop. 2010. Anadromous Salmonid Monitoring Strategy Viable Salmonid Population Parameters and Subset of Tributary Habitat and Hatchery Effectiveness.

Columbia River Inter-tribal fish Commission. 1995. Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon. Tribal Restoration Plan.

Confederated Tribes of the Umatilla Indian Reservation (CTUIR). 1990. Walla Walla Subbasin Salmon and Steelhead Production Plan. Columbia Basin System Planning, Walla Walla Subbasin, September 1990. Submitted to Northwest Power Planning Council and Columbia Basin Fish and Wildlife Authority, Portland, Oregon.

Crawford, B.A. and S. Rumsey. 2009. Guidance For Monitoring Recovery of Pacific Northwest Salmon and Steelhead: Listed Under the Federal Endangered Species Act (Idaho, Oregon, and Washington) DRAFT. http://www.nwr.noaa.gov/Salmon-Recovery-Planning/upload/Draft-RME-Guidance.pdf

Crawford, Bruce, Thaddeus R. Mosey, and David H. Johnson. 2007. Carcass Counts. Pages 59-86 in D.H. Johnson, B.M. Shrier, J.S. O'Neal, J.A. Knutzen, X. Augerot, T.A. ONeil, and T.N. Pearsons. Salmonid field protocols handbook: techniques for assessing status and trends in salmonid and trout populations. American Fisheries Society, Bethesda, Maryland.

CTUIR and Jones and Stokes. 2008. Walla Walla Spring Chinook Hatchery Master Plan. Prepared under BPA project #2000-038-00 and submitted to Northwest Power and Conservation Council. CTUIR Fisheries documents at: http://data.umatilla.nsn.us/fisheries/

CTUIR. 2004. Walla Walla Basin Flow Augmentation Recommendations. Prepared by Fisheries Program Department of Natural Resources The Confederated Tribes of the Umatilla Indian Reservation. CTUIR Fisheries documents at: http://data.umatilla.nsn.us/fisheries/

CTUIR. 2009a. Draft Hatchery and Genetic Management Plan. Walla Wall River Spring Chinook Reintroduction. Prepared by Fisheries Program Department of Natural Resources, The Confederated Tribes of the Umatilla Indian Reservation. Submitted to NMFS May 2009. CTUIR Fisheries documents at: http://data.umatilla.nsn.us/fisheries/

CTUIR. 2009b. Walla Walla Subbasin Flow Augmentation Recommendations. Prepared by Fisheries Program Department of Natural Resources The Confederated Tribes of the Umatilla Indian Reservation.

Darroch, J.N. 1961. The two-sample capture-recapture census when tagging and sampling are stratified. Biometrika 48, 241-260.

DeVries, Dennis R., and Richard V. Frie. Determination of Age and Growth. Pages 483-512 in B.R. Murphy and D.W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Gallagher, Sean P., Peter K.J. Hahn, and David H. Johnson. 2007. Redd Counts. Pages 197-234 in D.H. Johnson, B.M. Shrier, J.S. O'Neal, J.A. Knutzen, X. Augerot, T.A. ONeil, and T.N. Pearsons. Salmonid field protocols handbook: techniques for assessing status and trends in salmonid and trout populations. American Fisheries Society, Bethesda, Maryland.

Gallinat, M and L. Ross. 2008. Tucannon River Spring Chinook Salmon Hatchery Evalation Program: 2008 Annual Report. WDFW report to LSRCP.

Hesse, Jay, Jim Harbeck, Richard Carmichael, "Monitoring and Evaluation Plan for Northeast Oregon Hatchery Imnaha and Grande Ronde Subbasin Spring Chinook Salmon", 2006 Technical Report, Project No. 198805301, 160 electronic pages, (BPA Report DOE/BP-00004034-1).

Interior Columbia Basin Technical Recovery Team. 2004. Preliminary guidelines for population-level abundance, productivity, spatial structure, and diversity supported viable salmonid populations, an update. ICTRT 12/13/04.

ISRP. 2005. Retrospective Report 1997 – 2005.

Johnson, D.H., B.M. Shrier, J.S. O'Neal, J.A. Knutzen, X. Augernot, and T.N. Pearsons, 2007. Salmonid field protocols handbook: techniques for assessing status and trends in salmon populations. American Fisheries Society, Bethesda, Maryland. http://www.stateofthesalmon.org/fieldprotocols/

Kassler, T.W. and G. Mendel. 2007. Genetic Characterization of Bull Trout from the Walla Walla River Basin. WDFW Report. Olympia or Dayton, WA. 48 pgs.

Kuttle, M. Jr. 2001. Salmonid Habitat Limiting Factors Water Resource Inventory Area 32 Walla Walla Watershed. Washington State Conservation Commission. Olympia, WA. http://www.scc.wa.gov/index.php/Download-document/582-WRIA-32-Salmon-Habitat-Limiting-Factors-Final-Report.html

Lady, J, P. Westhagen, J. R. Skalski. 2001. SURPH .2 User Manual, SURPH 2.1, Survival under Proportional Hazards. School of Aquatic and Fisheries Sciences, University of Washington, Seattle, WA. http://www.cbr.washington.edu/paramest/surph.

Mahoney, B. D., Glen Mendel, Michael Lambert, Jeremy Trump, Preston Bronson, Michael Gembala, and Michael Gallinat. 2009. Walla Walla Subbasin Collaborative Salmonid Monitoring and Evaluation Project: 2007 and 2008 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power administration, Project No. 2000-039-00. CTUIR Fisheries documents at: http://data.umatilla.nsn.us/fisheries/

Martin, S.W., M.A. Schuck, K.D. Underwood, and A.T. Scholz. 1992. Investigations of bulltrout (Salvelinus confluentus), steelhead trout (Onchorhynchus mykiss), and spring Chinook (O. tshawytscha) interactions in southeast Washington streams. 1991 Annual Report. Project No. 90-53, Contract No. De B179-91BP17758. U.S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife. 206 pages.

Mayer, K. and M. Schuck. 2009. Assess Salmonids in the Asotin Creek Watershed. 2008 Annual Report. WDFW Report to BPA. Project Number 20002-053-00.

McLean, Michael, Ryan Seeger, Laurie Hewitt, "Grande Ronde Endemic Spring Chinook Salmon Supplementation Program; Satellite Facilities Operation and Maintenance", 2005 Annual Report, Project No. 199800703, 56 electronic pages, (BPA Report DOE/BP-00006509-8).

Mendel, Glen, Jeremy Trump, Mike Gembala, Scott Blankenship, and Todd Kassler. 2007. Assessment of salmonids and their habitat conditions in the Walla Walla River Basin of Washington. 2006 Annual Report for Project No. 19980200, Submitted to US DOE, Bonneville Power Administration, Portland Oregon. http://wdfw.wa.gov/fish/papers/se_wash_reports/salmonidhab_wwbasin_assess06-07.pdf

Montgomery Watson. 1995. Northeast Oregon Hatchery Project. Conceptual Design Report. Bonneville Power Administration, division of Fish and Wildlife. Portland, Oregon.

Montgomery, John, Ayesha Gray, Clark Watry, and Brian Pyper. 2007. Using Rotary Screw Traps to Determine Juvenile Chinook Salmon Out-migration Abundance, Size, and Timing in the Lower Merced River, California. 2007 Annual Report for Project No. 813326G009, Submitted to U.S. Fish and Wildlife Service, Anadromous Fish Restoration Program, California.

Narum, S.R, C. Contor, A. Talbot, and M.S. Powell. 2004. Genetic divergence of sympatric resident and anadromous forms of Oncorhynchus mykiss in the Walla Walla River, U.S.A. Journal of Fish Biology 65, 471-488.

NMFS (National Marine Fisheries Service). 2009. Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan. http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Interior-Columbia/Mid-Columbia/Mid-Col-Plan.cfm.

NOAA Fisheries. 2008. Endangered Species Act Section 7(a)(2) Consultation Biological Opinion And Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation.

Northwest Power Planning Council (NPPC). 2006. Columbia River Research Plan. Council document 2006-3.

Northwest Power Planning Council (NPPC). 2009. Columbia River Basin Fish and Wildlife Program: 2009 Amendments. Council document 2009-09.

Northwest Power Planning Council (NPPC). 2010. Draft Columbia River Basin Monitoring, Evaluation, Research, and Reporting (MERR) Plan. Council document 2010-4.

Rayton, Michael. 2006. Field Manual Okanogan Basin Monitoring and Evaluation Program Rotary Screw Trap Protocols. Prepared by Colville Confederated Tribes.

Reischauer, Alyssa, Frederick Monzyk, Erick Van Dyke, Brian Jonasson, Richard Carmichael, "Investigations into the Early Life-history of Naturally Produced Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River Basin", Project No. 1992-02604, 126 electronic pages, (BPA Report DOE/BP-00004119-1).

Snake River Salmon Recovery Board. 2006. Snake River Salmon Recovery Plan for Southeast Washington (Technical Document). www.snakeriverboard.org.

Snake River Salmon Recovery Board. 2010. Snake River Salmon Recovery Region Provisional 3 Year Work Plan. http://www.snakeriverboard.org/leadentity/Feb103yrplan.pdf

Stein, Carter, Dave Marvin, John Tenney and Nadia Gruman. 2004. Editor. 2004 PIT tag Specification Document. Columbia River Basin PIT Tag Information System. Pacific States Marine Fisheries Commission. Gladstone, Oregon.

Steinhorst, K., Y. Wu, B. Dennis, and P. Kline. 2004. Confidence intervals for fish outmigration estimates using stratified trap efficiency methods. Journal of Agriculture, Biological, and Environmental Statistics 9(3): 284-299.

Stillwater Sciences. 2010. Conceptual Biomonitoring Design for the CTUIR. Technical Memorandum. Prepared for the Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. CTUIR Fisheries documents at: http://data.umatilla.nsn.us/fisheries/.

Swindell, E. 1941. Historic fishing sites of the Columbia River Basin Tribes.

U.S. Army Corps of Engineers (Corps.) 1997. Reconnaissance Report-Walla Walla River Watershed. U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington.

U.S. Fish and Wildlife Service. 2002. Chapter 10, Umatilla-Walla Walla Recover Unit, Oregon and Washington. 153 pages. In: U.S. Fish and Wildlife Service. Bull Trout (Salvelinus confluentus) Draft Recovery Plan. Portland, OR.

U.S. Fish and Wildlife Service. 2004. Chapter 10, Umatilla-Walla Walla Recover Unit, Oregon and Washington. 149 pages. In: U.S. Fish and Wildlife Service. Bull Trout (Salvelinus confluentus) Draft Recovery Plan. Portland, OR.

U.S. Fish and Wildlife Service. 2008. Draft rotary screw trap protocol for estimating production of juvenile Chinook salmon. Document prepared by the U.S. Fish and Wildlife Service, Comprehensive Assessment and Monitoring Program. Sacramento, California. 44 pp.

Underwood, K.D., S.W. Martin, M.L. Schuck, and A.T. Scholz. 1995. Investigations of bull trout (Salvelinus confluentus), steelhead trout (Onchorhynchus mykiss), and spring Chinook (O. tshawytscha) interactions in southeast Washington streams. 1992 Final Report. Project No. 90-53, Contract No. De B179-91BP17758. U.S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife. 206 pages.

Van Cleve, R. & R. Ting. 1960. The condition of stocks in the John Day, Umatilla, Walla Walla, Grande Ronde, and Imnaha Rivers as reported by various fisheries agencies. Publisher unknown.

Volkhardt, Gregory, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and Davis E. Seiler. 2007. Rotary Screw Traps and Inclined Plan Screen Traps. Pages235-266 in D.H. Johnson, B.M. Shrier, J.S. O'Neal, J.A. Knutzen, X. Augerot, T.A. ONeil, and T.N. Pearsons. Salmonid field protocols handbook: techniques for assessing status and trends in salmonid and trout populations. American Fisheries Society, Bethesda, Maryland.

Walla Walla County (WWC) and Walla Walla Basin Watershed Council. 2004. Walla Walla Subbasin Plan. Report to Northwest Power and Conservation Council.

WDFW. 2002. Salmonid Stock Inventory (SaSI). http://wdfw.wa.gov/fish/sasi/index.htm

WDFW. 2009. Draft Walla Walla and Touchet Steelhead Hatchery Genetic Management Plans. Prepared for the Lower Snake River Compensation Plan Office, USFWS, Boise, ID.

White, Tara, Josh Hanson, Shannon Jewett, Richard Carmichael. 2007. Evaluation of Juvenile Salmonid Outmigration and Survival in the Lower Umatilla River Basin, 2003-2006 Annual Report, Project No. 198902401, 131 electronic pages, (BPA Report DOE/BP-00024721-1).

Yanke, Jeffrey, Brian Alfonse, Kyle Hanson, Scott Favrot, Jacob Kimbro, Jesse Steele, Ian Wilson, Brian Jonasson, Richard Carmichael. 2009. Investigations into the Early Life History of Naturally Produced Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River Subbasin, 2008 Annual Report, Project No. 1992-026-04 Document ID #P112788.

Key Personnel

HATCHERY AND GENETIC MANAGEMENT PLAN
(HGMP)

Hatchery Program:	Walla Walla Hatchery Spring Chinook Program
Species or Hatchery Stock:	Carson Stock Spring Chinook Salmon
Agency/Operator:	Confederated Tribes of the Umatilla Indian Reservation
Watershed and Region:	Walla Walla River, Columbia Basin
Date Submitted:	December 2012
Date Last Updated:	December 2012

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Walla Walla Hatchery Spring Chinook Program

1.2) Species and population (or stock) under propagation, and ESA status.

Carson stock spring Chinook salmon (*Oncorhynchus tshawytscha*) **–** not listed.

1.3) Responsible organization and individuals

Name (and title): Gary James, Fisheries Program Manager
Agency or Tribe: Confederated Tribes of the Umatilla Indian Reservation
Address: 46411 Timine' Way, Pendleton, OR 97801
Telephone: 541-429-7285
Fax: Same as telephone number
Email: garyjames@ctuir.com

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program: Both of the state agencies listed are involve as a subbasin co-manager.

Name (and title): Colleen Fagan, NE Region Hatchery Coordinator
Agency or Tribe: Oregon Department of Fish and Wildlife
Address: 107 20th Street, La Grande, OR 97850
Telephone: (541) 962-1835
Fax: (541) 963-6670
Email: Colleen.e.fagan@state.or.us

Name (and title): Glen Mendel
Agency or Tribe: Washington Department of Fish and Wildlife
Address: 529 W. Main Street, Dayton, WA 99328
Telephone: (509) 382-1005
Fax: (509) 382-1267
Email: Glen.Mendel@dfw.wa.gov

1.4) Funding source, staffing level, and annual hatchery program operational costs.

Walla Walla Hatchery (WWH) is being funded by Bonneville Power Administration (BPA). The WWH is projected to have five full time staff and an estimated initial annual operating budget of $865,000.

1.5) Location(s) of hatchery and associated facilities.

Walla Walla Hatchery is located at river mile (RM) 5.2 of the South Fork Walla Walla River, Umatilla County, Oregon within the Columbia River basin.

1.6) Type of program.

Integrated Recovery

1.7) Purpose (Goal) of program.

The purpose of the Walla Walla program is to help mitigate for fish losses in the Columbia River Basin caused by mainstem hydropower project construction and operation and other basin development by restoring spring Chinook salmon to the Walla Walla Subbasin. It is anticipated that adults from the program will provide escapement for natural production and reestablishment of spring Chinook populations to the Walla Walla Subbasin, establish an in-basin locally adapted broodstock source, and contribute to treaty and non-treaty fisheries.

1.8) Justification for the program.

The indigenous Walla Walla River spring Chinook were extirpated in the early to mid 1900's. Spring Chinook have been reestablished in the subbasin using adult outplants and juvenile releases from out of basin sources. Current efforts are not sized to meet subbasin goals and objectives. This program is needed to meet natural spawning supplementation and harvest goals identified in both the Walla Walla Subbasin Plan (Walla Walla County and Walla Walla Basin Watershed Council 2004) and Walla Walla Hatchery Master Plan (WWHMP) (CTUIR and Jones & Stokes 2008).

This program will require that new incubation, early and final rearing facilities be constructed at the site of the existing South Fork Walla Walla Adult Holding and Spawning Facility. These proposed facilities are described in detail in later sections of the document. The current implementation schedule calls for construction to occur in 2014-15 with the facility ready to begin operations in the fall of 2015.

1.9) List of program "Performance Standards".

See Section 1.10.

1.10) List of program "Performance Indicators"

1.10.1) "Performance Indicators" addressing benefits
1.10.2) "Performance Indicators" addressing risks.

	Benefits	
Performance Standard	**Performance Indicator**	**Monitoring and Evaluation**
Program meets legally mandated rebuilding objectives.	Release 500,000 1+ spring Chinook (CHS) smolts into the Walla Walla and Touchet rivers.	Monitor releases to insure numbers fall within IHOT guidelines of + or – 10% of stated goal.
Program meets legally mandated harvest objectives.	Program provides adults for mainstem Columbia treaty and non-treaty harvest.	Assess contribution to mainstem Columbia fisheries. Query Pacific States Marine Fisheries Commission (PSMFC) databases for CWT recoveries.

Program provides predictable, stable, and increased harvest opportunity.	Within tributary treaty and non-treaty harvest seasons occur annually.	Frequency and size of treaty and non-treaty tributary fisheries will be determined annually.
Restore and create viable natural spawning populations.	Natural origin adult return and escapement objectives to the upper mainstem and South Fork Walla Walla rivers and the Touchet River are met.	Use adult return counts from Nursery Bridge Dam, Mill Ck. and Dayton trap, spawning escapement in all spring Chinook production areas, number of redds, and juvenile production estimates to assess contribution of naturally produced adults.
Release groups are sufficiently marked in order to assess contribution to rebuilding and fisheries goals as well as monitoring straying.	All hatchery fish released are adipose fin clipped with representative Passive Integrated Transponder (PIT) and Coded Wire (CWT) tag groups.	Tributary, terminal, and harvest PIT-tag and CWT recoveries are monitored to determine survival rates, contribution, and straying.
Achieve within hatchery performance measures.	Integrated Hatchery Operations Team (IHOT) standards are being met.	Rearing and fish health parameters are monitored to ensure that fish culture standards are being attained.
Broodstock selection strategies effectively maintain genetic and life history characteristics	Collect 310 adult broodstock from a cross section of the run.	Broodstock collection and composition are monitored to ensure that they meet established AOP guidelines for timing and % Natural origin adults.
Conduct natural production monitoring and evaluation (M&E) to improve program performance.	Monitor Viable Salmonid Population Criteria (abundance, productivity, spatial structure and diversity; SRSRB 2011).	Estimate the following parameters to assess juvenile and adult production: Adult return to Nursery Bridge Dam (NBD), Dayton trap and Mill Creek division works. Recruits per spawner Fish per redd Spawning distribution Run and spawn timing Smolt to adult return Carrying capacity (smolt/redd) Juvenile out migrant estimate
Conduct hatchery production M&E to improve program performance.	Monitor hatchery performance measures outlined by Hatchery Science Review Group (HSRG 2009a)	Program type/purpose Broodstock # and composition Marking strategy Smolt release # and size
Communicate and coordinate effectively with co-managers in the Columbia River basin.	Participate in <u>US v Oregon</u> production advisory committee meetings. Develop AOP and set up monthly coordination meetings.	Provide technical information for PAC reports. Author AOP and provide data to co-managers.
	Risks	
Performance Standard	**Performance Indicator**	**Monitoring and Evaluation**
Minimize impacts to ESA listed and other native species from disease transmission.	Program will be in compliance with IHOT fish health transfer guidelines.	Oregon Department of Fish and Wildlife (ODFW) fish pathology will examine the fish at least once per month and just prior to release.

Minimize impacts to ESA listed and other native species from juvenile hatchery releases.	Age 1+ yearling smolts will be released.	Life history information and timing for both hatchery and natural outmigrants is collected using PIT-tag detections at in-basin detection arrays. Outmigrant abundance is estimated using mark recapture estimators on PIT-tagged fish taken in smolt traps (Bjorksted 2005, Steinhorst et al. 2004).
Minimize impacts to ESA listed and other native species from program adults straying.	Number of program adults captured in other basins.	Ensure adequate numbers of fish are coded wire and PIT tagged. Adult tag recoveries will be accessed through the PSMFC databases to summarize adult straying.
Avoid over harvest of non-target fish	Annual in-basin agreed to harvest allocations are not exceeded.	Conduct creel surveys to assess harvest.

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

Biological data for the program have been refined since the development of the WWHMP. It is estimated that 310 adults will be required for brood with 296 adults spawned to produce the total program of 500,000 smolts.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Yearling	South Fork Walla Walla River (RM 5.2)	Up to 400,000
Yearling	Touchet River (RM 53-55)	Up to 100,000

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

This will be a new program at a new facility. The WWHMP identified a smolt-to-adult (SAR) survival rate of 0.55%. This SAR estimate would equate to a return of 2,750 hatchery adults to the Walla Walla Subbasin. Performance data from the past and current Little White Salmon/Carson National Fish Hatchery (NFH) direct stream release program into the South Fork Walla Walla River is presented below.

Smolt to Adult Survival Rates (Mahoney et al. 2012): Based on PIT tag detections, mean SAR (BY 2003-2006) for Walla Walla hatchery spring Chinook was 0.33 (SE 0.14) to Bonneville Dam, 0.26 (SE 0.14) to McNary Dam, and 0.25 (SE 0.13) back to the Lower Walla Walla River (LWWR) (Figure 1). Likewise, mean SAR for natural spring Chinook was 0.40 (SE 0.08) to Bonneville Dam, 0.33 (SE 0.07) to McNary Dam and 0.27 (SE 0.07) to the LWWR (Figure 2). Mean SAR was not significantly different between natural and hatchery fish. The proposed WWH SAR goal of 0.55% was exceeded by BY2006 . Prior to BY 2005 SAR results were based on small sample size (e.g., < 8 adults), which may explain some of the lower SAR values reported for natural returns.

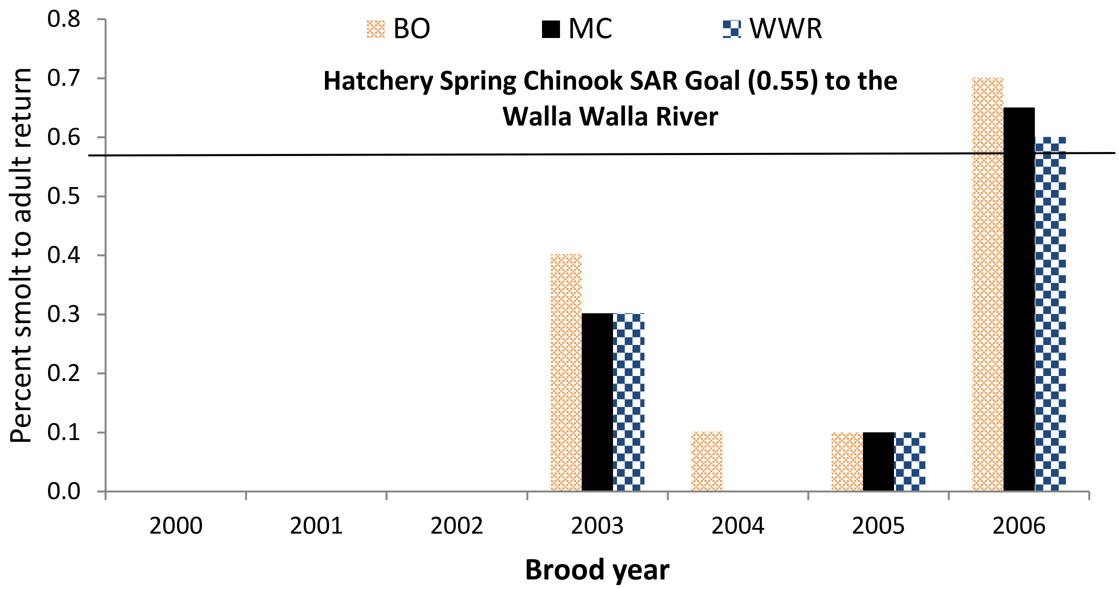


Figure 1. Hatchery spring Chinook SAR to Bonneville Dam (BO), McNary Dam (MC) and all Walla Walla River (WWR) PIT tag detections for BYs 2003-2006.

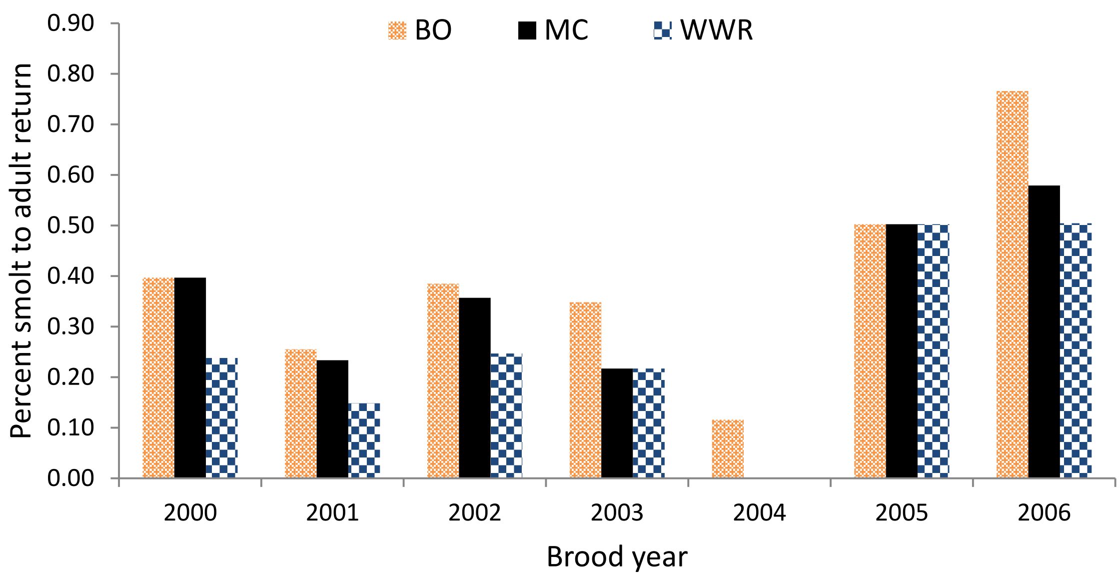


Figure 2. Natural spring Chinook SAR to Bonneville Dam (BO), McNary Dam (MC) and all Walla Walla River (WWR) PIT tag detections for BYs 2000-2006.

Adult Escapement Levels (Mahoney et al. 2012): Ladder and weir counts were used as indices of adult returns to the upper Walla Walla, Mill and Touchet drainages. The observations at Nursery Bridge Dam (NBD) and Mill Creek are from video counts; while the counts at Dayton adult trap (DAT) are based on trapping. These ladder and weir counts provide a fair to good representation of subbasin returns, especially at NBD, and provide a basis for estimating escapement into the three largest spawning areas. Our long-term goal is to get more complete and accurate estimates of total adult returns to the mouth of the WWR.
In 2011, a total of 468 spring Chinook were enumerated at NBD and 30 at Mill Creek Dam. Since 2004 (i.e., first age four returns), spring Chinook natural returns to NBD have shown an upward trend (Figure 3). The decline of adult returns in 2011 was attributed to the poor outmigrant survival (e.g. 16%; S.E. 0.1) of the Carson Hatchery spring Chinook (i.e. direct release program fish) to McNary Dam. The 8-year (2004-2011) geometric mean for total adult escapement past NBD was 294.1 (SE 168.2) fish. This is roughly 27% of the total goal of 1,100 naturally spawning fish for the upper mainstem and South Fork.. Enumeration error was assumed to be between 5% and 10%. Future study is needed to confirm this assumption. Potential sources of error may include fish jumping or falling back over the dam, observer error and video capture program efficiency.

Spring Chinook abundance in the Touchet River is limited and sporadic. Trap counts at DAT have documented spring Chinook in the Touchet River since 1999 (Figure 4). The highest return was in 2001 when a very large return occurred throughout the Columbia Basin. Recent increases at the trap may be reflective of the improved fish ladder and trap, as well as increased returns.

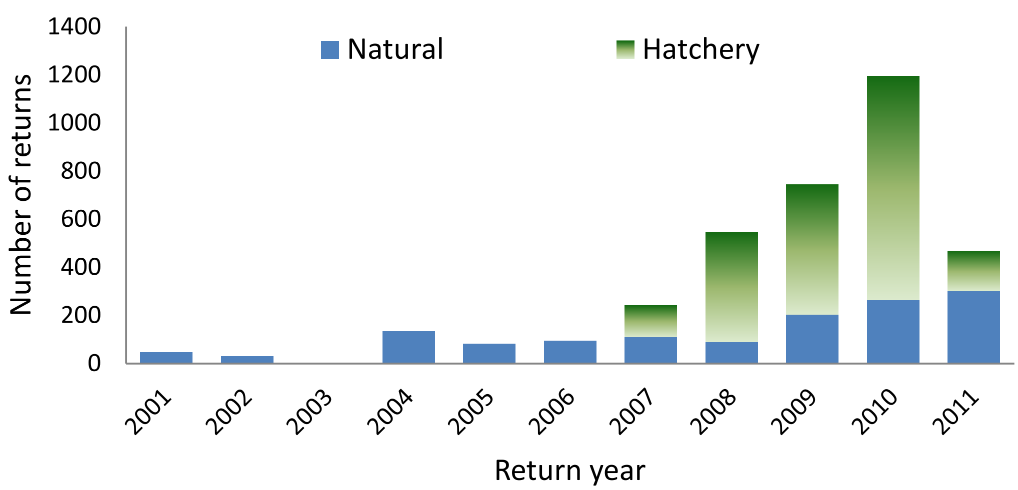


Figure 3. Adult return for spring Chinook to Nursery Bridge Dam on the Walla Walla River (river mile 44.7), 2001-2011.

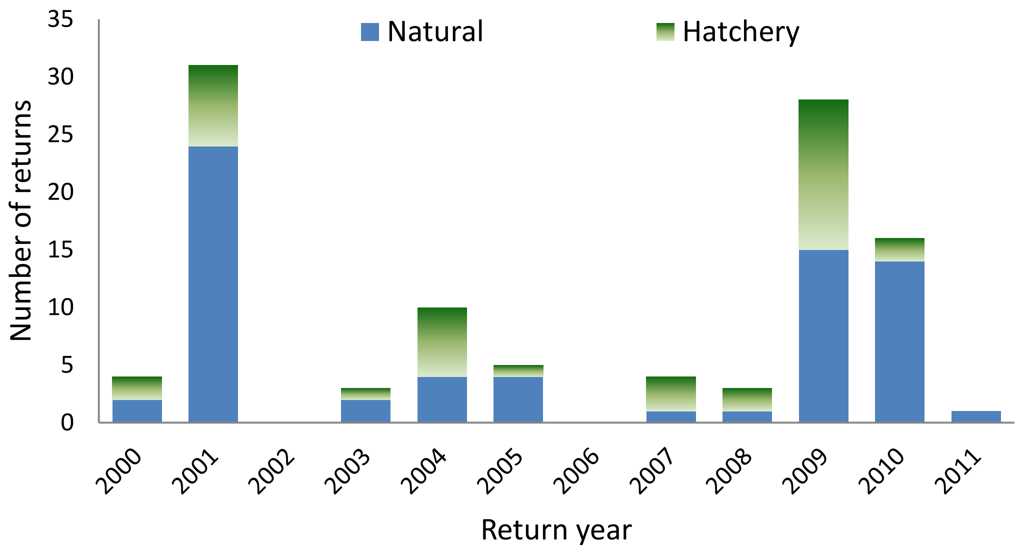


Figure 4. Spring Chinook captured in the Dayton Adult Trap on the Touchet River (river mile 54), 2000-2011 return years.

Spawners per redd (Mahoney et al 2012): Since 2000, the 12-year geometric mean of spring Chinook spawners per redd in the Walla Walla River was 1.9; and has ranged between 1.0 and 2.6. (Figure 5). The number of potential spawners and number of redds observed has shown an upward trend with a lot of variability. The increase in number of potential spawners is being driven largely by naturally spawning hatchery fish. The high fish per redd estimate in 2001 was likely due to poor spawning success; while the low estimate in 2005 was probably due to observer error yielding and overestimation of redds.

In 2011, a total of 271 spring Chinook redds were enumerated and 117 carcasses were sampled for pre-spawn loss (i.e., > 90% eggs/milt remained) of 12.5%. Since 2000, mean pre-spawn loss above NBD was 6.0%. These estimates should be considered conservative; the target is to sample at least 20% of spawning fish as carcasses. However, we know that many carcasses are consumed or dragged away by predators/scavengers before they can be sampled.

The Touchet River has had few spawners and redds, and many years there have not been enough adults observed at DAT to make it worthwhile to conduct redd surveys. Even during the years with adequate numbers of Chinook at DAT for redd surveys, some fish may have not been captured at the trap, so spawners per redd could not be accurately calculated.

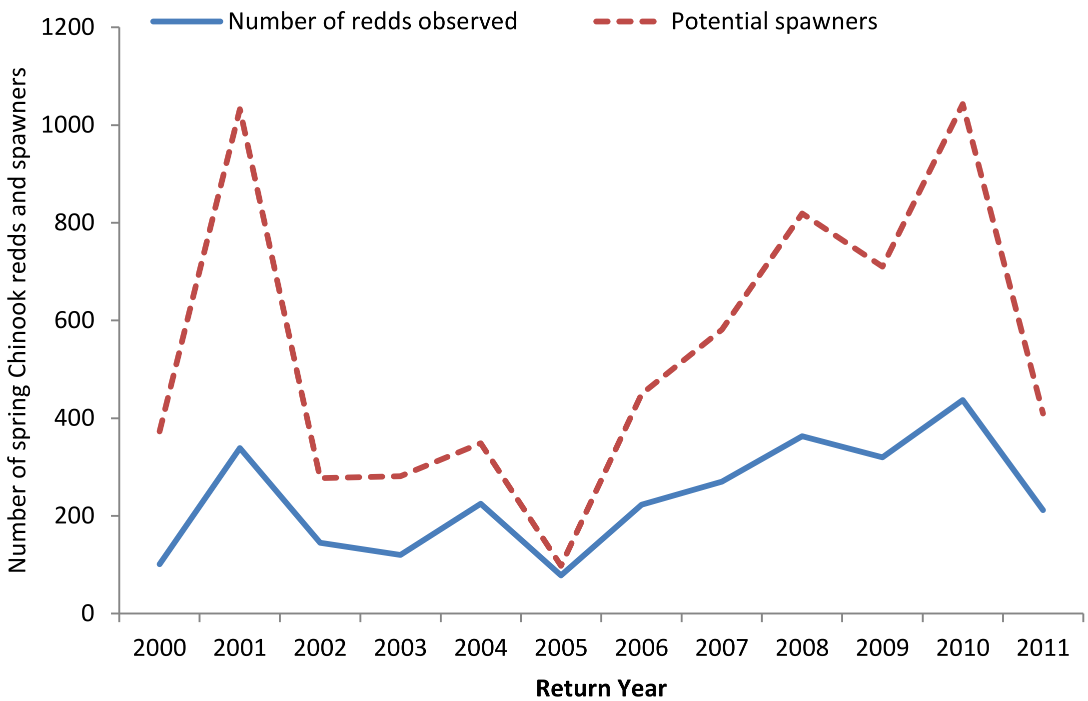


Figure 5. Redds observed and estimated available spawners in the upper mainstem and South Fork WWR 2000-2011. Number of potential spawners was estimated as ((NBD count + outplants - harvest) – (NBD count +outplants)) *(number of pre-spawn mortalities / all carcasses sampled)).

Adult production levels (Mahoney et al 2012): Adult to adult return (AAR) to NBD was estimated to describe trends in natural-origin production using the following formula:

AAR = adult recruits / potential spawners

Seven complete brood years (BY) have returned to NBD (BY 2000 – 2006). Adult replacement was met for BY 2005 (1.27) and nearly met for BY 2006 (0.71; Figure 6). The 7-year geometric mean for AAR to NBD was 0.41 (SE 0.15). There has been an upward trend towards replacement driven largely by the 2005 and 2006 broods. However, the current time series is too short to adequately describe the long-term trend. Inadequate and sporadic adult returns in the Touchet River drainage preclude estimates of AAR.

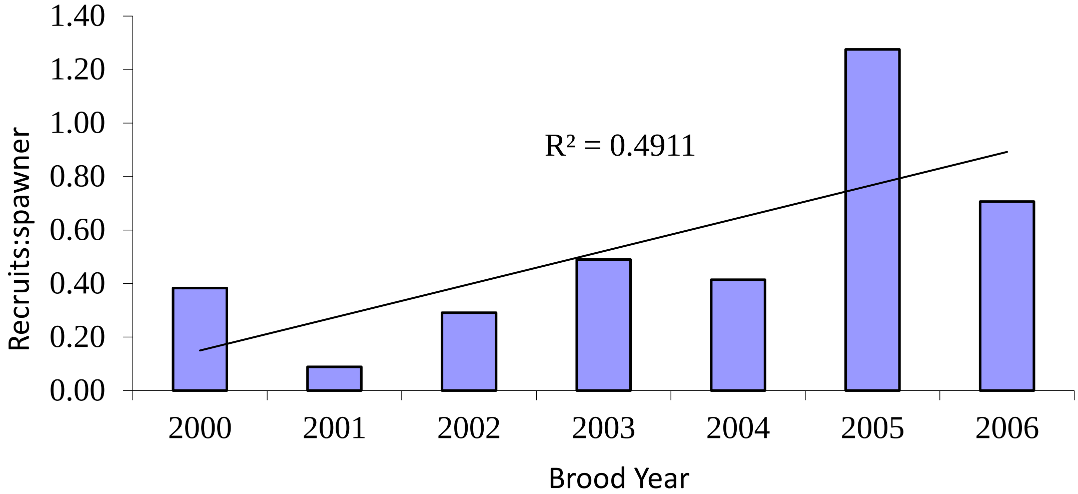


Figure 6. Natural adult to adult spring Chinook returns from the upper mainstem and South Fork WWR, 2000-2006 BYs.

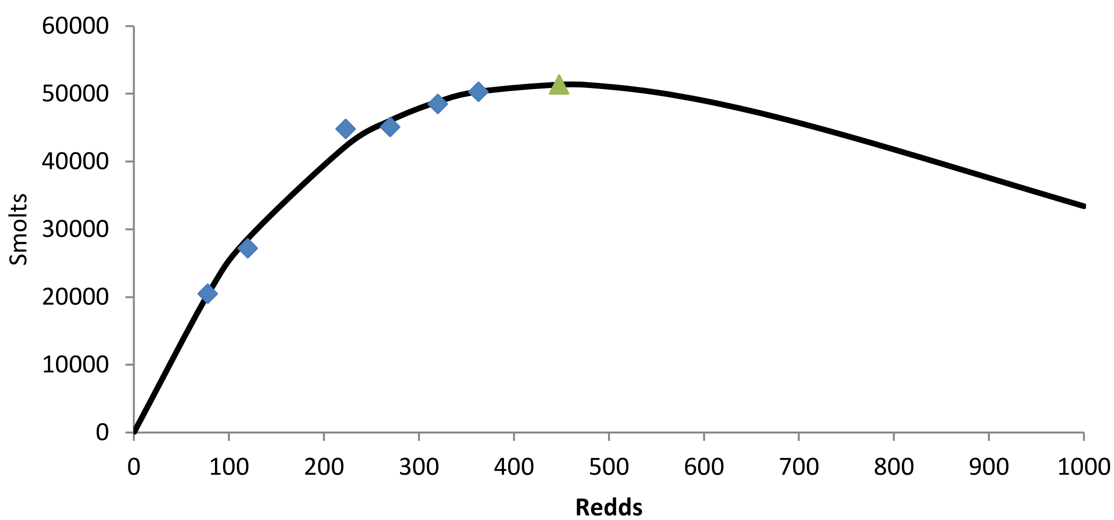


Figure 7. Ricker recruitment function curve relating spring Chinook juvenile production from the upper Walla Walla River against redds in the upper Walla Walla River, migration year 2005-2011. Maximum carrying capacity (green triangle) is estimated at: 448 redds and 51,362 outmigrants.

Juvenile Production (Mahoney et al 2012): A Ricker model comparing redds to smolts in the upper mainstem and South Fork takes into account density dependent effects on predicted population growth (Figure 7). Carrying capacity was estimated at the point of zero slope, this estimates carrying capacity as 51,362 smolts per 448 redds (i.e. 114.6 smolts per redd or 1,075 spawners). The 1,075 estimated spawner carrying capacity is very close to 1,100 spawners predicted by EDT (Walla Walla County and WWBWC 2004). However, this carrying capacity prediction should be viewed cautiously given the significant variance of the mark-recapture abundance estimates used to estimate smolt production, and the short 6-year data set. Based on the 2003-2009 brood years mean smolts per redd production from the WWR was 100.4 (SE 8.2) about 14.2% under the predicted carrying capacity.

1.13) Date program started (years in operation), or is expected to start.

The first releases under the proposed integrated (recovery) program from the expanded WWH are anticipated in 2017.

1.14) Expected duration of program.

On-going.

1.15) Watersheds targeted by program.

Target watershed is the Walla Walla Subbasin including both the Walla Walla and Touchet rivers within the Columbia River Basin.

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

Two alternative actions to address the spring Chinook restoration goals in the Walla Walla Subbasin have been implemented. The first action initiated was an interim adult outplanting program begun in 2000. From 2000 to 2008, adult spring Chinook from Ringold Springs Hatchery and the Umatilla River were outplanted into both the South Fork Walla Walla River and Mill Creek. These fish successfully spawned and produced the first returns in 2004. The South Fork outplants were discontinued in 2009 as natural and hatchery returns to the upper Walla Walla increased. The Mill Creek outplants have continued. Lack of a consistent source of adults for outplanting and continued infusion of out of basin adults limit the ability of this program to meet the three identified long term production goals for the Walla Walla Subbasin (natural production, broodstock, and harvest).

The second action alternative implemented a 250,000 yearling smolt release program that began with BY 2003. Initial releases occurred in 2005 using smolts produced at Little White Salmon NFH. The program was transferred to Carson NFH in 2009. Initial SARs from the first three complete brood year returns have averaged 0.33%. At this SAR, adult production from this program does not meet the three identified long term production goals for the Walla Walla Subbasin (natural production, broodstock, and harvest).

The Hatchery Scientific Review Group (HSRG) as part of their Columbia River Hatchery Reform Project Final System wide Report (2009b) reviewed the existing Carson NFH Walla Walla spring Chinook program and provided the following recommendations;

- Transition to local broodstock as soon as required facilities are operational. Until habitat can support an integrated population, maintain the current program until natural production appears evident. This segregated program using local broodstock would serve as a transitional phase in the reintroduction program. Returns in excess of broodstock needs should be allowed to spawn naturally.

- Expansion of this program should be contingent on the development of a local broodstock.

- The HSRG recommends that managers implement a BKD control strategy for their spring and summer/fall Chinook hatchery programs where BKD has proved a recurring problem. Ideally, the strategy should include culling (destroying) eggs/progeny from hatchery- and natural-origin brood that are found to be infected with the BKD agent. However, because brood fish with high levels of the BKD agent are more likely to transmit the agent to their progeny than brood with lesser levels of the agent, the culling of eggs/progeny from infected brood fish, should, at the very least, be applied to those with high levels of the BKD agent (e.g., ELISA OD value of 0.4 and above when broodstock are not in short supply and ELISA OD value of 0.6 and above when broodstock are in short supply). In addition, in programs using ESA-listed natural-origin brood fish, the culling of their eggs/progeny may, at the managers' discretion, be dispensed with. However, the ESA-listed broodstock should be injected, pre-spawning, with an appropriate antibiotic (preferably, azithromycin at 40 mg/kg fish), and the resulting eggs should be surface-disinfected with an iodophor. All pre-spawning brood injections may be limited to females, ESA-listed or otherwise.

- Finally, eggs and hatchlings derived from broodstock found to be heavily infected with the BKD agent should be incubated/reared in isolation from those obtained from broodstock with no or lesser levels of the BKD agent. In addition, the hatchlings should be reared at the lowest possible densities (below current standards), and, at the first signs of infection with the BKD agent, they should be treated with orally administered erythromycin (100 mg/kg fish) for 28 days. The treatment should be repeated if there is evidence that the BKD agent has persisted in the hatchlings.

The proposed Walla Walla Hatchery spring Chinook program presented in this HGMP is consistent with all these recommendations.

SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS. (Non-Salmonid Species are addressed in Section 15)

2.1) List all ESA permits or authorizations in hand for the hatchery program.

The current Carson NFH/Walla Walla spring Chinook release program is covered under a Hatchery and Genetic Management Plan (HGMP) (CTUIR 2009) submitted to NOAA Fisheries in May 2009. The Walla Walla Monitoring and Evaluation Project (WWMEP) activities are outlined in the May 2009 HGMP, Washington State Scientific Collection Permit #11-243, Oregon Scientific Taking Permit # 17124, NMFS Section 10 Research Permit #16446 and USFWS Take Permit TE844468-10 (bull trout – see Section 15).

No permits specific to the WWHMP program proposed in this HGMP have been issued.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

Walla Walla River summer steelhead (*Oncorhynchus mykiss*) (Mid Columbia DPS)
Bull Trout (*Salvelinus confluentus*) (Columbia River DPS) – see Section 15

Tucannon Spring/Summer Chinook salmon (*Oncorhynchus tshawytscha*) (Snake River ESU)

This is the closest ESA listed spring/summer Chinook population to the target area. There have been no

CWT recoveries to date in the Tucannon River from the current program (Gallinat and Ross 2011). PIT tag information has shown a few detections at Ice Harbor Dam but the final detections for these fish were within the Walla Walla River (Mahoney CTUIR, personal communication). Based on this information, CTUIR does not consider the Tucannon population to be affected by the proposed program and will not include discussion of that population in this section.

- Identify the ESA-listed population(s) that will be directly affected by the program.

The program will not directly affect any ESA-listed fish population.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

The Walla Walla River native summer steelhead population is depressed and listed as Threatened under ESA. This stock is part of the Mid-Columbia River steelhead Distinct Population Segment (DPS). There are two distinct populations of Walla Walla summer steelhead identified by the Interior Columbia Technical Recovery Team (TRT) (2004); Touchet River and Walla Walla River (which comprises the remainder of the Subbasin excluding the Touchet River system).

Age Class Structure and Size Ranges

Natural origin steelhead adults captured at Nursery Bridge Ladder during 1993-1995 were aged by Oregon Department of Fish and Wildlife (ODFW; Walla Walla Subbasin Plan 2004). Sixty one percent of adult steelhead returning to the Walla Walla River had reared two winters in fresh water and two winters in the ocean (denoted 2.2; Table 1). The next largest age class had spent two winters in fresh water and one winter in the Ocean (20%, 2.1). ODFW also estimated that almost seven percent of adults appeared to be repeat spawners. Similarly, 28% of Touchet River steelhead adults were age 2.2 with 52% age 2.1 (Table 2). Other life-history strategies were rare in both basins. The Walla Walla and Touchet River population units have similar life-history types with roughly 80% being either 2.1 or 2.2 based on the information presented in Table 2 and Table 3.

Table 1. Percent of sample by age designation for summer steelhead adults collected at Nursery Bridge Dam on the Walla Walla River (Oregon Department of Fish and Wildlife data).

Return Year	**Life-History Pattern Designation (Percent of Sample)**						
	2.1	**2.2**	**2.3**	**2.4**	**3.1**	**3.2**	**Repeat**
1992-93	24%	63%	2.6%	0.0%	3%	8%	8.0%
1993-94	21%	56%	0.1%	2.0%	7%	14%	3.5%
1994-95	14%	64%	3.0%	0.0%	9%	11%	9.1%
Mean	20%	61%	5.7%	0.7%	6%	11%	6.8%

Table 2. Ages of adult summer steelhead collected from the Touchet River trap near Dayton Washington, (Bumgarner and Dedloff 2009).

	Age 1.1		Age 1.2		Age 2.1		Age 2.2		Age 3.1		Age 3.2		%
BY	N	%	N	%	N	%	N	%	N	%	N	%	Repeat spawners
1994	0	0	0	0	6	29	8	38.1	3	14	3	14	4.8
1995	0	0	0	0	0	0	6	85.7	0	0	0	0	0
1999	0	0	1	3.2	18	58	9	29	2	6.5	0	0	3.2
2000	1	3.2	1	3.2	17	55	8	25.8	3	9.7	1	3.2	0
2001	1	0.6	14	8	84	48	40	23	15	8.6	9	5.2	5.7
2002	6	4.8	3	2.4	84	68	20	16.1	6	4.8	3	2.4	1.6
2003	0	0	8	6.7	20	17	73	60.8	2	1.7	10	8.3	5.8
2004	0	0	1	0.8	47	39	18	15	18	15	2	1.7	8.1
2005	0	0	0	0	37	44	21	25	15	18	8	9.5	3.6
2006	2	1.3	7	4.5	85	55	38	24.5	7	4.5	11	7.1	3.2
2007	2	1.4	11	7.9	46	33	54	38.6	7	5	14	10	2.8
2008	2	1.7	6	5.2	47	41	38	32.8	7	6	7	6	7.7
2009	3	2.1	0	0	81	56	21	14.6	19	13	8	5.6	8.2
2010	15	4.1	14	3.8	230	63	74	20.2	23	6.3	4	1.1	1.9
Totals	**32**	**2**	**66**	**4**	**802**	**52**	**428**	**28**	**127**	**8.2**	**80**	**5.2**	**5.1**

Note: this table does not include 3-ocean age fish, or those with freshwater age 4. Only a few of those individuals have been documented overall years (0.32%).

Lengths of 225 radio tagged adult steelhead captured in the Walla Walla River by CTUIR from 2002-2005 ranged from 50 to 90 cm and averaged 65 cm (Table 3 and Figure 6; Schwartz et al. 2005, Mahoney et al. 2006). Natural origin adult steelhead in the Walla Walla River were significantly larger than hatchery steelhead which are non-native Lyons Ferry Hatchery stock (*P* (|T|>=t is 0.0042)).

Table 3. Average fork lengths of adult steelhead captured in the Walla Walla River by CTUIR 2002-2005 (adapted from Mahoney 2003, Mahoney et al. 2006)

	Average Length	**Standard Deviation**	**Range (cm)**	**n**
All Steelhead	64.6	7.809	50-90	225
Hatchery Steelhead	62.7	6.885	50-87	82
Female Hatchery Steelhead	62.5	7.391	50-83	44
Male Hatchery Steelhead	62.9	6.339	55-87	38
Natural Steelhead	65.6	8.121	50-90	143
Female Natural Steelhead	65.7	7.392	55-90	74
Male Natural Steelhead	65.5	8.891	50-87	69

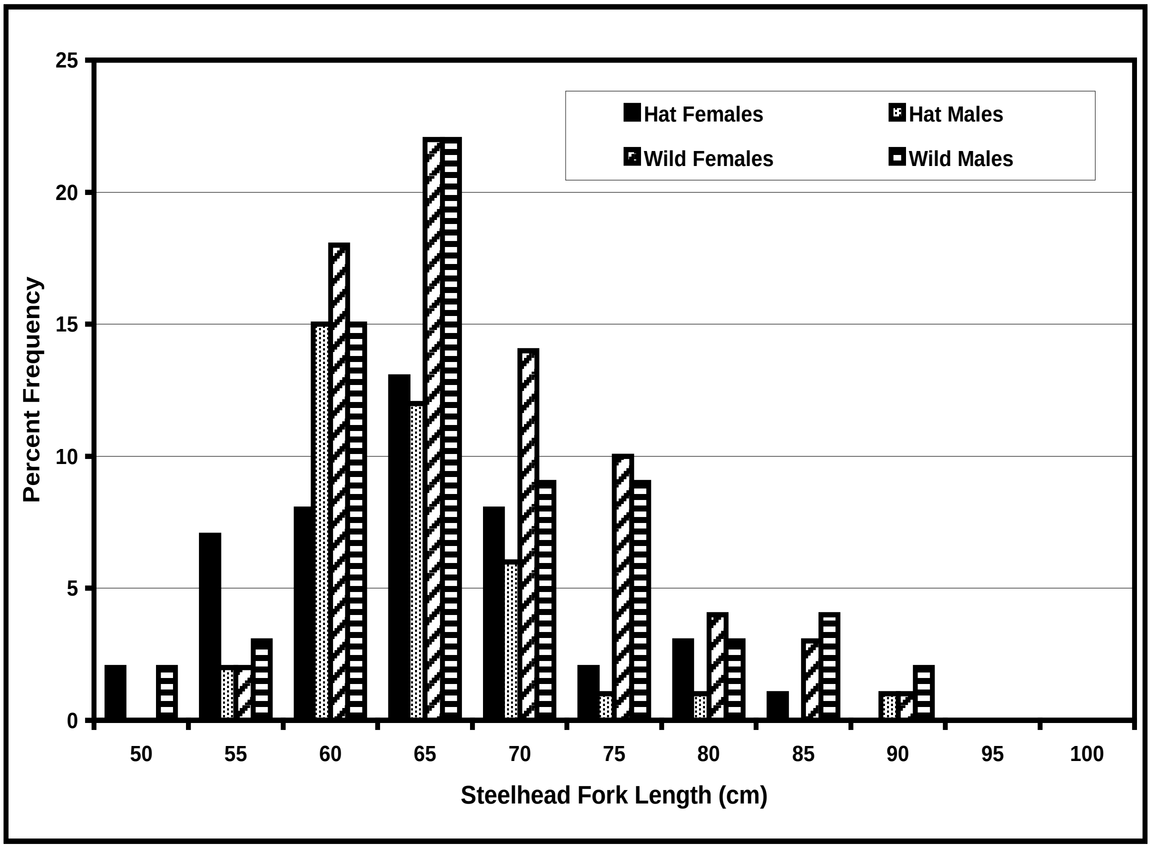


Figure 8. Length frequency histogram of hatchery and natural origin adult steelhead captured by CTUIR in the Walla Walla River, 2002-2005 (adapted from Mahoney 2003, Schwartz et al. 2005).

Summer steelhead juveniles have considerable overlap in fork length by age (Figures 9 & 10). Tribal biologists aged 780 *O. mykiss* but found only 10 age 4+ (150 to 330 mm) and one age 5+ at 240 mm in length (Contor et al. 2003). The variable growth of *O. mykiss* is likely related to the variety of water temperature profiles and habitat types in the basin. The small size of the older individuals is in part because larger, faster growing *O. mykiss* are thought to migrate to the ocean after their second winter. The early out-migration of larger individuals leaves the slower growing older individuals (possibly resident fish) for collection. Growth of *O. mykiss* in the Walla Walla basin is significantly slower in the headwater areas (age 2+ $P(t>= 7.484)<0.0001$, age 1+ $P(t>= 9.085)<0.0001$, Figures 11 & 12), where water temperatures are much colder and the oligotrophic nature of the streams limit energy pathways to fish (Contor et al. 2003).

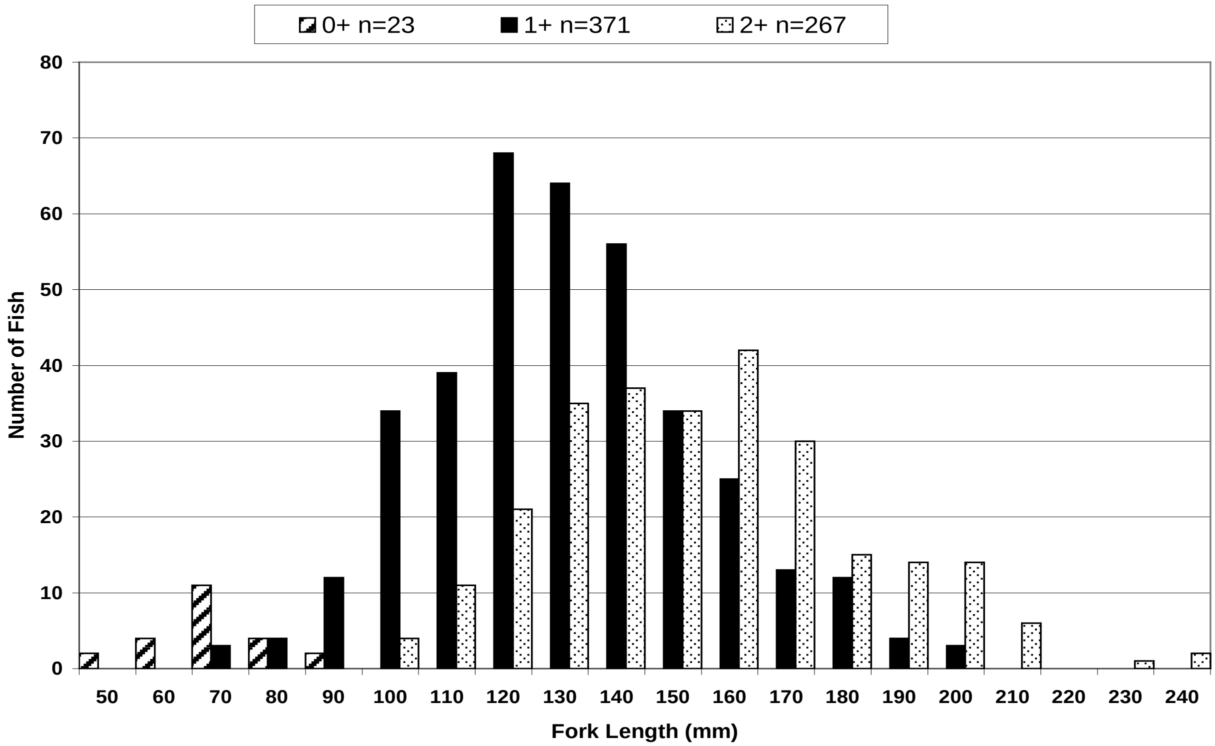


Figure 9. Age and length histogram for *O. mykiss* in the Walla Walla River Basin, ages 0+, 1+ and 2+ (from Contor et al. 2003).

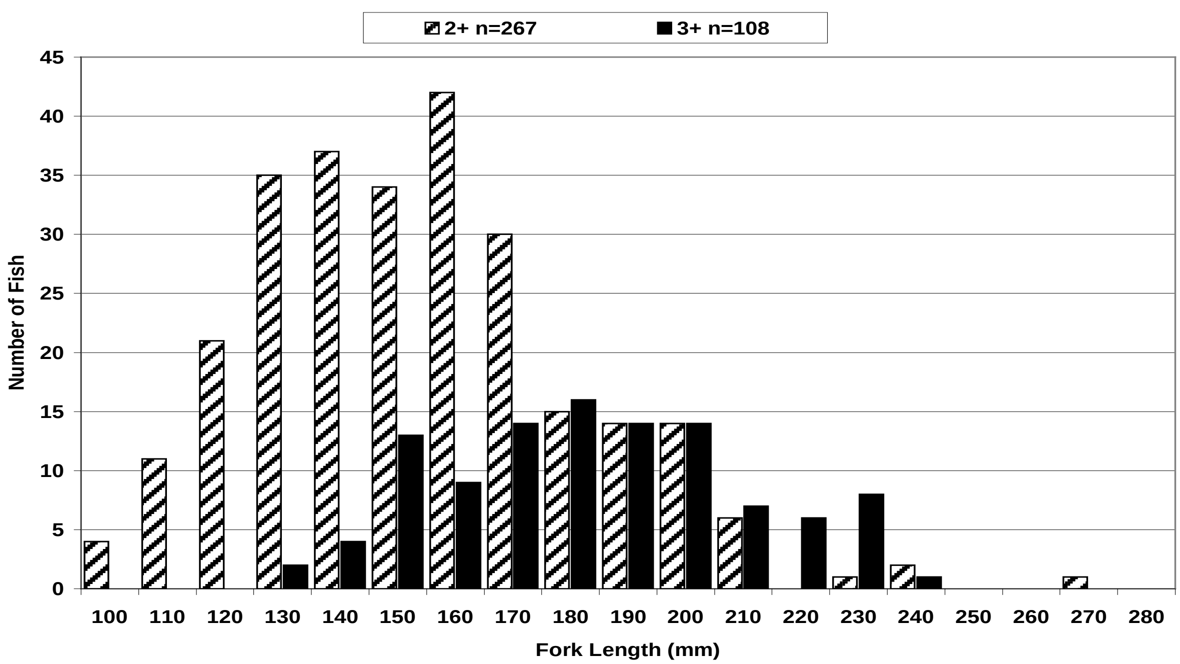


Figure 10. Age and length histogram for *.O mykiss* in the Walla Walla River Basin, age 3+; length frequencies of age 2+ fish are included for comparison (from Contor et al. 2003).

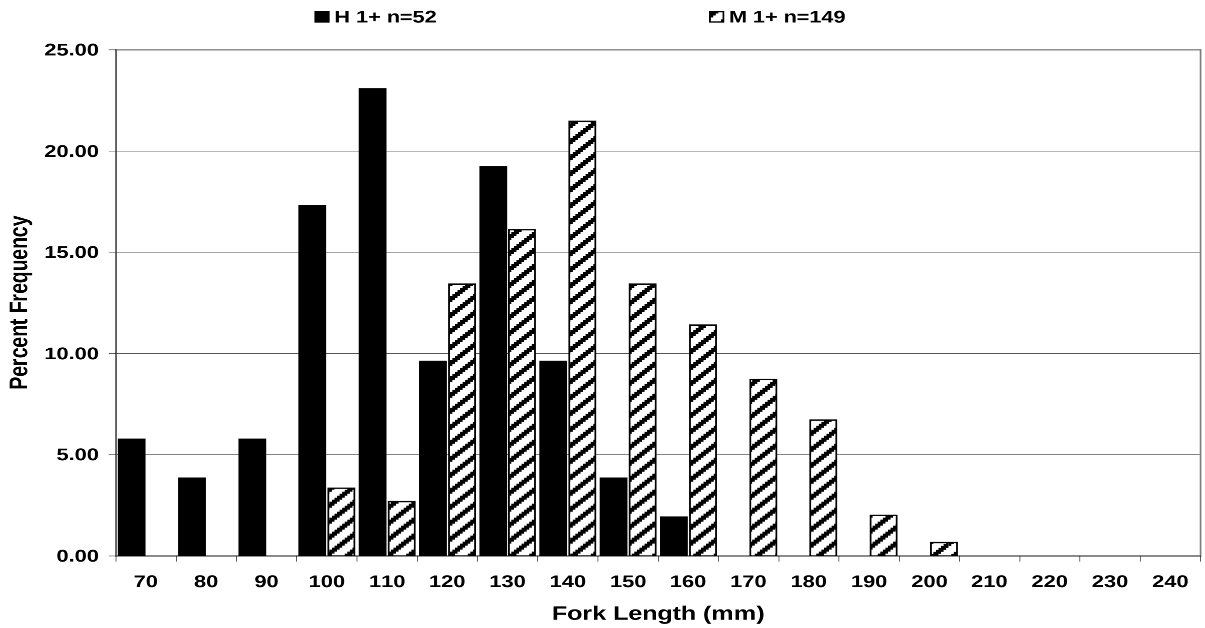


Figure 11. Length frequency histogram for age 1+ *O. mykiss* from two different areas of the Walla Walla Subbasin. H 1+ fish are from four headwater reaches, N. F. Walla Walla, N. F. Touchet, Griffin Fork of the S.F. Touchet and West Pattit Creek. M 1+ fish are from mid-basin reaches of Mill Creek and the mainstem Walla Walla River near Milton-Freewater (from Contor et al. 2003).

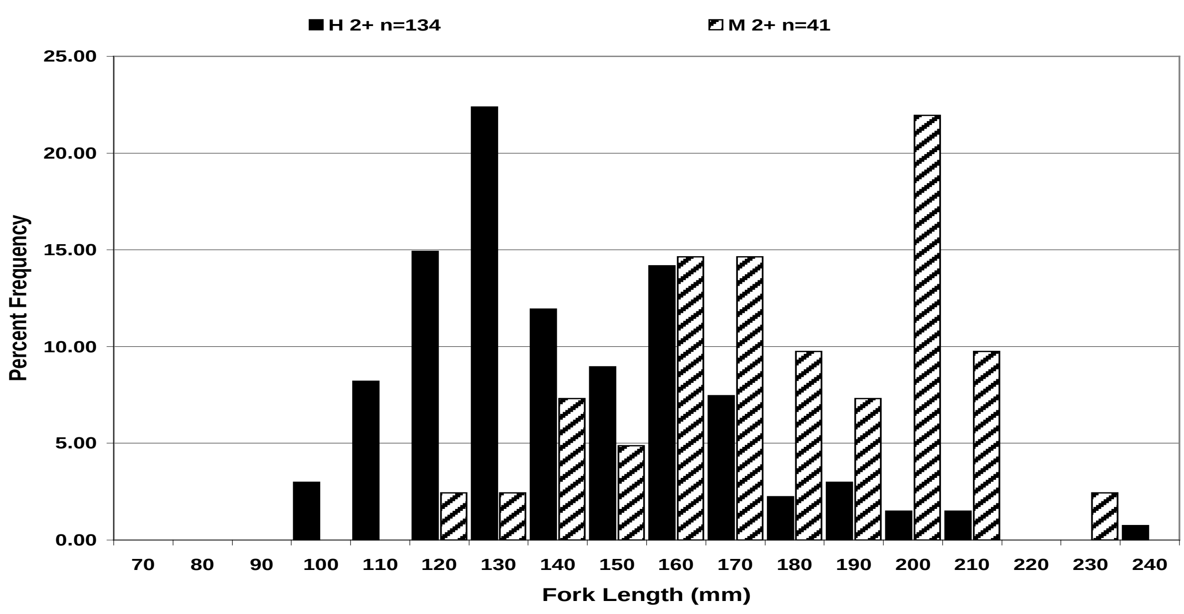


Figure 12. Length frequency histogram for age 2+ *O. mykiss* from two different areas of the Walla Walla Subbasin. H 2+ fish are from four headwater reaches, N. F. Walla Walla, N. F. Touchet, Griffin Fork of the S.F. Touchet and West Pattit Creek. M 2+ fish are from mid-basin reaches of Mill Creek and the mainstem Walla Walla River near Milton-Freewater (from Contor et al. 2003).

Sex Ratio
The percent females of natural steelhead adults captured at NBD averaged 74% and ranged from 69% to 76% from 1993 to 2001. This is a typical sex ratio for adult steelhead in the adjacent Umatilla Subbasin (Kissner 2003). Hatchery female at NBD steelhead averaged 68% and ranged from 58-75% (Table 4).

Table 4. The number of steelhead captured at Nursery Bridge Dam by origin and gender from 1993-2001 (CTUIR and ODFW unpublished data).

	Natural Steelhead					**Hatchery Steelhead**				
	Total	**Total**	**%**	**%**		**Total**	**Total**	**%**	**%**	
Year	**F**	**M**	**F**	**M**	**Total**	**F**	**M**	**F**	**M**	**Total**
1992-93	548	174	75.9%	24.1%	722	17	9	65.4%	34.6%	26
1993-94	321	101	76.1%	23.9%	422	2	2	50.0%	50.0%	4
1994-95	242	98	71.2%	28.8%	340	19	8	70.4%	29.6%	27
1995-96	177	81	68.6%	31.4%	258	15	5	75.0%	25.0%	20
1996-97	159	72	68.8%	31.2%	231	18	13	58.1%	41.9%	31
1997-98	223	79	73.8%	26.2%	302	12	6	66.7%	33.3%	18
1998-99	171	53	76.3%	23.7%	224	5	2	71.4%	28.6%	7
1999-00	305	104	74.6%	25.4%	409	12	4	75.0%	25.0%	16
2000-01	433	162	72.8%	27.2%	595	29	11	72.5%	27.5%	40
Average	**287**	**103**	**73.6%**	**26.4%**	**389**	**14**	**7**	**68.3%**	**31.7%**	**21**

Spawning Distribution and Timing (Mahoney et al. 2012): Adult summer steelhead enter the WWR as early as June (approximately one-year prior to the year they spawn), or as late as May of the year they spawn, depending on stream flows and water temperatures. Low flows in the lower Walla Walla and Touchet rivers often prevent or inhibit adult steelhead from migrating above the mouth of the Touchet River until December in many years (Walla Walla County and WWBWC 2004, Mahoney et al. 2008, Mendel et al. 2007, Bumgarner and Dedloff 2011). Steelhead usually are observed at the NBD between January and May, and at the DAT from December through August (Figures 13 & 14), although WDFW has observed that run timing at the Coppei trap is limited to mainly during February to mid-May. Steelhead generally spawn during the months of March, April and May, although a few fish spawn in January or February, and in early June.

Known spawning areas are identified in Figure 15. Progeny of adults that spawn in the mid river areas are likely to have low survival due to poor summer rearing habitat, unless they can find refuge areas prior to low summer flows. Considerable variability in redd density occurs between and within years and survey reaches (Mahoney et al. 2011). For example, in 2003 density of redds in portions of the Touchet Basin ranged from 1.0 to 7.3 redds/km, while in 1999 densities ranged from 3.2 to 32.2 (Mendel et al. 2000, 2001, 2002, 2004). WDFW has conducted redd surveys in index areas upstream of Dayton for many years and redd densities there have varied considerably (Bumgarner and Dedloff, 2009).

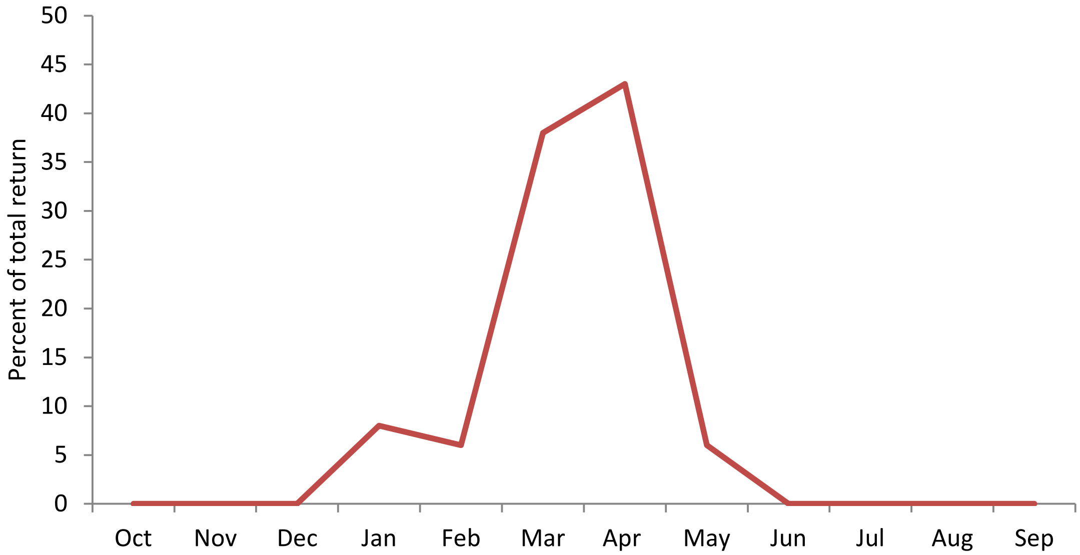


Figure 13. Mean adult steelhead run timing at NBD, for 2009 through 2011.

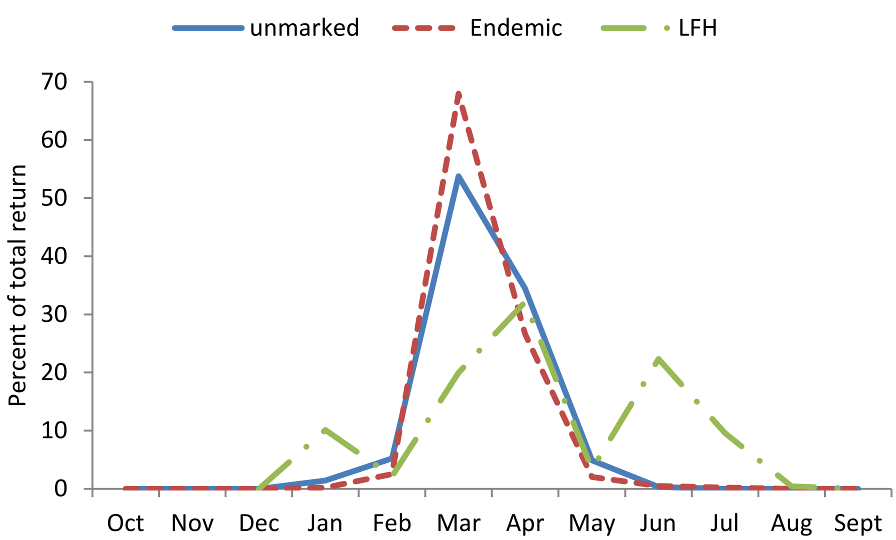


Figure 14. Mean adult steelhead run timing at the DAT, for 2009 through 2011. Steelhead returning in June and later are the beginning of the next run year.

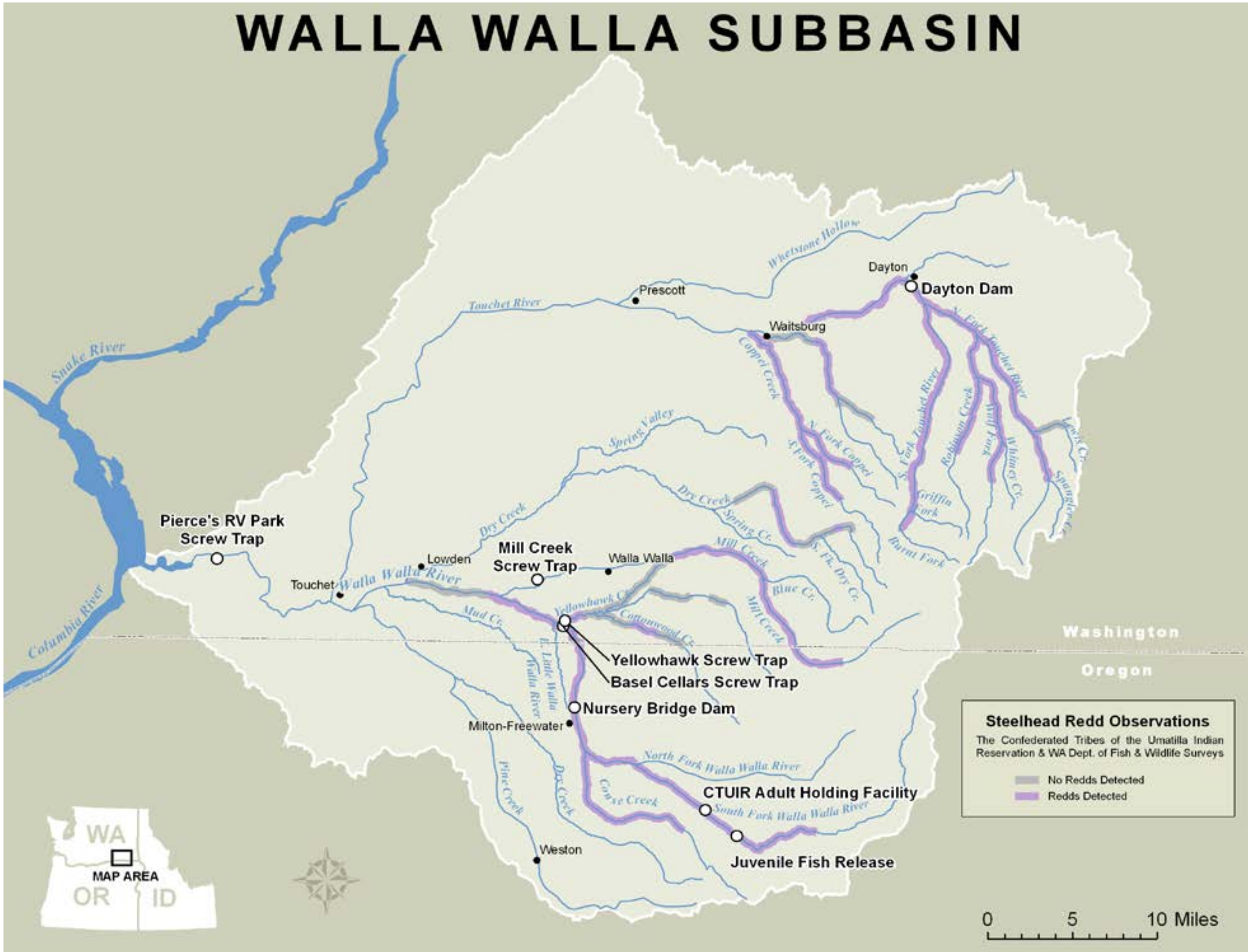


Figure 15. Walla Walla steelhead spawning areas (from Mahoney et al. 2011). Note that steelhead have been documented spawning in Walla Walla River above Mill Creek, in Mill Creek and Blue Creek, upper Dry Creek (in WA) , Cottonwood Cr, Yellowhawk Creek, plus in the Oregon portions of the basin. Some spawning is likely in mainstem Walla Walla between upper Dry Creek (in WA) and Mill Creek.

Juvenile Life-History, Migration and Distribution (Mahoney et al 2011): Steelhead juveniles have a diverse life-history and may migrate from the headwaters at age 1+ (as small as 80 mm) through age 3+. Based on current information, we estimate that about 80-90% of the steelhead smolts move into the Columbia after their second winter at age 2+ (Contor et al. 2003). Juvenile steelhead utilize the headwaters and higher quality mid-basin reaches during the summers for rearing. Based on out-migrant trap data, a large number of juvenile steelhead drop down into the mid and lower reaches at the onset of fall prior to their spring migration (Contor et al. 2003, Mahoney et al. 2011).

Based on outmigrant trap data, some juvenile steelhead disperse into the lower Walla Walla River in the fall prior to migrating to the Columbia River between March and June (Mahoney et al. 2011). Mean outmigrant timing from the WWR to McNary Dam was 10% by 2-April, 50% by 30-April, and 90% by 16-May (Figure 16). Mean travel time between the 10th and 90th percentiles was 44 days.

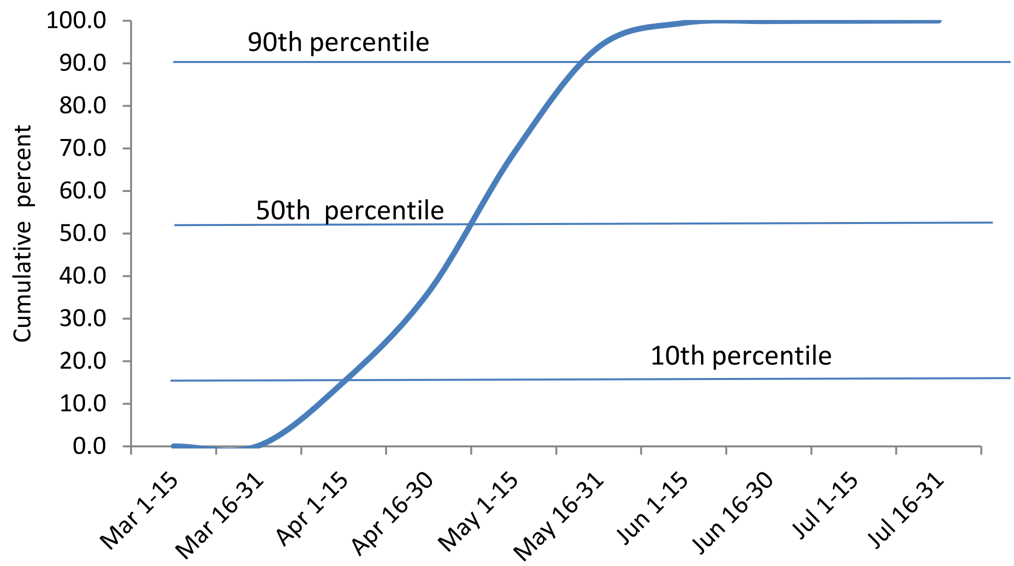


Figure 16. Percent cumulative emigration timing of Walla Walla summer steelhead to McNary Dam, migration years 2006-2011.

Touchet River steelhead juveniles have a diverse life-history and may migrate downstream at age 1+ (as small as 80 mm) through age 4+. Outmigration of natural origin steelhead occurred during two distinct periods in 2010-11 that included both a fall/early winter emigration and a spring emigration, as has been observed in past years. Based on outmigrant trap data, a large number of juvenile steelhead descend into the mid and lower reaches at the onset of fall and winter prior to their spring migration (Gallinat and Ross 2011, Ross and Gallinat 2011). Migrants arrived at McNary Dam from late March to mid-June in 2011, with a peak in arrival timing in mid-May (Figure 17). Over 90% of the migrants arrived at McNary Dam by late May (Figure 18), and 100% by mid-June. From scale analysis of adult returns, we estimate that 73% to nearly 80% of the Coppei Creek and Touchet River steelhead, respectfully, migrate out of freshwater after their second winter at age 2+ (See Mahoney et al. 2011) and most return after one year at sea.

In the Touchet River large numbers of parr have been documented migrating downstream past the trap, but we are uncertain whether they are overwintering downstream and not actively migrating to the ocean. WDFW attempted to operate an outmigrant trap downstream of Waitsburg in 2011 with a goal of evaluating whether some of the early migrants were overwintering in the mid or lower Touchet River (Ross and Gallinat 2011). Unfortunately, the trap was disabled several times during the spring season because of high flows and debris. Few small PIT tagged steelhead have been detected at McNary or other lower Columbia River dams (Gallinat and Ross 2011).

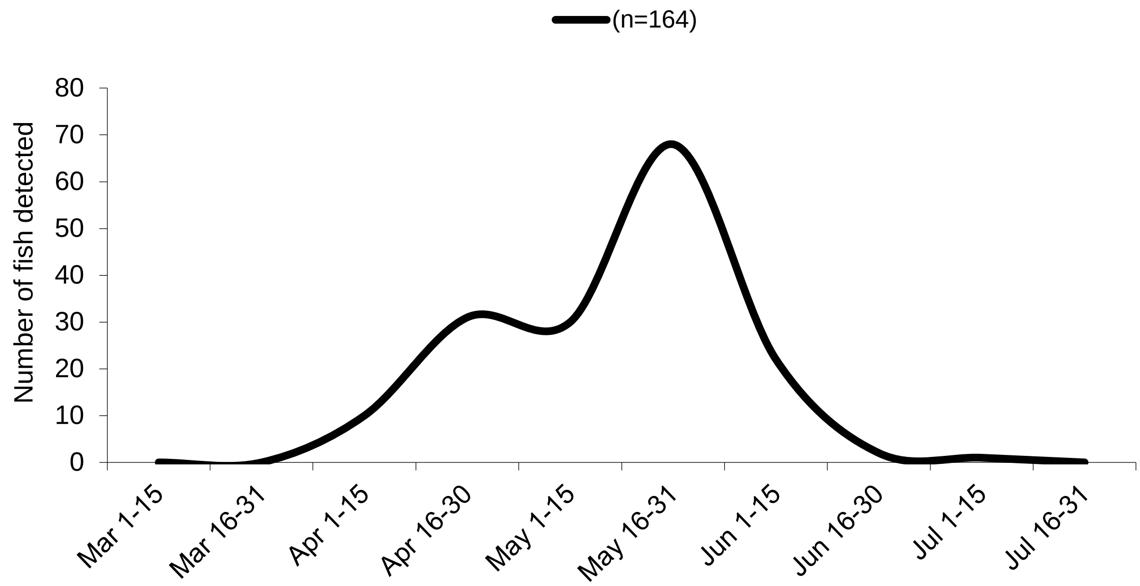


Figure 17. Emigration timing of Touchet summer steelhead juvenile (≥100 mm) to McNary Dam (MCD) for spring 2011.

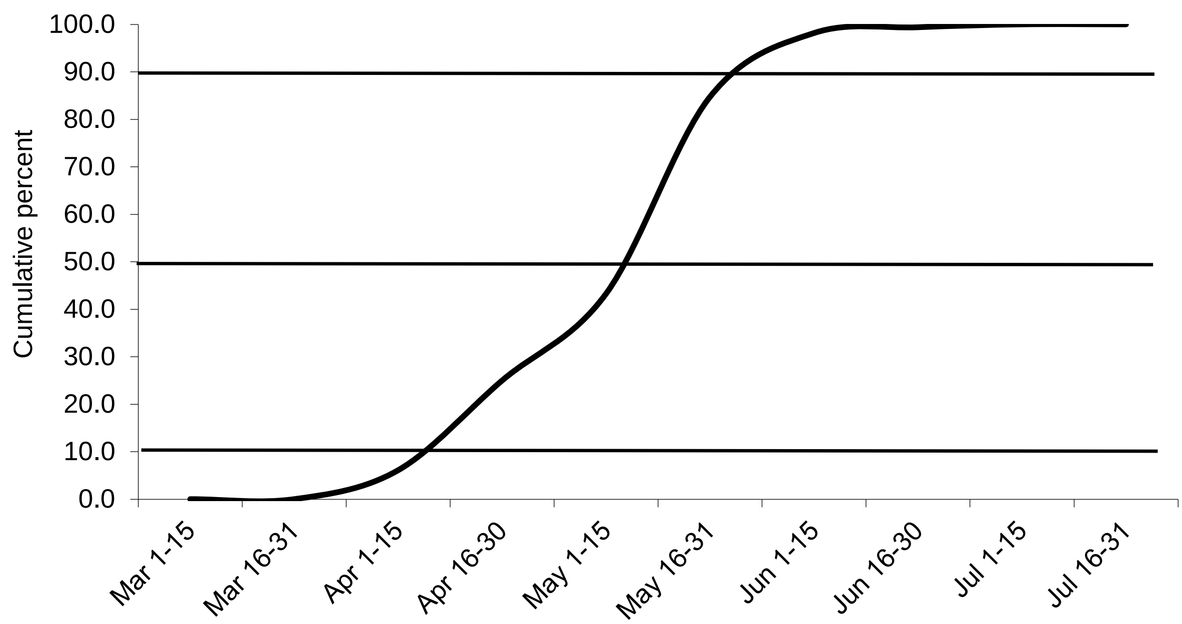


Figure 18. Percent cumulative emigration timing of PIT tagged Touchet summer steelhead (≥ 100 mm) from DAT to MCD during spring 2011.

Estimates of mean fork length, weight and condition factor at emigration for juvenile PIT-tagged steelhead in the Walla Walla River captured during migration years 2005-2010 are presented in Table 5. Overall mean fork length, weight and condition factor was 176.0 mm (95% CI +/- 4.8), 56.8g (95% CI +/- 3.5), and 30.9 (95% CI +/- 0.01); respectively.

Table 5. Estimates of mean fork length (mm), weight (g) and condition factor for PIT-tagged juvenile summer steelhead-rainbow trout sampled in the Walla Walla River and headwater tributaries, migration years 2005-2010.

Migration Year	Fork length (mm) N	Fork length (mm) Mean	Fork length (mm) 95% C.I.	Weight (g) N	Weight (g) Mean	Weight (g) 95% C.I.	Condition factor[a] N	Condition factor[a] Mean	Condition factor[a] 95% C.I.
				Steelhead					
2005	526	183.0	±2.8	518	61.9	±2.1	518	0.97	±0.01
2006	271	178.1	±2.5	169	56.0	±3.0	169	0.93	±0.01
2007	754	171.2	±1.9	390	53.1	±2.35	390	0.94	±0.01
2008	1860	173.9	±1.09	1684	55.2	±1.19	1684	0.99	±0.00
2009	2539	171.7	±0.97	1749	54.9	±1.22	1747	1.00	±0.01
2010	3718	178.4	±0.84	2813	59.8	±1.11	2800	0.99	±0.01

[a] Condition factor (K) was estimated $(100{,}000 * W)/L^3$

Juvenile Production (Mahoney et al. 2012): Mark recapture abundance estimates were made for wild summer steelhead smolts emigrating from the WWR (Figure 19). Between 2005 and 2010, abundance estimates were made based on trap recaptures at the LWWR trap site (rkm 14) well below the confluence for the Touchet River (rkm 35). In 2011, we moved the rotary trap up to its present Garden City trap site (rkm 49.6), well above the Touchet River. Abundance estimates made after 2010 are not comparable to previous years abundance estimates due to the Touchet River influence in the past. The 6-year (2005-2010) geometric mean for juvenile production from the LWWR was 30,251 (SE 5,934). The 2011 steelhead outmigrant estimate was 33,364 (SE 5,867) at the Garden City trap.

Mark recapture abundance estimates were made for wild summer steelhead smolts (Figure 20) emigrating past the Dayton rotary trap in the upper Touchet River (Gallinat and Ross 2011). The 4-year (2008-2011) mean for juvenile production from the upper Touchet River was 26,749 (range 8,188-62,730). Estimated outmigrant abundance of wild summer steelhead smolts has been variable, and beginning in 2010/11, estimates are made separately for those fish 80-124 mm and those ≥ 125 mm (Gallinat and Ross 2011). Steelhead outmigrants totaled 44,912 in 2011; 19,757 were 80-125 mm FL and 25,155 ≥ 125 mm FL.

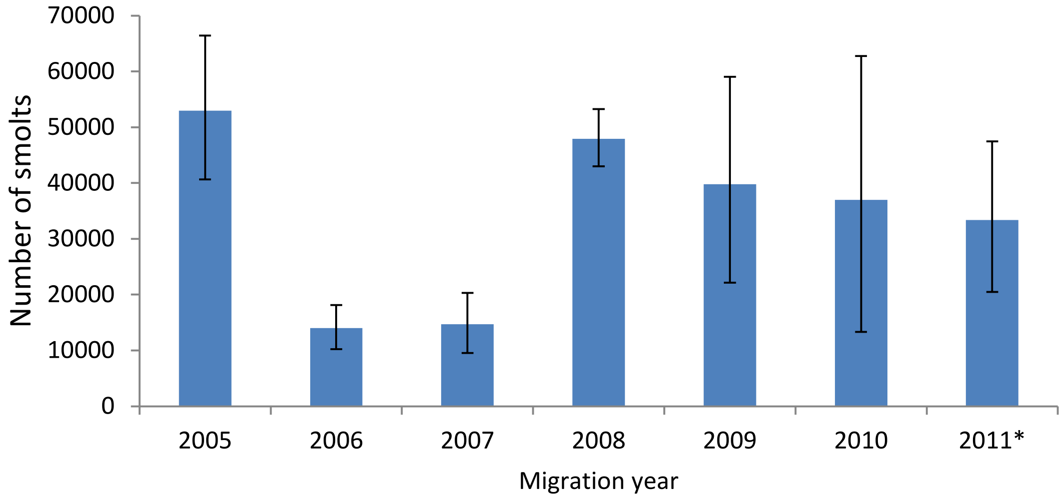


Figure 19. Abundance estimates for natural summer steelhead outmigrants from the WWR migration years 2005-2011. *Note that 2011 was for upstream of the mouth of the Touchet River, whereas the previous estimates included the Touchet River smolts.

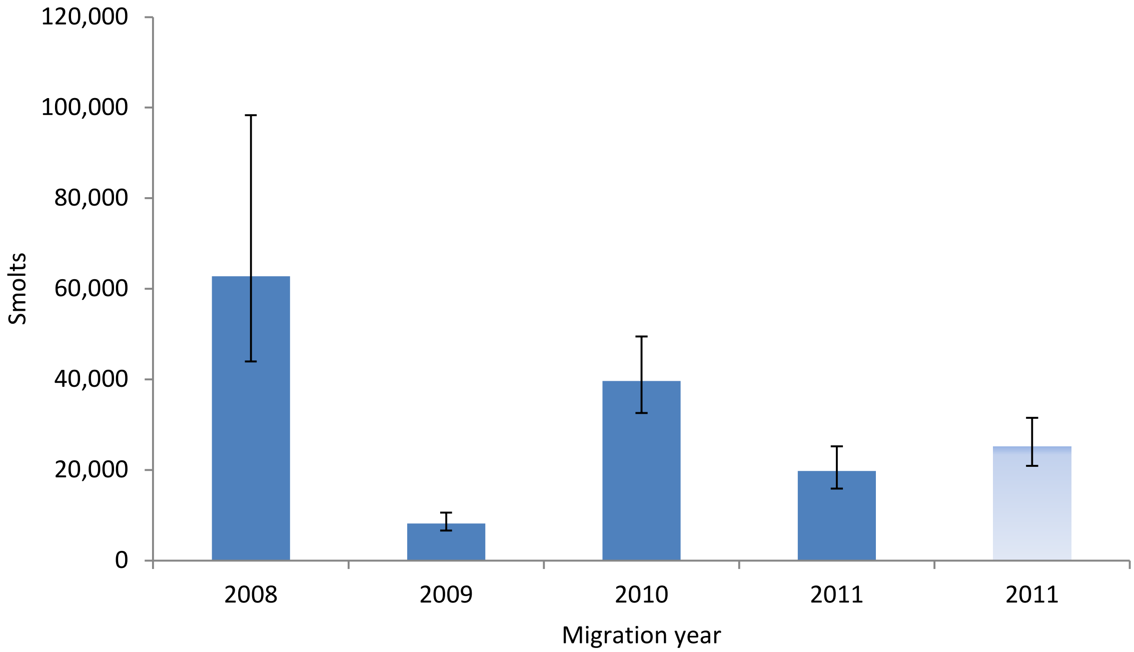


Figure 20. Steelhead outmigrant abundance and standard error (SE) on the Touchet River in Dayton, WA (derived from Gallinat and Ross annual reports). Note: 2011 abundance is shown separately for steelhead of 80-124 mm FL (dark bar) and $\geq$ 125mm (light bar).

Smolt to Adult Survival Rates (Mahoney et al. 2012): For out-migration years 2003-2009 mean smolt to adult return from the upper Walla Walla River was 1.39% (SE 0.45) to Bonneville Dam, 1.12% (SE 0.42) to McNary Dam, and 1.00% (SE 0.37) back to the WWR (Figure21). Smolt to adult returns for naturally produced steelhead from the Touchet Basin are not presently compiled, but these data should be available in future reports.

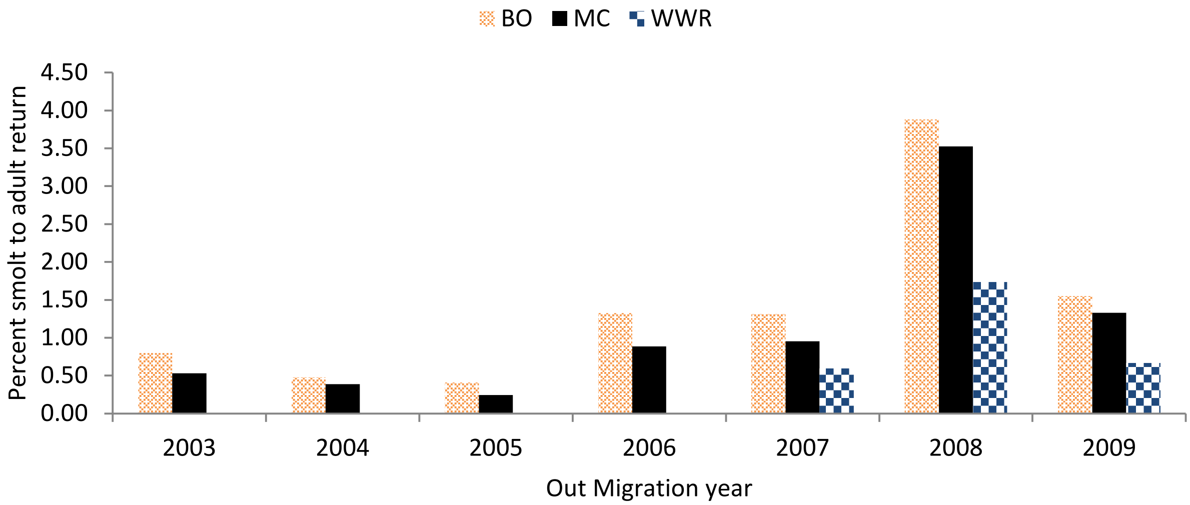


Figure 21. Estimated SARs for Walla Walla origin summer steelhead to Bonneville Dam (BO), McNary Dam (MC), and all Walla Walla River (WWR) PIT tag detections for out migration years 2003-2009. Adult detections to the WWR were not available for 2003-2006.

Juvenile Distribution (Contor et al 2003): Figure 22 shows summer distribution of juvenile *O. mykiss* in the Walla Walla River Basin. Juvenile *O. mykiss* were found in ephemeral streams during the spring and appear to use these habitats seasonally as conditions allow (Contor et al. 2003). During the summer, *O. mykiss* have been found wherever there is sufficient water with suitable temperatures. Summer rearing densities of juvenile *O. mykiss* in the primary habitat areas generally range from 10 to 70 fish/100 m^2. Densities over 200 fish/100 m^2 have been documented in some locations. Year to year variation can be substantial and observed densities in marginal habitats have ranged from 0 to 10 fish/100 m^2 (Contor et al. 2003, Mendel et al. 2000, 2001, 2002, and 2004, Schwartz et al. 2005, Mahoney et al. 2006).

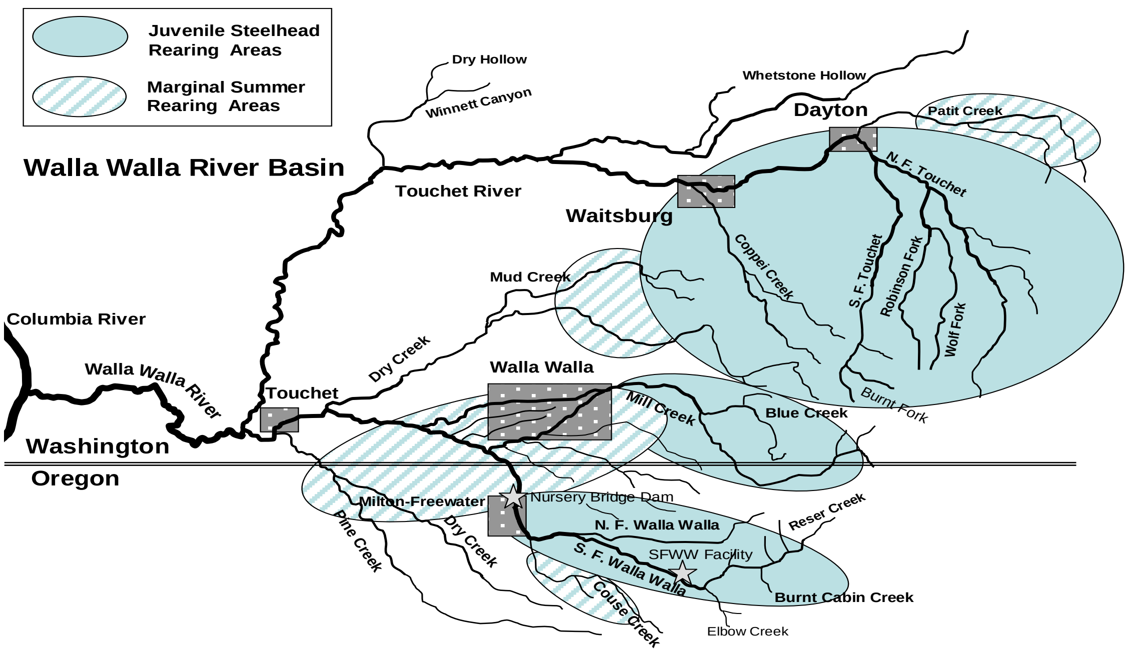


Figure 22. Summer distribution of juvenile *O. mykiss* in the Walla Walla River Basin.

Genetics: Summer steelhead in the Walla Walla River Basin are closely related to Umatilla and Snake River steelhead but have significant and unique genetic characteristics. Narum (et al. 2003), and Blankenship et al. (2007), and Blankenship et al. (2009) found evidence of genetic structure between populations from the Touchet and Walla Walla Rivers. In fact there was more similarity between Umatilla River steelhead and lower Snake River steelhead than between Touchet and Walla Walla River Steelhead (Narum et al. 2004). These studies also suggest that the Snake River origin hatchery steelhead have not significantly interbred with either Walla Walla or Touchet River endemic steelhead. Narum also found some divergence between resident and anadromous forms within the Walla Walla but not the Touchet. Tests of Hardy-Weinberg equilibrium indicated that both anadromous and resident populations were in equilibrium but mixed life-history collections were out of equilibrium (Blankenship et al. 2007 & 2009). These same studies also documented temporal stability in natural steelhead populations in the Walla and Touchet rivers and little evidence of hatchery introgression from Lyons Ferry hatchery releases or a non-native stock.

2.2.2) <u>Status of ESA-listed salmonid population(s) affected by the program.</u>

- **Describe the status of the listed natural population(s) relative to “critical” and “viable” population thresholds.**

The Walla Walla River Mid Columbia River summer steelhead run is listed as threatened. The ICTRT is currently developing “critical” and “viable” thresholds for this population. In the proposed guidance document for viable salmonid populations, the ICTRT described population attributes for the Touchet River and Walla Walla River populations (NMFS 2009). Both populations, when at viable levels, would be expected to have an abundance of 1,000 adults over a full brood year cycle and productivity threshold of 1.35 (NMFS 2008). The structure of the Touchet River population was considered to be small and/or linear, whereas, the Walla Walla River population was considered to be dendritic with multiple spawning aggregations (ICTRT 2004). The designation of structure categories for these populations relates to the level of extinction risk for the population based on the present conditions compared to historical spatial distribution, life-history strategies, genetic variation, and natural spawner composition.

- **Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**

  Adult to adult return (AAR; Mahoney et al 2012): Steelhead AAR to NBD was used to describe trends in natural-origin production from the upper WWR. Between 2000 and 2011, 12 complete broods (BY 1993-2004, age 3-6) have returned to NBD (Figure 23). The 10 year geometric mean for AAR was 1.30 (SE 0.33). During the monitoring period, AAR has ranged from 0.38 to 3.17. All the productivity estimates reported here are based on the NBD counts and do not include adults returning to Mill Creek and other tributaries that are included in the Walla Walla population. The population is stable or near replacement, however it remains below the recovery goal of a 20 year productivity geometric mean of 1.35 (SRSRB 2011).

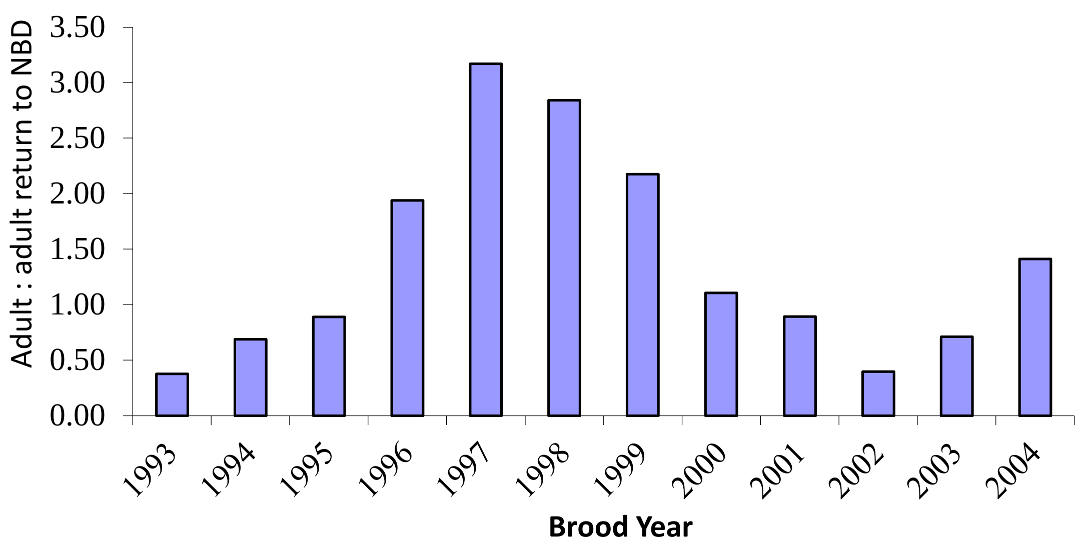


Figure 23. Natural origin summer steelhead adult to adult return to Nursery Bridge Dam on the upper WWR, estimated by CTUIR, BYs 1993-2004.

The Touchet River steelhead population AAR has been estimated by WDFW for the index area upstream of Dayton (Figure 24) using the data collected from spawning ground surveys (Joe Bumgarner, WDFW, personal communications 2011). The geometric mean AAR was 0.89, indicating that the stock is generally not replacing itself. Replacement has been met six of the past 17 years (35.3%). These estimates are based on returns upstream of DAT and do not include Coppei Creek and other portions of the Touchet drainage downstream of Dayton. The estimated productivity is highly variable and below the productivity recovery goal of a geometric mean of 1.35 (SRSRB 2011).

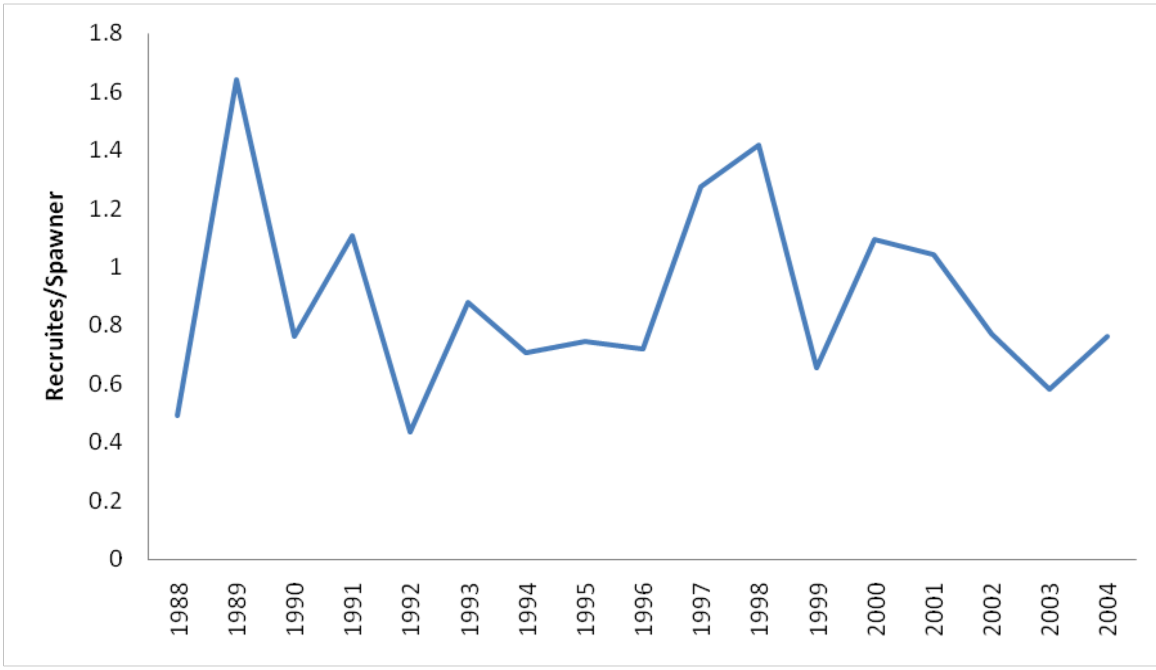


Figure 24. Estimated adult-to-adult replacement of natural origin Touchet River summer steelhead for the index areas upstream of Dayton (1988-2004 brood years) (estimates from J. Bumgarner, WDFW, personal communication, 2011, also in SRSRB 2011).

- **Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.**

Adult Abundance (Mahoney et al 2011): Adult steelhead abundance was enumerated at NBD (rkm 71.9) a short distance upstream of the Stateline. This site provides an index of abundance for much of the primary spawning areas in Oregon. Adult returns at NBD have increased annually since 2007, with 2010 and 2011 returns near record levels of nearly 1,100 (Figure 25). Since 1993, adult returns have ranged from a low of 231 to a high of 1,205 (Figure 25). The 10-year geometric mean calculated by CTUIR (2002-2011) for natural origin steelhead returns to NBD was 623 (SE 105.3). The 5-year mean hatchery origin return was 2.1%, and these hatchery fish were passed upstream. Estimates of abundance do not include adults returning to Mill Creek and other downstream areas or tributaries that are included as part of the Walla Walla steelhead population.

Prior to the 2002 return, all hatchery-origin fish captured at the NBD trap (operated by ODFW) were culled. Since 2002, video counts have been used and steelhead are no longer trapped and handled, hatchery fish are not removed. Fish origin was not identified for 2002 through 2005 returns, and gender of adult steelhead returns has not been determined since videotaping began. The NBD is not a complete barrier to steelhead passage (depending on stream flows) and some fish pass over the dam without using the fish ladder (Mahoney et al. 2011). Passage modifications at NBD and the lower river sill, and construction and operation of the new east bank fish ladder, has likely increased passage and enumeration through the two fish ladders. The number of fish bypassing the fish ladders is no longer estimated and should be considered a data gap.

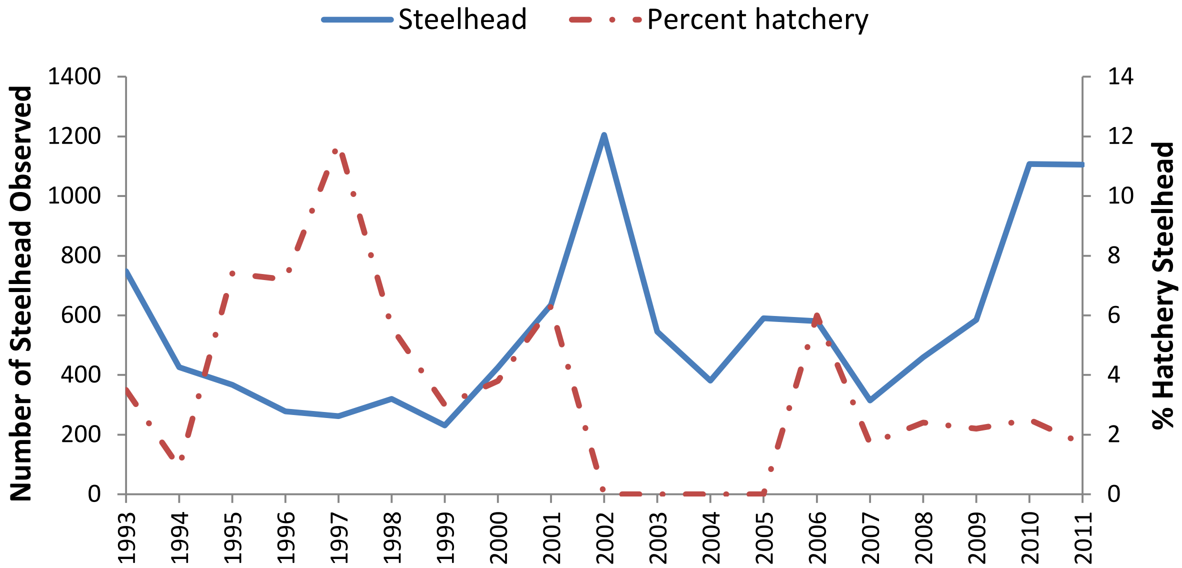


Figure 25. Adult steelhead counts at NBD from ODFW and CTUIR, including hatchery fraction, 1993-2011. Note: no data for fish origin was collected for return years 2002-2005; the 5-year mean hatchery return was 2.1% since 2007.

The steelhead counts at the DAT, and adult trap in Coppei Creek, provide indices to annual Touchet steelhead population returns (similar to the NBD counts). WDFW has operated the DAT on the Touchet River for several years to collect natural-origin summer steelhead for broodstock for an endemic stock hatchery program at Lyons Ferry Hatchery. Trapping has also provided run timing, age and run composition, and has been used in combination with spawning surveys to provide an index of abundance on the spawning grounds for hatchery and natural steelhead (Bumgarner and Dedloff, 2009, Mahoney et al. 2011). WDFW has used a combination of redd counts and run composition passing the DAT to estimate spawners on the spawning grounds upstream of Dayton (Figure 26); data from Joe Bumgarner, WDFW, personal communication). These estimates are not the same as the number of steelhead passed upstream of the trap.

Adult returns to the DAT and upstream varied between 181 (2004) and 738 in 1988 (Figure 26). Trapping began at DAT in July 2010 and continued through the end of 2011. Only fish captured before July of 2011 was included as part of the 2010/2011 return year reported here. The 10-year geometric mean as calculated by CTUIR (2002-2011) for natural steelhead returns to the DAT and upstream was 324 (SE 45.7). The 5-year mean Lyons Ferry Hatchery origin return was 11.7%. However, only a small percentage of those have been passed upstream to spawn in the past couple of years. Evaluation of the steelhead hatchery program in the Touchet River can be found in Bumgarner and Dedloff (2009, and 2011), and previous annual reports to LSRCP.

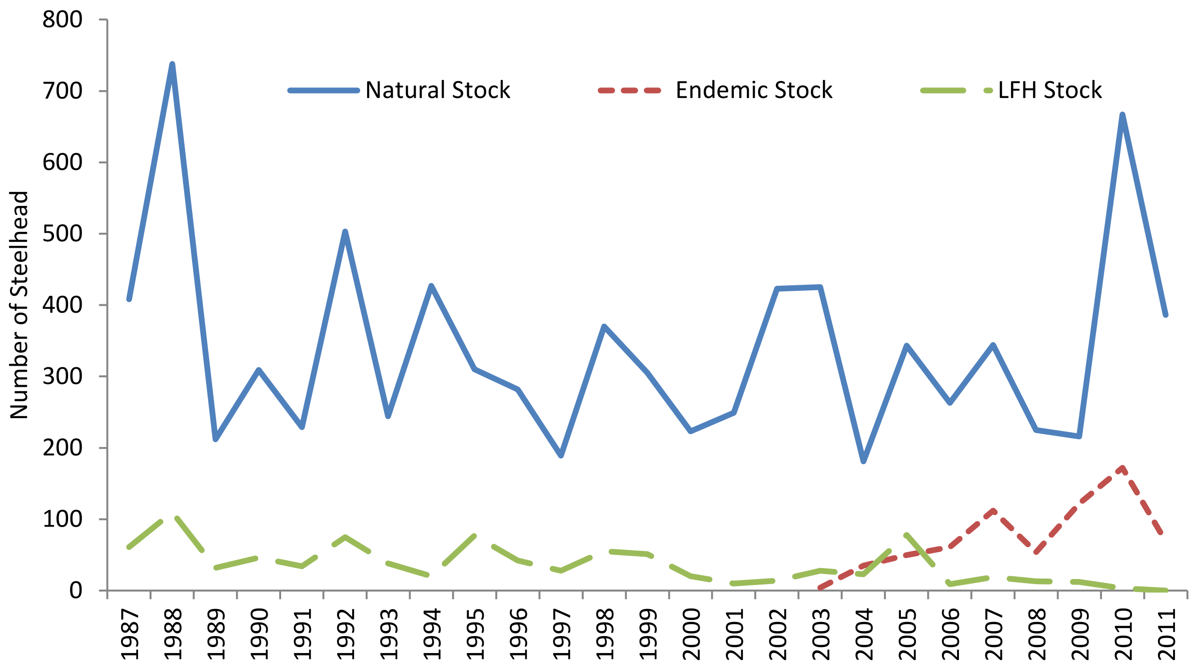


Figure 26. Estimated adult steelhead spawner abundance for index areas of the Touchet River upstream of DAT (based on redd counts and run composition at the DAT, data from Joe Bumgarner, WDFW, personal communication).

Estimates of abundance at DAT do not include adults returning to Coppei Creek and other downstream areas, or other tributaries, included as part of the Touchet population. WDFW supplements the DAT estimates by monitoring in Coppei Creek, which is a major tributary of the Touchet River that passes through the town of Waitsburg, well downstream of the DAT. WDFW has been monitoring steelhead in this stream for several years to supplement the index estimates of adult returns at Dayton (Mahoney et al. 2011). In 2010, WDFW estimated total adult steelhead returns in index areas of the Touchet Basin of 1,070 (888 natural), with 231 of those in the Coppei Creek drainage (221 natural), and 839 (667 natural) at the DAT. The natural steelhead abundance index estimate of 888 is below the recovery goal of 1,000, but the 2010 estimate also does not include adult returns in the mainstem of the Touchet River between Coppei Creek and DAT, and in other spawning tributaries (e.g., Patit and Whiskey creeks). The 2010 combined estimate was the first successful attempt to provide an adult return estimate for more of the Touchet Basin than just upstream of DAT.

In 2011, WDFW again operated an upstream steelhead trap on Coppei Creek to enumerate adult returns (Table 6). The Coppei trap was installed at rkm 5.3 (upstream of the town of Waitsburg) and was operated from 27 January through 18 May, with two disruptions in trap operation of approximately two weeks each (March 10-24, April 2-15). Because of damage from high flows the trap location had to be changed slightly after each flow disruption. The first upstream migrant at the trap was on 31 January, and the last one was on 23 April. The first two downstream migrating steelhead were captured on 4 February, and both were un-spawned. We used the average number, and origin (hatchery or natural), of adult steelhead captured four days before and four days after each trap outage to estimate the number and origin of steelhead that could be expected to have passed the trap when the trap was not operational. Our estimated passage during outages were 17 (13 natural and 4 hatchery) upstream migrants in March, and 19 (16 natural, 2 hatchery and 2 endemic stock) upstream migrants, and 4 downstream, in April. By combining the steelhead observed and those estimated to have passed the trap, we estimate that the total upstream return to the trap site in 2011 was 76 (63 natural, 10 hatchery and 4 endemic), but only seven of the hatchery fish were passed upstream. This estimate is not complete for Coppei Creek because we have no estimate of the number of fish that may have spawned downstream of the trap site in 2011.

We estimated that eight natural steelhead returned downstream below the trap site. The last downstream migrant was captured on 21 April. Four of the five downstream migrants were not marked indicating they had not been observed migrating upstream.

Males captured at the trap (n=14) ranged in size from 543-800 mm, and females (n=25) were 545-750 mm FL. DNA samples were collected from 41 separate individual steelhead handled.

Table 6. Adult steelhead trapped at the Coppei Creek trap in 2011.

	Natural	Hatchery	Endemic hatchery stock	Downstream migrants Natural	Downstream migrants Hatchery
January	1	0	0	0	0
February	9	1	0	1[a]	0
March[b]	20	2	1	0	0
April[b]	4	1	1	3[c]	0
May	0	0	0	0	0
Total	**34**	**4[d]**	**2[e]**	**4**	**0**

[a] This fish was caught above the trap/weir, was unspawned and released back above the trap.
[b] The trap was inoperable nearly two weeks during March and two weeks in April because of high water and debris.
[c] One of these fish was found dead on the weir unspawned.
[d] One hatchery fish was passed upstream, one was culled to retrieve CWT, and two were culled to reduce the number of hatchery fish on the spawning grounds.
[e] Endemic stock hatchery fish that had no external marks, but a CWT was detected in each fish.

Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

Ratio of Hatchery Origin Adults in the Natural Spawning Population (Mahoney et al. 2012): At Nursery Bridge the 15-year mean percent hatchery return was 4.4%. (Table 7). These fish are most likely of non-native Lyons Ferry Hatchery stock and prior to 2001 were removed to minimize the interaction with native steelhead spawning naturally above Nursery Bridge. However, videotaping replaced trapping operations at Nursery Bridge in 2001-02 and hatchery fish now have unrestricted access to the headwaters.

In the Touchet River, Lyons Ferry Hatchery (LFH) Origin fish escapement above Dayton has ranged from 4.3 to 20%. Between 2000-2011 mean percent LFH return was 3.1% (Table 8). These hatchery adults are also most likely of non-native Lyons Ferry Hatchery stock as well as those observed spawning in the mainstem below the mouth of Mill Creek. Summer rearing conditions in these mid and lower sections of Walla Walla are marginal for salmonids and few juvenile salmonids have been observed in the lower reaches during the summer (Contor and Sexton 2003, Schwartz et al. 2005, Mendel et al. 2007).

Table 7. Partial fish counts of adult steelhead from Nursery Bridge Dam on the Walla Walla River and in Mill Creek.

Year	Nursery Bridge Dam[d]		Mill Creek	
	Total Steelhead	%Hatchery	Total Steelhead	%Hatchery
1990[a]			15	33
1991[a]			13	39
1992[a]			48	0
1993[a]	748	4	35	6
1994[a]	426	1	11	0
1995[a]	367	7	10	20
1996[a]	278	7	42	5
1997[a]	262	12	10	20
1998[a]	320	6	10	60
1999[a]	231	3	1	0
2000[a]	425	4	13	0
2001[a]	635	6	15	20
2002[a]	1205	NA	57	9
2003[a]	545	NA	7	43
2004	381	NA	33[a]/51[b]	36[a]
2005	590	NA	25[a]/10[b]	4[a]
2006[b]	581	6	22	5
2007[b]	314	2	35	3
2008[b]	459	2	37	11
2009[c]	585	2	67	NA
2010[c]	1108	3	44	NA
2011[c]	1105	2	75	NA

a/ Mill Ck. data from trap counts at WDFW weir on Yellowhawk Creek (RM 7.1)
b/ Mill Ck. data from video counts at Mill Creek Dam ladder (RM 11.5)
c/ Mill Ck. data from video counts at Mill Creek 1st Division Works ladder (RM 10.5)
d/ Nursery Bridge Dam is located at RM 44.7 on the Walla Walla River

Table 8. Touchet River steelhead [a] trapping results at the DAT, 1992-1994 and 1998-2010 run years (year that they entered freshwater to generally early June of the following year). Note that the numbers in parentheses as captured at the trap represent fresh steelhead that are designated as adult returns for the new run year (based on brightness and condition of fish). Data presented here are from Joe Bumgarner, WDFW, personal communication.

	Number Captured at Trap					Number Passed Upstream				Percent of Passed Upstream [c]			
Run Year	Total	Natural Stock	LFH Stock	Endemic Stock	Total Hatchery Stock	Natural Stock [b]	LFH Stock	Endemic Stock	Total Hatchery Stock	Natural Stock	LFH Stock	Endemic Stock	Total Hatchery Stock
1992-93	61	53	8		8	49	7		7	87.5	12.5	0.0	12.5
1993-94	45	43	2		2	43	2		2	95.6	4.4	0.0	4.4
1994-95	10	8	2		2	8	2		2	80.0	20.0	0.0	20.0
	No adult trapping was conducted in 1995-1997												
1998-99	49	42	7		7	42	7		7	85.7	14.3	0.0	14.3
1999-00	34	31	3		3	9	0		0	100.0	0.0	0.0	0.0
2000-01	217	180	37 (5)		37	142	8		8	94.7	5.3	0.0	5.3
2001-02	193	174 (1)	19 (10)		19	134	4		4	97.1	2.9	0.0	2.9
2002-03	130	118	11 (1)	1	12	82	1	1	2	97.6	1.2	1.2	2.4
2003-04	144	101	27 (1)	16	43	72	1	16	17	80.9	1.1	18.0	19.1
2004-05	141	86	44 (21)	11	55	42	16	11	27	60.9	23.2	15.9	39.1
2005-06	211	161	15 (1)	35	50	135	0	34	34	79.9	0.0	20.1	20.1
2006-07	216	145 (2)	27 (14)	44	71	121	0	44	44	73.3	0.0	26.7	26.7
2007-08	165	119	19 (4)	27	46	102	0	27	27	79.1	0.0	20.9	20.9
2008-09	249	148 (3)	26 (1)	75	101	129	0	75	75	63.2	0.0	36.8	36.8
2009-10	833	601	82 (40)	150 (2)	232	571	0	150	150	79.2	0.0	20.8	20.8
2010/11	456	334 (1)	66 (35)	56	122	300	0	56	56	84.3	0.0	15.7	15.7
Mean 2000/11										80.0	3.1	16.0	19.1

[a] All fish were at least 44 cm in length for inclusion here as adult steelhead. Fish < 44 cm were considered resident trout or juvenile steelhead.
[b] Natural stock passed upstream includes fish taken for hatchery broodstock that were returned to the river (either not used at the hatchery or were still alive when returned).
[c] Percentage of fish passed upstream does not equal the percentage on the spawning ground because of prespawning mortality, etc.

2.2.3) <u>Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take.</u>

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken and observed injury or mortality levels for listed fish.

There is no known take directly associated with the release program. There may be take associated with the rearing portion of the program. Juvenile summer steelhead may enter into the facility pump intake bay but have access back to the river through a bypass channel. The pump screening system and bypass both were designed to NMFS screening and passage criteria. Level of take is unknown.

Water withdrawal for the facility may also result in take. The low stream flow period for the South Fork typically occurs between August and October. Average monthly stream flow for this period since 2000 has been 102 cfs with an average minimum of 98.5 cfs. The water usage profile for the facility identifies August as one of the highest usage months at 19.4 cfs. Based on this data, it is anticipated that the hatchery would divert an estimated 19.7% of the total stream flow. Approximately 500 feet of the stream, between the intake and discharge outfall would be affected.

Broodstock collection activities will entail some level of trapping, anesthetizing and handling of summer steelhead. Brood collection will occur in May and June at Nursery Bridge Dam. During the past five years, an average of 51 steelhead have been enumerated at Nursery Bridge Dam during May and June with a range of 12 to 94.

For past take history associated with monitoring and evaluation activities refer to the WWMEP Section 10 permit annual reports on file with NOAA. Table 9 shows the 2011 Annual Take report for permit 1365, which details all MCR-steelhead take from WWMEP activities, October 1, 2010 through June 31, 2011. Previous reports may be obtained through Robert Clapp at the Portland Office (NMFS).

Table 9. 2011 CTUIR's portion of the WWMEP project NMFS take report summary.

ESA Section 10(a)(1)(A) Scientific Research Permit
Annual Report

Date: January 15, 2012
Permit Number: 1365 Permit Holder's Name: CTUIR
Contact Name: Brian Mahoney Contact Email: brianmahoney@ctuir.org
Contact Phone #: 541.429.7541
Study Number and Title: Walla Walla M & E (BPA project number 2000-03900.

Work Element	Take Activity	Number of Fish Authorized for Take	Actual Number of Listed Fish Taken	Authorized Mortality	Actual Mortality	Research Location	Research Period
			2011 Juvenile MCR Steelhead				
Screw tapping & Pit-tagging	Capture/Handle/PIT-tag/Release	8,000	4,197	3%	1.7%	Walla Walla River, OR & WA	1-OCT.2010 to 31 June 2011
Depletion electro fishing population estimates	Capture/handle/ release	2000	0	3%	0%	Rainwater, Touchet River	2011
Fish salvage (e-fishing)	Capture/handle/ release	2000	830	3%	0.1%	Walla Walla River, OR & WA	1-Jan to 31 Dec 2011

- **Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**

Projected annual take levels associated for the WWMEP in 2012 are shown in Table 10. Estimated listed salmonid take levels by hatchery activity are shown in Table 11.

Table 10. Projected WWMEP take of MCR juvenile steelhead in 2012.

Work Element	Take Activity	Number of Fish Authorized for Take	Authorized Mortality	Research Location	Research Period
Screw tapping & Pit-tagging	Capture/Handle/PIT-tag/Release	8,000	3%	Walla Walla River, OR & WA	1-OCT.2012 to 31 June 2012
Depletion electro fishing population estimates	Capture/handle/ release	2,000	3%	Rainwater, Touchet River WA	1-July to 15 July 2012
Fish salvage (e-fishing)	Capture/handle/ release	2,000	3%	Walla Walla River, OR & WA	1-Jan to 31 Dec 2012

Table 11. Estimated listed salmonid take levels by hatchery activity.

Listed species affected: ***Summer Steelhead*** **DPS/Population:** ***Mid Columbia River*** **Activity:** ***Broodstock Collection***				
Location of hatchery activity: ***Walla Walla River – Nursery Bridge Dam*** **Dates of activity:** ***May 1 – June 15*** **Hatchery program operator:** ***CTUIR***				
	Annual Take of Listed Fish By Life Stage ***(Number of Fish)***			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			**<250**	
Capture, handle, tag/mark/tissue sample, and release d)			**<250**	
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			**<5**	
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or emigrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

If take levels are anticipated to exceed projections, the associated activities will be stopped and consultation will be re-initiated with NOAA Fisheries.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

The program is consistent with footnote 6 in Table B.1.of the *US v. Oregon* 2008-2017 Management Agreement of the Columbia River Fish Management Plan. The program is also consistent with the NPCC Walla Walla Subbasin Plan and will follow the 1995 Integrated Hatchery Operations Team (IHOT) Policy and Procedures for Columbia Basin Anadromous Salmonid Hatcheries.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

This project is included in the Memorandum of Agreement among the Umatilla, Warm Springs and Yakama Tribes, Bonneville Power Administration, U.S. Army Corps of Engineers, and U.S. Bureau of Reclamation (2008). This Memorandum of Agreement is also known as the Columbia Basin Fish Accords.

In addition, a Memorandum of Agreement was signed between CTUIR, ODFW and WDFW in October 2012 that outlines the hatchery production level identified in this HGMP and management guidelines for the program.

3.3) Relationship to harvest objectives.

Walla Walla/Carson stock spring Chinook are not listed under the ESA. It is anticipated that spring Chinook adults from this program will provide benefits to Columbia River fisheries. Adults from this program will be managed in mainstem Columbia River fisheries under the auspices of the *US v. Oregon* 2008-2017 Management Agreement. The production program in the Walla Walla Subbasin is not expected to add adverse effects to listed species or other stocks of concern beyond those currently allowable under non-jeopardy biological opinions for harvest in mainstem fisheries. In the future, adults from this program will also contribute to tributary fisheries in the Walla Walla Subbasin. A final spring Chinook disposition plan has not been developed at this point but will include a harvest component. It is anticipated that this document will be agreed to and included in the Annual Operations Plan (AOP) for the hatchery program.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available. *Also provide estimated future harvest rates on fish propagated by the program, and on listed fish that may be taken while harvesting program fish.*

In 2010, the first Tribal fishery opened on the South Fork Walla Walla River in likely over 100 years. Six fish were harvested. There have been no recent tributary sport fisheries.

Table 12 shows CWT recovery data from RMIS for Walla Walla Spring Chinook, brood years 2003-2006. Recovery data for BY 2007-09 is not yet available on RMIS. To date a total of 51 CWT recoveries have been reported: 18% (9) were taken in the Columbia River sport fishery and 47% (24) were harvested in Columbia River net fisheries above Bonneville.

Table 12. CWT recovery data from RMIS for Walla Walla Spring Chinook, Brood Years 2003-2006 (Mahoney et al. 2011).

Recovery location name	Number CWT recovered	% CWT recovered
Columbia River sport fishery	9	18%
Above Bonneville net fishery	24	47%
Hanford Reach	1	2%
South Fork Walla Walla R.	17	33%
Total	51	100%

3.4) Relationship to habitat protection and recovery strategies.

Spring Chinook have essentially been absent from the Walla Walla River subbasin for over 75 years. Losses have generally been attributed to the development of agriculture and related irrigation diversions and channel dewatering within the basin. In addition, the construction of Federal hydropower dams on the Columbia River changed the character of the mainstem migration corridor from a free-flowing river to a series of impoundments altering juvenile and adult migratory patterns and survival rates. While the passage, flow, and habitat concerns in the Walla Walla Subbasin have not been completely addressed, significant progress has been made in all these areas.

Minimum instream flows of 18 and 25 cubic feet per second (cfs) were negotiated for the mid and upper mainstem Walla Walla River as part of the USFWS Amended Civil Penalty Settlement Agreement (2001) with several basin irrigation districts. The USACE has initiated a feasibility study for instream flow enhancement which includes irrigation conservation, water right purchase, surface water exchange, and both groundwater and reservoir storage alternatives, or pumping and piping from the Columbia River.

In addition, juvenile and adult passage improvements have been ongoing since 1997. Improvements include removal of two decommissioned diversion structures (Marie Dorian and Maiden dams), construction of six large new or improved juvenile screening and seven new or upgraded ladders. In addition, hundreds of new or improved fish screens have been added to smaller pumps and diversions. Also, four ditch consolidation projects have been completed eliminating four surface diversions in the subbasin. There are additional juvenile screen and adult passage projects currently in the planning stages as well as multiple fish passage improvements for the Mill Creek flood control channel.

The Tri-State Steelheaders (TSS), WDFW, CTUIR, Walla Walla County Conservation District, and many others have been engaged in a long term effort to improve fish passage conditions within Mill Creek. An extensive engineering evaluation of fish passage conditions is being conducted. This nearly complete engineering study will provide the basis for multiple future fish passage restoration projects in Mill Creek. Wild steelhead and bull trout continue to spawn and rear in upper Mill Creek and CTUIR has been re-introducing spring Chinook adults (with an out-of-basin stock) into upper Mill Creek. Improvement of

Mill Creek fish passage and habitat conditions is critical for the Walla Walla population of steelhead to reach recovery and restoration goals, and for persistence and recovery of ESA listed bull trout, as well as for successful reintroduction of spring Chinook salmon.

A multitude of habitat improvement projects have been implemented by various agencies and organizations throughout the subbasin (e.g see SRSRB 2011). Funding for habitat improvement projects comes from a variety of sources, including BPA. The Inventory Sections of the Subbasin Plan (Walla Walla County and Walla Walla Basin Watershed Council 2004) and the recently updated Salmon Recovery Plan (SRSRB 2011 http://snakeriverboard.org) contain comprehensive listings of the passage improvement and habitat projects. Additional habitat projects continue to be implemented throughout the subbasin.

A Ricker model comparing redds to smolts in the upper Walla Walla River takes into account density dependent effects on predicted population growth (see above figure 7). Carrying capacity is estimated at the point of zero slope, this estimates carrying capacity as 51,362 smolts per 448 redds (i.e. 114.6 smolts per redd or 1,075 spawners). The 1,075 estimated spawning carry capacity is very close to 1,100 spawners predicted by EDT (Walla Walla County and WWBWC 2004). However, this carrying capacity prediction should be viewed cautiously given the significant variance of the mark-recapture abundance estimates used to estimate smolt production, and the short 6-year data set. Based on the 2003-2009 brood years mean smolts per redd production from the WWR was 100.4 (SE 8.2) about 14.2% under the predicted carrying capacity.

In addition, observed figures from the adult outplanting program and recent escapements suggest that 1,075 is a conservative spawner escapement number for the upper mainstem and South Fork (Table 13). Based on these estimates, a spawning escapement figure of 1,000 adults was used for planning in the WWHMP.

Table 13. Walla Walla River spring Chinook run reconstruction

Reach Description (rm)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total rkm surveyed WWR	26	21	21	34	43	43	43	43	43	43	43	43
Total redds observed WWR	101	339	145	120	225	78	223	270	363	320	437	212
Redds per km (WWR)	3.9	16.2	6.9	3.5	5.2	1.8	5.2	6.2	8.4	7.4	10.1	4.9
LWWR smolt abundace						15,018	22,327	11,566	27,813	31,985	33,490	29,050
Smolts per redd (LWWR&MC)				125.2	77.8	120.5	118.4	103.5	81.3	76.2	0.0	0.0
Total adult outplants SFWWR	259	1006	283	290	233	17	388	354	318	0	0	0
Jack return to NBD	0	0	3	1	3	1	2	6	48	167	7	33
Total Return to NBD	9	47	30	2	134	81	94	242	546	743	1194	468
Portion natual origin CHS return	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.45	0.16	0.27	0.22	0.64
Natural return to NBD	9	47	30	2	134	81	94	109	90	204	264	301
Hatchery return to NBD	0	0	0	0	0	0	0	133	456	539	930	167
Harvest	0	0	0	0	0	0	0	0	0	0	6	0
Pre-spawn loss from carcasses	unk	0.02	0.11	0.04	0.05	0.00	0.07	0.02	0.05	0.04	0.12	0.13
Potential spawners > NBD ((outplants +total returns)-(outplants, total returns*prespawn loss)).	373	1053	313	292	367	98	482	596	864	743	1188	468
Natural CHS spawners > NBD	373	1053	313	292	367	98	482	270	142	204	263	301
Hatchery CHS spawners > NBD	0	0	0	0	0	0	0	326	722	539	925	167
Estimated fish per redd	2.6	2.7	1.9	2.4	1.3	1.0	2.1	1.9	2.1	2.0	2.5	1.7
	3.7	3.1	2.2	2.4	1.6	1.3	2.2	2.2	2.4	2.3	2.7	2.2

3.5) Ecological interactions.

(1) Interactions with species that could negatively impact program: The program may be negatively impacted by a variety of freshwater and marine predators during migration periods such as bull trout, northern pikeminnow, smallmouth bass, seagulls, cormorants, Caspian terns, and pinnipeds which could significantly reduce overall survival rates of program fish.

(2) Interactions with species that could be negatively impacted by program: Co-occurring natural steelhead and bull trout populations in the Walla Walla River and ESA listed salmon and steelhead populations in the mainstem Columbia River could be negatively impacted by co-mingling with program fish in migration corridors. Impacts could potentially occur from competition for food, predation, disease transmission, or density dependent effects. In order to minimize the potential for these effects to occur, program fish are planned for release as full term yearling smolts in the upper parts of the basin during the major outmigration observed for the current program. The intent of these actions is to limit interaction with listed steelhead juveniles within the subbasin by releasing fish at a size and time which would expedite outmigration from the subbasin. The program will also follow protocols outlined by IHOT (1995) to minimize the potential for disease transmission to occur.

(3) Interactions with species that could positively impact program: Other salmonid species that naturally spawn in the target stream may positively impact program fish by contributing nutrients from decaying carcasses that increase productivity of the Walla Walla River.

(4) Interactions with species that could be positively impacted by program: The program provides a benefit to other salmonid species in the basin by contributing nutrients from decaying carcasses that increase productivity of the Walla Walla River. Spring Chinook also play an important role in community ecology since this population historically existed sympatrically with other species in the basin.

In addition, migrating hatchery fish may overwhelm predator populations, providing a potential protective effect to natural steelhead in the migration corridor. Off spring from natural spawning of program fish may also provide a forage source for both bull trout and natural steelhead smolts.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Surface Water -As part of the original adult holding facility design, an analysis of the surface water supply was completed and used in developing the original water right. Based on a review of the existing water rights, a total surface water right of 20.15 cfs is available for production facilities. The total surface water rights include: the original right for the South Fork adult holding and spawning facility of 19.4 cfs (Permit S-53028); a transferred right from the purchase of the adjacent Kentch property of 0.61 cfs (T-10019); and irrigation rights in the amounts of 0.02 cfs and 0.12 cfs which were part of the original BPA property purchase (Certificate Numbers 12630 and 13314). The hatchery water budget projected a peak flow of 21.5 cfs in April. Juvenile production and adult holding will be managed within the existing water right of 20.32 cfs by slightly adjusting the flow rates to each production facility, or timing of the adult holding.

Groundwater - As part of the preliminary engineering design development, the potential for developing a groundwater source of acceptable quantity and quality was evaluated. In short, the following conclusions were developed related to groundwater:

Due to high temperatures ranging from 60 to 70 °F; high concentrations of hydrogen sulfide; and low sustainable yield, the basalt aquifers beneath the project site at depths less than 500 feet were determined to be not suitable for development as a hatchery water source.

Although yield and quality of basalt aquifers below 500 feet depth might be better than those found above 500 feet, the temperature of water in the deep basalt zones is not expected to be acceptable for hatchery use.

The shallow alluvial aquifer at the project site has not been explored or characterized. It is unlikely that yields sufficient to meet the peak disease free water supply requirement of 1,800 gpm can be developed from the alluvial aquifer source. However, it may be possible to develop shallow low yield wells from the alluvial aquifer for incubation supply (150 gpm using conventional heath trays).

Based on this preliminary analysis, it was decided to proceed with surface water treatment using UV to provide disease free water for incubation and early rearing. A well testing program will also be pursued to assess the potential for developing a shallow well system to provide higher quality water for both incubation (assuming conventional Heath Tray incubators) and also for potable water use.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

Water withdrawal for the facility may also result in take. The low stream flow period for the South Fork typically occurs between August and October. Average monthly stream flow for this period since 2000 has been 102 cfs with an average minimum of 98.5 cfs. The water usage profile for the facility identifies August as one of the highest usage months at 19.4 cfs. Based on this data, it is anticipated that the hatchery would divert an estimated 19.7% of the total stream flow. Approximately 500 feet of the stream, between the intake and discharge outfall would be affected. No specific measures to address water withdrawal in this reach have been specified.

The existing facility intake screens conform to NMFS screening guidelines to minimize the risk of entrainment of juvenile listed fish. In addition, a fish bypass channel exists to direct any juveniles entering the pump forebay back to the river. Currently, the fish bypass channel does not meet NMFS depth criteria during low river flow periods. This will be corrected as part of the hatchery construction.

The existing facility also incorporates a pollution abatement pond. A vacuum cleaning system is proposed for the outdoor raceways which will allow the collected waste to be routed to the existing abatement pond. The indoor early rearing raceways would also be designed to route cleaning waste to the pollution abatement pond.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Initially, all adult spring Chinook broodstock will be collected at the existing Nursery Bridge Dam (NBDF) fishway. Adult trapping and holding facilities were incorporated into the original NBDF design and construction. The NBDF design consists of a vertical slot fishway with an auxiliary water supply designed to improve attraction conditions to the fishway entrance, particularly during high river flow stages. To trap upstream migrants, an exclusion panel will be installed within the ladder to guide fish into the trapping facility which consists of an Alaskan Steeppass (ASP) fishway, pumped water supply, holding tank, fish crowder, anesthetic tank, and recovery tank. The ASP is used to attract and convey fish towards the holding tank. Fish are then directed to an anesthetic tank where fish are sorted with spring Chinook salmon broodstock removed for transport, and non-target fish directed to a recovery tank. Initial plans are to use CO2 anesthesia, which has no withdrawal requirement, as fish may be released into fishery areas. Once the fish have recovered, they can move volitionally back into the fish ladder to continue their upstream migration.

The original design did not include facilities needed to move broodstock from the anesthetic tank location to a transport truck. This will be addressed as part of the hatchery development. A jib crane and fish loading hopper will be added in order to lift adults from the anesthetic well up to a transport vehicle.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Adult broodstock will be hauled from Nursery Bridge Dam Ladder trap to the South Fork Walla Walla Hatchery. Fish transportation equipment has not been purchased at this time. The transport unit(s) will likely be similar to those currently in use in the Umatilla and will have 12 inch discharge openings along with both liquid oxygen and electric aeration to reduce fish stress during transport. ODFW liberation protocols will be used as the basic guideline for hauling operations.

5.3) Broodstock holding and spawning facilities.

Broodstock for the program will be held in the existing facilities at the South Fork Walla Walla Adult Holding and Spawning Satellite Facility. The existing facility includes a water intake system with automatic screen cleaning, pump station having a nominal pumping capacity of 8,700 gpm, ozone effluent water treatment system, settling pond, five adult holding ponds, mechanical fish crowder, standby generator, chemical storage shed and spawning building. The spawning building includes a fish lift, electroshock anesthesia system, sorting and spawning facilities, wet and dry storage rooms, walk-in cooler/freezer, and restroom and office space.

Each of the adult holding raceways is 10-feet wide, 10-feet deep and 92-feet long, with a normal operating depth of 4.5-5.0 feet (effective holding volume = 4,500 ft^3). Total holding volume is 22,500 cf. Each raceway has an independent upwelling water supply with orifice plate flow control that provides up to 800 gpm per unit. Spray bars are mounted on each raceway to provide surface agitation to lessen sun exposure for the fish. At a broodstock holding criteria of 1 adult/10 ft^3 holding space and one gpm of flow/adult, the existing facility has more than enough capacity to hold and segregate the broodstocks for both the Umatilla and Walla Walla programs.

5.4) Incubation facilities.

The incubation room is approximately 27-feet long by 15-feet wide and is setup to provide space for three Moist Air Incubation (MAI) units. The MAI units have self contained chilling and UV systems and use a minimal amount of water (5 gallons/day). In addition, at least one Heath stack will be available for small egg takes.

Eggs can only be developed to the eyed stage in MAI units. After shocking and picking, eggs will be transferred to deep matrix incubators for hatching. The deep matrix incubation units will be placed into the head end of Canadian early rearing troughs.

The incubation room will also allow for conventional Heath stacks, if desired. A treated water supply will be provided directly from the UV system along with a future chilled water line if Heath stacks are used.

5.5) Rearing facilities.

The early rearing room is approximately 110-feet long by 64-feet wide and will house 36 double deep Canadian rearing tanks. Each tank is 21-feet long by 3-feet wide by 3 ½-feet deep with an operating depth of 2.5 feet (effective volume = 150 ft^3). Surface water will be the water source for the new hatchery process facilities, including the early rearing troughs. These early rearing troughs will demand up to 1,800 gpm of treated flow from April through July. This surface water source will be UV treated to provide a barrier against a wide-range of viruses and bacterial agents, including infectious hematopoietic necrosis (IHN) virus, and any other pathogens/micro-organisms that might be in the water supply.

When the fry reach approximately 150 fish/lb, the fry will be transferred from the early rearing tanks to the outdoor rearing raceways. The early rearing tanks are designed with two standpipes: one which routes water to the drain trench and the existing pollution abetment pond, and the second that connects to a fry release pipe. The fry release pipe will carry fish from the hatchery building to a marking trailer located on the east side of the outdoor raceways. As fish are marked, they will be directed into the outdoor rearing raceways.

Outdoor final rearing raceways are provided for the 500,000 smolt rearing program. There will be 16 concrete raceways. Each raceway is 90-feet long by 10-feet wide with an average operating water depth of 4 feet. The total rearing volume of the each raceway is 3,600 ft^3. Designed flow rate is 550gpm/raceway.

5.6) Acclimation/release facilities.

Initially, the Touchet River component will be direct stream released. The South Fork Walla Walla River on-station production will be volitionally released over an extended period directly from the hatchery into the river. Fish will be released by removing the stoplogs at the end of raceways into a smolt release channel. The channel is 3-feet wide and rectangular in shape and has a total length of approximately 450 feet. The fish will migrate down the channel and exit to the river through the existing fish bypass structure.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

There have not been any operational difficulties at the existing satellite facility that have resulted in significant adult mortality. However in 2004, during broodstock holding operations, natural *O. mykiss* and bull trout juveniles entered the abatement pond effluent outfall and became stranded when operations were discontinued for the year. This resulted in an estimated 10-12 *O. mykiss* and 5-6 bull trout returned to the river and 12-14 dead *O. mykiss* removed. Corrective measures were taken to screen fish out of the outfall and no issue has occurred since.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Fish being propagated in this program are non-listed so on-station risk aversion measures for listed fish are N/A. In addition to the exclusion measures discussed in Section 5.7, the following fish disease protocols will be implemented in order to minimize risk to listed fish due to disease transmission;

- Raceways will be cleaned routinely with a vacuum pump system with the effluent routed to the pollution abatement pond and immediately prior to release
- Collect and examine tissue samples from broodstock for pathogens
- Anticipate potential disease problems in progeny and develop appropriate prophylactic and control treatments
- Conduct routine monthly fish health examinations
- Conduct pathological examinations of fish during periods of unusual loss at the hatchery
- Conduct fish health examinations of each group prior to release from the hatchery
- Administer and document prophylactic and therapeutic treatments as necessary
- Work would follow established techniques and protocols and at a minimum follow those outlined by IHOT (1995)

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

The goal is to use adults returning to the Walla Walla Subbasin as broodstock for the program. The original native population of spring Chinook in the subbasin was extirpated and the parentage of the current returning adults is Carson stock.

6.2) Supporting information.

6.2.1) History.

Development of the Carson spring Chinook stock occurred during the period from 1955 thru 1964. Approximately 500 spring Chinook salmon were trapped annually at Bonneville Dam on the Washington side of Columbia River and transported to the holding ponds at Carson NFH. Genetic data indicate that the Carson stock was derived from a mixture of upper Columbia and Snake River populations passing Bonneville Dam (Campton 2000 Draft). Adult fish were held and spawned, with their progeny reared and released at Carson. The first returns to Carson NFH occurred in 1959 when 107 fish entered the hatchery (99 jacks, 2 adult females and 6 adult males). This run of spring Chinook has been maintained since. Carson origin spring Chinook eggs, fry, and fingerlings have been transferred to a wide range of localities within the Northwest including Alaska. In addition to Carson NFH, this stock is currently being propagated at many locations, including Leavenworth and Little White Salmon NFHs, Ringold Springs Hatchery, and Umatilla Hatchery.

The current juvenile release program in the Walla Walla River is Carson stock smolts from Carson NFH (2009 to present) and previously, Little White Salmon NFH (2005-2008). The adult outplanting program in the subbasin has utilized Carson stock adults from Ringold Hatchery and the Umatilla River.

6.2.2) Annual size.

The WWHMP originally identified a broodstock level of 350 adults. Further assessment during the facility planning process now estimates that 310 brood need to be collected.

6.2.3) Past and proposed level of natural fish in broodstock.

The WWHMP Appendix X adult disposition model is being used as a guideline for developing an adult management disposition table which is currently under discussion by the co-managers. Part of that disposition table will include the percentage of natural origin adults to be incorporated into the broodstock based on run strength. Actual annual natural origin brood percentages will be determined as part of the co-manager AOP process based on the adult management table. Under the Appendix X guidelines, 50% of the brood (155) would be comprised of natural origin fish once full program goals are reached.

6.2.4) Genetic or ecological differences.

Genetic or ecological difference between hatchery and "natural" stocks is unknown. However, it is likely that little genetic or ecological differences exist between the fish returning to the Walla Walla River collected for brood and those fish spawning naturally. All returns to the Walla Walla River are likely progeny of Carson stock adult outplants from Ringold Springs Hatchery and the Umatilla River and/or juvenile releases from Carson or Little White Salmon NFH.

6.2.5) Reasons for choosing

Carson stock was selected for reestablishment of Spring Chinook salmon in the Walla Walla River due to its widespread availability from the neighboring Umatilla River and other hatchery sources as well as the lack of availability of a suitable natural donor source from any adjacent watershed.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

It is unlikely that broodstock selection practices for spring Chinook will have any impact on listed steelhead in the Walla Walla Basin.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adult spawners returning to the Walla Walla River.

7.2) Collection or sampling design.

Initially, broodstock for both components of the program will be collected at the Nursery Bridge Dam ladder. In the future, after returns to the Touchet become established, broodstock may also be collected at the Dayton Trap. Adult spring Chinook return to the upper Walla Walla River primarily in May and June and fish will be collected from a representative cross section of the run.

7.3) Identity

Both natural and hatchery origin fish returning to Nursery Bridge ladder will be assumed to be of Carson/Walla Walla origin. Hatchery origin adults will be identified by an adipose fin clip.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

Current program goal is to collect 310 adults at a 1:1 sex ratio.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

N/A – no broodstock have been collected in the Walla Walla River to date. Current program uses adults returning to Carson NFH.

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Appendix X of the WWHMP and the afore-mentioned adult management disposition table identify multiple uses based on run size including natural spawning escapement, outplanting and harvest. Adult outplanting has been identified for continuation into Mill Creek. Actual disposition levels will be determined annually in the AOP process.

7.6) Fish transportation and holding methods.

Broodstock will be collected at Nursery Bridge Dam ladder and transported to the South Fork Walla Walla Adult Holding and Spawning Facility. Transit time is approximately 20 minutes. Fish will be hauled per the fish hauling and liberation protocols outlined in the ODFW Liberation Manual (1979). Water temperatures will be monitored in the tank and at the facility to ensure there is minimal water temperature difference between transport tanks and adult holding tanks.

No adult transport unit for the program has yet been purchased. However, it will likely be similar to those currently used for the Umatilla program and at a minimum have a 12 inch discharge opening and be equipped with both liquid oxygen and electric aeration to reduce fish stress during transport.

Adults will be held separately at the existing South Fork Walla Walla Adult Holding and Spawning Facility along with Umatilla program broodstock. There are five concrete ponds at the facility. Each pond is 90’ x 10’ x 5’ with an effective water volume of 4,500 ft3. Holding densities range from approximately 14.3 to 15.4 ft^3 per adult and flow rates vary from approximately 1.5 to 2.7 gpm per adult. Mortality of Umatilla program adults held at South Fork Walla Walla from 2000 to 2010 has ranged from 2.0 to 8.5% and has averaged 4.5%. Pre-spawn mortality is built into the broodstock collection goals.

7.7) Describe fish health maintenance and sanitation procedures applied.

Nursery Bridge Dam - Adults retained for broodstock will be injected with oxytetracycline (10 mg/kg) and erythromycin (20 mg/kg).

South Fork Walla Walla Adult Holding and Spawning Facility **–** Brood will be reinjected in July with oxytetracycline (10 mg/kg) and erythromycin (20 mg/Kg). Formalin treatments will be given to control fungal infections at a maximum concentration of 167 ppm. The treatment is applied for one hour to control fungus and parasites three times per week.

7.8) Disposition of carcasses.

All spring Chinook broodstock carcasses are buried in the regional landfill. There are no plans to use these for nutrient enhancement since they will have been injected, treated with formalin and anesthetized with MS-222. Broodstock surplus to spawning needs may be out planted if no fisheries are open or else buried.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Broodstock collection activities will entail some level of trapping, anesthetizing, handling and releasing of summer steelhead. Brood collection will occur in May and June at Nursery Bridge Dam. During the past five years, an average of 51 steelhead have been enumerated at Nursery Bridge Dam during May and June (range of 12 to 94), an average of 7% of the run.

In addition, the effluent from the spring Chinook brood holding ponds is disinfected using ozone and retained for a period of at least one hour in a retention pond prior to discharge into the South Fork. This is done in order to minimize potential disease transmission or any other possible effects on natural salmonids populations from the broodstock holding operations.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

From mid August to mid-September, broodstock maturation status will be checked and sorted once a week. All ripe females will be spawned on a given spawn day. Enough ripe males (including jacks) will be randomly selected on a given spawn day to fertilize the available females. Fish are anesthetized with MS-222 during selection for spawning.

8.2) Males.

Males (including jacks) will be used at a proposed rate of one ripe male for every ripe female and will be randomly selected from the broodstock population. Whenever possible, one male is used to fertilize the eggs from one female. Males may be used on multiple females when not enough males are available on a given day to spawn the available females at a 1:1ratio.

Jacks will be incorporated into the broodstock at a ratio of 1:10 adult males. The goal will be to use jacks at the same rate during spawning. Mating techniques, especially the use of jacks and incorporation of large males in spawning will be reevaluated as the program is initiated.

8.3) Fertilization.

The initial proposal is to utilize 1:1 spawning ratios and perform random matings. As mentioned above, spawning theories, especially the use of jacks and large males, are evolving and will likely be adapted prior to initiation of the program. These protocols along with the fertilization techniques below will be captured in the AOP for the facility.

Females will be killed and bled by severing the caudal peduncle. The undersides of the fish will be disinfected with an iodophor solution. The eggs from each female will be stripped into a colander to remove excess ovarian fluid and then placed into individual buckets.

Males will be killed, cleansed with iodophor, and the milt stripped directly into the eggs (one male per female). After the eggs are fertilized with the milt, water will be added and the eggs and sperm mixed and allowed to stand for at least one minute. The eggs will then be rinsed and drained. Eggs will then be placed into an iodophor solution and allowed to water harden for one hour.

In addition to using an iodophor solution for washing and water hardening to control vertical transmission of pathogens including IHNV and *Renibacterium Salmoninarum* (BKD), an egg culling program will also be implemented to control vertical transmission of BKD. The goal of the program will be to only use eggs from females with ELISA titer OD values <0.200.

8.4) Cryopreserved gametes.

Cryopreservation of gametes is not planned for this program.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

It is unlikely that mating protocols for spring Chinook will have any impact on listed steelhead in the Walla Walla Subbasin.

SECTION 9. INCUBATION AND REARING -
Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

As stated previously, the biological profile for the program has been refined since the WWHMP was developed. The goal for the program would be to collect 610,000 green eggs to produce 500,000 smolts (a green egg to smolt survival rate of 82%).

9.1.2) Cause for, and disposition of surplus egg takes.

The goal of the program is to stay within the IHOT guidelines of ± 10% of egg take goal. Disposition of eggs over this amount has not been discussed but the intent would be to deal with the excess at the egg stage. Outplanting would be the likely disposition as this is consistent with CTUIR position on disposition of surplus eggs in other spring Chinook programs.

9.1.3) Loading densities applied during incubation.

Current plans are to use MAIs. The single door units contain 110, 1.2 liter incubation trays. For Chinook eggs, one female is typically split into two trays. Eggs can only be incubated to the eyed stage in MAIs. After shocking and picking, eggs will be transferred to deep matrix incubators for hatching. If Heath tracks are used, the loading rate would be one female/tray.

9.1.4) Incubation conditions.

MAIs are recirculating type units and it is recommended that five gallons of water be exchanged per day. If Heath units are used, five gpm/stack of flow would be used. Recommended flow after eggs are transferred to the deep matrix incubators is five gpm.

9.1.5) Ponding.

Deep matrix incubators have a capacity of up to 60,000 Chinook eggs. However, the plan at WWH would be to stock 15,000 per deep matrix incubator. As they hatch, fry leave volitionally from the deep matrix incubator into double deep Canadian troughs for early rearing. The initial number placed into each deep matrix incubator matches the final rearing density in the Canadian deep troughs just prior to transfer outside so that fry do not have to be split and handled while indoors.

9.1.6) Fish health maintenance and monitoring.

Green eggs will be water hardened in 100ppm iodophor for one hour. An ultraviolet (UV) unit is incorporated into the MAI units to control fungus. No formalin treatments are anticipated with the MAIs but may be implemented if Heath trays are used. After eyeing, dead eggs are picked and removed.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

It is unlikely that incubation practices will have any impact on listed steelhead in the Walla Walla Subbasin.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

As stated previously, the biological profile for the program has been refined since the WWHMP was developed. Current planned survival goals are;

Fry to fingerling = 97.5%
Fingerling to smolt = 98.0%

9.2.2) Density and loading criteria (goals and actual levels).

Planned maximum program goals are as follows;

Early rearing:	Density = 0.66 lbs/ft^3	DI = 0.23 lbs/ft^3/in
	Loading = 2.0 lbs/gpm	FI = 0.71 lbs/gpm/in
Final rearing:	Density = 0.75 lbs/ft^3	DI = 0.12 lbs/ft^3/in
	Loading = 4.9 lbs/gpm	FI = 0.75 lbs/gpm/in

9.2.3) Fish rearing conditions

Early rearing will occur in fiberglass Canadian deep troughs that have an effective rearing area of 20'x3'x2.5' (150 ft^3) with a maximum flow rate of 50 gpm and a turnover rate of 3 times per hour at maximum flow. Final rearing will occur in standard cement raceways that have an effective rearing area of 90'x10'x4' (3,600 ft^3) with a maximum flow rate of 550 gpm and a turnover rate of 1.2 times per hour.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Growth rates are directly correlated to water temperatures, with higher growth rates occurring during warm water periods. The expected growth rate is 910 °F temperature units/per inch, typical for other CTUIR spring Chinook rearing operations. Programmed length and weight at the end of each month are presented in Table 14.

Table 14. Programmed end of month length and weight.

Month	Weight (#/lb)	Length (in)
April	1080	1.45
May	454	1.95
June	193	2.58
July	89.0	3.34
August	51.0	4.04
September	34.9	4.59
October	26.2	5.01
November	22.0	5.32
December	20.0	5.55
January	17.0	5.80
February	15.3	6.02
March	13.2	6.33
Mid-April	12.0	6.52

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Refer to Table 14 in Section 9.2.4.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Feed brand/type and rations have yet to be determined. Fish will be hand fed. Expected conversion rate is 1.0.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Fish health monitoring will at a minimum follow those guidelines as described in the fish health section of the Integrated Hatchery Operations Team (IHOT) Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (1995).

It is anticipated that all the fish health management activities for the program will be subcontracted to ODFW and that the ODFW Fish Health Management Policy (2003) will be followed as related to preventative and therapeutic fish health strategies and sanitation procedures.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

It is anticipated that a yet to be determined subjective smolt development assessment will be conducted as part of the pre-release sample. The collection of gill ATPase samples is not planned at this time.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

No “Natures” rearing strategies are identified for the program.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

No listed fish are under propagation in this program.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) **Proposed fish release levels.**

Age Class	Number	Size (fpp)	Release Date	Location
Yearling	Up to 400,000	12	April 15	South Fork Walla Walla River
Yearling	Up to 100,000	12	April 15	Touchet River

10.2) Specific location(s) of proposed release(s).
Stream, river, or watercourse: South Fork Walla Walla River
Release point: RM 5.2
Major watershed: Walla Walla River
Basin or Region: Columbia River

Specific location(s) of proposed release(s).
Stream, river, or watercourse: Touchet River
Release point: Exact release point has not been determined but will be in the reach from the town of Dayton upstream to the confluence of the North and Wolf Forks (RM 53-55).
Major watershed: Walla Walla River
Basin or Region: Columbia River

10.3) Actual numbers and sizes of fish released by age class through the program.

No releases have occurred from the program. See Section 10.1 for program goals.

10.4) Actual dates of release and description of release protocols.

The planned release date is mid-April with an anticipated two week volitional release period beginning April 1.

10.5) Fish transportation procedures, if applicable.

Transit time from the hatchery for the Touchet component will be an estimated 1.5 hours. Fish will be hauled per the fish hauling and liberation protocols outlined in the ODFW Liberation Manual (1979). Water temperatures will be monitored in the tank and at the release site to ensure there is minimal water temperature difference between transport tanks and receiving waters.

No transport unit for the program has yet been purchased. However, it will likely be a dual purpose transportation unit that will be used for both brood and juveniles. It will be similar to those currently used for the Umatilla program and at a minimum have a 12 inch discharge opening and be equipped with both liquid oxygen and electric aeration to reduce fish stress during transport.

10.6) Acclimation procedures.

The SFWW release group will be reared full term and released on-station. Initially, it is anticipated that the Touchet component will be direct stream released. However, changes to the steelhead program at Dayton Pond may allow for acclimation in the future.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

All fish will be adipose clipped prior to release to identify them as hatchery origin fish upon return. Additionally, a portion of each release group will be coded-wire tagged for production evaluation. Coded wire tag group sizes have not yet been determined. A portion of each release group will also be PIT tagged as part of the hatchery evaluation.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

The intent would be to deal with any surplus over the IHOT 10% guideline at the egg stage so no smolt surplus will occur.

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10.9) Fish health certification procedures applied pre-release.

As stated previously, fish health monitoring will at a minimum follow those guidelines as described in the IHOT Policies fish health section. Also, the fish health monitoring is anticipated to be subcontracted with ODFW. In that case, pre-release certification will likely follow the guidelines outlined in the ODFW Fish Health Management Policy which identifies that within four weeks prior to release, grab-sampled fish of each species and stock be examined as follows:

- ☐Kidney for *R. salmoninarum* by ELISA from a minimum of 60 fish per BY
- ☐Gill tissue and body scrapings by microscopy from a minimum of five fish
- ☐Gill/kidney/spleen tissue pools (5 fish per pool) from 10 fish per raceway for culturable viruses.

10.10) Emergency release procedures in response to flooding or water system failure.

In case of a facility water system failure or other emergency situation that compromised rearing conditions, all fish would be released directly from the hatchery into the South Fork Walla Walla River. If flooding conditions existed in either the South Fork or Touchet, release dates may be adjusted accordingly and fish may actual be kept on-station past the planned release date.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Fish will be reared to smolt stage and released during the primary migration period to minimize the time spent in the migratory corridor. This minimizes potential interaction with any listed fish in the Walla Walla and Columbia rivers. In addition, pre-release disease sampling will be conducted to ensure fish are in good health and to minimize the risk of disease transmission. Raceways will be cleaned immediately prior to the planned volitional release period to minimize the settleable solids entering the stream.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

The WWMEP BPA Statement of Work (BPA project #200003900) outlines a complete work plan for assessing the program performance indicators. In addition, Table 15 shows WWMEP project metadata.

Background (adapted from Mahoney et al. 2012): The WWSMEP a continuation of a coordinated and collaborative approach to improve monitoring of summer steelhead and bull trout stock status, as well as to evaluate spring Chinook reintroduction efforts and natural population rebuilding within the Walla Walla subbasin. This effort combines two previously separate BPA monitoring and reporting projects operated by the CTUIR and WDFW. It also incorporates summaries of adult abundance or spawning data over many years from WDFW hatchery evaluations as part of the Lower Snake River Compensation Plan (LSRCP) project, as well as from several other sources, in an effort to present the current state of our knowledge of salmonid stock status and monitoring efforts in the Walla Walla subbasin.

The project provides biological information to decision makers in support of adaptive management for ESA recovery, population restoration, conservation, and preservation of ecological, cultural, social, and economic salmonid resources. We do this by emphasizing monitoring of population status and trends to estimate "adults in and juveniles out" as a measure of salmonid population viability (VSP) within the subbasin. Project objectives were chosen to answer specific management questions regarding VSP parameters (McElhany et al. 2000) of abundance, productivity, spatial structure, and diversity for reintroduced spring Chinook salmon, ESA listed summer steelhead and bull trout in the Walla Walla subbasin. Project results also help inform CTUIR "First Foods" management within ceded lands.

Project work emphasizes Mill Creek, and the Walla Walla and Touchet river drainages, and is coordinated with, and helps inform, local stakeholders whenever possible (e.g., ODFW, USFWS, USACE, USFS, the Walla Walla subbasin Watershed Council, Snake River Salmon Recovery Board (SRSRB), local irrigation districts, and other public and private groups).

Primary management questions addressed by this project are based on the Draft Adaptive Management and Research, Monitoring and Evaluation chapter of the SE WA Salmon Recovery Plan (see Appendix C of SRSRB 2011). Monitoring questions 1 and 3 of that Appendix are most directly associated with this project. Those questions are: "Is the status of the population/ ESU/DPS improving? "And "Are hatchery programs meeting specific mitigation goals?" We used the following primary management questions derived from Appendix C of the draft Southeast Washington Salmon Recovery Plan (SRSRB 2011) to guide our reporting of status and trends.

- *Is the abundance of adult fish trending towards to the recovery and restoration criteria for each population?*
- *Is the population productivity of fish trending to the recovery and restoration criteria for each population?*
- *Are the population's viable or meeting mitigation goals?*

Our focus is to describe adult abundance and stock productivity, especially for steelhead and spring Chinook. We also contribute bull trout abundance and distribution information for portions of the Walla Walla subbasin to add to previous or current bull trout monitoring efforts by the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), Oregon Department of Fish and Wildlife (ODFW), and Utah State University (USU). Limited supplemental habitat condition information (e.g. stream discharges and water temperatures) is also collected. The salmonid and habitat monitoring data collected by this project contributes to many other fish and habitat planning or restoration efforts in the Walla Walla subbasin (e.g., ESA recovery planning and monitoring and spring Chinook reintroduction evaluation). The primary population productivity indicators reported here include natural origin adult to adult return and smolt to adult return (Table 15).

Table 15. Walla Walla Basin fish population performance indicators (VSP parameters).

Adults-in

- Adult abundance (abundance)
- Spawners per redd (abundance)
- Redds per km (productivity)
- Run timing (diversity)
- Adult to adult return (AAR: productivity)

Juveniles-out

- Smolt abundance (abundance)
- Smolts per redd (productivity)
- Run timing and survival (diversity)
- Smolt to adult return (SAR: productivity)

Project Work Elements (WEs) regarding fish monitoring in BPA's Pisces system included: adult enumeration, spawning surveys, outmigrant monitoring and PIT tagging. However, we also have WEs to collect water temperature and stream discharge data because they are such major factors determining salmonid distribution and abundance in the Walla Walla Basin. We believe these monitoring and evaluation actions meet the highest priorities for fish population monitoring as identified by the Walla Walla subbasin Plan (Walla Walla County and WWBWC 2004), the Middle Columbia River Steelhead Distinct Population Segment Recovery Plan (NMFS 2009), Snake River Salmon and Steelhead Monitoring and Evaluation Plan for Southeast Washington (Appendix C in SRSRB 2011), the Independent Science Review Panel, the Council's draft Columbia River Basin Monitoring, Evaluation, Research and Reporting Plan (MERR 2010), the NOAA Draft Guidance for Monitoring Recovery of Salmon and Steelhead (NOAA 2009), and the Draft Anadromous Salmonid Monitoring Strategy (ASMS, 2010). This project also conducts limited electrofishing for fish salvage or salmonid distribution evaluation (Section 3.3.5).

Implementation and compliance monitoring for this project (i.e., project accomplishments) are reported within the BPA's *Pisces* system http://efw.bpa.gov/contractors/usingpisces.aspx, and thus are not reported in greater detail here.

Project results have been incorporated in, or applied to, a variety of planning, management and recovery efforts (see Mahoney et al. 2011), most notably:

- Walla Walla River Ecological Flows-Recommended Stream Flows to support Fisheries and Riparian Habitats (Stillwater Sciences 2011)
- Biological Effectiveness Monitoring and Evaluation Plan for Fisheries Habitat Enhancement in CTUIR Subbasins (Stillwater Sciences 2012)
- Walla Walla Spring Chinook Hatchery Master Plan & associated Hatchery Genetic Management Plans (HGMP: CTUIR 2009)
- Snake River Salmon Recovery Plan for Southeast Washington (2006 and 2011)
- The Middle Columbia River Steelhead DPS Recovery Plan (NMFS 2009)
- Walla Walla Subbasin Plan (Walla Walla County and WWBWC, 2004)

Project methods were adapted from the Salmonid Field Protocols Handbook (Johnson et al. 2007) and are available through the Pacific Northwest Aquatic Monitoring Partnerships Monitoring Methods Project at http://www.monitoringmethods.org/Protocol/Details/107. For additional detail on adult traps and weirs, outmigrant trapping, PIT-tagging, and spawner and carcass surveys see Mahoney et al. 2012.

Much of the life history information for this project is collected using PIT tag detections from Columbia hydrosystem dams and in-basin detection arrays, or from scale analysis. PIT tag detection data are contributed to, and/or retrieved from, the PTAGIS data base maintained by Pacific States Marine Fisheries Commission at http://www.ptagis.org.

For adults-in our main population metric is adult abundance estimated at count stations at dams or traps, or in some cases use of spawning surveys (depending on the species and location). The primary population indicators are adult abundance and adult to adult return (AAR) based on spawning escapement. In the future, our long-term objective is to establish adult enumeration sites in the lower Walla Walla River to better estimate total adult return. For juveniles-out, our primary indicators are natural and hatchery smolt production and Smolt-to-Adult Returns (SAR) based on PIT tags from the Walla Walla back to McNary Dam, or the Walla Walla River, if possible.

Our future Hatchery RME Plan will follow the plans and guidelines outlined in Hesse, Harbeck, and Carmichael (2006) and HSRG (2009a). The HSRG identified the following criteria at a minimum for a hatchery M&E program:

- assure that conservation and harvest goals are stated with sufficient detail to evaluate the hatchery program (*population goals)*,
- determine if the hatchery program is achieving its stated biological objectives in terms of program size, broodstock selection (pNOB), and release strategy (*implementation monitoring*),
- determine program effectiveness in terms of survival and reproductive success of hatchery fish (*effectiveness monitoring*)
- determine progress toward conservation and harvest goals for all populations affected by the hatchery program, i.e., natural escapement trends in abundance and composition, catch, and verification of habitat and harvest assumptions) (*validation monitoring*)

At the implementation level, M&E should track compliance with BMPs and should record the following:

- hatchery program type (integrated or segregated)
- program purpose (conservation, harvest, or both)
- hatchery brood (number of adults spawned and pNOB)
- number of smolts released
- in-hatchery survivals
- number of fish marked and type of mark
- methods used to obtain all information, e.g., means and variances of estimates
- external conditions and events that might affect hatchery performance, e.g., environmental events (floods, droughts, fish kills, etc.) and annual variations in harvest
- survival of hatchery fish from release to fisheries and escapement
- proportion of returning hatchery fish that escape to natural spawning grounds
- the reproductive contribution of hatchery fish spawning in the wild and the number of adult recruits produced per hatchery spawner

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

The WWMEP is funded by BPA at least through 2017 via the MOA. The WWMEP work plan includes tasks for assessing the program performance indicators.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Potential take associated with monitoring and evaluation activities is discussed in Section 2.2.3.

SECTION 12. RESEARCH

12.1) Objective or purpose.

There is currently no research proposed beyond normal program monitoring and evaluation.

12.2) Cooperating and funding agencies.

N/A

12.3) Principle investigator or project supervisor and staff.

N/A

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

N/A

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

N/A

12.6) Dates or time period in which research activity occurs.

N/A

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

N/A

12.8) Expected type and effects of take and potential for injury or mortality.

N/A

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

N/A

12.10) Alternative methods to achieve project objectives.

N/A

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

N/A

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

N/A

SECTION 13. ATTACHMENTS AND CITATIONS

Bjorkstedt, E. P. 2005. Darr 2.0: Updated software for estimating abundance from stratified mark-recapture data. NOAA-TM-NMFS-SWFSC-368, NOAA Fisheries, Santa Cruz, California.

Blankenship, S.M., M.P. Small, J.D. Bumgarner, M. Schuck and G. Mendel. 2007. Genetic relationships among Tucannon, Touchet and Walla Walla River summer steelhead (O. mykiss) receiving migitation hatchery fish from Lyons Ferry Hatchery – WDFW report.

Blankenship, S.M, M.P. Small and J. D Bumgarner. 2009. Temporal stability of genetic variation within natural populations of summer steelhead receiving mitigation hatchery fish. TAFS 138:1052-1064.

Bumgarner, Joseph D. and Jerry Dedloff. 2009 Lyons Ferry Complex Hatchery Evaluation: Summer Steelhead Annual Report 2006 and 2007 Run Year. Washington Department of Fish and Wildlife Fish Program / Science Division Hatchery & Wild Interactions Sub-Unit 600 Capital Way North Olympia, Washington 98501. Report to U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office 1387 Vinnell Way, Suite 343 Boise, Idaho 83709 Cooperative Agreements #s 141106J013, 141107J011

Bumgarner, Joseph D. and Jerry Dedloff. 2011. Lyons Ferry Complex Hatchery Evaluation: Summer Steelhead Annual Report 2008 and 2009 Run Year. Washington Department of Fish and Wildlife Fish Program / Science Division Hatchery & Wild Interactions Sub-Unit 600 Capital Way North Olympia, Washington 98501. Report to U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office 1387 Vinnell Way, Suite 343 Boise, Idaho 83709.

Contor, Craig and Amy Sexton, editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

Contor, Craig R., Brian Mahoney and Tim Hanson. 2003. Juvenile salmonid monitoring: In Craig R. Contor and Amy Sexton, editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

CTUIR (Confederated Tribes of the Umatilla Indian Reservation) and Jones and Stokes. 2008. Walla Walla Spring Chinook Hatchery Master Plan. Prepared for the Northwest Power and Conservation Council, Portland, Oregon.

CTUIR (Confederated Tribes of the Umatilla Indian Reservation). 2009. Hatchery and Genetic Management Plan for Walla Walla River Spring Chinook Reintroduction. Submitted to National Marine Fisheries Service, Portland, Oregon.

Gallinat, M.P., and L.A. Ross. 2011. Tucannon River Spring Chinook Salmon Hatchery Evaluation Program 2010 Annual Report to U.S. Fish and Wildlife Service, Cooperative Agreement 1411-09-J012. Washington Department of Fish and Wildlife, Olympia, Washington. Appendix D.

Gallinat, M.P. and L. A. Ross. 2011. Touchet River smolt trapping- 2010/11 Outmigration Assessment Brief. WDFW, Snake River Lab. annual report.

Hesse, J. A., J. R. Harbeck, and R.W. Carmichael. 2006. Monitoring and Evaluation Plan for Northeast Oregon Hatchery Imnaha and Grande Ronde Subbasin Spring Chinook Salmon.

HSRG (Hatchery Science Review Group). 2009a. Columbia River Hatchery Reform Project Final Systemwide Report. Appendix A. White Paper #4.

HSRG (Hatchery Science Review Group). 2009b. Columbia River Hatchery Reform Project Final Systemwide Report. Review and Recommendations. Walla Walla Spring Chinook Population and Related Hatchery Programs.

IHOT (Integrated Hatchery Operations Team). 1995. Policy and procedures for Columbia Basin anadromous salmonid hatcheries. Annual report 1994 to the Bonneville Power Administration, Portland, Oregon. Project # 92-043.

ICTRT (Interior Columbia Basin Technical Recovery Team). 2004. Preliminary Guidelines for Population-level Abundance, Productivity, Spatial Structure, and Diversity Supporting Viable Salmonid Populations: An Update. December 13, 2004. Available at: http://www.nwfsc.noaa.gov/trt/trt_viability.htm

Johnson, D.H., B.M. Shrier, J.S. O'Neal, J.A. Knutzen, X. Augernot, and T.N. Pearsons, 2007. Salmonid field protocols handbook: techniques for assessing status and trends in salmon populations. American Fisheries Society, Bethesda, Maryland.

Kissner, Paul. 2003. Ault returns and spawning surveys. In Craig R. Contor, editor. 2003. Umatilla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 1990-005-01. Bonneville Power Administration, Portland, Oregon.

Kissner, Paul and Craig R. Contor. 2003. Spring Chinook and summer steelhead spawning surveys. In Craig R. Contor and Amy Sexton editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

Lady, J, P. Westhagen, and J. R. Skalski. 2001. SURPH .2 User Manual, SURPH 2.1, Survival under Proportional Hazards. School of Aquatic and Fisheries Sciences, University of Washington, Seattle, WA. http://www.cbr.washington.edu/paramest/surph.

Mahoney, Brian. 2003. Summer steelhead and bull trout radio telemetry study: In Craig R. Contor and Amy Sexton, editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

Mahoney, Brian D., Michael Lambert, Travis Olsen, Eric Hoverson, Paul Kissner, and Jesse D. M Schwartz. 2006. Walla Walla Basin Natural Production Monitoring and Evaluation Project; 2004-05 Progress Report. Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. Bonneville Power Administration Project No. 2000-039-00.

Mahoney, Brian D., Michael Lambert, Preston Bronson, Travis Olsen, and Jesse D. M Schwartz. 2008. Walla Walla Basin Natural Production Monitoring and Evaluation Project; FY 2006 Annual Report. Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. Bonneville Power Administration Project No. 2000-039-00.

Mahoney, Brian, Michael Lambert, Travis Olsen, Preston Bronson, and Rey Weldert. And Glen Mendel, Jeremy Trump and Mike Gembala, 2009. Walla Walla Basin Collaborative Salmonid Monitoring and Evaluation Project: 2007 and 2008 Annual Report. Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. Bonneville Power Administration Project No. 2000-039-00.

Mahoney B. D., Glen Mendel, Rey Weldert, Jeremy Trump, Joelle Pomraning, Michael Gembala and Michael Gallinat. 2011. Walla Walla Subbasin Monitoring and Evaluation Project: 2009 and 2010 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Memorandum of Agreement among the Umatilla, Warm Springs and Yakama Tribes, Bonneville Power Administration, U.S. Army Corps of Engineers, and U.S. Bureau of Reclamation. 2008. Columbia Basin Fish Accords.

Memorandum of Agreement between CTUIR, ODFW, and WDFW. October 2012. Regarding Walla Walla Spring Chinook Hatchery Design, Construction and Operations.

Mendel, Glen, David Karl and Terrence Coyle. 2000. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 1999 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland, Oregon. 86 pages.

Mendel, Glen, David Karl and Terrence Coyle. 2001. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 2000 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland, Oregon. 109 pages.

Mendel, Glen, Jeremy Trump and David Karl. 2002. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 2001 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland ,Oregon. 133 pages.

Mendel, Glen, Jeremy Trump and Mike Gembala. 2004. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 2003 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland, Oregon. 126 pages.

Mendel, Glen, Jeremy Trump, Mike Gembala, Scott Blankenship, and Todd Kassler. 2007. Assessment of salmonids and their habitat conditions in the Walla Walla River Basin of Washington. 2006 Annual Report for Project No. 19980200, Submitted to US DOE, Bonneville Power Administration, Portland Oregon.

MERR Columbia River Basin Monitoring, Evaluation, Research, and Reporting (MERR) Plan. 2010. http://www.nwcouncil.org/fw/merr/Default.asp

Narum, Shawn R., Craig R. Contor, Andre Talbot and Matthew S. Powell. 2003. Genetic divergence of sympatric resident and anadromous forms of Oncorhynchus mykiss in the Walla Walla River in: Craig R. Contor and Amy Sexton editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

Narum, Shawn R., Craig R. Contor, Andre Talbot and Matthew S. Powell. 2004. Genetic divergence of sympatric resident and anadromous forms of Oncorhynchus mykiss in the Walla Walla River. Journal of Fish Biology 65, 471-488.

NMFS (National Marine Fisheries Service). 2009. Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan. **http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Interior-Columbia/Mid-Columbia/Mid-Col-Plan.cfm**

ODFW (Oregon Department of Fish and Wildlife). 1979. Liberation Manual.

ODFW (Oregon Department of Fish and Wildlife). 2003. Fish Health Management Policy.

ODFW (Oregon Department of Fish and Wildlife) and CTUIR (Confederated Tribes of the Umatilla Indian Reservation). 2010. Hatchery and Genetic Management Plan for Umatilla Spring Chinook Program. Submitted to National Marine Fisheries Service, Portland, Oregon.

Schwartz, Jesse D.M., Paul Kissner, Michael Lambert, Brian Mahoney, and Craig R. Contor. 2005. Walla Walla Basin Natural Production Monitoring and Evaluation Project; 2003 Progress Report. Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. Bonneville Power Administration Project No. 2000-039-00.

Snake River Salmon Recovery Board. 2011. (Draft) Snake River Salmon Recovery Plan for Southeast Washington. www.snakeriverboard.org

Steinhorst, K., Y. Wu, B. Dennis, and P. Kline. 2004. Confidence intervals for fish outmigration estimates using stratified trap efficiency methods. Journal of Agriculture, Biological, and Environmental Statistics 9 (3): 284-299.

Tice, Benjamin. 2006. Mill Creek Flood Control Works. 2007-2008 Special Report on Fish Passage. U.S. Army Corps of Engineers Walla Walla District Walla Walla, Washington.

USFWS (U.S. Fish and Wildlife Service) v. Hudson Bay District Improvement Company, et al. Final Amended Civil Penalty Settlement Agreement. FWS.PN.2731. June 27, 2001.

Walla Walla County and Walla Walla Basin Watershed Council. 2004. Walla Walla Subbasin Plan. Prepared for the Northwest Power and Conservation Council.

WDFW. 2009. Draft Walla Walla and Touchet Steelhead Hatchery Genetic Management Plans. Prepared for the Lower Snake River Compensation Plan Office, USFWS, Boise, ID

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief."

Name, Title, and Signature of Applicant:

Certified by______________________________ Date:_____________

SECTION 15. PROGRAM EFFECTS ON OTHER (AQUATIC OR TERRESTRIAL) ESA-LISTED POPULATIONS. (Anadromous salmonid effects are addressed in Section 2)

15.1) List all ESA permits or authorizations for USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species associated with the hatchery program.

Originally, the USFWS issued a letter to CTUIR (dated 7/27/00) stating that the adult outplanting program was "not likely to cause negative impacts to the threatened bull trout in the basin". When the current juvenile release program was initiated, the USFWS issued a similar letter to CTUIR (dated 3/30/05) stating the same conclusion. The USFWS later developed a Biological Assessment for the existing program and conducted an internal consultation. In an internal memorandum (dated 7/26/07) they determined that the current program was "not likely to affect" the listed bull trout population in the subbasin.

The WWBNPME activities affecting bull trout are conducted under USFWS Section 10 permit #TE-844468-8. Threatened Species Permit TE844468-8 (expiration May 16, 2016) which authorizes CTUIR to annually take (harass by survey, capture, handle, mark, and release) listed bull trout while conducting the WWBNPME project. These activities are conducted in accordance with the study plans or biological assessment (as modified by the Special Terms and Conditions) accompanying the permit application. Estimated annual take is 200 individuals of all age classes, with less than 3% mortality.

15.2) Describe USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species and habitat that may be affected by hatchery program.

LISTED

Common Name	Scientific Name	Status
Fish:		
Bull trout [1]	*Salvelinus confluentus*	Threatened

[1] listing unit is the Columbia River Distinct Population Segment

The Columbia River Bull Trout Distinct Population Segment was federally listed as threatened on June 10, 1998 (63 FR 31647). Bull trout exhibit two main life histories in the Walla Walla Subbasin; resident and migratory. Resident bull trout remain in their natal headwater stream for their entire life cycle, whereas migratory bull trout rear for one to four years in small streams and then migrate downstream to larger rivers including migrating to and from the Columbia River (Marshall Barrows, USFWS, personal communication, 2011). Populations with different life histories may occupy the same stream.

Although bull trout were listed as threatened in the Columbia Basin in 1998, recovery planning has not been completed and adult abundance goals are currently not available. The upper Walla Walla River and Touchet River are identified as core population areas for bull trout. Local populations identified within these core areas are Mill Creek, North and South Fork Walla Walla River, and North, Wolf, and South Fork Touchet River.

Within the Walla Walla Subbasin, the status of bull trout appears to be viable in the Walla Walla River and Mill Creek with a modestly robust population (Figure 26). However, the bull trout population in the Touchet River is depressed and abundance is variable. Since 1994, indexed redd counts in the South Fork Walla Walla River have reflected the regional redd count trend (Figure 27). Hatchery spring Chinook juveniles may provide a forage base benefit to bull trout.

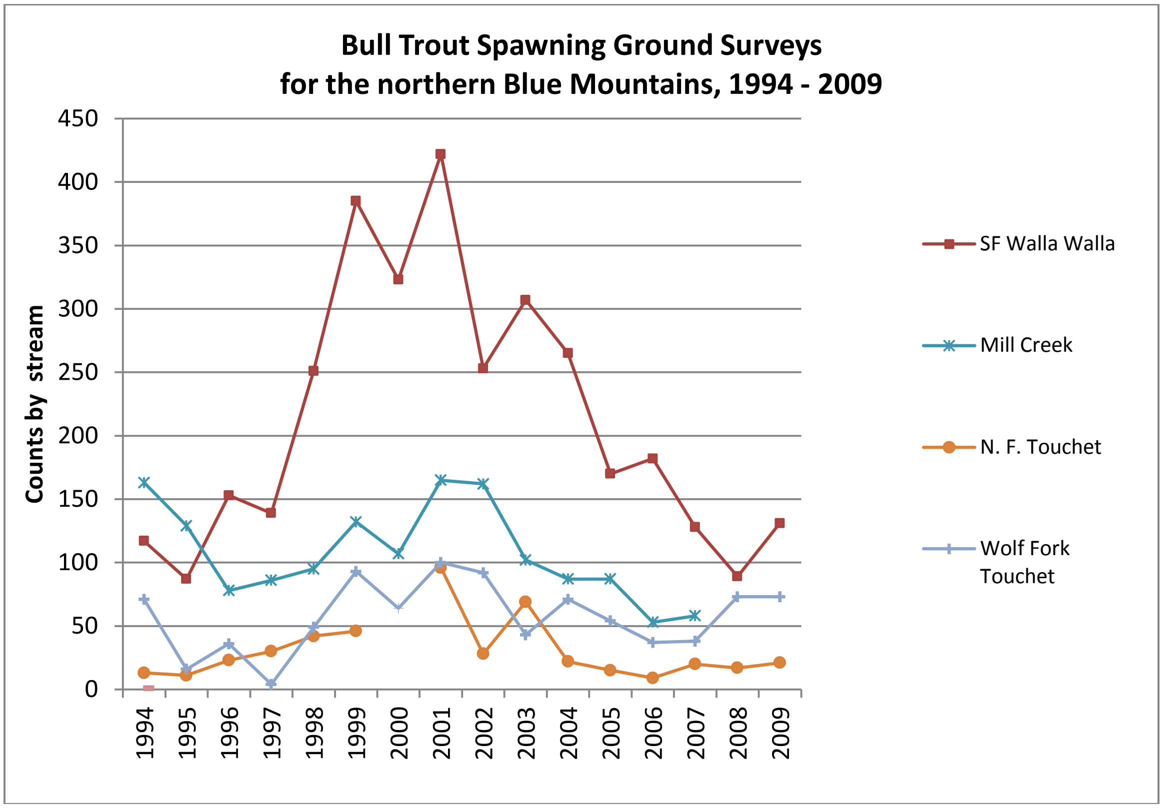


Figure 26. Northern Blue Mountains Streams bull trout spawning ground survey summary, 1994-2009 (Adapted from Dave Crabtree, U.S.F.S. Walla Walla Ranger District unpublished data).

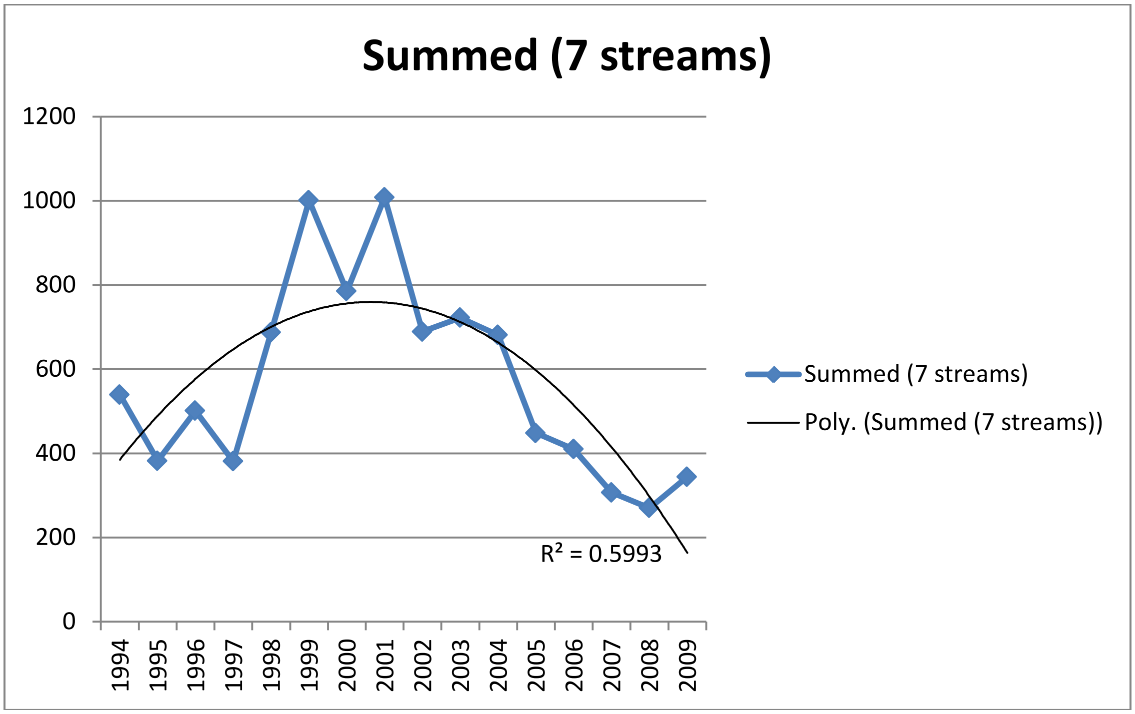


Figure 37. Northern Blue Mountains Streams bull trout spawning ground survey summary, 1994-2009 (Dave Crabtree, U.S.F.S. Walla Walla Ranger District unpublished data).

Counts of bull trout at NBD have shown an upward trend in the past few years (Figure 28). A similar increase in bull trout abundance is evident at the DAT (Figure 29) in the Touchet River. A fish ladder was added and the DAT was improved in 2008, so the increase in bull trout counts there may reflect either improved passage or trapping conditions, or increased numbers of bull trout.

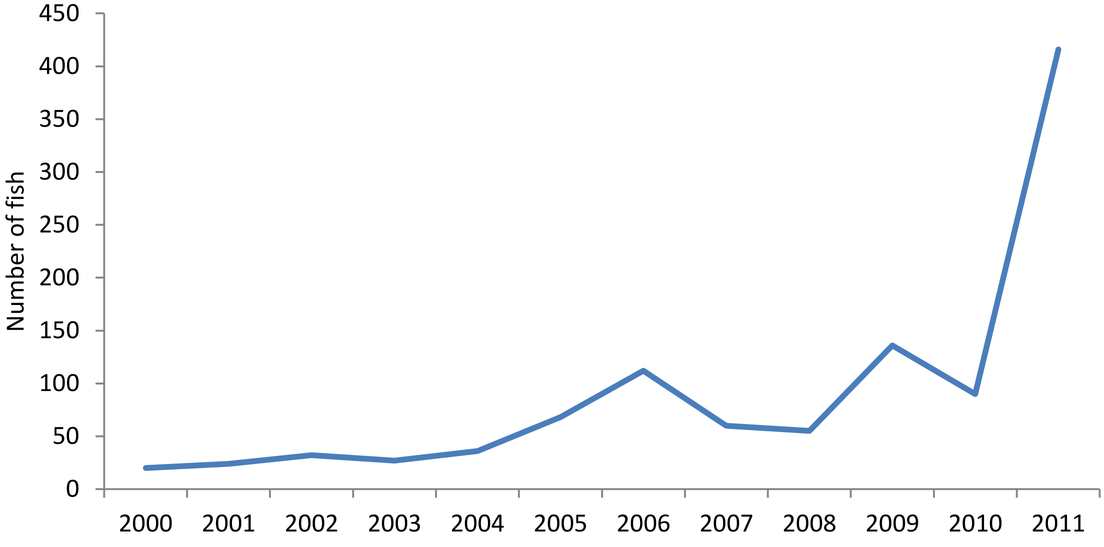


Figure 28. Numbers of bull trout counted at NBD, 2000-2011.

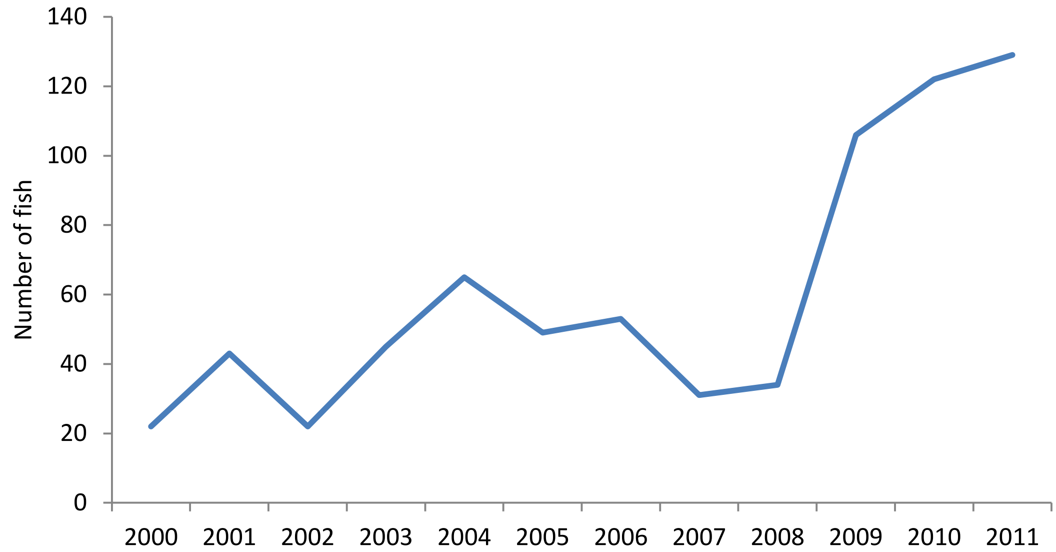


Figure 29. Numbers of bull trout captured at the DAT, 2000-2011 (data from Joe Bumgarner, WDFW). Note that fish count efforts had not been consistent until 2008 when the new ladder and trap was constructed.

The WWBNPME project assists the USFWS with concurrent bull trout research (Anglin et al. 2008) by opportunistically PIT-tagging bull trout > 120mm. Between 2007 and 2011, 158 sub-adult bull trout were captured by the project in the Walla Walla River (Table 16). Of these, 85 were PIT-tagged. Many of these fish were subsequently detected moving in and out of the Columbia River (Anglin et al., USFWS unpublished data). These fish may represent a migratory component of the Walla Walla Basin population that utilizes the Columbia River to complete rearing to sexual maturity and then return as spawners. Future detections will help to determine if they have recruited into the spawning population.

Table 16. Number of bull trout handled by WWBNPME January-March, 2009 (CTUIR unpublished data).

YEAR	LOCATION	Caught	PIT-Tagged	Recapture
2011	Garden City II (RM 30.8)	13	1	0
	Basel Cellars (RM 37.9)	6	5	0
2010	Pierce RV Park (RM 9)	1	1	0
	Basel Cellars (RM 37.9)	4	2	0
2009	Pierce RV Park (RM 9)	13	9	3
	Joe West Bridge (RM 50.5)	19	13	1
2008	Pierce RV Park (RM 9)	0	0	0
	Joe West Bridge (RM 50.5)	62	44	0
2007	Pierce RV Park (RM 9)	0	0	0
	Joe West Bridge (RM 50.5)	21	10	0

PROPOSED

None

CANDIDATE

None that would be affected by the proposed action.

CRITICAL HABITAT

Revised critical habitat for bull trout throughout the coterminous United States was proposed by the U.S. Fish and Wildlife Service (USFWS) on January 14, 2010 (Proposed rule, 75 FR 2270) and includes the Walla Walla Subbasin.

15.3) Analyze effects.

Associated monitoring and evaluation activities are conducted by the WWMEP project. Estimated annual take by the CTUIR portion of the project is 200 individuals of all age classes, with less than 3% mortality.

In addition, broodstock collection activities will entail some level of trapping, anesthetizing, handling and releasing of bull trout. Brood collection will occur in May and June at Nursery Bridge Dam. During the past five years, an average of 95 bull trout have been enumerated at Nursery Bridge Dam during May and June with a range of 32 to 211.

Water withdrawal for the facility may also result in take. The low stream flow period for the South Fork typically occurs between August and October. Average monthly stream flow for this period since 2000 has been 102 cfs with an average minimum of 98.5 cfs. The water usage profile for the facility identifies August as one of the highest usage months at 19.4 cfs. Based on this data, it is anticipated that the hatchery would divert an estimated 19.7% of the total stream flow. Approximately 500 feet of the stream, between the intake and discharge outfall would be affected.

15.4 Actions taken to minimize potential effects.

The USFWS concluded that neither the existing spring Chinook release program nor the adult outplanting program would adversely affect bull trout (see USFWS letters to CTUIR dated 7/27/00 and 3/30/05 and USFWS internal memorandum dated 7/26/07) but have not ruled on the proposed program. Associated monitoring and evaluation activities are conducted by the WWMEP in accordance with the biological assessment (as modified by the Special Terms and Conditions) accompanying the permit application.

Any bull trout captured during broodstock collection activities will be kept in water as much as possible during the handling process and be immediately released upstream. No actions have specifically been identified to mitigate for the water withdrawal in the 500 foot stream reach at the WWH.

15.5 References

Anglin Donald, R., D. Gallion, M. Barrows, C. Newlon, Ryan Kock. 2008. Current Status of Bull Trout Abundance, Connectivity, and Habitat Conditions in the Walla Walla Basin. 2007 Update. U.S. Fish and Wildlife Service Columbia River Fisheries Program Office Vancouver, Washington.

USFWS (U.S. Fish and Wildlife Service). Letter to CTUIR re: Experimental Outplanting of Surplus Hatchery Adult Spring Chinook Salmon in the Walla Walla River Basin. July 27, 2000.

USFWS (U.S. Fish and Wildlife Service). Letter to CTUIR re: Release of juvenile spring Chinook salmon in the Walla Walla River Basin. March 30, 2005.

USFWS (U.S. Fish and Wildlife Service). Internal Memorandum re: Release of juvenile spring Chinook salmon in the Walla Walla River Basin. July 26, 2007.

WALLA WALLA SPRING CHINOOK HATCHERY MASTER PLAN

Prepared by the
Confederated Tribes of the Umatilla Indian Reservation

and

Jones and Stokes

August 2008

Contents

Acronyms and Abbreviations

AF	Acre Feet
AHA	All-H-Analyzer
AOP	Annual Operating Plan
BPA	Bonneville Power Administration
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CWT	coded wire tag
DI	Density Index
EDT	Ecosystem Diagnosis and Treatment
EIS	Environmental Impact Statement
ELISA	enzyme-linked immunosorbent assay
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FI	Flow Index
fpp	fish per pound
FWS	U.S. Fish and Wildlife Service
gpm	gallons per minute
IHOT	Integrated Hatchery Operations Team
ISAB	Independent Scientific Advisory Board
ISRP	Independent Scientific Review Panel
LSRPC	Lower Snake River Compensation Program
LWWR	Lower Walla Walla River
NATURES	Natural Rearing Enhancement System
NEOH	Northeast Oregon Hatchery Program

NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPPC	Northwest Power Planning Council
ODFW	Oregon Department of Fish and Wildlife
PIT	Passive Integrated Transponder
PNI	proportion of natural influence
PTAGIS	PIT Tag Information System
RM	river mile
SAR	smolt-to-adult return
UHSFOM	Umatilla Hatchery Satellite Facilities Operation and Maintenance Project
VIE	Visual Implant Elastomer
WDFW	Washington Department of Fish and Wildlife
WWBNPME	Walla Walla Basin Natural Production Monitoring and Evaluation Project
WWFPO	Walla Walla Fish Passage Operations
WWHMP	Walla Walla Hatchery Master Plan

I. INTRODUCTION

The 1987 Northwest Power Planning Council (NPPC) Fish and Wildlife Program was amended to include a measure to develop artificial production facilities which would produce between 2.3 and 3.0 million Chinook salmon and steelhead smolts designated for release into the Hood, Umatilla, Walla Walla, Grande Ronde, and Imnaha River subbasins and elsewhere. Measure 703(f) (5) (A), known as the Northeast Oregon Hatchery Program (NEOH), required that prior to design of facilities, a master plan be developed for each subbasin by the tribes and state fishery agencies. This document is provided to meet that requirement for the Walla Walla Subbasin. As required by the program measure, the Walla Walla Hatchery Master Plan (WWHMP), as developed by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), includes the following:

1) A description of release sites in northeast Oregon and southeast Washington that will benefit from hatchery supplementation and discussion of the management history of each stock to be supplemented.

2) A detailed production profile that identifies the source of broodstock, number of smolts to be released and estimated adult returns.

3) A description of related harvest plans.

4) A conceptual design for integrated facilities at one or more locations that include all necessary elements for salmon and steelhead propagation, such as satellite acclimation ponds, adult traps or transportation facilities, and an evaluation of low-capital or small-scale facilities to meet production objectives.

5) The proposed management policies and procedures for streams receiving fish from the facilities in order to ensure that hatchery releases are consistent with the system policies and plans adopted by the Council, as described in Section 200: Salmon and Steelhead Framework.

6) An evaluation of sites to verify suitability for outplanting facilities, including low-cost and small-scale applications. Evaluations shall include recommendations for using sites as efficiently as possible.

7) A proposal for biological monitoring and evaluation studies to assess the effectiveness of outplanting facilities in supplementing natural production in a biologically sound manner and the effects of the outplanting on existing fish populations.

8) Preliminary cost estimates for implementation of the measure.

The WWHMP was developed based on logistical considerations, legal rationale and sound scientific principles. While the logistical and legal considerations were developed principally from conversations with local co-managers, the scientific principles were derived from technical reviews of hatchery practices (Independent Scientific Advisory Board 2003, 2004; Williams et al. 2003). CTUIR used an ecoscape perspective to evaluate the potential of the Walla Walla Subbasin to support an integrated reintroduction program for spring Chinook. This perspective, discussed in detail by Williams et al. (2003), includes the following principles:

- Operations are consistent with the ecological attributes of the system
- Natural production is a driving goal of the program
- Operations are inclusive of the non-consumptive services Chinook perform

- Operations are inclusive of the consumptive and non-consumptive services of the ecosystem as a whole, including other focal species and non-focal fish and wildlife
- Operations are consistent with parallel habitat, harvest, and hydrosystem actions and plans
- Research, monitoring, and evaluation activities are planned to address both the hatchery and natural production goals and objectives of the program

These principles, and the various recommendations of the Independent Scientific Advisory Board (ISAB), were developed in this plan in accordance with the Northwest Power Planning Council's three step review process. In general these steps are;

STEP 1: Completion and approval of a conceptual plan generally presented in the form of the WWHMP.

STEP 2: Development of a preliminary design with cost estimates, and completion of necessary environmental review including National Environmental Policy Act (NEPA) and Endangered Species Act (ESA).

STEP 3: Development of the final design prior to construction and operation.

This Plan addresses Step 1 of the review process, and the seventeen WWHMP requirements as defined by the NPPC. Table 1 lists the 17 requirements and identifies the pages where they are specifically addressed. This is followed by a discussion of and reference to ISAB and Independent Scientific Review Panel (ISRP) Scientific Principles for Hatchery Planning.

Table 1. Walla Walla Hatchery Master Plan Requirements

Requirement	Sections	Pages
1. Address the relationship and consistencies of the proposed project to the eight scientific principles outlined in the Northwest Power Planning Council 'sFish and Wildlife Program.	I.A. Independent Scientific Advisory Board Artificial Production Recommendations	3
2. Describe the link of the proposal to other projects and activities in the subbasin and the desired end state condition for the target subbasin.	V.A. Existing Environmental Resources, VII. Management Approach/Relationship to Other Programs	40, 57
3. Define the biological objectives with measurable attributes that define progress, provide accountability and track changes through time associated with the project.	III.A. Measurable and Time-limited Program Objectives	15
4. Define expected project benefits (e.g. preservation of biological diversity, fishery enhancement, water optimization, and habitat protection).	VI. Expected Project Benefits	48
5. Describe the implementation strategies as they relate to the current conditions and restoration potential of the habitat for the target species and the life stage of interest.	III.B. Summary of Production Alternatives	14
6. Address the relationship of the project to the habitat strategies.	VII.E. Adaptive Management	63
7. Ensure that cost-effective alternate measures are not overlooked and include descriptions of alternatives for resolving the resource problem, including a description of other management activities in the subbasin, province and basin.	III.B. Summary of Production Alternatives	18
8. Provide the historical and current status of anadromous and resident fish and wildlife in the subbasin most relevant to the proposed project.	V.A.3. Status of Spring Chinook Salmon in the Walla Walla Subbasin	42
9. Describe current and planned management of anadromous and resident fish and wildlife in the subbasin.	VII.A. Current Management Approach, VII.C. Harvest Management Approach and Related	59, 61

Requirement	Sections	Pages
	Harvest Plans	
10. Demonstrate consistency of the proposed project with National Marine Fisheries Service recovery plans and other fishery management and watershed plans.	VII.E. Adaptive Management	63
11. Describe the status of the comprehensive environmental assessment.	V.A. Existing Environmental Resources	40
12. Describe the monitoring and evaluation plan associated with the project.	IV. Monitoring and Evaluation	23
13. Describe and provide specific items and cost estimates for 10 fiscal years for planning and design (i.e. conceptual, preliminary and final), construction, operation and maintenance and monitoring and evaluation.	VIII. Conceptual Design and Cost Estimates for the Preferred Alternative	63
14. Address the relation and link to the Council's artificial production policies and strategies.	VII.E. Adaptive Management	63
15. Provide a completed Hatchery and Genetic Management Plan for the target population(s).	Attached Addendum to WWHMP	
16. Describe the harvest plan.	VII.C. Harvest Management Approach and Related Harvest Plans	61
17. Provide a conceptual design of the proposed facilities, including an assessment of the availability and utility of existing facilities.	VIII.B. Conceptual Design	63

A. Independent Scientific Advisory Board Artificial Production Recommendations

In addition to meeting programmatic requirements, this WWHMP was developed using best available science and general guiding principles associated with the Walla Walla ecoscape, integrated hatchery design, and holistic subbasin restoration planning described in the Walla Walla Subbasin Plan. Specifics associated with the biology, history, management structure, and logistics in the Walla Walla Subbasin make the direct incorporation of some guiding principles easier than others. This plan addresses the eight ISAB recommended scientific principles for integrated hatchery design as follows (Independent Scientific Advisory Board 2003):

ISAB RECOMMENDATION 1:

Only natural-origin adults should be used as broodstock.

CTUIR Recommended Action: *As an integrated reintroduction program this plan recommends incorporating natural origin adults into the broodstock. Based on the output from the All-H-Analyzer (AHA) Model (Mobrand Biometrics 2005), a broodstock composition goal of 50% natural origin adults was selected for the program in order to maximize both the proportion of natural influence (PNI) in the program and natural origin adult spawning escapement. The goal of 50% natural origin broodstock would yield a program PNI of just over 0.5 which is within the Hatchery Scientific Review Group guideline for integrated hatchery programs.*

ISAB RECOMMENDATION 2:

Performance standards for natural-origin and hatchery origin adult abundance and per capita production rates should be established.

CTUIR Recommended Action: *The standards have been established and are described under the preferred alternative.*

ISAB RECOMMENDATION 3:

All supplementation programs should be conducted within an explicit experimental design.

CTUIR Recommended Action: *While the Walla Walla hatchery facility is not a research facility, the comprehensive restoration program sponsored by CTUIR incorporates an explicit experimental design. Within the subbasin the comparative performance of smolt releases and adult outplants will be evaluated across the Walla Walla, Mill Creek, and Touchet tributaries. In addition, comparative performance of the integrated progressive WWHMP will be evaluated across the CTUIR ceded lands, with the intensive hatchery program in the Umatilla, cautious captive brood programs in the Tucannon and Grande Ronde, and habitat-only actions in the John Day. In addition the performance of the WWHMP will be evaluated in terms of its ability to support genetic and phenotypic metrics in an observational experiment described in section IV. C. Monitoring and Evaluation Activities Associated with the Hatchery Program.*

ISAB RECOMMENDATION 4:

Reference populations should be established as experimental controls.

CTUIR Recommended Action: *As described above, the WWHMP will be carried out in the context of a broad programmatic evaluation including both in-basin (Mill Creek and Touchet River) and out of basin experimental controls (Umatilla, Tucannon, Grande Ronde and John Day Subbasins).*

ISAB RECOMMENDATION 5:

Program plans should contain an objective means to assess when supplementation should be terminated.

CTUIR Recommended Action: *Based on limiting factors analysis described in the Walla Walla Subbasin Plan, achievement of Bonneville Power Administration (BPA), NPPC, and CTUIR programmatic goals for spring Chinook cannot be sustained without supplementation. Even in the context of rigorous flow and habitat restoration actions, the capacity and productivity of the system is limited by hydrosystem mortality and marine harvest. Hence the termination of supplementation is not expected without dam breeching or other dramatic actions in the hydrosystem. If, for some reason, the performance of naturally spawning populations in the Walla Walla is greater than expected, and if harvest and natural production goals can be demonstrated to be sustainable without supplementation in the future, the termination or radical reorganization of the hatchery program would be addressed as described in Section VII. E., ADAPTIVE MANAGEMENT. However, there is currently no empirical or modeled evidence to suggest that the termination of spring Chinook supplementation need be explored at this time.*

ISAB RECOMMENDATION 6:

Multiple supplementation projects across the Columbia River Basin should be coordinated so that in the aggregate they constitute a basinwide adaptive management experiment.

CTUIR Recommended Action: *As described above CTUIR co-sponsors a number of hatchery actions in the context of broad basinwide adaptive experimentation that range from a "No Action" hatchery program in the John Day Subbasin to cautious captive brood programs in the Tucannon and Grande Ronde basins to a very intensive hatchery program in the Umatilla River. This plan represents another type of hatchery action, a progressive integrated hatchery program incorporating best available science and guiding principles. As stated in the responses to ISAB Recommendations 3 and 4, it is the intent of CTUIR to assess comparative performance of these programs in order to provide a broad programmatic evaluation of supplementation. The potential for these evaluations to contribute to basinwide knowledge and understanding cannot be overstated.*

ISAB RECOMMENDATION 7:

Supplementation projects should collect the data necessary to test their effectiveness.

CTUIR Recommended Action: *Section IV. MONITORING AND EVALUATION describes the specific performance metrics and monitoring activities that will be used to test the effectiveness of the supplementation program.*

ISAB RECOMMENDATION 8:

Supplementation should be used sparingly, focusing in areas where natural spawning populations are not replacing themselves, where habitat capacity is available to accommodate the additional production and where landscape conditions are suited to the experimental design.

CTUIR Recommended Action: *The risks of supplementation to endemic stocks have been clearly spelled out, and are currently being incorporated into a programmatic review of basinwide hatchery programs. The Walla Walla Subbasin represents an ideal region for the application of progressive integrated hatchery actions due to the extirpation of Walla Walla spring Chinook more than 80 years ago, and the presence of prime, under seeded, improving, and protected spring Chinook habitat. Hence the presentation of this plan, and the impetus for reintroduction and restoration of Walla Walla spring Chinook production. Section VII. MANAGEMENT APPROACH/RELATIONSHIP TO OTHER PROGRAMS includes an analysis of the habitat conditions, current and future, as they relate to the artificial production strategy. This analysis, conducted by the co-managers, suggests that the preferred alternative is well suited to the habitat conditions and habitat plans for the subbasin.*

As described in the following sections of the Plan, we have made every attempt to integrate these guiding principles with the long-term Treaty supported goals and objectives of CTUIR and CRITFC. The potential of this exciting and progressive recommended alternative cannot be over stated. While conceptual in nature, the alternative has undergone rigorous review, and is compliant with the numerous plans and regulations that govern restoration in the Columbia Plateau. In many ways CTUIR considers the preferred alternative to be some of the most "low hanging fruit" in the Columbia Basin as a whole.

B. Independent Scientific Review Panel Artificial Production Principles

The WWHMP was designed in part to conform to the Independent Scientific Review Panel's artificial production principles. These principles outline a pathway for developing artificial production programs which match the ecological functions of their target systems. Each of these principles has been addressed through quantitative analysis, hatchery design, and the corresponding adaptive management plan. The sponsor recognizes the need for an ecosystem approach for sustainable hatchery and harvest planning. The following section outlines the principles, and provides a roadmap to how and where they were addressed in this document.

Principle 1. The abundance, productivity and diversity of organisms are integrally linked to the characteristics of their ecosystems.

The physical and biological components of ecosystems together produce the diversity, abundance and productivity of plant and animal species, including humans. The combination of suitable habitats and necessary ecological functions forms the ecosystem structure and conditions needed to provide the desired abundance and productivity of specific species.

CTUIR Response: *The Walla Walla Hatchery is designed to be an integral part of the Walla Walla ecosystem and to operate within its constraints and opportunities. Salmon are clearly a vital component of the Walla Walla ecosystem. Historically salmon returned in large numbers providing significant ocean derived nutrients and forming a key (and perhaps keystone) role in aquatic and terrestrial foodwebs. The Walla Walla Hatchery is designed to increase significantly the return of anadromous salmonids to the Walla Walla system. Coupled with habitat improvements throughout the system, the hatchery should make a significant contribution to the restoration of natural function of the Walla Walla ecosystem. The Monitoring and Evaluation Program is structured to monitor these improvements in the system, and to detect any potential impacts of the hatchery on endemic fishes.*

Reference: 1. Biological Rationale **(25),** 4. Natural Production Monitoring and Evaluation Objectives**,** 1. Watershed Carrying Capacity **(42)**, and 2. Description of Available Habitat **(43).**

Principle 2. Ecosystems are dynamic, resilient and develop over time.

Although ecosystems have definable structures and characteristics, their behavior is highly dynamic, changing in response to internal and external factors. The system we see today is the product of its biological, human and geological legacy. Natural disturbance and change are normal ecological processes and are essential to the structure and maintenance of habitats.

CTUIR Response: *The demise of Chinook and steelhead in the Walla Walla system is the result of past (legacy) and on-going factors related to human use of the watershed and downriver areas. The Walla Walla Hatchery is designed to address some of these factors within the intrinsic potential of the system. We recognize the natural dynamics of salmon abundance and ecosystem conditions. Past hatchery programs have sought to dampen natural population dynamics and supply a constant "product." The Walla Walla supplementation program is designed to work with natural fluctuations in conditions and abundance. Broodstock abundance and juvenile release numbers will track return dynamics and natural cycles.*

Reference: C. Harvest Management Approach and Related Harvest Plans **(63)**, D. Production Management Structure and Process **(63)**, E. Adaptive Management **(63)**, and C. Monitoring and Evaluation Activities Associated with the Hatchery Program **(29)**

Principle 3. Biological systems operate on various spatial and time scales that can be organized hierarchically.

Ecosystems, landscapes, communities and populations are usefully described as hierarchies of nested components distinguished by their appropriate spatial and time scales. Higher-level ecological patterns and processes constrain, and in turn reflect, localized patterns and processes. There is no single, intrinsically correct description of an ecosystem, only one that is useful to management or scientific research. The hierarchy should clarify the higher-level constraints as well as the localized mechanisms behind the problem.

CTUIR Response: *Appropriate hierarchies for salmonid ecosystems can be tracked along two dimensions. A physical dimension recognizes the position of the Walla Walla as a system of nested sub-watersheds that in turn are part of the larger ecological province of the Columbia River Plateau and ultimately the Columbia Basin. The biological dimension recognizes sub-populations of spring Chinook*

(Touchet, Mill Creek etc.) that form the Walla Walla spring Chinook population that is part of the upper Columbia Chinook Evolutionarily Significant Unit (ESU). The WWHMP will operate within these hierarchies and is designed to preserve the natural biological and physical hierarchies of the Walla Walla system. This is done by the choice of outplanting locals and emphasis on developing locally adapted broodstock.

Reference: D. Production Management Structure and Process **(63),** E. Adaptive Management **(63),** and F. Consistency and Coordination of Project with Other Plans **(64)**

Principle 4. Habitats develop, and are maintained, by physical and biological processes.

Habitats are created, altered, and maintained by processes that operate over a range of scales. Locally observed conditions often reflect more expansive or non-local processes and influences, including human actions. The presence of essential habitat features created by these processes determines the abundance, productivity and diversity of species and communities. Habitat restoration actions are most effective when undertaken with an understanding and appreciation of the underlying habitat-forming processes.

CTUIR Response: *Much of the degradation of stream conditions in the Walla Walla is the result of disruption of natural habitat forming processes. This includes alteration of the hydrograph, stream channel and sediment dynamics. Habitat restoration in the Walla Walla will be designed to restore a measure of these natural processes. Habitat restoration projects will take advantage of natural processes and act to reduce the constraints imposed by human actions.*

Reference: A. Existing Environmental Resources **(42)** and 4. Habitat and Passage Restoration and Improvements Efforts **(47)**

Principle 5. Species play key roles in developing and maintaining ecological conditions.

Each species has one or more ecological functions that may be key to the development and maintenance of ecological conditions. Species, in effect, have a distinct job or occupation that is essential to the structure, sustainability and productivity of the ecosystem over time. The existence, productivity and abundance of specific species depend on these functions. In turn, loss of species and their functions lessens the ability of the ecosystem to withstand disturbance and change.

CTUIR Response: *Salmon clearly played a key role in the Walla Walla ecosystem. Large numbers of returning salmon brought ocean-derived nutrients that enriched both aquatic and riparian environments. Restoring salmon, in part through the efforts of the WWHMP, will contribute to the restoration of the Walla Walla ecosystem. The hypothesis is that appropriate increases in abundance of salmon will promote the recovery of other elements of the system that are linked to the presence of salmon.*

Reference: 1. Biological Rationale **(25)** and 4. Natural Production Monitoring and Evaluation Objectives **(38)**

Principle 6. Biological diversity allows ecosystems to persist in the face of environmental variation.

The diversity of species, traits and life histories within biological communities contributes to ecological stability in the face of disturbance and environmental change. Loss of species and their ecological functions can decrease ecological stability and resilience. It is not simply that more diversity is always good; introduction of non-native species, for example, can increase diversity but disrupt ecological structure. Diversity within a species presents a greater range of possible solutions to environmental variation and change. Maintaining the ability of the ecosystem to express its own species composition and diversity allows the system to remain productive in the face of environmental variation.

CTUIR Response: *The WWHMP is designed to enhance the biological diversity of salmon across all biological scales. Hatchery practices will minimize domestication selection and allow natural expression of biological diversity. The preferred alternative will supplement individual sub-populations across the watershed through a mixture of acclimated releases and adult outplanting, and will seek to develop locally adapted sub-populations.*

Reference: 2. Preferred Alternative: Full Production at South Fork Facility **(21)** and 1. Biological Rationale **(25)**

Principle 7. Ecological management is adaptive and experimental.

The dynamic nature, diversity, and complexity of ecological systems routinely disable attempts to command and control the environment. Adaptive management — the use of management experiments to investigate biological problems and to test the efficacy of management programs — provides a model for experimental management of ecosystems. Experimental management does not mean passive "learning by doing," but rather a directed program aimed at understanding key ecosystem dynamics and the impacts of human actions using scientific experimentation and inquiry.

CTUIR Response: *Recovery and management of salmon populations does not occur by set recipe. Many of the solutions and approaches to supplementation and habitat restoration are experimental or need to be refined for use in the Walla Walla. At the same time, management objectives will likely shift reflecting new legal direction and social priorities. Because of this, the WWHMP will have a strong monitoring and evaluation focus designed to help navigate the program over time across scientific and social uncertainties.*

Reference: E. Adaptive Management **(63)**

Principle 8. Ecosystem function, habitat structure and biological performance are affected by human actions.

As humans, we often view ourselves as separate and distinct from the natural world. However, we are integral parts of ecosystems. Our actions have a pervasive impact on the structure and function of ecosystems, while at the same time, our health and well being are tied to these conditions. These actions must be managed in ways that protect and restore ecosystem structures and conditions necessary for the survival and recovery of fish and wildlife in the basin. Success depends on the extent to which we choose to control our impacts so as to balance the various services potentially provided by the Columbia River Basin.

CTUIR Response: *The Walla Walla system has been dramatically altered by actions designed to promote human well-being and commerce. The result has been the decline and near elimination of once thriving populations of Chinook and steelhead. As human actions have been the source of most factors limiting natural salmon populations in the Walla Walla, they will be responsible for altering those actions to restore the Walla Walla ecosystem. The Walla Walla spring Chinook artificial production program is one element of a comprehensive effort to restore production and ecological functions in the system.*

Reference: 1. Biological Rationale **(25),** C. Monitoring and Evaluation Activities Associated with the Hatchery Program **(29),** 4. Natural Production Monitoring and Evaluation Objectives **(38),** B. Existing Program Resources **(46),** and VII. MANAGEMENT APPROACH/RELATIONSHIP TO OTHER PROGRAMS **(61)**

C. Summary of the Recommended Alternative

The WWHMP would integrate two artificial production purposes, augmentation and restoration, as outlined in the NPPC Artificial Production Review report (Northwest Power Planning Council 2000). Augmentation is defined in that document as “to provide fish for a specific reason, such as harvest, in numbers beyond the capability of the natural system” (page 13). Restoration is defined as “a means to speed or ‘jump-start’ recovery of natural populations” (page 14). Furthermore, the report cites “an extreme case of a restoration program is where the natural population has been eliminated, and fish are reintroduced by artificial production when the problem causing the extirpation is removed” (page 14).

Under the Preferred Alternative, co-managers propose implementing a two-pronged approach for meeting the spring Chinook augmentation and restoration goals in the Walla Walla Basin. A juvenile program will be initiated to provide for both harvest augmentation in the mainstem Walla Walla River and natural spawning restoration in the upper mainstem and South Fork Walla Walla River. An adult outplanting strategy will be used to restore natural spawning populations in Mill Creek and the Touchet River. In the longer term, after a self sustaining natural population has been reestablished in the upper mainstem, a portion of the hatchery releases may be shifted to Mill Creek and the Touchet River to augment harvest in those two areas of the subbasin as described in Section VII.E., ADAPTIVE MANAGEMENT.

To meet the juvenile production target, co-managers propose adding incubation, early rearing, and final rearing facilities to the existing South Fork Walla Walla Adult Holding and Spawning Facility in order to produce 500,000 yearling spring Chinook smolts annually. This enhanced facility would then be known as the South Fork Walla Walla Hatchery. This production group would be reared full term at the new facility, acclimated on site, and released directly into the South Fork Walla Walla River. The proposed release site is located within the primary spring Chinook natural production area in the upper mainstem portion of the subbasin.

Broodstock for the program would be Carson stock spring Chinook. Carson stock is an amalgam of several Columbia/Snake river stocks which is widely used in the mid and upper Columbia area including the Umatilla River. Initially, it is anticipated that broodstock for the WWHMP may include Carson stock returns to the Umatilla River or other Carson stock hatchery stations in conjunction with adults returning to the Walla Walla River. As population levels increase in the Walla Walla Subbasin, the intent is to collect all broodstock in-basin.

In contrast to the neighboring Umatilla Basin, brood collection, harvest, and escapement into the upper mainstem portion of the subbasin will be managed in an attempt to expedite the restoration of a naturally reproducing population. This approach includes utilizing a portion of the hatchery adults returning to the upper mainstem for outplanting into Mill Creek and the Touchet River. This natural production emphasis is incorporated into the management model presented in Appendix X, which allocates disposition of returning hatchery and natural adults between spawning escapement, broodstock, outplanting, and harvest. This difference in management approach will allow for direct comparisons between restoration and supplementation strategies in neighboring basins as well as within the Walla Walla Subbasin.

D. Organization of Document

Below is a short description by chapter of the WWHMP organization.

Chapter II gives a brief history of NEOH, background on hatchery production, WWHMP goals for the subbasin, and a rationale for action.

Chapter III describes the WWHMP proposed alternatives. The final section of this chapter presents the rationale for the Preferred Alternative, including discussion of the underlying cost comparison assumptions.

Chapter IV outlines the current monitoring and evaluation activities in the basin and future plans for monitoring and evaluation of the hatchery program.

Chapter V describes existing resources into which the alternatives would be implemented, including program resources and natural resources.

Chapter VI discusses short- and long-term risks and benefits of the Preferred Alternative.

Chapter VII relates the WWHMP to other subbasin initiatives and programs, which in turn relate to maintaining the long-term benefits discussed in Chapter 6 and outlines program management structure and process.

Chapter VIII presents initial cost estimates for the WWHMP, including preliminary designs for the South Fork Walla Walla Hatchery.

Appendix X is the management disposition model that allocates returning natural and hatchery adults between spawning escapement, broodstock, outplanting, and harvest purposes.

II. BACKGROUND

A. NEOH and Walla Walla Hatchery Master Plan History

Spring Chinook have essentially been absent from the Walla Walla River subbasin for over 75 years. "The last run of importance was reported in 1925 and entered the river in May and early June" (Van Cleave and Ting 1960). Losses have generally been attributed to the development of agriculture and related irrigation diversions and channel dewatering within the basin. In addition, the construction of Federal hydropower dams on the Columbia River changed the character of the mainstem migration corridor from a free-flowing river to a series of impoundments. This development altered juvenile and adult migratory patterns, further compromising salmonid lifecycles.

Under the NPPC Columbia River Basin Fish and Wildlife Program, NEOH was established in 1987. It was the initial artificial production planning effort by fishery co-managers for restoring anadromous fish runs in Northeast Oregon including the Walla Walla Subbasin. Little progress had been made towards meeting the NEOH goals since it was identified in the 1987 Fish and Wildlife Program and NEOH was reincorporated into the 1994 NPPC Fish and Wildlife Program (Northwest Power Planning Council 1994).

As stated previously, a requirement of NEOH and the Council's review process is that prior to design of facilities, a master plan be developed for each subbasin. The development of this WWHMP is authorized under 1994 NPPC Fish and Wildlife Program Measure 7.4L1 which directs BPA to "fund planning, design, construction, operation, maintenance and evaluation of artificial production facilities to raise Chinook salmon and steelhead for enhancement in the Hood, Umatilla, Walla Walla, Grande Ronde and Imnaha rivers and elsewhere."

The development of the WWHMP was begun in the early 1990s under project #198805302 and was separated out as project #200020138 in 2000. Two draft master plans have been developed, one in 1993 and one in 1998. Neither plan was finalized as significant passage, flow, and/or habitat issues remained unresolved at the time. Considerable progress has been made in all these areas to the point where implementation of the hatchery program is now warranted. Specifically, numerous passage improvements have allowed for the reintroduction of late spring anadromy as evidenced by adult returns from outplanted natural production (Schwartz et al. 2005). In addition summer flows have been partially restored in the Walla Walla mainstem, and are slated for significant improvements over the coming five to ten years. Finally, a variety of implemented and planned habitat actions have/will dramatically increase the capacity of the Walla Walla and South Fork Walla Walla reaches that support spring Chinook rearing (see the Walla Walla Subbasin Plan). Finally, the completion of a detailed limiting factors analysis has made clear that spring Chinook restoration, and the attainment of BPA, NPCC, and CTUIR biological objectives will not be possible without hatchery actions.

B. Production Background and Adult Return Goals

The need for a Walla Walla Basin spring Chinook hatchery production program has been identified in several planning efforts. These various plans include the 1987 and 1994 NPPC Fish and Wildlife Programs (Northwest Power Planning Council 1987, 1994), the Walla Walla Subbasin Plan (Confederated Tribes of the Umatilla Indian Reservation 1990); Wy-Kan-Ush-Mi Wa-Kish-Wit, the Tribal Restoration Plan (Columbia River Inter-Tribal Fish Commission 1995); the U.S. Army Corps of Engineers (Corps) Walla Walla Watershed Reconnaissance Report (U.S. Army Corps of Engineers 1997); the Walla Walla Subbasin Summary (Confederated Tribes of the Umatilla Indian Reservation 2001); and the recently completed Walla Walla Subbasin Plan (Walla Walla County and Walla Walla Basin Watershed Council 2004). Each of these documents identifies hatchery production as a critical element in meeting both in-basin and Columbia River Basin salmon restoration goals.

In 1990, subbasin plans were developed for all Columbia Basin tributaries (including the Walla Walla) through NPPC. These plans outlined habitat restoration, tributary passage improvements, and artificial propagation as means to restore salmonid populations in the subbasins. The production component of the Walla Walla Subbasin Plan (Confederated Tribes of the Umatilla Indian Reservation 1990) identified an annual release of 600,000 yearling spring Chinook smolts to meet a hatchery adult return goal of 3,000 to the subbasin. The production releases were to be split, with 350,000 smolts designated for the upper mainstem portion of the subbasin in Oregon and 250,000 for the upper Touchet River in Washington.

Each of the earlier draft master plans, as well as the NEOH Final Siting and Conceptual Design reports (Montgomery Watson 1995a, 1995b) identified the same smolt production level, release locations, and hatchery adult return goal as the 1990 Subbasin Plan. The smolt production level and adult return goals have since been modified during development of the Walla Walla Subbasin Summary (Confederated Tribes of the Umatilla Indian Reservation 2001). The most significant changes are the elimination of the proposed Touchet River smolt releases and a reduction in the natural spawning goal for the upper mainstem and South Fork Walla Walla River. The Ecosystem Diagnosis and Treatment (EDT) model developed for the Walla Walla Subbasin Plan (Walla Walla County and Walla Walla Basin Watershed Council 2004), estimates that the current spawner capacity for this reach under "properly functioning conditions" is approximately 1,000 adults. Based in part on this new information, the Walla Walla Subbasin co-managers are proposing the following revised near term goals for the WWHMP:

- Return an average of 3,850 adult spring Chinook to the upper mainstem and South Fork Walla Walla River in Oregon. Returns would be comprised of 2,750 hatchery-produced and 1,100 naturally-produced adults.
- Restore natural spawning populations in Mill Creek and the Touchet River by outplanting hatchery adults into each tributary.
- Provide annual opportunities for Tribal and non-Tribal tributary harvest.

Actions being proposed in order to meet the above stated goals:

- Release 500,000 yearling smolts at 10fpp into the Oregon portion of the subbasin.
- Externally mark hatchery releases at 100% in order to differentiate between returning hatchery and natural adults for management of broodstock, harvest, and escapement.
- Outplant up to 390 hatchery adults into Mill Creek and 470 hatchery adults into areas of the upper Touchet River.
- Collect 350 adults for WWHMP broodstock needs.

C. Rationale for Action

Due to concerns in the subbasin with passage, flow, and habitat issues, a Walla Walla smolt production program has never been implemented, although, the need for a hatchery program in order to reestablish spring Chinook in the subbasin was identified over 15 years ago. Over the past five years, there have been significant efforts made to address passage, flow, and habitat issues throughout the subbasin to the point where artificial production restoration actions are now justified. The recent Walla Walla Subbasin Plan confirmed that spring Chinook restoration and achievement of BPA Fish and Wildlife Program goals will not be possible without dam breaching or hatchery actions.

While the passage, flow, and habitat concerns have not been *completely* addressed, significant progress has been made in these areas. Minimum instream flows of 18 and 25 cubic feet per second (cfs) are now required to be maintained in the mid and upper mainstem Walla Walla River as part of the U.S. Fish and Wildlife Service (FWS) Amended Civil Penalty Agreement (2001) with basin irrigation districts. In addition, passage improvements have been ongoing since 1997. These improvements include removal of two decommissioned diversion structures, construction of five new or improved juvenile screen and bypass facilities, and four new or upgraded ladders have been built. In addition, two ditch consolidation projects have been completed eliminating two surface diversions in the subbasin. There are four additional screening and two fishway projects in the planning stages. A multitude of habitat improvement projects have been implemented by various agencies throughout the subbasin. The Inventory Section of the Subbasin Plan (Walla Walla County and Walla Walla Basin Watershed Council 2004) contains a comprehensive listing of the passage improvement and habitat projects.

As an interim measure prior to implementation of a WWHMP, spring Chinook adults from Ringold Springs Hatchery and the Umatilla River have been outplanted since 2000 into natural production areas of the South Fork Walla Walla River and Mill Creek (see Table 2). The intent of the adult outplanting program was twofold; begin establishing a naturally producing spring Chinook population in the subbasin and provide an opportunity to monitor juvenile and adult migration and natural reproductive behavior and success. Surplus adults were not available from Ringold Springs Hatchery from 2004-2006.

Table 2. Annual Outplants of Adult Spring Chinook into the Walla Walla Subbasin

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mill Creek	105	150	50	0	0	0	0	100	97
South Fork Walla Walla River	259	1092	329	313	233	17	417	365	318

No releases of juvenile spring Chinook were made in the Walla Walla Subbasin until 2005. As part of the *U.S. v. Oregon* Interim Management Agreement, 250,000 spring Chinook smolts were reprogrammed from Little White Salmon National Fish Hatchery for release into the South Fork Walla Walla River in order to initiate an interim smolt release program for the Walla Walla River prior to implementation of the WWHMP. This program has been incorporated into the 2008-2017 *U.S. v. Oregon* Management Agreement and beginning with the 2007 brood will come from Carson National Fish Hatchery. As stipulated in the 2008-2017 Management Agreement, this program will continue through the 2017 brood year or until the Walla Walla Hatchery Master Plan is implemented. Juvenile release information is presented in Table 3.

Table 3. Spring Chinook Juvenile Releases into the Walla Walla Subbasin

Release Year	Hatchery	Number	Size (pounds))	Release Dates	Release Location
2005	Little White Salmon	250374	16.1	4-4/5	SFWW @ Harris Park (RM 7.0)
2006	Little White Salmon	250004	16.5	3-28/29	SFWW @ Harris Park (RM7.0)
2007	Little White Salmon	251915	18.0	4-3	SFWW @ Harris Park (RM 7.0)
2008	Little White Salmon	239515	17.7	4-1	SFWW @ Harris Park (RM 7.0)

RM = river mile

From 2000 to 2003, a few adult spring Chinook had been observed annually migrating up the Walla Walla River and passing Nursery Bridge Dam on the upper mainstem in Oregon. Observations of adult spring Chinook had also been documented at the Dayton trap on the upper Touchet River during this same period. No spring Chinook had been observed returning to Mill Creek prior to 2004 but this is largely due to the fact that no enumeration capabilities were in place until that year. Annual observations from 2000-2003 at Nursery Bridge Dam and the Dayton trap are presented in Table 4. These adults are thought to be strays from the neighboring Umatilla River and Tucannon River programs. Limited coded wire tag (CWT) recovery information substantiates this theory. In addition, juvenile spring Chinook produced from the adult outplanting program have been documented successfully rearing and migrating from the basin.

Table 4. Pre-Outplanting Returns of Spring Chinook to the Walla Walla Subbasin.

Year	2000		2001		2002		2003	
	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack
Dayton Trap	3	1	28	3	0	0	1	2
Nursery Bridge Dam	9	0	47	0	27	3	1	1

Monitoring of adult spawning began in 2000 in conjunction with the initial outplants. In 2004, the first 4 year old adults from these initial outplantings returned to the subbasin with increased numbers of adults over pre-outplant years being enumerated at Nursery Bridge Dam since. While there are additional flow, passage, and habitat concerns still being addressed in the subbasin, these adult returns from the outplanting program demonstrate that spring Chinook can successfully spawn, rear, migrate, and return to natural production areas under current conditions. In addition, these preliminary results suggest that current Walla Walla Subbasin habitat conditions are sufficient to support a natural spawning population, and that increases in adult spawners will result in increased redd deposition. The Preferred Alternative and the management table presented in Appendix X are quantitatively derived using a natural spawner capacity of 1,000 adults for the upper mainstem/South Fork Walla Walla River whose attainment appears to be well supported by the initial results from the adult outplanting program. Annual redd data for the upper mainstem and South Fork Walla Walla River is presented in Table 5.

Table 5. Spring Chinook Redds, Upper Mainstem and South Fork Walla Walla River.

Reach Description	RM	2000	2001	2002	2003	2004	2005	2006	2007
Stateline to LWWR Diversion	40.0-45.9	NS	NS	NS	NS	NS	2 (2.6)	7 (3.1)	1 (0.4)
LWWR Diversion to Joe West Bridge	45.9-49.2	7 (6.9)	NS	NS	NS	8 (3.6)	0 (0.0)	4 (1.8)	5 (1.9)
Joe West Bridge to Steel Bridge	49.2-53.0	NS	NS	NS	NS	23 (10.2)	20 (25.6)	26 (11.7)	18 (6.7)
Steel Bridge to CTUIR Fish Facility	53.0-55.7	NS	NS	NS	NS	34(15.1)	13 (16.7)	24 (10.8)	36 (13.3)
CTUIR Fish Facility to Trailhead Gage	55.7-59.2	40 (39.6)	88 (26.0)	46 (31.7)	33 (27.5)	41 (18.2)	8 (10.3)	24 (10.8)	33 (12.2)
Trailhead Gage to Bear Creek	59.2-63.4	41 (40.6)	135 (39.8)	73 (50.3)	54 (45.0)	64 (28.4)	28 (35.9)	67 (30.0)	97 (35.9)
Bear Creek to Skiphorton Creek	63.4-67.3	13 (12.9)	100 (29.5)	26 (17.9)	33 (27.5)	46 (20.4)	7 (9.0)	62 (27.8)	73 (27.0)
Above Skiphorton Creek	>67.3	0 (0.0)	16 (4.7)	0 (0.0)	0 (0.0)	9 (4.0)	0 (0.0)	9 (4.0)	7 (2.6)
Total Redds		**101**	**339**	**145**	**120**	**225**	**78**	**223**	**270**
Estimated Total Female Escapement		156	671	209	139	219	58	269	328
Redds per Female		0.65	0.51	0.69	0.86	1.03	1.34	0.83	1.21

RM = river mile NS = not surveyed; LWWR = Lower Walla Walla River ; CTUIR = Confederated Tribes of the Umatilla Indian Reservation

III. ALTERNATIVES FOR SOLVING THE RESOURCE PROBLEM

This chapter describes five WWHMP alternatives. These alternatives include a Preferred Alternative, three additional action alternatives, and a No Action Alternative. Section B. provides a discussion of the various alternatives. Section C. discusses the rationale for the Preferred Alternative.

A. Measurable and Time-limited Program Objectives

The horizon for all the production alternatives is 25 years, encompassing five lifecycles of spring Chinook salmon. Within those 25 years, juvenile production objectives should be fulfilling adult return goals for hatchery adults and natural production should be approaching identified population levels.

1. General Walla Walla Hatchery Master Plan Objectives

The WWHMP has three general objectives it is seeking to accomplish with an emphasis on escaping natural origin adults to spawn in an attempt to accelerate the restoration of natural spawning populations;

1) establish self-sustaining natural populations in the South Fork Walla Walla River, Mill Creek, and Touchet River,
2) provide non-tribal and tribal fisheries in the subbasin, and
3) develop a localized brood stock.

The intent of the WWHMP is to be adaptable as objectives are being reached in order to take full advantage of the hatchery program in restoring natural populations and providing harvest benefits throughout the subbasin. This may include shifting a portion of the hatchery production from the upper mainstem once a self sustaining natural population has been established and fewer hatchery adults are required for natural spawning. By that time, additional information on the productivity and habitat availability in Mill Creek and the Touchet River will be available from monitoring and evaluation of the adult outplanting portion of the program. A portion of the hatchery production may then be reprogrammed into Mill Creek and/or the Touchet River to provide additional harvest opportunities and natural spawning augmentation in those two tributary areas. See additional discussion of reprogramming alternatives in Section VII. E., ADAPTIVE MANAGEMENT.

The WWHMP goal is to return a total of 3,850 adult spring Chinook salmon to the upper mainstem portion of the subbasin in Oregon. This total would be comprised of 1,100 naturally-produced and 2,750 hatchery-produced adults. Specific natural production goals have not been established for Mill Creek and the Touchet River. Data on habitat availability and production capacity for these two systems is limited. In the near term, adult outplanting goals of 390 hatchery adults (195 pairs) into Mill Creek and up to 470 (235 pairs) in the Touchet River have been established which will provide the opportunity to further analyze the potential for these two systems.

To meet Objective 1 for the upper mainstem and South Fork Walla Walla River, it is estimated that approximately 1,100 adults would need to escape above Nursery Bridge Dam in order to provide 1,000 actual spawners. An adult to adult return rate of approximately 1.1 would be required to sustain the natural population in the South Fork at the WWHMP goal level. The number of hatchery adults available for outplanting into Mill Creek and the Touchet River will be determined annually using Appendix X. Adult outplants will be prioritized with the first 50 pair going to Mill Creek and the next 100 pair to the Touchet River. Outplanting will continue using this rotation with the next 50 pair going back into Mill Creek and the next 100 pair going to the Touchet River until both goals are met. The minimum number of available pairs needed to justify outplanting has not been determined.

In order to meet Objective 2, a management strategy will be implemented which limits harvest during low natural run years to allow larger numbers of fish to escape into the upper mainstem portion of the subbasin. The harvest rate increases as the natural population level increases and lesser numbers of hatchery fish are needed for spawning escapement. The management intent is to provide some level of harvest during all but the lowest of return years. The Appendix X management table has been developed incorporating hatchery/natural spawning escapement ratios for the upper mainstem and South Fork Walla Walla River and harvest rates at various return levels along with broodstock needs. At the full program level goal of 3,850 returning adults, it is anticipated that 2,400 hatchery origin fish would be available for harvest and outplanting.

In addition to natural spawning escapement needs, a total of 350 adults would be collected in-basin for hatchery broodstock in order to meet Objective 3.To develop a localized broodstock, an emphasis will be placed on collecting a high proportion of the adults returning to the Walla Walla River at Nursery Bridge Dam during the developmental portion of the program. In addition, natural adults will be incorporated into the brood annually at a level of 50% to maintain gene flow into the hatchery program from local, naturally produced adults as well as to counter domestication effects (Campton 2003).

2. Smolt-to-Adult Returns and Rearing Parameters

Rearing densities and loading rates appear to be the most influential hatchery rearing parameters for producing quality spring Chinook smolts and increasing smolt-to-adult return (SAR) ratios (Ewing and Ewing 1995, Banks 1993). High rearing densities may contribute to morphological, physiological, and behavioral anomalies in hatchery-reared juveniles. These anomalies may, at some point in the fish's life history, affect its ability to adapt and succeed. As rearing densities vary, SARs may go up or down in response to them. In regional augmentation hatcheries, standard rearing densities for spring Chinook range from 1.0 -1.5 pounds per cubic foot. The new Cle Elum spring Chinook supplementation hatchery uses lower rearing densities as part of an overall Natural Rearing Enhancement System (NATURES) rearing strategy. The optimal density cited in the facility biological specifications report was a maximum of 0.75 pounds per cubic foot (Hager et al. 1999).

Many variables may affect SARs besides density and loading so that comparing SARs and rearing parameters between facilities may not be valid. However, at an individual facility, it is generally accepted that lower rearing densities and loading rates result in increased relative SARs (Hager et al. 1999, Ewing and Ewing 1995, Banks 1993). The Preferred Alternative is based on a maximum final rearing density of 0.75 pounds per cubic foot (DI = 0.11), a value lower than standard regional rearing densities and identified as an optimal level for spring Chinook supplementation programs (Hager et al. 1999).

Full scale NATURES or semi-natural rearing conditions are not proposed for incorporation into the South Fork Walla Walla Hatchery. This rearing strategy is currently being tested at the Cle Elum spring Chinook supplementation hatchery and early survival data indicates that smolts reared in a conventional manner are performing as well as or better than smolts reared under NATURES conditions (Fast 2003). All juveniles at Cle Elum Hatchery are however reared under low rearing density conditions (0.75 pounds per cubic foot) further substantiating the theory that density may be the most influential hatchery rearing parameter.

3. Action Alternative SARs

With the exception of the Adult Outplanting and No Action alternatives, the other three alternatives are geared toward achieving 100% of the hatchery spring Chinook salmon adult return goal. The fundamental difference among the three juvenile production alternatives are the hatchery production facilities involved.

The SARs used in the alternatives have been projected based on observed survivals for Carson stock production programs in the Umatilla Subbasin and at Ringold Springs Hatchery. A 0.4% SAR has been observed for spring Chinook reared at Umatilla Hatchery. This figure is based on survivals of six brood years (1991-1996) of CWT spring Chinook yearling groups produced at the facility (Rowan 2000). There is not enough historical recovery data from fish produced at Little White Salmon National Fish Hatchery for the Umatilla River to determine an accurate SAR for fish from that facility (the first complete brood year returns from the hatchery did not occur until 2001 and CWT data is still incomplete). Observed SARs of CWT spring Chinook yearling groups from Bonneville Hatchery released in the Umatilla River were approximately 0.5%. This figure is based on the observed survival of eight brood years (1986-1993) of CWT spring Chinook yearling groups produced from that facility (Rowan 2000).

The 0.55% SAR selected for the Preferred Alternative (a new South Fork Walla Walla Hatchery) is a projected figure. This SAR is predicated on the theory that lower rearing densities and loading rates, a temperature profile more suited to spring Chinook salmon rearing, and less stress from transportation than fish reared at Umatilla and Bonneville hatcheries, would result in a higher SAR from this facility than those observed in the Umatilla Program. Although Walla Walla releases must pass one additional pool and dam (McNary) than Umatilla releases, we believe the preferred alternative will compensate for increased juvenile mainstem mortality sufficiently to produce the predicted SAR. Table 6 shows the survival by life stage based on the 0.55% SAR.

Table 6. Walla Walla Spring Chinook Survival Rates at Various Life Stages.

Stage	Survival Rate (%)	Number Remaining	Number Lost	Escapement Equivalent
Release		500,000		
Downstream Dam Passage	0.614	307,000	193,000	1738
Early Ocean Survival	0.020	6,140	300,860	135,454
Ocean Fisheries	0.990	6,079	61	28
Adult Ocean Survival	0.650	3,951	2,128	1,489
Lower River Fishing	0.985	3,892	59	42
Bonneville Dam Passage	0.950	3,697	195	146
Treaty Fishing	0.920	3,401	296	241
Upstream Dam Passage	0.903	3,071	330	268
Escapement	0.900	2,764	307	

An SAR of 0.30 for the other two juvenile production alternatives is based on observed survivals of two brood years (1989 and 1990) of CWT spring Chinook yearling groups released from Ringold Springs Hatchery (Byrne et al. 1997). These were the only two complete brood years of data available from releases at Ringold Springs Hatchery within the same comparative time frame as releases into the Umatilla River from Umatilla and Bonneville hatcheries. While there is general agreement that increased handling increases stress levels and negatively affects survival (Piper et al. 1982, Cuenco et al. 1993, Integrated Hatchery Operations Team 1995), there is little information to determine what the actual numeric reductions in survival would be. Therefore, no adjustment has been made to the SAR value for these two production alternatives to account for the additional handling and transport of fish between stations.

B. Summary of Production Alternatives

Alternative 1 (the preferred alternative) is construction of a full scale hatchery at the existing South Fork Walla Walla Brood Facility; Alternative 2 adds incubation and early rearing capabilities to the South Fork Facility and provides final rearing at an existing hatchery facility; and Alternative 3 uses existing hatchery facilities to produce the entire program. Alternative 4 would utilize adult outplants to restore populations in the subbasin and contains no juvenile production segment. Finally, a No Action Alternative is also presented. Production objectives for alternatives 1-3 are calibrated to a return goal of 2,750 hatchery adults to the subbasin. The number of smolts required at the estimated survival rates to achieve the hatchery adult return goal for the three juvenile production alternatives are presented in Table 7.

Mobrand Biometrics AHA was used to evaluate the production alternatives. Figure 1 outlines the inputs to the model, and Figure 2 depicts some of the corresponding outputs. The modeled scenarios include (from left to right) historic production, production alternatives 2 and 3, the preferred alternative, and the long-term 50yr+ goal for restoring properly function conditions and supporting an integrated hatchery program. Information for the modeling exercise was derived from a variety of sources, and is described in greater detail at http://www.mobrand.com/aha. While the figure displays considerable information that may be familiar to the AHA end user, the most important aspect of the analysis lies in the graph in Figure 2 where the values known as the PNI ratio (the ratio of natural reared broodstock to hatchery reared spawners) are compared. The PNI values for alternatives 1-3 are also included in Table 7. The preferred alternative, indicated by a white circle, is shown to produce an approximately 0.5 PNI ratio, and is therefore considered a well integrated program under the criteria presented by Ford (2002). Alternatives 2 and 3 require more broodstock, result in lower outmigrant performance, and therefore produce a lower PNI (less integrated) value of approximately 0.3. The current interim program (not modeled) is considered to be totally segregated (PNI < 0.1) and may negatively impact natural production via genetic isolation as defined by Ford (2002). The column charts display the expected harvest, habitat, and hatchery distribution of spawners based on the various alternatives.

Table 7. Adult Return Goal for Juvenile Spring Chinook Production by Alternative

Alternative	Juvenile Production	Estimated SAR (%)	Adults Produced	PNI
1	500,000	0.55	2,750	0.5
2,3	917,000	0.30	2,750	0.3

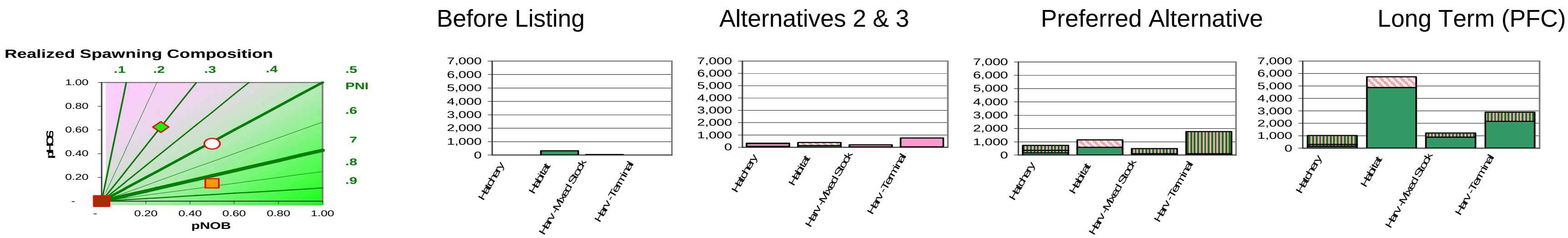
PNI = proportion of natural influence

Figure 1. Input of the Walla Walla spring Chinook All-H-Analyzer model.

Subbasin	Species	Administrator			Management Intent:	harvest thru self sustaining		thru self sustaining population (self		thru self sustaining population (self	
Walla Walla	Spring Chinook				Management Strategy:						
Walla Walla Spring Chinook		Historic		Before Listing		Alternatives 2 & 3		Preferred Alternative		Long-term (PFC)	
Hab	[EDT] Prod. | Capacity	25.09	11,363	4.00	443	5.65	478	5.65	1,162	6.00	8,054
Hab	Min NOR Escape | %Kelt	1		1		100		100		1	
Hab	Smolt Prod. | Capacity	627	284,075	100	11,075	141	11,950	141	29,050	150	201,350
Hydro	SAR [Mar.|Total] Vary? (Y/N)	0.066 0.066	y	0.066 0.040	y	0.070 0.042	y	0.070 0.042	y	0.070 0.047	y
Hydro	Passage Surv [Juv. | Adult]	1.00	1	0.67	0.90	0.67	0.90	0.67	0.90	0.74	0.90
Hydro	Adj. Prod. | Adj. Capacity	41.47	18,781	4.00	443	5.96	504	5.98	1,230	6.99	9,377
Harv	Harv -Mixed Stock	NORs	HORs	0.110		0.110	0.120	0.110	0.120	0.110	0.120
Harv	Harv -Terminal	NORs	HORs			0.120	0.600	0.120	0.600	0.300	0.300
Harv	Total Exploitation Rate	NORs	HORs	0.110		0.22	0.65	0.22	0.65	0.38	0.38
Hatch				pNOB	pHOS	pNOB	pHOS	pNOB	pHOS	pNOB	pHOS
Hatch	Broodstock Composition	pNOB-Goal	pHOS-Goal			20%		50%		50%	
Hatch		pNOB-Realized	pHOS-Realized		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Hatch	Hatchery Type ->		[Int /Seg /None]	Local Import	None	Local Import	None	Local Import	Int	Local Import	Int
Hatch	Broodstock Numbers by Source	Local Imported	Smolt Release		-	650	953,160	350	513,240	310	582,800
Hatch	Brood Exported (from HOR Surplus)	Exported Brood	% Marked								
Hatch	Destination for HOR Returns	% to Hatchery	% to Nat. Spawn		100%	50%	50%	50%	50%	50%	50%

Inputs were developed based on Appendix X and the empirical performance of adjacent Tucannon and Umatilla spring Chinook programs. For details on the model, and references associated with the inputs, the reader is referred to http://www.mobrand.com/aha.

Figure 2. Output of the the Walla Walla spring Chinook All-H-Analyzer model. The PNI graph depicts the realized ratio of hatchery origin spawners to natural origin broodstock based on estimates of performance and planned program objectives. The column charts depict the realized harvest based on the same inputs. For details on the model the reader is referred to http://www.mobrand.com/aha.



	Before Listing Max	Min	Ave	Alternatives 2 & 3 Max	Min	Ave	Preferred Alternative Max	Min	Ave	Long Term (PFC) Max	Min	Ave
NOR Escapement	1,189	158	316	706	100	144	2,788	218	593	18,794	2,494	4,887
Total Natural Escapement	1,189	158	316	1,638	144	384	4,862	534	1,146	22,009	2,985	5,746
Total Harvest	147	20	39	3,664	205	946	8,459	1,228	2,252	15,476	2,215	4,122
Hatchery Broodstock	-	-	-	650	8	290	350	350	350	310	310	310
Surplus at Hatchery	-	-	-	412	0	28	1,901	126	380	3,062	311	704
Total Runsize	1,336	177	355	6,364	415	1,648	15,572	2,275	4,128	40,857	5,847	10,882

1. General Features of the Alternatives

The following proposed measures apply to all three of the juvenile production alternatives:

- Utilize Carson stock spring Chinook as the founder broodstock
- In the near term collect broodstock at the Three Mile Dam collection facility (or other Carson stock stations). Longer term, collect brood at the Nursery Bridge Dam ladder trap.
- Hold and spawn broodstock at the South Fork Walla Walla Hatchery.
- Rear juveniles to a yearling smolt stage.
- Releases would occur in April at 10 fish per pound (fpp).
- Utilize a portion of returning hatchery adults for outplanting in Mill Creek and the Touchet River.

2. Preferred Alternative: Full Production at South Fork Facility

Under the Preferred Alternative, a full scale hatchery including incubation, early rearing, and final rearing capabilities would be constructed at the site of the existing South Fork Walla Walla Brood Facility. This hatchery would produce 500,000 juvenile spring Chinook salmon to be released into the South Fork Walla Walla River. Following is a more detailed discussion of the strategies and procedures associated with the various aspects of the Preferred Alternative.

The ISAB (2003) presented recommendations for the development of integrated hatchery programs such as the preferred alternative. This alternative was, simply put, crafted in part due to increased concern regarding the risk that supplementation may pose to programmatic sustainability. While the extent of this risk remains uncertain, the nature of risk has been clearly stated. The preferred alternative represents a comprehensive, holistic, programmatic response to potential risks as is described in greater detail below in section VI. RISK/BENEFIT ANALYSIS.

Broodstock Selection and Acquisition Strategies

Carson stock spring Chinook salmon would be selected as the WWHMP founder stock. This stock is an amalgam of several mid-Columbia River stocks and has been used in similar programs in the Columbia Basin including the neighboring Umatilla Hatchery Program with varying degrees of success. It is also the stock currently being used in the adult outplanting program in the subbasin and is the only spring Chinook stock readily available for use in a large scale hatchery program. No local endemic stocks are available as a founder broodstock for this program. Spring Chinook have been extirpated from the basin for nearly 75 years. Neighboring subbasins with endemic populations include the Tucannon, Grande Ronde, and John Day rivers. Populations in the Tucannon and Grande Ronde subbasins are listed as Threatened under the ESA and are not at a level where they could provide brood for another subbasin. The population in the John Day River is not listed under the ESA but management goals for that subbasin preclude its use long term as a founder stock for the Walla Walla Subbasin.

For the near term, three potential Carson stock sources have been identified for broodstock: 1) adults returning to Threemile Dam on the Umatilla River; 2) natural adults returning to the Walla Walla River from the adult outplanting program; and 3) hatchery adults returning to the Walla Walla River from the interim smolt release program. The near term priority would be to utilize adults returning to the Walla Walla River for brood to expedite development of a localized Carson stock. If adults from the Umatilla River are collected, only identifiable hatchery fish would be used, and no natural origin Umatilla adults would be transferred to the Walla Walla. The longer term goal is to collect all brood at Nursery Bridge Dam from adults returning to the Walla Walla River. All broodstock will be held at the South Fork Walla Walla Hatchery. In low-run years, broodstock or eggs for the WWHMP may be supplemented with adults returning to other Carson stock stations.

Production objectives would require collecting 350 adults for broodstock. Fish would be collected throughout the run to provide a representative cross section of the return. During the early stages of the program a high proportion of the adults returning to the Walla Walla River will be collected for brood expediting the development of a localized source. It is anticipated that the brood goal would be met entirely from the Walla Walla Basin whenever hatchery adult returns reach 500 fish. In years where the hatchery return is less than 500 fish the broodstock will be supplemented with fish or eggs from other Carson stock stations. Jacks would be incorporated into the broodstock at a rate of one for every ten adult males by origin.

Once the full broodstock component is being collected from the Walla Walla Basin, the goal is to have a broodstock composition of 50% hatchery adults (175 fish) and 50% natural origin adults (175 fish). The infusion of 50% natural adults into the brood produces an AHA Model PNI value of approximately 0.5 which is he level recommended for integrated hatchery programs. In order to maximize the number of natural adults in the spawning escapement composition, a maximum of 20% of the natural population will be incorporated in the brood. Implementation of the 20% limit would require a return of 900 natural adults to fully meet the 50% natural brood goal. Natural adults would be incorporated into the broodstock at lower percentages in lower natural return years. The goal of the broodstock program and the intent of these criteria are to minimize the number of natural origin fish removed from the natural spawning population while still maintaining an integrated program.

Spawning, Incubation, and Rearing Procedures and Strategies

Beginning in mid-August, fish would be sorted and spawned once per week by CTUIR personnel. A spawning ratio of 1:1 would be used whenever possible. No natural by natural crosses will be used; each natural fish will be crossed with a hatchery fish to maximize gene flow into the hatchery program. Following fertilization, eggs from four females would be pooled to form a single-family group. In cases where there is a shortage of males, milt from two or three males would be pooled before fertilizing individual females. Eggs would then be water-hardened in iodophor at 75 parts per million and incubated on-station.

The Preferred Alternative calls for production of 500,000 yearling smolts at a size of 10 fpp annually. This size corresponds with that of the neighboring Umatilla program. Production would be reared at a maximum final density of 0.75 pounds per cubic foot (DI = 0.11) and a loading rate of 3.75 pounds per gpm (FI = 0.54). This would require a minimum of 19 raceways (at 3,500 cubic feet per raceway) with a flow of 670 gpm each. To provide for logistical flexibility within the facility it is recommended that 20 raceways be constructed. This would require a total flow of 13,400gpm or 30cfs. All spawning, incubation, and rearing would occur at the South Fork Walla Walla Hatchery. Adult holding, spawning, incubation, rearing and release procedures will follow established Integrated Hatchery Operations Team (IHOT) guidelines (1995).

Release Strategies and Procedures

Under the Preferred Alternative, the initial strategy is to release all 500,000 yearling smolts directly from the facility into the South Fork Walla Walla River. These fish would be allowed to migrate volitionally from the hatchery for a period of three to four weeks prior to being forced out at the end of April. No acclimation facilities would be required as the hatchery facility would utilize surface water for rearing and is located within the primary natural production area of the South Fork Walla Walla River. Long-term, a portion of the production may be shifted to Mill Creek and/or the Touchet River.

Natural Production Strategies

An emphasis will be placed on escaping natural origin adults to spawn in an attempt to accelerate the restoration of natural spawning populations. All hatchery produced juveniles will be marked in order to differentiate between hatchery and natural origin fish. Differentiation will allow implementation of an overall management strategy for broodstock collection, spawning escapement, and harvest which emphasizes escapement of a high PNI fish into the upper mainstem Walla Walla River and South Fork.

This strategy includes a goal of integrating 50% natural origin fish into the brood while limiting the number of natural fish removed from the stream. A maximum of 20% of the natural origin return will be incorporated in the broodstock. The 100% mark rate will also allow for management of hatchery/natural fish ratios on the spawning grounds and would provide non-tribal fishery opportunities which focus on harvesting hatchery origin adults while letting natural origin adults escape for spawning. In addition, differentiation provides the ability to identify hatchery adults available for outplanting into Mill Creek and the Touchet River while allowing naturally produced adults to escape into the upper mainstem area.

Hatchery/natural escapement ratios and harvest rates will be adjusted as the program develops based on the model presented in Appendix X. Initially, a high percentage of hatchery fish will be allowed to escape for natural spawning augmentation. As the natural population increases, the ratio of hatchery fish in the spawning population will be reduced in order to maximize the percentage of natural fish spawning. Similarly, harvest rates will be set low initially allowing higher numbers of hatchery fish to escape to spawn and seed the habitat. Rates will be increased as the number of natural fish increase and fewer hatchery adults are needed for natural spawning augmentation or for outplanting.

Monitoring and Evaluation Strategy

Natural production monitoring and evaluation of Walla Walla Hatchery Program fish would be conducted by the existing CTUIR Walla Walla Basin Natural Production Monitoring and Evaluation Project (WWBNPME). Evaluation of in-hatchery survival rates will occur under the Umatilla Hatchery Satellite Facilities Operation and Maintenance Project (UHSFOM) in conjunction with WWBNPME. Annual returns will be monitored by the WWBNPME, Walla Walla Fish Passage Operations (WWFPO) project, the Corps, and Washington Department of Fish and Wildlife (WDFW). An outline of the monitoring and evaluation plan is presented in Section IV and Appendix X describes the various Chinook performance metrics that will be monitored.

All juveniles released under this program will receive a Visual Implant Elastomer (VIE) for external identification. In addition, 10% of the production group will also have a CWT implanted and receive a ventral clip in order to assess program performance. There will also be 13,500 hatchery origin and 5,000 naturally produced juveniles (3,000 upper mainstem/South Fork, 1,000 Mill Creek, and 1,000 Touchet River) which will be implanted with Passive Integrated Transponder (PIT) tags to monitor outmigration patterns and survival.

Research Strategy

While the Walla Walla Hatchery is not proposed as a research facility, programmatically the WWHMP offers a unique opportunity for basic research into the potential of progressive integrated programs, and the ability of progressive programs to support genetic, behavioral, and morphological diversity. The research strategy for the WW Hatchery Program will center around population status monitoring and the assessment and monitoring of behavioral, genetic, and morphological traits for Walla Walla, Umatilla, Tucannon, Grande Ronde and John Day spring Chinook. Performance comparisons will be made between these various populations and their associated hatchery actions. Data will be analyzed using a variety of performance metrics to evaluate the performance of the WWHMP to nurture allelic diversity, morphological metrics (including growth rates, size, fecundity, egg size, etc.), and behavioral performance (including run timing, outmigrant behavior, and spawner distribution) in comparison to these other programs and populations. In addition in-basin comparisons of smolt and adult outplanting strategies will be conducted at the watershed level. As a reintroduction program the WWHMP presents an opportunity to evaluate hatchery performance from “ground zero” without risk to endemic stocks or bias associated with past performance.

Administrative Strategy

The overall WWHMP strategy would integrate broodstock acquisition, harvest augmentation, supplementation of natural populations, and monitoring and evaluation into a single program making information sharing and adaptive management more efficient. CTUIR will manage and operate the South Fork Walla Walla Hatchery. Hatchery operations are anticipated to be incorporated under the existing UHSFOM project. Research, monitoring and evaluation, and broodstock collection activities will be integrated into existing projects within the subbasin. Incorporation of these increased activities associated with implementation of the hatchery program within existing projects will require additional funding for those projects but will be more cost effective than initiating new projects.

Annual disposition of returning adults will be coordinated amongst the co-managers utilizing the management table presented in Appendix X. Annual forecasts of both hatchery and natural returns will be made and used in conjunction with the management table to determine yearly objectives for harvest, natural escapement, outplanting, and broodstock. This information would then be incorporated into a Walla Walla Subbasin Annual Operating Plan (AOP).

3. Alternative Two: Partial Production at South Fork Facility

Under this alternative, only incubation and early rearing capabilities would be constructed at the site of the existing South Fork Walla Walla Brood Facility. Final rearing under this alternative would occur at Ringold Springs Hatchery. Fry would be transported to Ringold Springs and full term smolts would be transported back from Ringold Springs and released into the South Fork Walla Walla River. The earthen final rearing pond at Ringold Springs Hatchery would need to be upgraded and modified so that juveniles could be collected for transport and juvenile acclimation facilities would need to be constructed at the South Fork Walla Walla satellite facility. Due to lower observed survival rates from historical releases at Ringold Springs Hatchery than that of the projected SAR used for the Preferred Alternative, this alternative would require production of 917,000 yearling smolts in order to meet the identified spring Chinook adult return goals.

4. Alternative Three: Full Production at Existing Facilities

Under this alternative, no production facilities would be added to the South Fork Walla Walla Brood Facility. Incubation and early rearing would occur at Little White Salmon National Fish Hatchery. Parr would be transferred from Little White to Ringold Springs at 100/pound for final rearing. Full term smolts would be transported from Ringold Springs and released into the South Fork Walla Walla River. The earthen final rearing pond at Ringold Springs Hatchery would need to be upgraded and modified so that juveniles can be collected for transport and juvenile acclimation facilities would need to be constructed at the South Fork Walla Walla satellite facility. Due to lower observed survival rates from historical releases at Ringold Springs Hatchery than that of the projected SAR used for the Preferred Alternative, this alternative would require production of 917,000 yearling smolts in order to meet the identified spring Chinook adult return goals.

5. Alternative Four: Adult Outplanting Program - No Juvenile Production

This alternative would be a reinitiation of the adult outplanting program with 500,000 yearling spring Chinook smolts being released at Ringold Springs Hatchery and returning adults being transported to the Walla Walla Subbasin for outplanting. Similar to Alternative 3, incubation and early rearing would occur at Little White Salmon National Fish Hatchery. Parr would be transferred from Little White to Ringold Springs at 100/lb for final rearing.

At a SAR of 0.30%, there would be up to 1,500 adults returning to Ringold Springs Hatchery. These adults would be captured, transported to the South Fork Walla Walla Brood Facility for summer holding and outplanted into natural production areas within the Walla Walla Subbasin just prior to spawning. Of the 1,500 available adults, 1,000 would be outplanted into the South Fork, 300 into the Touchet River and 200 into Mill Creek. No in-basin smolt production program would be pursued under this alternative. This alternative would preclude co-managers from meeting the subbasin goals for harvest in the foreseeable future. This alternative would require no capital outlays for construction of new facilities, however annual costs associated with adult transport would increase.

6. Alternative Five: No Action

Under the No Action Alternative, no artificial propagation activities would occur and no long term source of spring Chinook production would be available for the Walla Walla River. The No Action Alternative would prevent co-managers from meeting any of the subbasin goals for spring Chinook outlined in the Walla Walla Subbasin Summary (Confederated Tribes of the Umatilla Indian Reservation 2001). The No Action Alternative would require no capital outlays for construction of new facilities and costs associated with new production would not be incurred.

C. Rationale for Preferred Alternative

1. Biological Rationale

The rationale for action is presented in Section II.C. The proposed juvenile release goal is the same as that outlined in the Walla Walla Subbasin Summary (Confederated Tribes of the Umatilla Indian Reservation 2001). The adult goal is 250 fish higher than that listed in the Subbasin Summary due to a change in projected SAR. The Preferred Alternative was specifically developed to meet this goal. No natural origin adult return goals from the outplanting component have been developed for Mill Creek or the Touchet River.

It is generally accepted within the artificial propagation community that increased handling, including transportation, leads to elevated stress levels (Piper et al. 1982, Integrated Hatchery Operations Team 1995) and a reduction in survival rates. Multiple transfers of fish also amplify the risks involved with the program as well as increase annual operating costs. The Preferred Alternative minimizes handling and transfer of fish by maintaining them within one facility through their entire juvenile life history.

Exposure to disease is amplified when rearing occurs in multiple facilities and water sources. There is also an increased risk of importing disease into the subject basin. One passive disease management technique recommended by IHOT (1995) is to restrict fish transfers. In addition, rearing on natal water has been recommended in numerous documents (Cuenco et al. 1993, Integrated Hatchery Operations Team 1995, Brannon et al. 1999) as the preferred rearing strategy. Juveniles reared under natal water conditions are better suited to their environment after release. This has been theorized to increase survival rates and reduce the risk of straying by imprinting juveniles throughout their life history (Cuenco et al. 1993, Brannon et al. 1999).

The proposed juvenile production objectives are based on observed and projected SAR rates. The release of higher numbers of juveniles associated with alternatives two and three (relative to the Preferred Alternative) may intensify density-dependent impacts on natural spring Chinook salmon populations and other indigenous species. Also, larger production numbers would require additional broodstock to be collected. This would either lessen the number of adults available for other program objectives or require further increases in production to fulfill program goals. Larger production numbers also increase annual operational costs such as feed, disease treatments, and marking.

The relative cost of the three proposed juvenile alternatives is one factor in deciding the preferred alternative. However, a more important factor is fish quality which guides the rationale for the Preferred Alternative. WWHMP co-managers advocate that achieving numerical goals is important, but that the overall regional goal of salmon recovery is also predicated on healthy fish and fish populations. Producing fish through a program that rears fish in natal waters, minimizes handling and stress, and reduces disease exposure provides the best opportunity to create healthy populations with the best chance for survival and successful restoration.

Alternatives 4 and 5 do not provide adequate options for meeting the established adult return goals. Alternative 4 may provide enough adults to meet the natural spawning escapement goals. While this would provide progress towards reestablishment of natural spawning populations in the subbasin, it would not provide any fish for meeting the identified harvest goals. The No Action Alternative provides no opportunity to meet any of the proposed program goals.

2. Fiscal Rationale

The utilization of existing hatchery facilities to produce all or part of the program as proposed under alternatives 2, 3, and 4 would result in direct capital cost savings over the construction of a full production facility as proposed in the Preferred Alternative. However, a major capital investment in the large rearing pond would need to be made at Ringold Springs Hatchery to make either Alternative 2 or 3 feasible and an acclimation facility would need to be constructed. The smaller number of fish produced under the Preferred Alternative would result in lower capital costs for incubation and early rearing facilities than would be needed under Alternative 2. Juvenile production costs for the Preferred Alternative would also be lower than alternatives 2 and 3 due to reduced annual operational costs associated with a lower production level (i.e. feed, medication, marking, transportation).

Alternative 4 would not require any capital facility investments and operational costs would be lower than the other smolt production alternatives. However, there would be indirect costs associated with lack of harvest opportunity including loss of licensing revenues, lost revenues for tourism and recreation, and lost ceremonial and subsistence use of the fish to Tribal peoples. While no facilities would need to be built and no long-term operational costs would be incurred under the No Action Alternative the actual cost would be would be high, both directly and indirectly. The inability to provide production to restore spring Chinook populations in the Walla Walla Subbasin would result not only in the loss of revenues and use related to harvest but also in potential costs of litigation and increased costs of restoring runs later, should that be mandated.

3. Legal Rationale

The Treaty of 1855 between the United States and the Walla Walla, Cayuse, and Umatilla Indian Tribes provides the basis for CTUIR co-management of fisheries resources in off reservation areas. In exchange for 6.4 million acres of land in northeastern Oregon and southeastern Washington ceded to the Federal government, the Treaty provided to CTUIR a parcel of land for a reservation and reserved Tribal rights to fish, hunt, and gather traditional foods throughout the ceded lands and other locations where these usual and accustomed activities took place.

The Walla Walla River is within the ceded land area and was a usual and accustomed fishing location for spring Chinook by Tribal members. However, due to extirpation of spring Chinook in the Walla Walla River in the early 20th century, CTUIR has been unable to fulfill its Treaty-reserved fishing rights in the subbasin. Construction of the hatchery and subsequent reestablishment of spring Chinook in the subbasin as proposed under the WWHMP will once again provide CTUIR the opportunity for spring Chinook ceremonial and subsistence fisheries in the Walla Walla River.

The CTUIR Columbia Basin Salmon Policy (1995) states:

> "it is the policy of the Confederated Tribes of the Umatilla Indian Reservation that the health of the Columbia Basin and Pacific Ocean be restored, and that all salmon and other native fish species be restored to the same population levels and to all rivers in which they lived prior to the Treaty of 1855".

This is a long term goal as it may not be realistic to restore populations to former abundance at this time. However, implementation of this plan, along with the numerous other water and habitat accomplishments in the Walla Walla Basin will provide for salmon restoration back to this location.

Other excerpts from the CTUIR Salmon Policy which are consistent with this plan include:

- Currently extinct spring Chinook must be re-established in the Walla Walla River.
- Install adequate supplementation facilities in the upstream portions of the Columbia Basin to assist in the restoration of the salmon to their traditional habitat and to supply our Tribal fisheries.
- Use supplementation as a tool to rebuild the salmon runs to the levels protected under the Treaty of 1855 and to restore our Treaty fishery as quickly as possible.

- The Federal and State "concrete to concrete" hatchery practices must be replaced with a restoration-based "gravel-to-gravel" use of supplementation.

IV. MONITORING AND EVALUATION

A. Previous and Ongoing Monitoring and Evaluation Activities

In general the purpose of salmonid monitoring activities is to quantify life-cycle status and trends, and the various forcing functions (e.g. environmental conditions, habitat availability, etc.) that impact status and trends. The goals of analysis and evaluation activities are to describe these metrics, to draw clear correlative or cause-effect relationships between status/trends & forcing functions, and to make technical recommendations regarding these relationships. As a whole the monitoring and evaluation process is quite complex, especially in the context of numerous management actions such as hatchery releases. For the past five years spring Chinook have been monitored in the Walla Walla Subbasin by CTUIR as part of three currently existing projects. The UHSFOM project (BPA project #8343500) has monitored the holding and release of adult outplants. The WWFPO - a cooperative project between CTUIR and Oregon Department of Fish and Wildlife [ODFW] - BPA project #200020139) has monitored adult returns at Nursery Bridge Dam and a variety of juvenile passage projects at diversions and fish screens. The WWBNPME project (BPA #200003900) has monitored a variety of population status/trend and forcing function metrics in cooperation with the WDFW, FWS, ODFW, the Walla Walla Basin Watershed Council, Tri-State Steelheaders, and a number of other local and regional collaborators.

During the recent subbasin planning process an extensive data compilation, analysis, and dissemination effort was undertaken to determine limiting factors, restoration/protection priorities, and the potential for fish restoration in the Walla Walla Subbasin. The principle tool for fish analysis used in subbasin planning was the EDT Model. The Walla Walla EDT analysis made clear three relevant conclusions based principally on previous and ongoing monitoring and evaluation activities relevant to spring Chinook:

1) Walla Walla spring Chinook remain severely habitat and hydrosystem limited in the Walla Walla
2) Continued habitat, flow, and passage restoration activities will improve Walla Walla spring Chinook natural production, but will not achieve Fish and Wildlife Program goals and objectives
3) While considerable data are available, additional monitoring and evaluation will be required to detect progress in the Walla Walla and inform management

An extensive description and discussion regarding past and ongoing Walla Walla monitoring and evaluation activities is included in the subbasin plan which is available online from http://www.nwcouncil.org/.

B. Monitoring and Evaluation Oversight

There is extensive review, oversight and coordination of the projects currently monitoring and evaluating the natural production of spring Chinook from the adult outplanting program in the Walla Walla Subbasin. This will expand to include monitoring and evaluation of the hatchery program after it is implemented. Each project is reviewed annually through many different processes that include various agencies, councils, committees and forums. Proposed work is reviewed by the sponsoring agency and examined by the Research, Monitoring and Evaluation subcommittee of the Walla Walla Basin Technical Work Group. The Walla Walla Basin Technical Work Group meets as needed to coordinate ongoing and future fisheries restoration activities in the basin. Monitoring and evaluation requirements will also be identified and coordinated during the development of the subbasin AOP. Research proposals are then submitted to BPA for additional review and passed on for examination and prioritization by regional fish and wildlife managers. Proposals are reviewed again by the ISRP and the NPPC.

The recommended oversight for monitoring and evaluation is as follows: At the hatchery, UHSFOM (BPA project #8343500) personnel would conduct and record information on general hatchery practices such as sorting, spawning, incubating, ponding, feeding, fish health monitoring and release of spring Chinook. This project would also monitor influent and effluent water parameters such as temperature, flow, dissolved oxygen, ozone, suspended solids, pH, nitrogen etc. This project would coordinate the marking program including fin clipping, CWT and VIE tagging for production evaluations. It is anticipated that ODFW would provide pathology services for the new hatchery.

The WWFPO (BPA project #200020139) would monitor adult returns at Nursery Bridge Dam. In addition, this project will be responsible for the collection and transportation of broodstock for the program from either Three Mile Dam or Nursery Bridge Dam. The WWFPO will also continue to monitor passage facilities to ensure they are operating within criteria and enable the successful passage of adult and juvenile salmon and steelhead. The WWBNPME (BPA project #200020127) is involved in collaborative research, monitoring, and evaluation to document and explain status and trends in salmonid production, productivity, and capacity in the Walla Walla Basin. Appendix Y lists the performance metrics currently being evaluated in the Walla Walla, along with the cooperating entities involved in that work. WWBNPME will continue to monitor Tribal harvest, natural spawning, natural rearing, smolt outmigration, species interactions, upstream passage, and adult returns as well as analyze hatchery adult return data. Sport/non-tribal harvest of returning adults will be monitored by ODFW and WDFW. It is anticipated that adult returns to the Dayton weir and Mill Creek Dam will continue to be monitored by WDFW and the Corps, respectively.

As stated previously, increased activities resulting from the hatchery program will require additional funding as well as collaboration between WDFW, the Corps, and CTUIR to monitor spring Chinook returns at these sites. Monitoring of spring Chinook populations in the Umatilla, Tucannon, Grande Ronde, and John Day subbasins will be a collaborative effort between WWBNPME, ODFW, WDFW, and other CTUIR projects. The co-managers have drafted a comprehensive salmonid monitoring and evaluation plan for the subbasin which is under review by NPCC, IRSP, and ISAB. A draft of that plan has been submitted as Appendix AD3 of the Walla Walla Subbasin Plan (Walla Walla County and the Walla Walla Basin Watershed Council, 2004). In addition, all monitoring and evaluation activities are also reviewed through formal permit processes by the FWS and National Marine Fisheries Service (NMFS) to ensure project activities are not deleterious to endangered species. Upon initiation of the WWHMP, the co-managers will develop a comprehensive hatchery research, monitoring, and evaluation plan, and will submit this product to peer review within and outside of the NPPC program.

C. Monitoring and Evaluation Activities Associated with the Hatchery Program

The WWHMP was developed as a component of variable spring Chinook hatchery management approaches in NE Oregon and SE Washington. The preferred alternative represents the most adaptive suite of actions, and one that most augments the regional and system-wide hatchery experiment recommended by ISAB (2003). At the watershed scale the Walla Walla Subbasin will receive two experimental treatments: smolt releases in the Walla Walla River and adult outplants in the Touchet and Mill Creek watersheds. Regionally the WWHMP represents a new and progressive treatment in a series of mixed hatchery treatments co-sponsored by CTUIR. Table 8 lists the range of spring Chinook hatchery treatments within the CTUIR ceded lands area that will allow co-managers to evaluate the effectiveness of various strategies in restoring both ESA listed and locally extirpated stocks.

Table 8. Spring Chinook Hatchery Treatments in CTUIR-Ceded Lands.

Subbasin	Tributary	Treatment
Walla Walla	Walla Walla River	Smolt releases
	Mill Creek	Adult outplants
Umatilla	Umatilla River	Conventional smolt releases
John Day	John Day River	Natural production only
Tucannon	Tucannon River	Captive brood

Subbasin	Tributary	Treatment
		Conventional smolt releases
Grande Ronde	Upper Grande Ronde	Captive brood
		Conventional smolt releases
	Catherine Creek	Captive brood
		Conventional smolt releases
	Lookinglass Creek	Adult outplants
		Conventional smolt releases

1. Critical Uncertainties

Figure 3 illustrates the various life-cycle status/trend and forcing function information needed for Walla Walla monitoring and evaluation. The solid lines represent information that is already being collected on an ongoing basis. In general the WWHMP critical uncertainties relate to the relationships portrayed by the black dashed lines in the figure: impacts of hatchery releases on ecological/habitat conditions, the benefits to harvest, and the impacts on production at various life stages.

Critical uncertainties regarding the production and restoration of spring Chinook salmon in the Walla Walla Subbasin are organized into hatchery and natural production related questions, although some tasks and objectives will deal with both hatchery and naturally produced salmon. Many of these critical uncertainties are already being addressed by ongoing projects and programs. These uncertainties were developed based in part on monitoring and evaluation, and operational recommendations from the ISAB (2003). Table 9 lists the specific recommendations, null and alternative hypotheses that will be tested by the program, the corresponding critical uncertainties, and the lead projects responsible for the monitoring and evaluation activities. Each uncertainty and recommendation presented by ISAB will be addressed by the monitoring and evaluation program. However, the specific recommendations of ISAB for hatchery operations have not all been adopted. The WWHMP is one of several hatchery programs developed to address the uncertainties presented by ISAB in the Columbia Basin. This system-wide experiment will be used to evaluate the sustainability and effectiveness of different hatchery programs in a series of testable null and alternative hypotheses. The WWHMP is an integral component of the system-wide hatchery experiment, and represents an opportunity to test the importance and efficacy of particular recommendations such as the development of mixed-origin broodstock free from domestication effects. The adoption and modification of specific recommendations is discussed in detail below.

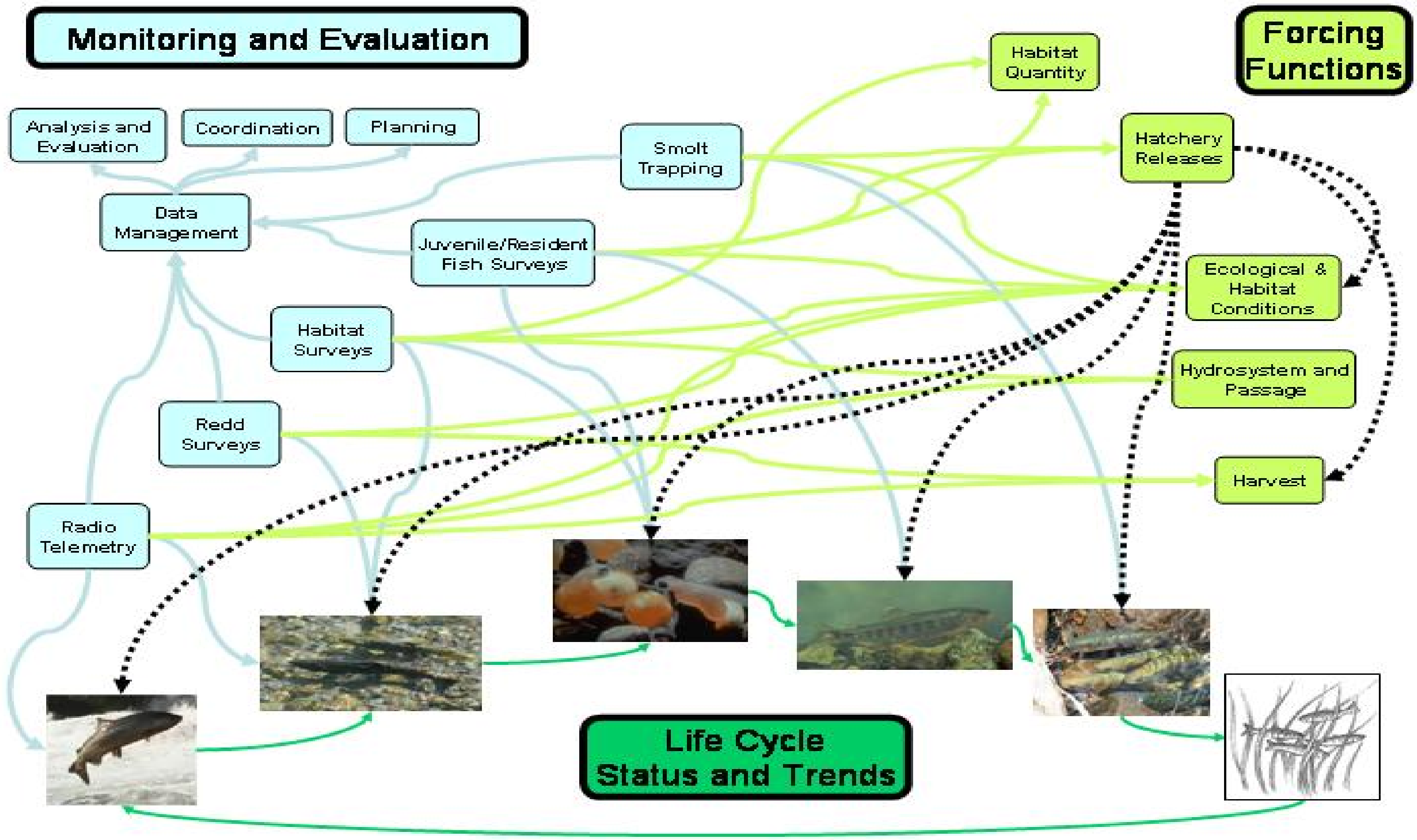


Figure 3. Spring Chinook life cycle, environmental forcing functions, and the corresponding monitoring and evaluation activities. The Walla Walla hatchery monitoring and evaluation program will focus on the relationships illustrated by the black dashed lines.

Specific Critical Uncertainties:

Hatchery Effectiveness Uncertainties

1) Will hatchery spawning, hatching and rearing practices produce smolts at the desired quality, size, and number?
2) Will hatchery-reared spring Chinook smolts successfully migrate out of the Walla Walla Subbasin and return as adults at the desired survival rates?
3) What will the stray rates be for returning program spring Chinook adults reared at the South Fork Walla Walla Hatchery?
4) Will a mixed-origin 50/50 natural/hatchery broodstock composition result in domestication effects; e.g. genetic drift, reduced fecundity, reduced size, etc?
5) Will adult outplanting, juvenile release, or mixed strategies result in better adult-to-adult survival in the Walla Walla?

Natural Production Uncertainties

6) What is the natural production capacity and productivity of spring Chinook salmon in the Walla Walla Subbasin?
7) Will hatchery smolt releases result in increased natural production of spring Chinook?
8) Do large releases of hatchery reared Chinook salmon negatively impact endemic steelhead and resident trout populations in the Walla Walla Subbasin?
9) Will large releases of hatchery reared Chinook salmon in the Walla Walla Subbasin negatively impact neighboring salmon populations (i.e., Tucannon)?
10) Will hatchery strategies produce sustainable genetic characteristics in the reintroduced naturally-spawning population?
11) Will broodstock, escapement, and harvest management strategies employed in the Walla Walla Basin result in a more rapid establishment of natural spawning populations than in the neighboring Umatilla Basin?
12) Will an adult outplanting or juvenile release strategy be more effective for reestablishment of natural spawning populations?
13) How will ongoing flow, passage, and habitat restoration activities impact survival and productivity of reintroduced naturally spawning populations, including hatchery origin natural spawners?
14) Which of the hatchery actions being implemented in the Walla Walla, Tucannon, John Day, Grande Ronde, and Umatilla will result in the most effective restoration of natural populations?

Table 9. ISAB Assumptions

ISAB Recommendation (Taken directly from ISAB, 2003, page 111)	WWHMP Hypothesis	Critical Uncertainty	Lead Project
1. Only natural-origin adults should be used as broodstock in each generation of hatchery supplementation operations. This restriction will reduce the potential for domestication selection and create motivation to implement habitat improvements that will increase the abundance of the natural-origin adults.	Alternative Hypothesis Ha1: A 50/50 hatchery/natural composition is sufficient to minimize domestication effects,	4, 7, 10, and 11	WWBNP ME
2. Performance standards for natural-origin and	Null Hypothesis Ho1:	All	shared

ISAB Recommendation (Taken directly from ISAB, 2003, page 111)	WWHMP Hypothesis	Critical Uncertainty	Lead Project
hatchery-origin adult abundance and per capita production rates should be established for each project.	Performance standards detailed in Table 9 are sufficient to quantify and evaluate the performance of the WWHMP.		
3. To reduce uncertainty and to contain the risk of long-term impacts, all supplementation programs should be conducted within an explicit experimental design that is accepted by all affected parties.	Null Hypothesis Ho2: A stratified supplementation experiment has sufficient impact, in the context of environmental, hydrosystem, and harvest variability, to have a statistically significant impact on harvest and natural production.	All	shared
That design should contain: a. Limits to the proportion of the adult natural population that can be collected as broodstock. Those limits should reflect a balance between maintaining a reasonable population in the wild and collecting sufficient adults to minimize genetic drift.	Null Hypothesis Ho3 50/50 hatchery/natural composition is sufficient to minimize or eliminate domestication.	4, 7, 10, and 11	WWFPO
b. Allowance for the numerical abundance of hatchery smolt releases to vary with environmental changes and juvenile production in the natural population. When natural abundance is limited, recommendation 3(a) protects the natural population, but when productivity increases, the numbers of hatchery-origin smolts released (combined with the number of natural-origin smolts) should be based on the carrying capacity of the natural environment. Part of the carrying capacity calculation should include an escapement goal. Each year the program should try to reach as large a fraction of that escapement goal as possible with natural-origin adults.	Alternative Hypothesis Ha2: The smolt carrying capacity of the Walla Walla River habitat is greater than the relative fry/parr capacity, and sufficient to sustain the proposed smolt releases.	2, 5, 6, 7, and 8	WWBNPME
c. Operational guidelines and performance standards that respond to changes in the ratio of natural-origin and hatchery-origin adult abundance. For example, the proportion of hatchery-origin adults permitted to spawn with natural-origin adults should be established as part of the experimental design and should be regulated so as not to exceed a specified level in each treatment. The treatments should represent a spectrum of values for that ratio from zero to 50%. A set of supplementation experiments should then test different limits.	Alternative Hypothesis Ha3: Effectively integrated and appropriately sized hatchery programs (e.g.50/50 hatchery/natural broodstock etc.) do not require year-to-year modifications of smolt releases to nurture natural production.	All	WWBNPME
d. Commitment to a specified monitoring and assessment program that includes an un-supplemented reference population(s) evaluated in parallel with each of the supplemented populations. Monitoring requires measuring the adult-to-adult return rate for natural spawning of hatchery origin fish and for natural-origin fish in the supplemented treatment, and for natural-origin fish in the un-supplemented control.	Null Hypothesis Ho4: The Walla Walla, Mill Creek, and Touchet River treatments are sufficiently stratified using Releve' criteria to evaluate hatchery program effectiveness.	All	Shared

ISAB Recommendation (Taken directly from ISAB, 2003, page 111)	WWHMP Hypothesis	Critical Uncertainty	Lead Project
e. A schedule of annual reporting that ensures that the data collected are being analyzed, reviewed, and utilized on a timely basis. We recommend that all the basin supplementation programs be required to adopt annual reporting in a standardized format that provides at minimum the details presented in Table 6.1 (page 60 of independent Scientific Advisory Board 2003).	Null Hypothesis Ho5: The metrics outlined in this master plan are sufficient to inform the salmonid management community.	All	Shared
4. For ongoing supplementation programs to be continued or new supplementation programs to be initiated, it is imperative that requisite reference populations be established and that adequate levels of monitoring and evaluation be included as part of the basinwide adaptive management experiment. Adequate controls should be streams that as far as is known are interchangeable with the treatment. When such pairs are identified, the assignment of one to the treatment and one to the control should be random to eliminate any systematic bias resulting from unavoidable differences.	Null Hypothesis Ho4: The Walla Walla, Mill Creek, and Touchet River treatments are sufficiently stratified using Releve' criteria to evaluate hatchery program effectiveness.	All	Shared
5. Program plans must contain an objective means to assess when supplementation should be terminated (due to either success or failure) and should commit to a decision rule to do so.	Alternative Hypothesis Ha4: The WWHMP preferred alternative is sustainable and necessary for attaining Fish and Wildlife Program Objectives.	All	Shared
6. Multiple supplementation projects should be coordinated across the Columbia River Basin so that in aggregate they constitute a basinwide adaptive management experiment, maximizing the information collected and attempting to reduce uncertainty. For ongoing supplementation programs to contribute to the experiment, adequate monitoring needs to be instituted, and reference populations need to be designated or established.	Alternative Hypothesis Ha5: The Walla Walla River integrated smolt releases will out perform adult outplants in the Mill Creek and Touchet Rivers. Alternative Hypothesis Ha6: The Walla Walla integrated hatchery program will outperform conventional, natural production, and captive brood programs in the region.	5	WWBNP ME
7. The Fish and Wildlife Program should include mechanisms to ensure that supplementation projects are collecting the data necessary to test their effectiveness. Project analysis and reporting should be required. Regional (basinwide) coordination and responsibility for a meta-analysis of the multiple experiments are necessary.	Null hypothesis Ho1, and alternative hypotheses Ha5 and Ha6 stated above.	All	WWBNP ME

2. Objectives, Tasks, and Approaches

The various performance metrics that will be addressed by the monitoring and evaluation program as a whole, and the corresponding objectives and tasks are listed below in Table 10. The majority of the tasks associated with the hatchery monitoring and evaluation objectives will be new or significantly broadened to incorporate spring Chinook. Many of the natural production objectives and tasks are currently ongoing for the spring Chinook adult outplanting program under WWBNPME (BPA project #200003900) although the level of effort will need to be expanded in association with the WWHMP. The approach briefly summarizes the rational, techniques and strategies used to complete tasks. Detailed methodologies that describe sample sizes, experimental designs, and the like will be incorporated in the Walla Walla Comprehensive Research, Monitoring, and Evaluation Plan that is currently under revision by the co-managers. Some tasks involve long-term monitoring repeated annually (hatchery production, redd surveys, natural rearing density surveys, outmigration, daily passage facility operations, harvest, adult returns, etc.). Other tasks can be completed in several years or only need to be examined periodically (documenting genetic characteristics, evaluating passage facilities or testing new hatchery rearing strategies).

It is important to note that the South Fork Walla Walla Hatchery itself would not be a research facility as there are already a number of hatcheries in the region where research is an important function. Rearing densities have been reduced from standard densities to improve smolt quality and performance. In fact, lower rearing densities are one of the important components of ‘natural’ rearing regimes currently being researched throughout the region (Maynard et al. 2001, Berejikian et al. 1999). Appropriate and new rearing techniques would be added to the South Fork Walla Walla Hatchery once these techniques have been fully tested and proven effective at research hatcheries.

More critical than monitoring and evaluation of in-hatchery fish culture techniques is the evaluation of the use of the different supplementation management strategies to be employed in the Walla Walla Basin with their emphasis on natural production reestablishment. An in-basin comparison of the conventional juvenile release program and adult outplanting strategies will be conducted as well as a comparative evaluation between the different strategies utilized in the Walla Walla, Umatilla, Tucannon, Grande Ronde, and John Day spring Chinook restoration efforts. Monitoring and evaluation of broodstock collection, escapement, and harvest strategies as related to restoration of naturally reproducing spring Chinook populations in the basin will be the primary focus of the monitoring and evaluation effort.

Table 10. Performance Metrics: Monitoring and Evaluation Program.

Performance Metric	Objectives	Tasks
Hatchery Survival		
Brood stock survival	1	1.1
Egg to smolt survival	1	1.3
Smolt to adult returns	3 &8	3.1-3.5, 8.2-8.5
Hatchery Production		
Broodstock abundance and composition	6	6.1-5.2
Spawning targets	1	1.1-1.2
Egg size	1	1.2
Smolt abundance	1	1.3
Size at release	1	1.3
Hatchery Operations		
In-hatchery predation	1	1.3
Water quality & quantity	1	1.4
Production efficiency	1	1.3
Food quality	1	1.3
Disease		
Incidence in hatchery	2	2.1-2.5

Performance Metric	Objectives	Tasks
Migration		
Natural outmigration	8	8.1-8.5
Hatchery smolt outmigration timing	8	8.2-8.5
Adult return timing	8	8.1-8.5
Straying	3, 8	3.1-3.6, 8.1-8.5
Natural Production		
Environmental and ecological functions	5, 9	5.1-5.3, 9.1-9.2
Limiting factors	5	5.1-5.3
Pre-spawning survival	7	7.8
Spawner abundance and composition	6, 7	6.1-6.3, 7.1-7.9
Redd abundance, distribution, and timing	7, 8	7.1-7.3, 8.1-8.4
Life-stage survival: smolt-to-adult	8	8.2-8.5
Recruits per spawner	7	7.8
Morphometrics		
Length-weight	1, 7	1.1,7.6, 7.10
Growth rates	1, 7	1.1, 7.6, .7.10
Length-body depth	1, 7	7.7, 7.10
Gonado-somatic index	1, 7	1.1-1.2, 7.10
Genetics and Reproduction		
Allelic diversity	1, 7, 10	1.1, 7.10, 10.1-10.5
Effective population size of hatchery and natural fractions	1,10	1.1, 10.1-10.5
Sex ratios	1	1.1
Age distribution	1, 7	1.1, 7.10
Fecundity	1	1.2
Parentage of naturally reared smolts and adult returns	7	7.5-7.5, 7.11
Harvest Abundance and Composition		
Marine harvest	4	4.3
Mainstem non-tribal harvest	4	4.3
Mainstem tribal harvest	4	4.3
Subbasin sport harvest	4	4.2
Subbasin tribal harvest	4	4.1
Comparative Performance		
Adult-to-adult performance of Walla Walla, Mill Creek, and Touchet sub-populations	12	12.1-12.3
Adult-to-adult performance of Walla Walla, Umatilla, John Day, Tucannon, and Grande Ronde spring Chinook	13	13.1-13.4
Morphological, demography, and genetic performance of Walla Walla, Mill Creek, and Touchet sub-populations.	12	12.1-12.3
Morphological, demography, and genetic performance of Walla Walla, Umatilla, John Day, Tucannon, and Grande Ronde spring Chinook	13	13.1-13.4

3. Hatchery Production Monitoring and Research Objectives and Tasks

Objective 1: Monitor and record hatchery operations and water quality parameters.

Task 1.1: Document activities associated with the collection, holding, and spawning of broodstock including number collected, spawned, pre-spawning mortalities, and the composition of broodstock including origin, morphology, and genetic characteristics.

Task 1.2: Document egg take and incubation activities including eggs taken, egg size, fecundity, viability, survivals, and egg transfers.

Task 1.3: Document juvenile rearing activities including survival, feeding, pond care, pond cleaning, growth, grading, marking, tagging, rearing densities, loading rates, and release numbers.

Task 1.4: Monitor water quality of influent and effluent including dissolved oxygen, temperature, ozone, pH, nitrogen, ammonia, alkalinity, total suspended solids, and settleable solids.

Approach: Monitoring of production activities is a critical step in reaching production goals in terms of smolt number, size and quality. Quantity and quality of smolts can directly affect adult returns. To ensure that production goals are met, CTUIR hatchery personnel would be responsible for conducting and recording all broodstock, incubation and production activities. Fish growth would be monitored, and feed adjusted to meet release goals. Water samples would routinely be collected and shipped to a laboratory for analysis. Water temperature, ozone, dissolved oxygen and flow would be monitored on site. Instruments would be calibrated routinely. Daily production records, results from water quality samples, and data from monitoring instruments would be digitized, summarized and reported.

Objective 2: Maintain, monitor and evaluate fish health.

Task 2.1: Administer and document prophylactic and therapeutic treatments for all ages of spring Chinook at the South Fork Walla Walla Hatchery.

Task 2.2: Conduct routine fish health examinations from each raceway.

Task 2.3: Conduct pathological examinations of fish during periods of unusual loss at the hatchery.

Task 2.4: Conduct fish health examinations of each group prior to release from the hatchery.

Task 2.5: Collect and examine tissue samples from broodstock for pathogens. Anticipate potential disease problems in progeny and develop appropriate prophylactic and control treatments.

Approach: Disease outbreaks in spring Chinook hatcheries have the potential to severely impact adult production. Diseases can lead to high mortalities within the hatchery and after release. The release of diseased fish into natural systems could also impact naturally produced salmonids. To minimize and manage the risk of diseases, ODFW Pathology and CTUIR personnel would conduct, monitor and evaluate activities outlined in Tasks 2.1 through 2.5. Work would follow established techniques and protocols and may be expanded as needed. Tribal personnel would assist in the administration of prophylactic and therapeutic treatments as prescribed by ODFW pathologists and in accordance with U.S. Department of Agriculture Food and Drug Administration requirements.

Objective 3: Use CWT data to determine smolt to adult survival and stray rates for each production group of spring Chinook salmon reared at the South Fork Walla Walla Hatchery.

Task 3.1: Mark ten percent of the production release with CWTs along with VIE tags and a ventral fin clip for CWT identification purposes. Mark the remainder of the production with a general production mark (VIE only – no CWT or fin clip).

Task 3.2: Collect snouts from adult salmon with CWTs (VIE + Ventral Clip). Snouts will be collected from hatchery broodstock, harvested fish, and carcasses found on the spawning grounds.

Task 3.3: Send snouts to the Regional Mark Processing Center in Clackamas, Oregon for tag extraction and decoding.

Task 3.4: Obtain CWT recovery data from the Regional Mark Processing Center.

Task 3.5: Estimate smolt to adult survival for each tag group based on CWT recoveries and expansions.

Task 3.6: Estimate stray rates of adult spring Chinook salmon from both hatchery and direct stream release groups.

Approach: Monitoring smolt to adult survival and stray rates with CWTs will continue to provide critical information regarding the performance of each brood year. The production program will begin operations tagging 50,000 smolts. This tagging level will be adjusted as needed to provide statistically justified estimates of smolt-to-adult survival and detection rates. The South Fork Walla Walla Hatchery manager will coordinate the annual tagging of 50,000 juvenile Chinook salmon to be released at the South Fork Walla Walla Hatchery. In addition, all other hatchery fish released will be marked with a VIE only in order to identify adults of hatchery origin. CTUIR artificial production staff in conjunction with WWBNPME personnel will evaluate smolt-to-adult survival and stray rates from these releases.

Objective 4: Monitor the harvest of Walla Walla River spring Chinook salmon.

Task 4.1: Monitor Tribal in-basin harvest of spring Chinook salmon.

Task 4.2: Monitor non-Tribal in-basin sport harvest of spring Chinook salmon.

Task 4.3: Utilize CWT recovery data to estimate harvest contribution of Walla Walla River spring Chinook from sport, Tribal, and commercial fisheries outside of the Walla Walla Subbasin.

Approach: Harvest opportunities are a desired consequence of a successful program. Over-harvest can impact the program if hatchery broodstock and natural production escapement goals are not met. Harvest will be based on preseason return estimates used in conjunction with the management plan presented in Appendix X. In years of low natural origin fish abundance, harvest of hatchery adults will be restricted to allow more of these fish to escape for natural spawning enhancement. As natural population levels increase harvest rates will be less restrictive to allow utilization of hatchery adults no longer needed for spawning escapement. Harvest monitoring is needed to determine when pre-season quotas have been reached to avoid over-harvest. ODFW and WDFW will monitor in-basin sport harvest and CTUIR will monitor in-basin Tribal harvest of adult spring Chinook salmon returning to the Walla Walla River. CTUIR will evaluate CWT returns from out of basin sources to estimate out of basin harvest contribution. Roving creel surveys with stratified-random designs will be incorporated for harvest monitoring. Survey design may change as management adapts harvest opportunities to run size and catch rates. Survey designs will follow the work of Malvestuto et al. (1996) and will also include telephone surveys.

4. Natural Production Monitoring and Evaluation Objectives

Objective 5: Monitor the availability of spring Chinook spawning and rearing habitat in the Walla Walla Subbasin.

Task 5.1: Survey habitat conditions in the Walla Walla, Mill Creek, and Touchet tributaries using regionally standardized protocols every ten years.

Task 5.2: Evaluate changes in fish habitat conditions.

Task 5.3: Evaluate relative juvenile productivity in the upper Walla Walla River, Mill Creek, and Touchet

River drainages as it relates to changes in fish habitat conditions.

Approach: Proper habitat conditions are required for effective spawning, maturation of eggs, emergence, and juvenile salmonid rearing. Changes in conditions can result in or confound the evaluation of program performance. An understanding of these conditions is essential to proper long-term evaluation and analysis of spawner performance and juvenile rearing. WWBNPME will use regionally standardized protocols and a locally integrated collaborative program to ensure that habitat conditions are evaluated properly and in a timely manner.

Objective 6: Monitor adult returns.

Task 6.1: Operate adult traps or counting stations at Nursery Bridge Dam, Mill Creek Dam, and at the Dayton Conditioning Pond.

Task 6.2: Record adult returns by species, age class, sex, fin marks and disposition.

Approach: Monitoring of adult returns at Nursery Bridge Dam, Mill Creek Dam, and Dayton Conditioning Pond will be conducted by CTUIR, the Corps, and WDFW, respectively. This monitoring effort will provide detailed information on adult spring Chinook returning to the various tributary areas with the Walla Walla Subbasin. Species, age class, sex, and fin mark information will be collected to document population composition. Disposition of returning adults will be recorded in order to assess achievement of program goals.

Objective 7: Annually monitor spring Chinook spawning performance in the Walla Walla Subbasin and the relative reproductive success of hatchery reared and naturally reared spawners.

Task 7.1: Conduct spawning ground surveys in Mill Creek, Touchet, Walla Walla and South Fork Walla Walla Rivers to census primary spring Chinook spawning areas.

Task 7.2: Determine the distribution and abundance of spring Chinook salmon redds.

Task 7.3: Determine the number of redds per adult salmon available for spawning.

Task 7.4: Determine the percentage of returning adult Chinook salmon that are of natural or hatchery origin for each tributary area in the subbasin.

Task 7.5: Determine the percentage of hatchery and natural origin adults spawning in each tributary area in the subbasin.

Task 7.6: Determine the age composition of hatchery and natural origin adults spawning in each tributary area in the subbasin (using scale analysis and length frequency distributions).

Task 7.7: Estimate adult to adult survival of naturally produced spring Chinook salmon returning to the Walla Walla River for each tributary area in the subbasin.

Task 7.8: Determine the ratio of pre-spawning mortalities to successful spawners.

Task 7.9: Estimate the adult-to-adult productivity of each hatchery and naturally produced brood year in each tributary area of the subbasin.

Task 7.10: Sample natural mortalities and harvested mortalities, including pre-spawn and post-spawn carcasses, for demographic, morphological, and genetic performance metrics.

Approach: The basic plan for reestablishing a natural spawning population of spring Chinook salmon in the Walla Walla Subbasin depends initially on hatchery-reared adult salmon spawning successfully in natural habitat. As the program develops, management strategies will be employed that emphasize escapement of natural origin adults to reestablish natural populations. Currently, CTUIR monitors spring Chinook spawning activities from the adult outplanting program to determine the success of this recovery strategy. These efforts will need to be expanded as production releases and returns begin. The productivity of each brood year within the various tributary areas will be estimated based on age frequency distribution, adult return data, and redd observations. Adult-to-adult performance of each brood year will be compared. This information will be useful in the adaptive management of spawner escapement in the Walla Walla.

Objective 8: Estimate migration timing, survival, and abundance of hatchery and naturally produced spring Chinook smolts in the Walla Walla and Columbia rivers.

Task 8.1: PIT tag up to 4,000 natural smolts in the upper mainstem Walla Walla River area and 1,000 each for Mill Creek and the Touchet River. Submit tagging and release files to PTAGIS.

Task 8.2: PIT tag up to 13,500 hatchery smolts, submit tagging, and release files to the PIT Tag Information System (PTAGIS).

Task 8.3: Download and submit tagging files to PTAGIS.

Task 8.4 Capture smolts with screw traps to monitor outmigrant timing, survival and abundance.

Task 8.5: Examine and analyze PIT tag data and estimate migration timing and survival of hatchery and natural smolts in both the Walla Walla and Columbia River systems.

Approach: WWBNPME personnel will coordinate with the South Fork Walla Walla Hatchery manager to PIT tag juvenile Chinook salmon to represent the standard production group released into the South Fork Walla Walla River. Naturally produced juvenile Chinook salmon will be PIT tagged in the upper mainstem and South Fork Walla Walla River, Mill Creek and Touchet River. WWBNPME personnel using a combination of interrogation stations and traps will monitor smolts during their in-basin migration. After spring Chinook smolts complete their migration, CTUIR would collect, collate and analyze all the relevant tagging, tag detection efficiency and interrogation data to estimate and report survival and timing of smolt migrations in the Walla Walla River and past the Columbia River Dams.

Objective 9: Estimate the affects of hatchery releases on endemic steelhead and bull trout.

Task 9.1: Compare migration timing, survival, and abundance of hatchery spring Chinook smolts to steelhead and bull trout in the Walla Walla Basin

Task 9.2: Compare population trends of natural steelhead and bull trout in the Walla Walla Subbasin to adjacent basins with and without spring Chinook hatchery programs.

Approach: Summarize adult returns of natural salmonids in areas with and without the influence of hatchery spring Chinook smolts. This information will also be used to compare interactions between hatchery and natural populations in the Walla Walla Subbasin with those presented in the literature for other basins.

Objective 10: Monitor the Genetic Characteristics of Reestablished Spring Chinook.

Task 10.1: Collect baseline genetic samples from initial hatchery program broodstock.

Task 10.2: Collect genetic samples from returning natural and hatchery adults every second generation (every 8 to 10 years).

Task 10.3: Periodically analyze genetic samples and compare genetic profiles for hatchery and natural populations.

Approach: The endemic stock was extirpated during the early 1900s. We will collect baseline genetic samples from hatchery broodstock used to found the program. Provided that a natural population of adults is reestablished in the subbasin, a unique Walla Walla stock may develop over time. It would likely take many generations for the local stock to diverge significantly from the original donor stock. By collecting and archiving tissue samples through time, any detectable genetic divergence by the Walla Walla stock from the original Carson stock would be documented. General indices of genetic diversity could also be evaluated from the archived samples.

Objective 11: Compare juvenile release versus adult outplanting strategies within the Walla Walla Subbasin.

Task 11.1: Evaluate adult-to-adult, adult-to-smolt, and smolt-to-adult survivals in the upper Walla Walla River, Mill Creek, and Touchet River drainages.

Approach: Releases of hatchery smolts has been the primary artificial production strategy in the Columbia River Basin for restoration or enhancement of natural populations. Adult outplanting is an alternative strategy to accomplish this management goal. The multi-pronged management approach presented in this WWHMP provides a unique opportunity for comparing the relative success of these strategies for restoring populations. We will compare juvenile and adult performance measurements (smolt-to-adult survival, productivity, parent to progeny ratios, etc.) in the Walla Walla, Mill Creek, and Touchet watersheds, and compare performance of the different restoration approaches.

Objective 12: Compare spring Chinook management strategies applied in the Walla Walla River, Tucannon River, John Day River, Grande Ronde Subbasin and Umatilla River for restoring naturally spawning populations.

Task 12.1: Compare abundance, density, and distribution of redds in the Walla Walla River, Tucannon River, John Day River, Grande Ronde Subbasin and Umatilla River through time.

Task 12.2: Compare the ratio of hatchery and natural origin adults in the spawning escapement in the Walla Walla River, Tucannon River, John Day River, Grande Ronde Subbasin and Umatilla River.

Task 12.3: Evaluate adult-to-adult, adult-to-smolt, and smolt-to-adult survivals of naturally spawning adults in the Walla Walla River, Tucannon River, John Day River, Grande Ronde Subbasin and Umatilla River.

Approach: The proposed management strategy for the Walla Walla River places an emphasis on escaping natural origin adults to spawn. The hatchery strategies in neighboring basins range from a no action hatchery approach in the John Day River, to an aggressive approach in the Umatilla River that provides for minimal differentiation of hatchery and natural origin adults for broodstock, harvest, or spawning escapement. In addition, various weir management strategies as well as captive brood programs are occurring in the Grande Ronde Subbasin. The Walla Walla monitoring and evaluation program will incorporate analyses and evaluations from neighboring subbasins for comparative analyses.

V. EXISTING RESOURCES

This chapter details two categories of existing resources in the subbasin: 1) Existing environmental resources including the natural production potential of the Walla Walla River Basin; and 2) Current program resources such as existing facilities and projects. Although these seem like different categories, both serve as baseline descriptions against which environmental and cost impacts may be measured.

A. Existing Environmental Resources

1. Watershed Carrying Capacity

Empirical spawning ground and juvenile production data gathered during monitoring and evaluation of the adult outplanting program are the foundation for estimating the number of spawners and juveniles required to seed the habitat. From 2000-2007, WWBNPME personnel have observed spring Chinook returning to the Walla Walla River and from the adult outplanting program spawning from river mile 42.3 of the mainstem to river mile 70.2 in the South Fork of the Walla Walla River, a reach of 27.9 miles (Contor and Sexton 2003, Mahoney et al. 2007). The range of observed spawning in recent years is actually larger than that initially estimated (26.5 miles) based on water temperature data and stream habitat evaluation (Contor and Sexton 2003). The primary spawning area within this reach ranges from the Joe West Bridge on the upper mainstem (RM 49.2) upstream to Skiphorton Creek, a distance of 18.1 miles (Table 5). Spawning densities in 2001 within the sampled portion of the primary production area was 27.8 redds/mile and the number of adults/redd since 2000 has averaged 2.33 (Table 5). Based on these observations of primary spawning area (18.1 miles), redd density (27.8/mile), and adults/redd (2.33), a conservative spawner escapement estimate is 1,172 adults. This number is close to the estimated capacity of 1,000 spawners for the upper mainstem and South Fork Walla Walla River as identified by the Walla Subbasin Plan EDT model (Walla Walla County and Walla Walla Basin Watershed Council 2004) under “properly functioning conditions.”

Juvenile spring Chinook salmon have been observed summer rearing in 25 stream miles within the upper Walla Walla River and South Fork (Contor and Sexton 2003). The potential number of suitable stream miles for juvenile rearing in this reach based on water temperature data and by evaluating stream habitat. The actual quantity of available habitat may be as large as 32 miles (Contor and Sexton 2003). Densities of juvenile Chinook in this area ranged from 546-8,650 per stream mile and averaged approximately 3,100/mile (Contor and Sexton 2003). These numbers are on the higher end of densities presented in the literature and those observed in surrounding basins (Contor pers. comm.). Based on observed figures for summer rearing area (25 miles) and rearing density (3,100/mile) a conservative summer rearing abundance is 77,500 parr. It is estimated that 1,000 adult spawners would produce approximately 350 redds which would produce about 105,000 parr (3,000 eggs per redd at 10% egg-to-parr survival) which would seed the estimated available summer juvenile rearing habitat in the upper mainstem and South Fork. The Walla Walla Subbasin Plan Addendum EDT model predicts a parr capacity for the upper Walla Walla River and South Fork of 669,979 individuals; far more than the estimated 105,000 parr estimated to be produced by 1,000 adult spawners.

Mill Creek received adult outplants from 2000-2002 and then again in 2007-2008. Monitoring information is much more limited than that available for the upper mainstem and South Fork Walla Walla River. The Touchet River system has not been a part of the adult outplanting program and therefore does not have any direct production information for spring Chinook spawning and juvenile rearing. However, it is assumed that the primary production areas in both Mill Creek and the Touchet River would produce similar numbers as seen in the South Fork. There are an estimated 10 miles of suitable habitat for spawning and juvenile rearing in Mill Creek and approximately 12 miles in the North and Wolf Forks of the Touchet River (Confederated Tribes of the Umatilla Indian Reservation 2001). In the upper mainstem and South Fork, the primary spawning area is about 60% of the total observed spawning range. Applying this percentage to Mill Creek and the Touchet River would result in primary spawning reaches of 6.0 miles in Mill Creek and 7.2 miles in the Touchet River. Using the observed spawning data from the South Fork of 27.8 redds/mile and 2.33 adults/redd and estimated spawning reaches in these two systems, conservative spawner escapement numbers are 389 and 466 adults, respectively. Sideboards for the proposed adult outplanting numbers for these two tributary were developed based on these enumerations of spawner performance. At this seeding level, parr numbers should be well within available summer rearing capacities. However, outplanting programs may be increased or decreased in the future based on empirical estimates of redd densities, juvenile densities, and parent-progeny-parent performance.

2. Description of Available Habitat

Detailed evaluations of habitat conditions in the subbasin are lacking. The following habitat descriptions are paraphrased from the assessments included in the Walla Walla Subbasin Summary (Confederated Tribes of the Umatilla Indian Reservation 2001). The descriptions use the rating definitions from that report which are included in Table 11.

Table 11. Habitat Rating Descriptions

Rating	Definition
Excellent	Habitat of high quality – stronghold area key to survival and recovery of salmonids
Good	Suitable for salmonids – important salmonid production area
Fair	Can be utilized by salmonids
Poor	Harsh conditions – unsuitable for salmonids
Unknown	More examination required

<u>South Fork Walla Walla River</u>

The South Fork Walla Walla River provides excellent spring Chinook spawning and rearing habitat throughout its upper reaches above Harris Park (RM 9). The South Fork below Harris Park has good spawning and rearing habitat. Flow and water quality in this reach is excellent but the habitat is affected by channelization and rural development in the flood plain. Much of the watershed is in a wilderness area, and produces cool and persistent flows during the summer. Woody debris, pools and juvenile rearing areas are abundant. It is an important salmonid natural production area for spring Chinook, steelhead, rainbow trout, bull trout, and mountain whitefish.

<u>Upper Walla Walla River</u>

The Walla Walla River from the confluence of the North and South Forks to the Little Walla Walla diversion in the town of Milton-Freewater (approximately 6 miles) provides fair to good spawning and rearing habitat for spring Chinook. Water quality and flow are excellent although habitat in this reach has been significantly altered by municipal activities and flood control levees. Efforts to rehabilitate the riparian habitat and to restore portions of the natural floodplain continue to improve salmonid habitat in this reach.

<u>Upper Walla Walla River Tributaries (North Fork and Couse Creek)</u>

The upper reaches of the North Fork generally has excellent habitat conditions. The lower portion of the North Fork has been impacted by rural development and has major channelization concerns. Stream flows, water temperatures and habitat conditions are generally in fair condition. Couse Creek has been severely impacted by land use activities. Flows are intermittent in the summer and water temperatures are at lethal levels most of the summer. Riparian habitat is poor. No spring Chinook adults have been observed in either of these areas. Low numbers of juveniles appear to be using the lower portions of these tributaries for winter and spring rearing.

<u>Mid and Lower Walla Walla River</u>

This stream reach has been severely impacted by agricultural practices and water diversions and habitat conditions are generally poor. Flows are at extremely low levels during the summer, water temperatures are high, and heavy channelization has occurred. Adults have not been outplanted in this portion of the basin but adult holding and spawning as well as redds have been observed in recent years (Table 5). Juveniles have been observed rearing in this reach during the winter and spring.

Mill Creek

Mill Creek provides excellent spring Chinook spawning and rearing habitat throughout its upper reaches (10 miles). The watershed is the municipal water source for the city of Walla Walla and as such is pristine. It produces cool and persistent flows during the summer. Woody debris, pools and juvenile rearing areas are plentiful. Naturally produced juvenile spring Chinook, steelhead, rainbow trout, bull trout, and mountain white fish are abundant in upper Mill Creek. The middle portion of Mill Creek generally has fair habitat conditions but is affected by City of Walla Walla water withdrawals and rural development. The lower reach of Mill Creek has been severely impacted by water withdrawal, municipal development and flood control systems and the habitat is in poor condition. Adults have been outplanted into upper Mill Creek. Juveniles have been observed rearing throughout the year in the upper reaches and in the winter and spring in the lower to mid portions. There are major unresolved juvenile and adult passage issues in lower Mill Creek.

Touchet River and Tributaries

The Touchet River provides fair to good spring Chinook spawning and rearing habitat in the Wolf and North Forks (12 miles). These areas produce cool and persistent flows during the summer. Woody debris, pools and juvenile rearing areas are plentiful. Naturally produced juvenile steelhead, rainbow trout, bull trout, and mountain white fish are abundant in these tributaries. Although no adults have been outplanted into the Touchet River, low numbers of adult spring Chinook have been observed annually in the Wolf and North Forks. The mid and lower portions of the Touchet River have been severely impacted by upland agricultural practices, water withdrawal, municipal development and flood control systems. Flows are at extremely low levels during the summer and water temperatures are high.

3. Status of Spring Chinook Salmon in the Walla Walla Subbasin

Historical Status of the Resource

The Walla Walla Subbasin once supported large runs of spring Chinook salmon, however the last run of importance was reported in 1925 (Van Cleve and Ting 1960). The decline of the Walla Walla spring Chinook runs were coincident with the construction of Nine Mile (Reese) Dam in 1905 and by 1955 only 18 spring Chinook were reported caught in the sport fishery (Van Cleve and Ting 1960). Water extractions and associated diversion structures, upland land practices, channelization, flood control structures and urban development all contributed to the decline of the spring Chinook runs by degrading habitat and constraining passage (Confederated Tribes of the Umatilla Indian Reservation 1990, 2001; U.S. Army Corps of Engineers 1997). In addition, hydroelectric projects constructed on the mainstem Columbia River blocked migration corridors and changed the character of the river from a free-flowing stream to a series of slack water impoundments. This significantly altered anadromous salmonid escapement rates.

Current Status

Since the mid 1990s, a few spring Chinook adults have been enumerated at Nursery Bridge Dam on the upper mainstem Walla Walla River and at the Dayton trap on the upper Touchet River. These were the most spring Chinook adults observed in the basin in recent history and were theorized to be strays during high return years from the neighboring Umatilla and Tucannon subbasins. The limited mark data available from these returns supports this theory as the eight known origin adults trapped at the Dayton weir during this period were all from Tucannon River releases (J. Bumgarner pers. comm.) and the three known origin adults trapped at Nursery Bridge Dam were of Umatilla origin (Rowan pers.comm.). No enumeration capabilities existed in Mill Creek until 2004 so no data on recent adult returns to that tributary are available.

The first adults (3 year old jacks) returned from the outplanting program in 2003 and one jack spring Chinook was enumerated at Nursery Bridge Dam that year. In 2004, the first 4 year old adults from the initial outplanting returned and there were 68 adults enumerated at Mill Creek Dam and 131 adults and three jacks counted at Nursery Bridge Dam. The first return of jacks from the 2005 South Fork Walla Walla juvenile releases occurred in 2006 with the first 4 year old adults returning in 2007. Adult counts at Nursery Bridge, Mill Creek, and Dayton dams since 2000 are presented in Table 12. While no outplants or releases have occurred in the Touchet River, the numbers are provided here for comparison. The "Unknown" column at Dayton Dam is for fish that registered on a resistivity counter. These counts are probably conservative, as enumeration at the dams has not been refined and is known to be incomplete.

Table 12. Adult Counts at Nursery Bridge Dam, Mill Creek Dam and Dayton Dam.

Location	Nursery Bridge Dam			Mill Creek Dam			Dayton Dam			
Year	**Total**	**Adults**	**Jacks**	**Total**	**Adults**	**Jacks**	**Total**	**Adults**	**Jacks**	**Unk**
2000	9	9	0	NA			4	3	1	NA
2001	47	47	0	NA			31	28	3	NA
2002	30	27	3	NA			0	0	0	NA
2003	2	1	1	NA			3	1	2	NA
2004	134	131	3	68	68	0	13	4	6	3
2005	81	80	1	17	17	0	24	5	0	19
2006	94	92	2	13	13	0	0	0	0	NA
2007	242	236	6	0	0	0	4	3	1	NA
2008	514	466	48	11	11	0	3	3	0	2

Carson stock spring Chinook adults from Ringold Springs Hatchery and the Umatilla River have been outplanted into natural production areas of the South Fork Walla Walla River and Mill Creek since 2000. Mill Creek recievied adult outplants from 2000-2002 and again in 2007-2008. With the exception of 2005, adults have been outplanted into the South Fork Walla Walla River every year since 2000. In addition to the adult outplants and natural returning fish, a few adults excess to broodstock needs were also released into the South Fork Walla Walla River between 2001 and 2007. Annual estimated spawning escapement of adults for Mill Creek and the upper Walla Walla River/South Fork including outplants, excess brood and natural returns is presented in Table 13 along with estimated redd counts for each year.

Table 13. Adult Spawning Escapement in the Walla Walla Subbasin (includes adult outplants).

Location	Mainstem/SFWW					Mill Creek				
Year	**Total**	**Females**	**Males**	**Jacks**	**Redds**	**Total**	**Females**	**Males**	**Jacks**	**Redds**
2000	268	156	79	33	101	105	58	31	16	40
2001	1139	671	435	33	339	150	76	72	2	53
2002	359	209	134	16	145	50	25	25	0	23
2003	315	139	171	5	120	0	0	0	0	NA
2004	367	219	124	24	225	68	NA	NA	NA	42
2005	98	58	39	1	78	24	NA	NA	NA	18
2006	511	269	221	21	223	9	NA	NA	NA	12
2007	591	328	257	6	270	103	57	31	15	39

<u>High Priority and Provisional Population Units</u>

The Sustainable Fishery Act (Interim Standards for the Use of Captive Propagation) defines 'high priority populations' as: 1) Populations returning less than fifty adults annually; 2) Populations showing poor resilience from the bottleneck immediately prior to receiving the designation; and, 3) Populations endemic to watersheds with habitat and carrying capacity favorable to recovery. There are no high priority or provisional population units of spring Chinook salmon within the Walla Walla River Subbasin. Natural spring Chinook salmon populations were extirpated approximately 75 years ago.

<u>Genetic/Morphological Profile of Natural Spawning Populations and Characteristics to be Maintained</u>
Genetic and/or morphological assays have not been conducted on the few returning spring Chinook salmon or the surplus adults that have been outplanted. Generally speaking, the genetic and morphological profile of the Carson founder stock would be used as a baseline. This information would be collected as part of the monitoring and evaluation plan.

<u>Limiting Factors for Naturally Spawning Populations</u>
Considerable spawning habitat is available in the Walla Walla Subbasin. While rearing habitat is not as abundant as spawning habitat in the subbasin, there are still large areas of suitable rearing habitat available to support reintroduction of spring Chinook (see Section V.A.1.) and as such stream carrying capacity is not the primary limiting factor. Passage constraints, including water withdrawals, instream passage barriers, and potential thermal barriers, are the primary limiting factor for reestablishing spring Chinook in the basin. As discussed in Section II. C., these passage constraints have been significantly improved over the past five years. Instream flows between 18 and 25 cfs are now required to be maintained in the mid and upper mainstem Walla Walla River as part of the FWS Amended Civil Penalty Agreement (2001) with basin irrigation districts. In addition, passage improvements have been ongoing since 1997 and include removal of decommissioned diversion structures, new or improved juvenile screen and bypass facilities, surface diversion consolidations and new or upgraded fish ladders. There also have been a multitude of habitat restoration projects implemented by a host of agencies.

B. Existing Program Resources

1. Collection Facilities

In the near term, it is anticipated that broodstock for the program would be collected from adults returning to Threemile Dam on the Umatilla River or other Carson stock hatchery stations if unavailable from the Umatilla River. The Three Mile Dam collection facility is located on the east bank of the Umatilla River at approximately RM 4. The facility includes a vertical slot ladder, Denil steeppass, raceway type holding pond (1,800 cubic feet), automated fish crowder, fish handling and sorting complex, and bunkhouse. The bunkhouse includes two bunkrooms, kitchen area, office space, conference room, shop, and restrooms. The facility is manned 24 hours a day during trapping operations. Spring Chinook adults are trapped at this site and broodstock are transferred to the South Fork Walla Walla Adult Holding and Spawning Facility.

An adult fish trap was incorporated into the design and construction of the new Nursery Bridge Dam fish ladder built in 2001. The facility includes a vertical slot ladder, Denil steeppass, raceway type holding pond (~1,200 ft^3), automated fish crowder and brail, and fish handling and sorting station. The facility is protected by a security fence. It is anticipated that after adult returns to the Walla Walla River are sufficient to support broodstock collection that brood would be trapped at this facility and transferred to the South Fork Walla Walla Adult Holding and Spawning Facility. Operation of both the Threemile Dam and Nursery Bridge Dam collection facilities are funded by BPA under the Umatilla and Walla Walla Fish Passage Operations projects, respectively.

There is also an adult fish trap located at the Dayton Conditioning Pond on the Touchet River. The facility consists of an instream trap box in conjunction with a fixed picket weir. This facility would be used for enumeration only; no broodstock for the program are proposed to be collected from the Touchet River. Operation of the Dayton trap is currently funded by the Lower Snake River Compensation Program (LSRCP).

2. Holding and Spawning Facilities

The South Fork Walla Walla Adult Holding and Spawning Facility is located east of Milton-Freewater, Oregon. The facility is located on the South Fork of the Walla Walla River at approximately RM 7. The facility includes a water intake system with automatic screen cleaning, pump station having a pumping capacity of 8,700 gpm, ozone water treatment system, settling pond, five adult holding ponds (each 90 by 10 by 6 foot effective water depth), mechanical fish crowder, standby generator, chemical storage and spawning buildings and two homes for night-watch personnel. The spawning building includes a fish lift, electroshock anesthesia system, sorting and spawning facilities, wet and dry storage rooms, walk-in cooler/freezer, restroom, and office space. All of these features were originally sized to accommodate future holding and spawning of a Walla Walla spring Chinook component. The facility was authorized as a Umatilla Hatchery satellite facility under the NPPC Fish and Wildlife Program and began operation in 1997. BPA funds operation of the facility as part of the UHSFOM project. It currently serves as the adult holding and spawning site for the spring Chinook component of the Umatilla Hatchery Program as well as the holding facility for the Walla Walla spring Chinook adult outplanting program.

3. Incubation, Rearing, and Release Facilities

Currently, no incubation, rearing, or release facilities are available for the Walla Walla spring Chinook hatchery program. It is planned that these facilities would be constructed at the current location of the South Fork Walla Walla Adult Holding and Spawning Facility. The physical area needed, water supply requirements, treatment facilities, and ozone disinfection capabilities for the hatchery were all incorporated into the purchase of the property and construction of the adult holding and spawning facility.

4. Habitat and Passage Restoration and Improvements Efforts

The Walla Walla spring Chinook artificial production program is an element of, dependent upon, and integrated with the Walla Walla environment. As with any natural system, habitat conditions are in continual flux in the Walla Walla. Human development continues to encroach on salmon habitat. Passage conditions continue to be improved in great strides in some locations, while they may be static or degrading in others. Conditions are generally improving in many protected areas, but natural disasters and rare evens threaten that progress.

The Walla Walla is known regionally for its collaborative spirit which crosses two states and five counties. The local and regional co-managers work closely to support salmon restoration programs through a variety of funding sources. The presence and stability of this restoration program is an important element of Walla Walla spring Chinook restoration planning. As habitat conditions continue to improve in the Walla Walla, the potential benefits and sustainability of the hatchery improve in concert. Today the capacity of the system is improved significantly over what it was ten years ago. New water, new passage facilities, and new structural and biological habitat have added greatly to the system and helped ripen the question of a restoration program.

The future of the system looks bright. Walla Walla County has 417 Conservation Reserve Program contracts covering 149,646 acres with approximately 75% of these acres are planted to a native grass mix that includes a minimum of four species. In addition these acres have had over 2.6 million native shrubs planted on them and over 320 guzzlers installed. A conservative estimate is that the perennial cover saves at least 10 tons/acre/year in reduced soil erosion. This equals reduced sedimentation in the system, greater groundwater retention, and correspondingly improved water quality in the lower and middle reaches of the Walla Walla. Since 1996, over 400 in-stream structures have been installed in Walla Walla County streams for stream restoration and fish stream improvement. These include root-wads, root-wad revetments, barbs, j-hooks, rock vortex weirs, log revetments, log weirs, and lunker structures. These were put in through a number of programs including the NRCS Wildlife Habitat Improvement Program, the Natural Resources Conservation Service Emergency Watershed Protection Program, WDFW block grants, BPA grants, and others. Many of these treatments are in their early or formative stages. As they mature, vegetational succession is likely to follow. These improvements present a countervailing force to development in the Walla Walla that was engineered to support salmon restoration. This work is more than just an assemblage of projects; it represents a long-term collaboration among stakeholders whose value as a programmatic resource cannot be quantified. It is this suite of relationships which helps guarantee future progress towards salmon habitat improvement in the Walla Walla, and which helps secure a role for the Walla Walla artificial production program.

Summary of Walla Walla Watershed Habitat Improvements in the Last 5-10 Years

Flow Enhancement

- FWS/Irrigation District settlement agreement resulted in improvement from near zero instream flows to approximately 25cfs in the mainstem Walla Walla River at Milton Freewater (RM 48) during the irrigation season.
- FWS/Irrigation District settlement agreement resulted in improvement from near zero instream flows to approximately 18cfs in the mainstem Walla Walla River at Burlingame Dam (RM 39) during the irrigation season.
- Washington and Oregon Water Trust purchase, lease or donation of water rights for instream flow enhancement has totaled about 3,350 acre-feet (AF).
- Irrigation efficiency programs to provide water savings instream or to the Water Trust Program have totaled 6,481AF.
- New Instream Flow Rule enacted by Washington State Department of Ecology was designed to reduce impacts to surface water and groundwater in the Walla Walla Basin by restricting withdrawals of newly constructed exempt wells to 1250 gallons per day and requiring 100% mitigation for outdoor water use (to be administered by a new mitigation water bank).
- The Corps/CTUIR Walla Walla Instream Flow Enhancement Project is finishing the feasibility study in 2009 with construction expected in four more years. Instream flow provided from spring through fall will be 50 to 150cfs.
- Annual shallow aquifer recharge operations totaling about 5,000 AF at three different locations has shown positive initial results regarding surface water retention in spring branch tributaries.
- 250 new meters were installed on well and pumping stations to monitor water use compliance.

Fish Passage Improvements

- 2 dam removals on mainstem Walla Walla and Touchet River (Marie Dorian and Maiden); 5 fish barriers removed on tributaries
- 6 adult ladders completed (Little Walla Walla, Nursery Bridge, Burlingame, Garden City/Lowden II, Hofer, Gose Street)
- 6 juvenile screens completed (Little Walla Walla, Burlingame, Garden City/Lowden II, Hofer, Smith-Nelson and City of Walla Walla)
- 2 ditch consolidations (Milton Ditch/Little Walla Walla River, and Garden City/Lowden II)
- 350 new pump intake screens in Oregon and Washington
- 18 push-up dam operations converted to pumps
- Continued work on another ditch consolidation and lower Mill Creek channel and passage improvements

Table 14. Stream Habitat Enhancement Programs in the Walla Walla Basin.

Actions	CTUIR	Walla Walla CCD	Tri-State Steelheaders	Blue Mt. Land Trust	TOTALS
Stream miles in easement	8	See county programs table	3	.5 completed 4 in process	11.5
Acres in easement	272	See county programs table	279	55 completed 295 in process	606
Acres seeded to native grass	60	See county programs table	7	-	67
Shrubs and trees planted	150,000	See county programs table	12,000	-	162,000
Miles livestock exclusion fence	7	-	-	-	7
Instream structures	37	400	19	-	456

CTUIR = Confederated Tribes of the Umatilla Indian Reservation; CCD = County Conservation District

Table 15. County stream buffer and soil conservation programs in the Walla Walla Basin.

Programs	WWCCD	Columbia CCD	Umatilla CCD	TOTALS
CRP				
- contracts	417	408	unavailable	825
- acres	150,000	55,000		215,000
- shrubs/trees	2.6M			2.6M
CCRP				
- contracts	62	38	unavailable	100
- acres	2,800	950		3,750
CREP				
- contracts	144*	88	unavailable	232
- acres	3,100	2,000		5,100
- stream miles	181	87		268
- shrubs/trees	1.4M			1.4M

*represents 28% of CREP projects in Washington

CREP = Conservation Reserve Enhancement Program; CCRP = Current Conservation Reserve Program; CRP = Conservation Reserve Program; CCD = County Conservation District

VI. RISK/BENEFIT ANALYSIS

This chapter assesses the risks and benefits to Walla Walla Subbasin and Columbia River Basin spring Chinook salmon, and other listed anadromous salmonids and resident fish from rearing and release of 500,000 spring Chinook salmon smolts into the Walla Walla Subbasin. In its Artificial Production Review (Northwest Power Planning Council 2000, Appendix C), the Council presented assessment criteria for proposed hatchery programs. The risks and benefits analyzed below are measured against the following criteria:

- Has the hatchery achieved its objective?
- Has the hatchery incurred costs to natural production?
- Are there genetic impacts associated with the hatchery production?
- Is the benefit greater than the cost?

The WWHMP is classified as an augmentation and restoration program for purposes of assessment. Restoration is defined as the re-establishment of a salmon or steelhead run in the place of an extirpated natural population (Northwest Power Planning Council 2000, Appendix C). The Artificial Production Review applies one other paramount criterion to restoration programs: Restoration programs must be assessed on the fundamental basis of the number of returning adults. Thus, regardless of any other program objectives that are met, successful restoration entails increasing the number of adults returning to program streams to spawn naturally. Additional benefits include: 1) restoring natural ecosystem functions to the Walla Walla Subbasin (nutrient enrichment, primary and secondary productivity, benefits to watershed); 2) maintaining/generating genetic and life history diversity for conservation purposes; and 3) providing for Walla Walla Subbasin fisheries (Tribal and non-Tribal).

This chapter begins by describing in general the most commonly identified risks involved in artificial production, rearing, and release. The assessment criteria (questions) above are then asked and answered, either from the perspective of program data, or risk assessment. A summary table of risks and benefits appears at the end.

A. Uncertainties and Constraints

The critical uncertainties relative to the program are the same as those outlined in Section IV.C.1. and are listed below.

<u>Hatchery Effectiveness Uncertainties</u>

1) Will hatchery spawning, hatching and rearing practices produce smolts at the desired quality, size, and number?
2) Will hatchery-reared spring Chinook smolts successfully migrate out of the Walla Walla Subbasin and return as adults at the desired survival rates?
3) What will the stray rates be for returning program spring Chinook adults reared at the South Fork Walla Walla Hatchery?
4) Will mixed-origin 50/50 natural/hatchery broodstock result in domestication effects; e.g. genetic drift, reduced fecundity, reduced size, etc?
5) Will adult outplanting, juvenile release, or mixed strategies result in better adult-to-adult survival in the Walla Walla Subbasin?

<u>Natural Production Uncertainties</u>

6) What is the natural production capacity and productivity of spring Chinook salmon in the Walla Walla Subbasin?

7) Will hatchery smolt releases result in increased natural production of spring Chinook?

8) Do large releases of hatchery reared Chinook salmon negatively impact endemic steelhead and resident trout populations in the Walla Walla Subbasin?

9) Will large releases of hatchery reared Chinook salmon in the Walla Walla Subbasin negatively impact neighboring salmon populations (i.e. Tucannon)?

10) Will hatchery strategies produce sustainable genetic characteristics in the reintroduced naturally-spawning population?

11) Will broodstock, escapement, and harvest management strategies employed in the Walla Walla Basin result in a more rapid establishment of natural spawning populations than in the neighboring Umatilla Basin?

12) Will an adult outplanting or juvenile release strategy be more effective for reestablishment of natural spawning populations?

13) How will ongoing flow, passage, and habitat restoration activities impact survival and productivity of reintroduced naturally spawning populations, including hatchery origin natural spawners?

14) Which of the hatchery actions being implemented in the Walla Walla, Tucannon, John Day, Grande Ronde, and Umatilla will result in the most effective restoration of natural populations?

B. Types of Risk

The common types of risks associated with artificial production, rearing, and release in restoration programs are outlined below.

1. Broodstock Selection and Spawning (Genetic Variability and Fitness)

The risk from this program is that poor broodstock selection or spawning protocols and controls would lead to a loss of genetic variability and fitness in hatchery-reared and naturally spawning population components. Often individuals within an identified biological unit (a spring Chinook salmon within the population of Carson stock spring Chinook salmon) are more genetically similar to one another than they are to individuals from other biological units. The genetic constitution of individuals is set for the life of the individual and passed on to offspring during reproduction…..unless a gene or genes within the individual mutates, or physiology/metabolism regulated by a gene complex is altered by recombination. The genetic make-up of an individual dictates to an extent how the fish appears morphologically (body shape, coloration, etc.), how its physiological processes operate, and how it responds behaviorally to the local environment. Traits that are solely genetically determined (e.g., gene x produces phenotype y) are strictly heritable traits, that is, these traits are passed to offspring with a heritability approaching 100%. However, most traits are not completely genetically controlled, and result instead from some interaction between the genotype and the environment.

The interaction between the genotype and the environment coupled with natural selection is believed to give rise to healthy, adapted individuals. Unfortunately, the extent to which populations differ adaptively from one another is difficult to ascertain. However, population genetics tells us that the collective genetic material contained within an identified population may be to some extent unique, particularly if the population has been relatively reproductively isolated from other populations for a long period of time. The genetic constitution of a population changes when random mutations in individuals are passed onto offspring, or when fish from other populations with a different genetic constitution mate with individuals from within the identified population.

As an operating hypothesis, healthy populations are large enough to maintain a balance between mutation (giving rise to new genetic variation) and genetic drift (random loss of genetic variation). Since slight changes in genetic constitution can produce adaptively differentiated fish, this balance is thought to be a critical mechanism to increase the capability of exploiting new habitats. The result is a population that is resilient to long and short-term environmental random change. On the other hand, a healthy population does not produce so many changes that large numbers of individuals become unsuited to the environmental conditions.

Broodstock Selection

Broodstock that do not share genetic make-up with, and do not phenotypically mimic the original stock, present the risk that they may not be suited to the receiving habitats. Such fish may augment harvest, since they would presumably outmigrate quickly and return at least to the Columbia River mainstem. However, returning adults may not cue on the environment as readily, resulting in large numbers of strays. It is highly unlikely that such fish would re-establish themselves quickly in an environment that does not favor their phenotype. However, the ability of salmonids to rapidly colonize new habitat suggests that genotype-environment interactions allow for the resiliency necessary to maintain a population until natural selection can act to optimize the phenotype within the novel environment.

WWHMP broodstock selection presents a low risk for these effects. The Carson founder stock was selected because it is an amalgam of mid-Columbia River stocks, which were likely adapted to habitat types common to the program release, migration, and spawning habitats. Hatchery adults are returning to the neighboring Umatilla River at a rate (0.4%) that indicates that life history characteristics of the population may be germane to local conditions. The WWHMP would retain these characteristics by continuing to use returning Carson broodstock. In the event that returns do not meet broodstock objectives, broodstock from other Carson stations would be used. Since the adaptive process between the re-establishing stock and the local environment has not yet begun, introgression of the fish from various Carson station gene pools should not significantly affect the development of a local spawning population in the near term. In the long term, it is anticipated that out of basin Carson stock transfers would likely represent only a fraction of the broodstock and naturally spawning population components. Any risk to local genetic adaptation that may be compromised by the introgression of any new Carson station gene pool would likely be quite low. In other words, if it can be said that evolutionary and selective mechanisms interacting over long periods produce a gene pool that is locally adapted, then there probably would be little damage to the reintroduced Walla Walla stock, since not enough time would have passed for the interaction to take hold.

Also, the affect of such introgression is expected to be a function of the intensity and duration of the introgression. Depending on the frequency of stock transfers, the introgression may or may not be intense. Alternatively, introduction of Carson stock spring Chinook from outside sources could be beneficial, since it could provide a mechanism to replace genetic variability lost through genetic drift as the Walla Walla stock is founded.

Spawning: Inbreeding and Outbreeding Depression

'Inbreeding' refers to mating between individuals more closely related to one another than any two individuals drawn randomly from the same population. 'Out breeding' refers to mating among members of two or more distinct breeding populations. Inbreeding and out breeding both are normal phenomena, and can be either beneficial or deleterious to a population. In large and healthy populations, inbreeding is expected to be uncommon. Out breeding in a large population likely increases genetic variability and is unlikely to compromise local adaptation.

In declining populations, however, inbreeding can result in inbreeding depression, either through the loss of genetic variation or through accumulation of deleterious alleles. Inbreeding can efficiently pass deleterious alleles or disrupt adaptive gene complexes when the number of breeders is small. Out breeding, meanwhile, may introduce disruptive adaptive gene complexes or introduce novel genetic variation at a pace that decreases the effectiveness of natural selection.

The risks of impacts from inbreeding are mostly a function of the size of the naturally spawning population. As the size of the naturally spawning population increases, all things being equal, the probability of mating between closely related individuals decreases, and the risk of inbreeding is low. In addition, there is some evidence that salmon can identify close relatives (Quinn and Busack 1985), and therefore potentially avoid spawning with them. Within the hatchery-reared component, adults are typically killed and spawned randomly. Therefore, the probability of inbreeding, all things being equal, decreases as the number of broodstock increases. The WWHMP would breed 350 adults per year, collected from a representative cross section of the entire return. In addition, another 18 jacks (3 year old males) would be incorporated into the brood. This number of broodstock would likely represent most, if not all, of the genetic variation present in the naturally spawning population component. On the other hand, inbreeding depression can result from poor spawning protocols that repeatedly cross closely related individuals. However, given the number of Walla Walla broodstock, and the fact that spawning protocols conform to IHOT recommendations; the risk of inbreeding from poor spawning protocols should be low.

Outbreeding is largely a function of stray rates and stock transfers. If a large number of strays successfully spawn in the Walla Walla River or are included as broodstock, novel genetic variation might be introduced, potentially resulting in outbreeding depression. Since the Carson stock being used in the Walla Walla River is a conglomerate of upriver stocks the risk to the WWHMP of adults straying into the system is low. In addition, if hatchery-reared or naturally spawned progeny from the WWHMP successfully spawn with other stocks, there is the potential for outbreeding depression in the receiving broodstock. Since the Walla Walla production will be 100% externally marked, any adults that stray into other systems can be identified and removed from the broodstock. The risk to surrounding hatchery broodstocks is low.

2. Juvenile Rearing

Domestication; Disproportionate Survival; Domestication Selection

Theory suggests that direct or indirect artificial selection in the hatchery environment, coupled with shelter from natural selection, could decrease the survival of hatchery-reared progeny upon release, and decrease the effectiveness of hatchery-reared adults attempting to spawn in natural habitat (Fleming and Gross 1993). The name that has been given to the cumulative effects of artificial rearing on fish is ‘domestication.’ Exactly how and to what extent domestication affects the fish’s suitability for life in the wild is uncertain; and theorized domestication effects are too numerous to list.

The likelihood and concurrent risk is high that domestication occurs to one extent or another. Over the years, observed domestication effects have been met with solutions that are more numerous, and just as hypothetical, as the effects themselves. Risk as it relates to domestication effects is less a question of reducing the risk, than a question of reducing the risk at a bearable cost. Maynard et al. (2001) suggest ways to make the rearing environment more natural, including painting raceways and using natural substrate, limiting contact between humans and rearing fish, juvenile training in predator recognition, etc.

Presently, many of these techniques are being researched. The WWHMP would not incur the costs of implementing unproven measures. However, rearing densities, which correlate strongly with anomalous age-to-size ratios, anomalous behaviors, disease transmission, and other effects, are addressed by the Proposed Action. While rearing juveniles at 0.75 pounds per cubic foot would not mitigate for all domestication effects, it would reduce impacts from those most clearly understood.

In any case, domestication typically affects traits that result from the interaction between the genotype and environment, rather than traits that are strictly genetically based (see below for a theory of genetically based domestication). As such, these traits are not 100% heritable, and may not be transmitted to the spawning population. Further, the effects of short-term artificial selection are reversible.

Disproportionate Survival

Disproportionate survival may occur as a byproduct of increased survival from the egg-to-smolt stage in the hatchery environment relative to egg-to-smolt survival in the stream. Given that survival from egg to smolt stage in a hatchery is commonly in excess of 90%, while egg to smolt survival in the wild may be less than 10%, it is possible that the adult return rate of the hatchery-reared population component could far exceed the adult return rate of the naturally spawned population component. For programs with a relatively small broodstock, there is some possibility that this could result in over-representation of the genetic variation and life-history traits exhibited by the hatchery-reared population component (often termed swamping). However, the SAR rate of hatchery-reared progeny is often less than the smolt to adult return rate of naturally spawned progeny. Further, the effects of disproportionate survival are expected to be detrimental only if the result is a loss of genetic variability, or if the hatchery-reared and naturally spawned population components differ genetically or in some key life-history trait.

Given the number of broodstock proposed for the WWHMP is quite large and broodstock are collected throughout the entire run, it is unlikely that the genetic composition and life-history traits of the hatchery-reared and naturally spawned population components would differ. Therefore, it is concluded that the risks of detrimental effects resulting from disproportionate survival are low.

<u>Disease</u>
Interactions between infected hatchery fish and fish in the natural environment may result in pathogen transmission. As the pathogens responsible for diseases are present in both hatchery and natural populations, there is some uncertainty associated with determining the extent of disease transmission from hatchery fish (Williams and Amend 1976; Hastein and Lindstad 1991). However, hatchery populations are considered to be reservoirs of disease pathogens because of high rearing densities and resultant stress. There is little evidence, however, to suggest that diseases are routinely transmitted from hatchery to wild fish (Steward and Bjornn 1990). Chapman et al. (1994) concluded that disease transmission from hatchery to natural populations is probably not a major factor negatively affecting wild steelhead in the Columbia Basin. Disease transmission between hatchery and natural Chinook may be one cause of mortality in the Corps transportation program. The incidence of bacterial kidney disease (and the potential for transmission between natural and hatchery stocks of spring/summer Chinook salmon collected for transport are being investigated by the USFWS.

Carson stock spring Chinook from the Umatilla River are identified as the founder broodstock for the WWHMP. Oregon Department of Fish and Wildlife fish pathology personnel have monitored the health of Umatilla River spring Chinook salmon for brood years 1997-2000. Sampling and testing for bacterial kidney disease, culturable viruses and systemic bacteria have been conducted each year as part of the fish health section of the Umatilla Hatchery monitoring and evaluation project. Extensive sampling for Rs antigen (bacterial kidney disease) by enzyme-linked immunosorbent assay (ELISA) has shown that the vast majority (>98%) of this stock have had negative or low-level values. In three years of monitoring 763 adults, only one case of clinical bacterial kidney disease has been documented. This was in a BY98 female and the eggs were not used for production. The overall bacterial kidney disease profile indicates this stock has been very “clean.”
In the first two years, infectious hematopoietic necroses virus or other culturable viruses were not detected in this stock at this facility. However, 42% of the BY99 females sampled were positive for infectious hematopoietic necroses virus. Three bacterial pathogens have infrequently been isolated from adult mortality. *Yersinia ruckeri,* the causative agent of enteric redmouth disease, was detected in one of 54 (1.8%) adult mortalities in 1997. During this same year, three of 54 (5.6%) adult mortalities exhibited a low prevalence of *Carnobacterium pisciola* bacteria, the agent of pseudokidney disease. One of eighteen (5.6%) BY98 adult mortalities had a heavy level of systemic *Aeromonas salmonicida*, the causative agent of furunculosis.

To address concerns of potential disease transmission from hatchery to natural fish, the Pacific Northwest Fish Health Protection Committee has established guidelines to ensure that hatchery fish are released in good condition, thus minimizing impacts to natural fish (Pacific Northwest Fish Health Protection Committee 1989). Also, IHOT (1995) developed detailed hatchery practices and operations designed to prevent the introduction and/or spread of any fish diseases within the Columbia River Basin. The WWHMP would follow fish health protocols in accordance with Pacific Northwest Fish Health Protection Committee and IHOT recommended guidelines, hence minimizing the risk of disease transmission. The risk of disease transmission from hatchery fish to natural stocks of anadromous salmonids is uncertain, and an objective of program monitoring and evaluation.

3. Juvenile Release

Predation

Hatchery fish may prey upon naturally spawned fish. Due to their location, size, and time of emergence, newly emerged Chinook salmon fry are likely to be most vulnerable to predation by hatchery-released fish. Their vulnerability is believed to be greatest as they emerge, and decreases somewhat as they move into shallow, shoreline areas (U.S. Fish and Wildlife Service 1994). Emigration out of hatchery release areas and foraging inefficiency of newly released hatchery smolts may minimize the degree of predation on Chinook salmon fry (FWS 1994).

Predation by hatchery fish on natural-origin smolts is less likely to occur than predation on fry (U.S. Fish and Wildlife Service 1994). Chinook salmon yearling smolts released from hatcheries may interact with one-, two-, or three-year-old unsmolted wild steelhead that are rearing in the tributary and mainstem migration corridors. The Species Interaction Work Group (1984) reported that there is an unknown risk of predation by enhanced Chinook salmon on wild steelhead juveniles where they interact in freshwater migration areas. The Species Interaction Work Group noted that predation may be greatest when large numbers of hatchery smolts encounter newly emerged fry or fingerlings, or when hatchery fish are large relative to natural fish.

There is a potential for predation of natural steelhead by hatchery Chinook if the steelhead are small enough. Predators tend to prey on food items less than or equal to one-third of their length (Witty et al. 1995). Non-smolted age two and three steelhead are relatively large in the Walla Walla River (150-175 millimeters), making predation by hatchery Chinook smolts unlikely (Contor and Sexton 2003).

Spring Chinook begin making a transition from an invertebrate diet to a fish diet when they reach 120 mm or larger and begin their seaward migration as yearling smolts. Muir and Emmett (1988) found Chinook smolts actively feeding on invertebrate species such as clodocerans, chironomids, and amphipods during their downstream migration. Larger smolts may eat smaller fish, but recent information indicates that fish are an insignificant fraction of the food consumed by migrating Chinook salmon in the Snake and Columbia rivers (Muir and Coley 1995).

Large numbers of hatchery fish may attract predators (birds, fish, pinnipeds) and, consequently, contribute indirectly to predation of natural fish. On the other hand, a mass of fish moving through an area may confuse or distract predators and may provide a beneficial effect. Both effects may be occurring to some extent. The presence of large numbers of hatchery fish may also alter natural fish behavioral patterns, which may influence vulnerability and prey susceptibility (U.S. Fish and Wildlife Service 1994).

The WWHMP will only release full-term smolts. Full-term smolts leave the system quickly, and therefore are less vulnerable to predation. This strategy helps minimize concerns about predation and other ecological interactions.

Competition

Direct competition for food and space between hatchery and listed fish may occur in spawning and/or rearing areas, the migration corridor, and the ocean habitat. Impacts from competition are assumed to be greatest in the spawning and nursery areas and at the points of highest density (release areas), and to diminish as hatchery smolts disperse (U.S. Fish and Wildlife Service 1994). Competition continues to occur at some unknown, but probably lower level, as smolts move downstream through the migration corridor. Release of large numbers of pre-smolts in a small area is believed to have greater potential for competitive effects because of the extended period of interaction between hatchery and natural fish. Release of hatchery smolts that are physiologically ready to migrate is expected to minimize competitive interactions, as they should quickly migrate out of the spawning and nursery areas.

Juvenile Chinook salmon have been shown to behaviorally dominate juvenile steelhead (Allee 1974). However, where populations have evolved sympatrically, Chinook and steelhead have evolved slight differences in habitat use patterns that minimize their interactions. Segregation of species appears to be both actively maintained and adaptive (Nilsson 1967). Juvenile spring Chinook salmon would probably provide an additional forage base for bull trout in areas where they coexist. Ultimately, intra-specific and inter-specific competition tends to be density-dependent. Since the carrying capacity of the target streams is underutilized, impacts to naturally rearing anadromous species are expected to be minimal. The WWHMP will only release full-term smolts. Full-term smolts leave the system quickly, and therefore are less likely to compete. This strategy helps minimize competition concerns.

4. Adult Outplants

Historically, populations of spring Chinook and other salmonids existed sympatrically in Mill Creek and the Touchet River. Reestablishment of Chinook is these two tributaries through the adult outplanting component of the program is not anticipated to have any significant affect on other salmonid populations during the freshwater life history stages (see discussion above in Section VI.B.3.). Since progeny from this portion of the program will have reared their entire life cycle in a natal stream environment, straying and outbreeding concerns would be anticipated to be no more than other natural populations.

5. Straying

Straying is considered the major cause of out breeding depression. The straying of non-endemic hatchery stocks causes concerns from the cumulative effects of unidirectional gene flow into non-targeted populations. There is evidence that a number of phenotypic and life history traits of Pacific salmon are the result of local adaptation (Ricker 1972; Taylor 1991). Circumstantial evidence for the importance of local adaptation is provided by Withler (1982), who found that stock transfers within the normal range of Pacific salmon have been unsuccessful in producing new anadromous stocks, except where natural colonization has been prevented by an obvious physical barrier. Therefore, the BiOp (National Marine Fisheries Service 1995) recommends that straying of nonnative hatchery fish may not exceed 5% of any non-targeted naturally-produced salmon or steelhead population from a different ESU to minimize the effects of genetic introgression on natural populations.

Umatilla River origin Carson stock spring Chinook have been documented straying into the Tucannon River. The Tucannon River spring Chinook population is listed as Threatened under the ESA and is a population of concern. The potential exists that Walla Walla River spring Chinook could also stray into the Tucannon River. Expanded estimated annual recoveries of Umatilla origin adults in the Tucannon River from 1992 to 2006 has ranged from 0 to 64 and averaged approximately 12 adults per year (Gallinat pers.comm).The number of Umatilla adults observed in the Tucannon River has ranged from 0% to 1.27% of the total annual Umatilla River return and averaged 0.40%. If the 0.40% rate is applied to the expected Walla Walla River hatchery return goal of 2,750, it would result in approximately 11 adults per year entering the Tucannon River with a range of 0 to 35 fish. Since the Walla Walla production will be 100% externally marked, adults reaching the Tucannon River weir can be identified for removal. It has been estimated that 80% of these fish that enter the Tucannon River could be removed from the system (Mendel pers.comm.). This would result in approximately two Walla Walla adults per year unaccounted for in the Tucannon River with a range of 0 to 7 fish.

During the same period of 1992 to 2006, Umatilla strays have comprised an average of 2.53% of the Tucannon total run and ranged from 0% to 12.1%. If 80% of these stray fish are removed, Walla Walla adults would comprise an average of 0.5% of the Tucannon run with a range of 0% to 2.4%.These stray estimate figures from the Umatilla program may be higher than what would actually be expected from the WWHMP since the Walla Walla production will be reared full term in-basin on a natal water source. This combination of factors results in an acceptable risk to the Tucannon River. If actual stray rates are significantly higher than projected in this analysis then co-managers would address the issue in the forums outlined in Sections VII.D. and VII.E.

6. Migration Corridor/Ocean

Considerable speculation, but little scientific information, is available concerning the overall effects to listed salmon and steelhead from the combined number of hatchery fish in the Snake/Columbia rivers migrational corridor. In a review of the literature, Steward and Bjornn (1990) indicated that some biologists consider density-dependent mortality during freshwater migration to be negligible; however, they also cited a steelhead study that indicated there might have been a density-dependent effect (Royal 1972, cited in Steward and Bjornn 1990). Hatchery and natural populations have similar ecological requirements and can potentially be competitors where critical resources are in short supply (Lower Granite Migration Study Steering Committee 1993). Feeding rates may be a useful indicator for determining if food is a limiting factor in the migration corridor, which could decrease survival to adulthood. However, it may also be an indicator of poor health or stress even when food is not limited (Dawley et al. 1986). Giorgi (1991) indicated that there is contrasting information on the food habits of yearling Chinook salmon at Lower Granite Dam.

Carrying capacity depends on system productivity, which fluctuates. Variation in productivity is probably linked to climatic cycles as well as to human activities that have altered the habitat in the last 100 years. The difficulty of estimating a system's capacity to support salmon is probably further compounded by cycles of oceanic productivity and other ecological and human factors, effects that may be difficult to isolate from each other. Current migration corridor and ocean carrying capacity estimates must be based on present conditions and may be lower than historical levels. However, a reasonable estimate of the current carrying capacity is not available and would be difficult to derive. The effects of hatchery production on listed salmon and steelhead in the ocean would be speculative, since hatchery fish intermingle at the point of ocean entry with natural and hatchery anadromous salmonids from many other regions. The additional production of spring Chinook expected from this program should not have a measurable impact on survival rates in the migration corridor and the ocean. The production levels remain below the artificial production cap proposed by NMFS.

7. Program Assessment

Costs to natural production from the release of an additional 500,000 juveniles into the Columbia River Basin would be incurred in the tributary rearing and migration areas, mainstem migration corridor, estuary, and/or ocean if incurred at all. Once these smolts enter the mainstem, they would begin mixing with other stocks. In all cases – increased predation, competition, etc. – the combination of potential risk factors and the mixing of stocks make any analysis of impacts speculative in the extreme.

There are no genetic impacts to naturally spawning Walla Walla populations, since spring Chinook have been extirpated in the subbasin since the early 1900s. Genetic impacts would be from straying of program fish into other watersheds. Straying is expected to be very low (about 1.1%); therefore, minimal or no impacts are expected from straying. At this point, there is no known cost to listed populations of Columbia/Snake River Basin anadromous salmonids. There are potential short-term and long-term risks, which have been summarized in previous sections. Co-managers believe that the Preferred Alternative presents uncertain or low to moderate risks in the impact categories, and uncertain or high benefits.

8. Impacts on Other Anadromous and Resident Species

Co-managers and researchers estimate that impacts from releasing hatchery spring Chinook on natural salmonids would be small based on the following concepts: Habitat is abundant when and where hatchery fish are released. Releases of hatchery-reared fish into the Walla Walla River will occur in the spring when water temperatures are cold, flows are high and natural rearing space is abundant. Duration of contact is minimal. The majority of the hatchery spring Chinook are anticipated to migrate to the Columbia River soon after release. Because hatchery fish reside in the basin for a short period when habitat is abundant, the overall impact on naturally produced salmonids is probably small.

WWHMP fish will comprise only a small proportion of all the hatchery fish in the Columbia River. The affect of hatchery fish on natural salmonids migrating in the mainstem of the Columbia River is unknown.

Releasing hatchery smolts into the Walla Walla River would not change densities in the Columbia River to any extent.

9. Ecological Compatibility

Spring Chinook salmon were native to the Walla Walla Subbasin and existed sympatrically with steelhead, bull trout and mountain whitefish. Because these species evolved together, restoring Chinook salmon to the basin should enhance species diversity and improve the overall productivity of the system. Research by Everest and Chapman (1972), and more recent work by Hillman et al. (1987), and McMichael and Pearsons (1999) suggest that, through niche partitioning, spring Chinook juveniles do not significantly affect the natural production of juvenile steelhead. Nutrients from adult carcasses are expected to benefit all salmonid species. Chinook fry and parr produced by spawning adult hatchery fish would enhance forage opportunities for bull trout and piscivorous rainbow trout.

The number of adult steelhead returning to the Walla Walla River, Umatilla River, Grande Ronde River and index counts from the John Day River all follow similar patterns of higher returns in the 1980s, poor returns in the 1990s, and and increase in numbers again in the 2000s. Steelhead returns in basins without hatchery releases do not show any significant trend differences in adult returns correlating to large releases of hatchery fish. In fact, steelhead in the Umatilla River (a heavily supplemented basin) have done better, proportionally, than John Day River and Walla Walla River steelhead populations (both non-supplemented basins) (Contor and Kissner 2000).

C. Cumulative Impacts

There are no anticipated cumulative negative impacts to Walla Walla Subbasin and/or Columbia River Basin anadromous salmonids from the Proposed Action. While the theory and science of ecosystem management remains in its infancy, co-managers expect that as Walla Walla River natural populations re-establish themselves, the ecosystem would continue to come into balance. Predation, competition, and genetic effects would conform to normal limits for the condition of the ecosystem.

Positive cumulative impacts expected from the WWHMP, beyond increased subbasin harvest and adapted natural populations, are listed below:

- Restoration of normative ecosystem functions
- Fulfillment of treaty-reserved fishing rights
- Sport-fishing opportunities
- Nutrient cycling-recruitment of marine nutrients
- Increased geographic range of salmonid populations—risk buffering for salmonid species
- Scientifically addressing critical uncertainties regarding passage improvement, habitat restoration, reintroduction, and supplementation
- Scientifically evaluating the colonizing capability of salmonids

D. Expected Project Benefits

<u>Augmentation</u>

- Program adult returns are expected to benefit augmentation in the long-term.
- Opportunities for tributary Tribal subsistence, and ceremonial harvest would be provided.
- Opportunities for tributary sport fisheries would be provided.
- Treaty and *US v. Oregon* Tribal fishing obligations would be addressed.
- Program adults would contribute to ocean and Columbia River mainstem fisheries.

- Sport harvest opportunity should bring increased local economic activity from tourism and fishing.

<u>Restoration</u>

- Only a handful of adults currently return to the basin on an annual basis.
- Returns from the adult outplanting program occurred in 2003 and 2004.
- Increased hatchery production in combination with habitat restoration, passage improvement, and flow enhancement efforts will allow a natural population to reestablish in the subbasin.
- Hatchery returns will provide an available source of adults for outplanting.
- Adult outplanting will expand the restoration of natural populations to the Mill Creek and Touchet River areas of the subbasin.
- Hatchery and natural production from the Walla Walla River would contribute to the NPPC's long-term goal for doubling anadromous fish runs within the Columbia River Basin. It would also assist BPA in meeting its requirements under the Act to mitigate for loss of anadromous fish and habitat from construction and operation of the hydrosystem.

1. Long-term Maintenance of Expected Benefits

The WWHMP would be one of several integrated fisheries restoration projects in the subbasin. Together, these projects provide extensive monitoring and evaluation for all phases of hatchery operations, hatchery and natural production objectives, subbasin habitat restoration, passage and flow enhancement, water quantity and quality issues, harvest planning, etc. This extensive monitoring and evaluation effort is designed to provide adaptive management capabilities for the program to ensure long term benefits of the program are maintained and to respond quickly to any adverse impacts. The relative risks and benefits to Chinook salmon as a result of implementing the Preferred Alternative are summarized in Table 16.

Table 16. Preferred Alternative: Risks/Benefits to Spring Chinook

		Risks		**Benefits**	
		Short-term (program life)	**Long-term**	**Short-term (program life)**	**Long-term**
Domestication Effects		Moderate	Low	None	High
Disease		Moderate	Low		
Competition	Juveniles	Low	Low	None	High
	Adults	Low	Low		
Predation	Juveniles	Moderate	Moderate	None	High
	Adults	None	None		
Adult Straying		Moderate	Low	None	High
Genetic Variability/Fitness					
	Inbreeding Depression	Low	Low	High	High
	Outbreeding Depression	Moderate	Low		
Other					
Restoration of normative ecosystem functions		None	None	High	High
Nutrient cycling-recruitment of marine nutrients		None	None	High	High
Fulfillment of treaty-reserved fishing rights		Low	Low	High	High
Sport fishing opportunities					

	Risks		Benefits	
	Short-term (program life)	**Long-term**	**Short-term (program life)**	**Long-term**
Increased geographic range of	Low	Low	High	High
extant salmonid populations	None	None	High	High
Scientifically address reintroduction uncertainties	Moderate	Low	Moderate	High

VII. MANAGEMENT APPROACH/RELATIONSHIP TO OTHER PROGRAMS

The following section describes the goals, objectives and strategies of the WWHMP. Under the NPCC master planning process step, the sponsor must relate the proposed program to other existing programs, management plans, and agreements. Such programs and plans may include surveys of natural populations, harvest strategies, habitat recovery strategies, and ecological interactions.

A. Current Management Approach

Walla Walla River subbasin restoration planning began after adoption of the first Council Fish and Wildlife Program (Northwest Power Planning Council 1987). This led to the development of a number of planning documents (Confederated Tribes of the Umatilla Indian Reservation 1990, 2001; Columbia River Inter-Tribal Fish Commission 1995; U.S. Army Corps of Engineers 1997and Walla Walla County and Walla Walla Basin Watershed Council 2004). These restoration planning documents identified six strategies to restore Walla Walla River subbasin anadromous fish production. These strategies include: 1) improving instream flows; 2) enhancing passage at irrigation diversions; 3) improving riparian communities and instream habitat; 4) reestablishing salmon production through hatchery releases; 5) supplementing steelhead populations using endemic broodstock; and 6) monitoring and evaluation.

The Walla Walla Subbasin Summary (Confederated Tribes of the Umatilla Indian Reservation 2001) and Subbasin Plan (Confederated Tribes of the Umatilla Indian Reservation 2004) provide goals, objectives, and strategies for restoration of spring Chinook salmon in the subbasin. The general goal of the WWHMP is to restore sustainable, naturally producing populations to support Tribal and non-Tribal harvest and cultural and economic practices, while protecting the biological/ecological integrity and the genetic diversity in the watershed. In addition, the program will be operated with an emphasis on escaping natural origin adults to spawn in an attempt to accelerate the restoration of natural spawning populations.

B. Past Efforts

Many specific actions have been implemented to address the six restoration strategies outlined above. The instream flow issue is being addressed through two different forums. Immediate steps to provide minimum instream flows in the mainstem river reaches below Nursery Bridge and Burlingame dams have been required since 2000 as part of the FWS Civil Penalty Settlement Agreement (U.S. Fish and Wildlife Service 2000) with three local irrigation districts. The agreement outlined minimum flows of 13 cfs below Nursery Bridge Dam and 10 cfs below Burlingame Dam. Under the Final Amended Civil Penalty Settlement Agreement (U.S. Fish and Wildlife Service 2001), these flow levels were increased to 18 cfs and 14 cfs in 2001 and again in 2002 to 25 cfs and 18 cfs, respectively. In addition to these minimum instream flows, planning is currently underway to develop long term flow enhancement measures for the upper mainstem Walla Walla River. The Corps and CTUIR have initiated a feasibility study to determine long term alternatives to the instream flow improvement question.

Passage enhancement has occurred on a large scale basis across the watershed. Many of the larger juvenile and adult passage impediments have been addressed although a number of passage concerns still exist in the basin, especially in Mill Creek. Two decommissioned dams, one in the upper mainstem Walla Walla River and one in the lower Touchet River, have been removed. New or improved adult ladders have been constructed at Burlingame Dam, Nursery Bridge Dam, Gose Street (Mill Creek), and Little Walla Walla River. New juvenile fish screening facilities have been constructed at Burlingame, Little Walla Walla River, Hofer Dam (lower Touchet River), City of Walla Walla intake (Mill Creek), and numerous smaller diversions. Also, the Lowden 2 and Garden City ditches in the middle mainstem area have been consolidated with a new screen and ladder and the Milton Ditch has been consolidated into the Little Walla Walla River system. A number of other passage improvements, most notably at Titus Creek (Mill Creek), Mill Creek Dam, and Old Lowden and Bergevin-Williams diversions (mid-mainstem) are in the planning stages.

The WWFPO project (BPA # 200020139) monitors juvenile screen and adult ladder passage facilities in the basin. This project also provides trap and haul capabilities if required. Ongoing operation and maintenance of BPA-funded ladders and screens is implemented by local irrigation districts under the Walla Walla River Juvenile and Adult Passage Improvements Project (BPA # 199601100).

Projects to protect and enhance anadromous and resident salmonid habitat is funded under numerous projects in both the Oregon and Washington portions of the subbasin by BPA as well as many other funding sources including the Oregon Watershed Enhancement Board, the Salmon Recovery Funding Board, and the Fisheries Restoration and Irrigation Management Program. These projects implement a variety of stream and riparian habitat improvements to increase the productivity of migration, spawning and rearing areas including land purchase, fencing, instream structures, bank stabilization and riparian plantings on both private and public land.

There are three on-going production actions occurring in the subbasin. Adult spring Chinook from Ringold Springs Hatchery and the Umatilla River have been outplanted since 2000 to begin restoration of spring Chinook populations into Mill Creek and South Fork Walla Walla River. This program was initiated with the intent that it would be an interim effort prior to implementation of a full scale juvenile production supplementation program.

As part of the *U.S. v. Oregon* Interim Management Agreement, 250,000 spring Chinook smolts were reprogrammed from Little White Salmon/Carson National Fish Hatchery beginning in 2005 utilizing Mitchell Act funding to initiate an interim smolt release program for the Walla Walla River prior to implementation of this WWHMP. It is anticipated that this program will extend at least through the 2017 brood year (2019 releases) unless the WWHMP is implemented prior to that.

There are also two summer steelhead hatchery programs in the Washington portion of the subbasin conducted under the Lower Snake River Compensation Plan (LSRCP). The mitigation program has been ongoing since 1983 and uses Lyons Ferry Hatchery stock steelhead. The current release goals are for 85,000 smolts into the Touchet River and 100,000 smolts into the mid-mainstem Walla Walla River for fishery augmentation purposes. The Dayton Conditioning Pond was constructed as part of the LSRCP program to acclimate steelhead smolts prior to release into the Touchet River. An endemic stock (Touchet River) component was added to the LSRCP program beginning with the 2000 brood. The short term goal is to release 50,000 smolts into the Touchet River above Dayton, Washington.

Several actions are being implemented in order to assess progress and adapt strategies through monitoring and evaluation (addressing subbasin information needs). As mentioned previously, daily monitoring of passage facilities are conducted under BPA project #200020139. Evaluation of newly constructed passage facilities is conducted as part of BPA project #199601100. Steelhead and bull trout passage and migration patterns are being evaluated as part of the WWBNPME (#200003900). The WWBNPME project also monitors and evaluates natural production of bull trout, steelhead, and results of the spring Chinook outplanting program primarily in the Oregon portion of the subbasin (including Mill Creek). Natural production monitoring and evaluation in the Washington portion of the subbasin is primarily conducted by WDFW under BPA project #199802000. In addition, WDFW conducts both natural production and hatchery monitoring and evaluation under LSRCP. Table 17 presents the list of BPA funded restoration projects currently ongoing in the subbasin.

Table 17. Bonneville Power Administration-Funded Projects in the Walla Walla Subbasin

Project #	Agency	Title	Activities
200020139	CTUIR/ ODFW	Walla Walla Fish Passage Operations	Monitor passage facilities and conditions.
199601100	CTUIR (sponsored)	Walla Walla River Juvenile and Adult Passage Improvements	Fund construction of passage improvements. Fund ongoing O&M of passage improvement projects.

Project #	Agency	Title	Activities
200003900	CTUIR	Walla Walla Basin Natural Production Monitoring and Evaluation	M&E of natural production primarily in Oregon Enumerate adult returns at Nursery Bridge Dam.
199802000	WDFW	Assess Fish Habitat and Salmonids in the Walla Walla Watershed in Washington	Monitoring and evaluation of natural production primarily in Washington
200002600	CTUIR	Rainwater Wildlife Area	Enhancement of upland and riparian habitat
199604601	CTUIR	Walla Walla Basin Fish Habitat Enhancement	Enhancement of riparian habitat

CTUIR = Confederated Tribes of the Umatilla Indian Reservation; WDFW = Washington Department of Fish and Wildlife

C. Harvest Management Approach and Related Harvest Plans

The harvest management goal for the Walla Walla Subbasin is to provide opportunities for Tribal and sport harvest while maintaining natural and hatchery production objectives. This proposed goal is designed to support the rebuilding of salmon populations in the subbasin while being consistent with Indian treaty fishing rights, the U.S./Canada Pacific Salmon Treaty, the US v. Oregon Agreement, and the NPPC Fish and Wildlife measures 204 (b), (d), and (e).

As stated previously, the program will be operated with an emphasis on escaping natural origin adults to spawn in an attempt to accelerate the restoration of natural spawning populations. Hatchery/natural escapement ratios and harvest rates will be adjusted as the program develops. Initially, harvest rates will be set low allowing higher numbers of hatchery fish to escape to spawn and seed the habitat. Rates will be increased as the number of natural fish increase and fewer hatchery adults are needed for natural spawning augmentation in the upper mainstem and South Fork Walla Walla River or for outplanting. Appendix X presents the model which will be used to set harvest rates at varying run sizes and escapement levels of natural adults. In the long term, it is anticipated that harvest opportunities will be provided in Mill Creek and the Touchet River after hatchery releases have been reprogrammed into these areas.

D. Production Management Structure and Process

Management of the South Fork Walla Walla Hatchery will be conducted under the direction of CTUIR. The production program at the facility will be coordinated between the subbasin fisheries co-managers (CTUIR, ODFW, WDFW, FWS, and NMFS) through development of an AOP for the subbasin similar to that which exists in the Umatilla Basin. In addition, any in-season adjustments that need to be made which deviate from the AOP will be coordinated with the co-managers through the Walla Walla Basin Technical Work Group meetings. Production will be coordinated at a regional level through the *US v. Oregon* Production Advisory Committee .

E. Adaptive Management

A key ingredient of any hatchery management plan is the ability to adapt the program as necessary based on performance and monitoring and evaluation results. Annual variations in adult return numbers may result in one year management changes in order to address issues related to broodstock collection and escapement numbers or disposition of surplus hatchery adults. As stated in Section VII.D., an AOP will be developed with the co-managers based on Appendix X. to determine annual disposition of returning adults.

Long term variations from the predicted SAR and spawner escapement or juvenile habitat capacities are examples of monitoring and evaluation results which may trigger a reprogramming of hatchery production or adult outplanting within the subbasin. It is the intent of the co-managers that in the longer term, after a self sustaining natural population has been reestablished in the upper mainstem, a portion of the hatchery releases may be shifted to Mill Creek and the Touchet River to augment harvest in those two areas of the subbasin. In addition, monitoring and evaluation of tributary habitat capacities may alter the number and location for adult outplants. Lastly, fundamental changes to the overall program may be implemented based on results of the comparative hatchery action analysis study when it is completed in order to more effectively reach the WWHMP goals. Any longer term changes to the program will be coordinated with the co-managers and through *U.S. v. Oregon.*

F. Consistency and Coordination of Project with Other Plans

The WWHMP will be coordinated throughout its development with the appropriate corresponding processes related to production and harvest. A Hatchery and Genetic Management Plan (HGMP) will be developed from this document as the WWHMP is being implemented to satisfy NPPC and ESA requirements. Other activities related to the implementation of the WWHMP will be incorporated into future subbasin planning documents. Production and harvest related issues will be coordinated with ODFW and WDFW at the local level and all co-managers through the *U.S. v. Oregon* process. The project is also included in the 2008-2017 BPA/Tribal Accords Agreement. Table 18 outlines the relationship of the WWHMP with other region wide plans and policies.

Table 18. Consistency with Other Plans and Processes

Plans/Agreements	Consistency
NPPC Fish and Wildlife Program	Consistent with the Council's goal of "doubling" anadromous runs in the Columbia Basin
NPPC Artificial Production Review	Consistent with the Council's policies for supplementing natural populations through artificial production and with the AHA Model for integrated hatchery programs
NMFS Recovery Plans	Consistent with the NMFS Recovery Plans
NMFS 1999 Biological Opinion on Artificial Production	Consistent with the 1999 NMFS Biological Opinion on Artificial Production.
FWS Recovery Plans	Consistent with the FWS Bull Trout Recovery Plans and Walla Walla HCP
U.S. v. Oregon	Consistent with both the Interim Management Agreement and 2008-2017 Management Agreement which identify spring Chinook releases into the Walla Walla Subbasin
Watershed Plans and Activities	Consistent with the NPPC Subbasin Plan
Related Harvest Plans Mainstem and Ocean	Consistent with U.S./Canada Pacific Salmon Treaty and US v. Oregon
Tribal Accords - MOA between BPA and CTUIR	Consistent with BPA/CTUIR agreement for commitment to provide funding for Walla Walla Spring Chinook Hatchery project planning, construction, O&M and M&E 2008-2017.

NPPC = Northwest Power Planning Council; FWS = Fish and Wildlife Service; NMFS = National Marine Fisheries Service; HCP = Habitat Conservation Plan

VIII. CONCEPTUAL DESIGN AND COST ESTIMATES FOR THE PREFERRED ALTERNATIVE

A. Schedule for Walla Walla Hatchery Master Plan Development and Construction

Table 19. South Fork Walla Walla Hatchery Development Schedule

Step 1 completed	Step 2 completed	Step 3 completed	Final Design Completed	Construction Initiated	Construction Completed	Operations Begin
2008	2009	2010	2010	2010	2011	2011

B. Conceptual Design

The NEOH Conceptual Design and Final Siting reports which identified a hatchery for the Walla Walla Subbasin were completed by Montgomery Watson in 1995. The preferred location identified in those reports for construction of a hatchery was at the same location (Russell Walker property) as the site selected for the South Fork Walla Walla Adult Holding and Spawning Facility. This site was originally selected during the analysis of alternatives under the Umatilla Satellites and Release Sites for a Umatilla Program spring Chinook adult holding and spawning satellite facility due to its favorable spring Chinook water temperature profiles.

The final design of the of the South Fork Walla Walla Adult Holding and Spawning Facility was done internally by the BPA Engineering Division and a number of provisions were incorporated into the development of the facility with the anticipation that the site would be expanded in the future into a full scale hatchery. A larger tract of land was purchased, the facility was sized in order to accommodate both a Umatilla and Walla Walla broodstock program, and the water supply intake and pumps, influent and effluent piping, pollution abatement pond, and ozone treatment system were all sized for full hatchery production. In addition, an adult trap to facilitate broodstock collection for the hatchery was incorporated into the construction of the new Nursery Bridge Dam ladder.

The information in the original NEOH Conceptual Design and Final Siting reports (Montgomery Watson 1995) was updated by Montgomery Watson Harza (MWH) in the form of a Technical Memorandum (Montgomery Watson Harza 2004). The Technical Memorandum contains preliminary engineering documentation based on updated project criteria, schematic layouts for the proposed facility, an estimate of cost expenditures to date, and planning level cost estimates. Updated conceptual planning level cost estimates for both construction and design have been provided by HDR/Fish Pro (2007).

C. Costs to Date

As stated above, a number of provisions and associated costs were included in the construction of both the South Fork Walla Walla Adult Holding and Spawning Facility and Nursery Bridge Dam ladder. Construction cost breakdowns for these additional facility provisions specific to the hatchery are not readily discernible from the overall project costs. Since the satellite facility was originally designed to accommodate both Umatilla and Walla Walla broodstock programs, half the original construction cost ($2,952,500) was assigned to Walla Walla Hatchery. In addition, rough cost estimations were provided by MWH for the facility oversizing ($575,000) and the Corps for the trap at the Nursery Bridge Dam ladder ($596,000). These costs are included on the construction line in Table 20.

The original parcel of land for the South Fork satellite facility was purchased for $98,500. This included $56,000 for 18 acres of land and $42,500 for buildings and other improvements. The existing satellite facility occupies roughly three-quarters of the total land area purchased. All the property improvements are located on the portion of the parcel not currently utilized by the satellite facility. The land purchase estimation entered in Table 20 for the hatchery includes one-quarter of the actual land value and all the property improvement values. Although the satellite facility originally could have been constructed on a much smaller parcel if the hatchery had not been envisioned the previous owner would not split the original parcel and so this cost would have been occurred whether the hatchery was built or not.

Similarly, early planning and design work for a Walla Walla Hatchery were incorporated into two other planning efforts, the NEOH project which covered multiple subbasins and the Umatilla Satellites and Release Sites project. Again, breakdowns of design and planning costs specific to the Walla Walla Hatchery portion are not readily available. Rough estimates of costs associated with Walla Walla Hatchery incurred under these other two projects were provided by Montgomery Watson Harza (2004) and BPA. These costs along with recent planning and design costs specific to the WWHMP development are presented in Table 20. All planning costs listed in Table 20 for the period prior to 2000 were incurred as a part of these other efforts. Costs incurred related to operation of the existing South Fork Walla Walla Adult Holding and Spawning Facility and ongoing monitoring and evaluation efforts in the subbasin have not been included in Table 20 as they have been incurred as part of existing project tasks and are not specific to the development of this WWHMP.

Table 20. Costs to Date

Calendar Year(s)	1989-1999	2000-2007
Planning	$150,000	$103,125
Land Purchase	$56,500	$0
Design	$80,000	$30,000
Construction	$4,123,500	$0
Operation and Maintenance	$0	$0
Monitoring and Evaluation	$0	$0

D. 2008 through 2017 Estimated Costs

Step 1 of the WWHMP is anticipated to be completed in 2008. Estimated costs for Step 2 are $100,000 for planning and $384,000 for engineering and for Step 3, $55,000 for planning and $576,000 for engineering. The engineering estimates are based on a percentage of the 2010 projected construction cost. The cost estimate for Step 3 planning assumes that only final technical design details will need to be completed.

The budget line item for NEPA costs is $350,000. This is the amount identified by BPA as needed for developing a full Environmental Impact Statement (EIS) which BPA feels is necessary for any new or expanded artificial production program (J. Marcotte pers. comm.).

All necessary land purchases have already been made. The preliminary planning level construction cost estimate identified in the Technical Memorandum (Montgomery Watson Harza 2004) for the South Fork Walla Walla Hatchery was $6,622,950. In addition to the construction estimate, capital ($221,000) and non-capital ($90,000) facility startup equipment costs were also estimated and included as part of the total construction budget. The projected conceptual level cost estimate provided by HDR/Fish Pro (2007) for total construction cost of the hatchery in 2010 is $11,448,500. Projected estimates for capital and non-capital startup equipment to be included as part of the total construction costs are $248,000 and $101,000, respectively.

The total projected construction cost estimate provided by HDR/Fish Pro (2007) includes a line item for

Engineering, Permitting, and Administration. Half of the 2010 estimated total $1,918,733 under this line item is for the Step 2 and Step 3 engineering design work. For the purposes of Table 21, these costs have been subtracted from the total construction cost and included separately on the Design line item. The total construction line item in Table 21, including capital and non-capital startup equipment is $10,837,500.

The annual operation and maintenance cost for the hatchery after all facilities are fully developed is estimated at approximately $865,000. This figure includes costs for broodstock and facility maintenance activities related to the Umatilla spring Chinook production program at the South Fork facility currently budgeted under the UHSFOM project. The estimated portion of the UHSFOM budget related to South Fork satellite facility operations is 19.7% or approximately $170,000. Applying that figure to the projected hatchery facility operation and maintenance budget estimate, an increase of $695,000 over existing satellite facilities operation and maintenance activities would be expected for WWHMP implementation. In addition, it is anticipated that another $69,000 would be required for costs associated with broodstock collection and adult outplanting. This would result in a total annual increase in operation and maintenance activities specific to implementing the WWHMP of $764,000.

There were also significant cost increases identified for natural production monitoring activities associated with implementation of the WWHMP. The additional costs anticipated to be incurred annually under the existing WWBNPME project are estimated initially at $186,000 (for increased pre-project population status monitoring) and $425,000 for project evaluation following operation of the new hatchery facility. Monitoring and evaluation specific to hatchery operations (on-station production monitoring and marking) are included in the annual hatchery operation and maintenance budget.

The operation and maintenance and monitoring and evaluation cost figures presented in Table 21 reflect only the estimated increases related to implementation of the WWHMP and ***do not include ongoing project task costs*** which would continue whether the hatchery is constructed or not. The 2011 cost estimations presented in Table 21 assume only partial activities for both operation and maintenance (broodstock collection and transport, holding, spawning, and incubation) and monitoring and evaluation (adult enumeration). The 2012 figures are for a full year of activities under both projects. The 2011-12 figures are based on the costs for wages, materials, and supplies used in the UHSFOM 2007-2009 NPCC Project Solicitation proposal. Out-year estimates for 2013 and beyond for these activities includes a 3.5% annual cost increase. All costs in Table 21were projected utilizing a 2007 cost basis and will be updated as the WWHMP proceeds through Steps 2 and 3 of the Master Planning process.

Table 21. Out-year Costs

Calendar Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Planning	$13K	$100K	$55K	$0	$0	$0	$0	$0	$0	$0
NEPA	$0	$350,000		$0	$0	$0	$0	$0	$0	$0
Land Purchase	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Design	$0	$384K	$576K	$0	$0	$0	$0	$0	$0	$0
Construction	$0	$0	$10,837,000		$0	$0	$0	$0	$0	$0
O & M	$0	$0	$0	$331K	$764K	$791K	$819K	$848K	$878K	$908K
M & E	$186K	$186K	$191K	$195K	$425K	$435K	$450K	$470K	$490K	$500K

IX. REFERENCES

Written References

Allee, B. 1974. Spatial Requirements and Behavioral Interactions of Coho Salmon and Steelhead Trout. Ph.D. dissertation, University of Washington, Seattle, Washington.

Banks, J. 1993. Raceway Density and Water Flow as Factors Affecting Spring Chinook Salmon (Oncorhynchus tshawytscha) During Rearing and After Release. Aquaculture, 119 (1994) 201-217.

Berejikian, B.A., E.P. Tezak, T.A. Flagg, A.L. LaRae, E. Kummerow & C.V.W. Mahnken. 2000. Social dominance, growth, and habitat use of age-0 steelhead (Oncorhynchus mykiss) grown in enriched and conventional hatchery rearing environments. Can. Journal of Fisheries and Aquatic Sciences 57: 628-636.

Brannon, E., K. Currens, D. Goodman, J. Lichatowich, W. McConnaha, B. Riddell, and R. Williams. 1999. Review of Artificial Production of Anadromous and Resident Fish in the Columbia River Basin, Part I: A Scientific Basis for Columbia River Production Program, Northwest Power Planning Council, Portland, Oregon.

Byrne, J., H. Fuss, and C. Ashbrook. 1997. Annual Coded Wire Tag Program Washington Missing Production Groups. Project No. 89-66. Prepared for Bonneville Power Administration, Portland, Oregon.

Campton, D. 2003. Management Goals for Hatchery Broodstocks: Genetic Integration versus Segregation. Presentation to the 54th Annual Northwest Fish Culture Conference. December 2003. Portland, Oregon.

Chapman, D., C. Peven, T. Hillman, A. Giorgi, and F. Utter. 1994. Status of Summer Steelhead in the Mid-Columbia River. Don Chapman Consultants, Inc., Boise, Idaho.

Columbia River Inter-Tribal Fish Commission. 1995. Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon. Tribal Restoration Plan.

Confederated Tribes of the Umatilla Indian Reservation (CTUIR). 1990. Walla Walla River Subbasin Salmon and Steelhead Production Plan. Columbia Basin System Planning, Walla Walla Subbasin, September 1990. Submitted to Northwest Power Planning Council and Columbia Basin Fish and Wildlife Authority, Portland, Oregon.

———. 1995. Columbia Basin Salmon Policy.

———. 2001. Walla Walla Subbasin Summary, August 2001. Prepared for the Northwest Power Planning Council, Portland, Oregon.

———. 2004. Walla Walla Subbasin Plan, May 2004. Prepared for the Northwest Power Planning Council, Portland, Oregon.

Contor, C. and P. Kissner. 2000. Umatilla Basin Natural Production Monitoring and Evaluation Annual Progress Report, 1997-1998. Project No. 1990-005-01. Prepared for Bonneville Power Administration, Portland, Oregon.

Contor, C. and A. Sexton, editors. 2003. Walla Walla Basin Natural Production Monitoring and Evaluation Progress Report, 1999-2002. Project No. 2000-039-00. Prepared for Bonneville Power Administration, Portland, Oregon.

Cuenco, M., T. Backman, and P. Mundy. 1993. The Use of Supplementation to Aid in Natural Stock Restoration. Pages 269-293 in J. Cloud and G. Thorgaard (editors), Genetic Conservation of Salmonid Fishes. Plenum Publishing Company, NY, NY.

Dawley, E., R. Ledgerwood, T. Blahm, C. Sims, J. Durkin, R. Kirn, A. Rankis, G. Monan, and F. Ossiander. 1986. Migrational Characteristics, Biological Observations, and Relative Survival of Juvenile Salmonids Entering the Columbia River Estuary, 1966-1983. Final Report to Bonneville Power Administration, Portland, Oregon. Contract No. DE-A179-84BP39652.

Ewing, R. and S. Ewing. 1995. Review of the Effects of Rearing Density on Survival to Adulthood for Pacific Salmon. The Progressive Fish Culturist, Volume 57, No. 1, January 1995.Everest, F. and D. Chapman. 1972. Habitat Selection and Spatial Interaction by Juvenile Chinook Salmon and Steelhead Trout in Two Idaho Streams. Journal of the Fisheries Research Board of Canada 29: 91-100.

Fast, D. 2003. Monitoring and Evaluation of a Production Chinook Supplementation Facility. Presentation to the 54th Annual Northwest Fish Culture Conference. December 2003. Portland, Oregon.

Ford, M.J. 2002. Selection in captivity during supportive breeding may reduce fitness in the wild. Conservation Biology, 16(3):815-825.

Giorgi, A. 1991. Mortality of Yearling Chinook Salmon Prior to Arrival at Lower Granite Dam, on the Snake River. Project No. 91-051. Annual Progress Report to Bonneville Power Administration, Portland, Oregon.

Hager, R., R. Costello, and Upper Yakima Spring Chinook Biological Specifications Work Group. 1999. Optimal Conventional and Semi-natural Treatments for the Upper Yakima Spring Chinook Salmon Supplementation Project, Treatment Definitions and Descriptions and Biological Specifications for Facility Design. Project No. 9506404. Final Report to Bonneville Power Administration, Portland, Oregon.

Hastein, T. and T. Lindstad. 1991. Diseases in Wild and Cultured Salmon: Possible Interaction. Aquaculture, 98:277-288.

HDR/Fish Pro. 2007. Review and Update of the 2004 MWH South Fork Walla Walla Facility Expansion Technical Memorandum Costs. Prepared for Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon.

Hillman, T.W., J.S. Griffith & W.S. Platts. 1987. Summer and winter habitat selection by juvenile chinook salmon in a highly sedimented Idaho stream. Transactions of the American Fisheries Society 116: 185-195.

Independent Scientific Advisory Board (ISAB). 2000. Review of the Draft Performance Standards and Indicators for Artificial Production in the Northwest Power Planning Council's Artificial Production Review. Northwest Power Planning Council, Portland, Oregon.

_____. 2003. Review of salmon and Steelhead Supplementation. Northwest Power and Conservation Council, Portland, Oregon.

Integrated Hatchery Operations Team (IHOT). 1995. Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries. Prepared for Bonneville Power Administration, Portland, Oregon.

Lower Granite Migration Study Steering Committee. 1993. Research Plan to Determine Timing, Location, Magnitude, and Cause of Mortality for Wild and Hatchery Spring/Summer Chinook Salmon Smolts Above Lower Granite Dam. Project No. 91-017. Report Prepared for Bonneville Power Administration, Portland, Oregon.

Mahoney, Brian, Michael Lambert, Travis Olsen, and Jesse Schwartz. 2007. Draft Walla Walla River Basin Natural Production Monitoring and Evaluation Project, 2006 Annual Report. Project # 200003900. In press for Bonneville Power Administration, Portland, Oregon.

Maynard, D.J. & T.A. Flagg. 2001. NATURES rearing as a tool for increasing ranched salmon survival. World Aquaculture. 32: 56-58.

McMichael, G.A., T.N. Pearsons & S.A. Leider. 1999. Behavioral Interactions among Hatchery-Reared Steelhead Smolts and Wild Oncorhynchus mykiss in Natural Streams. North American Journal of

Fisheries Management 19: 948-956.

Mobrand Biometrics. 2005. All H Analyzer (AHA) User Guide. Developed for the Northwest Power and Conservation Council. Portland, Oregon.

Montgomery Watson. 1995a. Northeast Oregon Hatchery Project. Conceptual Design Report. Bonneville Power Administration, Division of Fish and Wildlife. Portland, Oregon.

Montgomery Watson. 1995b. Northeast Oregon Hatchery Final Siting Report. Bonneville Power Administration, Division of Fish and Wildlife. Portland, Oregon.

Montgomery Watson Harza). 2004. South Fork Walla Walla Hatchery Facility Expansion. Engineering Support for Step 1 Submittal - Technical Memorandum. Prepared for CTUIR under contract to Bonneville Power Administration, Division of Fish and Wildlife. Portland, Oregon.

Muir, W. and T. Coley. 1995. Diet of Yearling Chinook Salmon and Feeding Success During Downstream Migration in the Snake and Columbia Rivers. Northwest Science Vol. 70, No. 4.

Muir, W. and R. Emmett. 1998. Food Habits of Migrating Salmonid Smolts Passing Bonneville Dam in the Columbia River, 1984. Regulated Rivers 2:1-10.

Nilsson, N. 1967. Interactive Segregation in Fish Species. In Gerking, S. (ed.), The Biological Basis of Freshwater Fish Production. Pp. 295-313. Blackwell Scientific, Oxford, England.

Northwest Power Planning Council (NPPC). 1987. Columbia River Basin Fish and Wildlife Program. Portland, Oregon.

_____. 1994. Columbia River Basin Fish and Wildlife Program. Portland, Oregon.

_____. 2000. Artificial Production Review Report. Portland, Oregon.

Pacific Northwest Fish Health Protection Committee . 1989. Model Comprehensive Fish Health Protection Program. Washington Department of Fish and Wildlife, Olympia, Washington.

Piper, R., I. McLain, L. Orem, J. McCarran, L. Fowler, and J. Leonard. 1982 Fish Hatchery Management. United States Department of Interior, Fish and Wildlife Service, Washington D.C.

Quinn, T.P. and C.A. Busack. 1985. Chemosensory recognition of siblings in juvenile coho salmon [*Oncorhynchus kisutch*] *Animal Behavior*. 33: 51-56.

Ricker, W. 1972. Hereditary and Environmental Affecting Certain Salmonid Populations. In R. Simon and A. Larkin (eds), The Stock Concept in Pacific Salmon. Pp 19-160. H.R. MacMillan Lectures in Fisheries. University of British Columbia, Vancouver, British Columbia, Canada.

Rowan, G. 2000. Umatilla Hatchery Satellite Facilities Operation and Maintenance Annual Progress Report, 1999. Project No. 83-435. Prepared for Bonneville Power Administration, Portland, Oregon.

Schwartz, J.D.M., P. Kissner, M. Lambert, B.D. Mahoney & C. Contor. 2005. Walla Walla Basin Natural Production Monitoring and Evaluation Project Progress Report, 2003. *In:* C.T.U.I.R (ed.) report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Species Interaction Work Group. 1984. Evaluation of Potential Interaction Effects in the Planning and Selection of Enhancement Projects. Report prepared for the Enhancement Planning Team for Implementation of the Salmon and Steelhead Conservation and Enhancement Act of 1980. Washington Department of Fish and Wildlife, Olympia, Washington.

Steward, C. and T. Bjornn. 1990. Supplementation of Salmon and Steelhead Stocks with Hatchery Fish: A Synthesis of Published Literature. In Miller, W. (ed), Analysis of Salmon and Steelhead Supplementation. Project No. 88-100. Report to Bonneville Power Administration, Portland, Oregon.

Taylor, E. 1991. A Review of Local Adaptation in Salmonidae, With Particular Reference to Pacific and Atlantic Salmon. Aquaculture 98:185-207.

U. S. Army Corps of Engineers (Corps). 1997. Reconnaissance Report – Walla Walla River Watershed. U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington.

U.S. Fish and Wildlife Service (FWS). 1994. Biological Assessments for Operation of U.S. Fish and Wildlife Service Operated or Funded Hatcheries in the Columbia River Basin in 1995-1998. Submitted to National Marine Fisheries Service.

____. 2000. USFWS v. Hudson Bay District Improvement Company, et al. Civil Penalty Settlement Agreement. FWS.PN.2731. June 9, 2000.

____. 2001. USFWS v. Hudson Bay District Improvement Company, et al. Final Civil Penalty Settlement Agreement. FWS.PN.2731. June 27, 2001.

Van Cleave, R. and R. Ting. 1960. The condition of salmon stocks in the John Day, Umatilla, Walla Walla, Grande Ronde, and Imnaha Rivers as reported by various fisheries agencies.

Walla Walla County, Walla Walla Basin Watershed Council & 49 Contributers. 2004. Walla Walla Subbasin Plan. pp. 210. In: I. Economic and Engineering Services & Parametrix (ed.).Williams, I. and D. Amend. 1976. A Natural Epizootic of Infectious Hematopoietic Necrosis in Fry of Sockeye Salmon at Chilko Lake, British Columbia. Journal of the Fisheries Research Board of Canada 33:1564-1567.

Williams, Richard N., James A. Lichtowich, Phillip R. Mundy, and Madison Powell. 2003. Integrating artificial production with salmonid life history, genetic, and ecosystem diversity: a landscape perspective. Issue Paper for Trout Unlimited, West Coast Conservation Office, Portland. 4, September 2003.

Withler, F. 1982. Transplanting Pacific Salmon. Can. Tech. Rep. Fish. Aqua. Sci. No. 1079.

Witty, K., C. Willis, and S. Cramer. 1995. A Review of Potential Impacts of Hatchery Fish on Naturally Produced Salmonids in the Migration Corridor of the Snake and Columbia Rivers. Comprehensive Environmental Analysis – Final Report. S.P. Cramer and Associates, Gresham, Oregon.

Personal Communication

Bumgarner, J. Lower Snake Compensation Program Steelhead Biologist. Washington Department of Fish and Wildlife. 2004. Phone conversation re: Dayton trap data.

Contor, C. Monitoring and Evaluation Program Supervisor. Confederated Tribes of the Umatilla Indian Reservation. Pendleton, Oregon. 2003. Internal files.

Gallinat, M. Lower Snake Compensation Program Spring Chinook Biologist. Washington Department of Fish and Wildlife. Dayton, Washington. 2007. Phone conversation re: Tucannon trap data.

Marcotte, J.. Contracting Officer Technical Representative. Bonneville Power Administration. Portland, Oregon. 2007. Phone conversation re: Project NEPA requirements.

Mendel, G. Southeast Regional Management Biologist. Washington Department of Fish and Wildlife. Dayton, Washington. 2004. Phone conversation re: Tucannon spawning distribution.

Rowan, G. Artificial Production Biologist. Confederated Tribes of the Umatilla Indian Reservation. 2004.Internal files.