



Department of Energy

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

FREEDOM OF INFORMATION ACT/PRIVACY PROGRAM

October 20, 2014

In reply refer to: FOIA #BPA-2014-00407-F

Susan Drumheller
North Idaho Associate
Idaho Conservation League
P.O. Box 2308
Sandpoint, ID 83864

Ms. Drumheller:

This communication is a final response to your request for Bonneville Power Administration (BPA) records under the Freedom of Information Act (FOIA), 5 U.S.C. § 552. Your request was received in our office on December 31, 2013, which we acknowledged on January 14, 2014.

You requested:

"...documents as a follow-up to previous requests regarding operations at the Albeni Falls Dam. Specifically, we would like copies of documents and/or communications related to the flexible winter operations of the dam after the record of decision was issued to fluctuate winter lake levels, such as decisions as to whether or not to fluctuate in the winters of 2011/2012 or 2012/2013. We also would like any documents and/or communications regarding any results or impacts from winter lake level operations in the winters of 2011/2012 or 2012/2013... [and] ...any documents and/or communications concerning any monitoring, assessment, or study of environmental conditions (including but not limited to fish, wildlife, wetlands, water quality and erosion) related to the ongoing operations of Albeni Falls Dam since 2005."

On January 17, 2014 you narrowed the request to, "...any documents and/or communications produced since January 2009 concerning monitoring, assessment or study of erosion in Lake Pend d'Oreille and its tributaries, bull trout in Lake Pend d'Oreille and aquatic invasive species in Lake Pend d'Oreille related to the ongoing operations of Albeni Falls Dam. However, we are not interested in documents concerning fish passage, or bank stabilization for USACE facilities, such as recreation sites."

Response:

We conducted a search of the records of the germane personnel at the following BPA offices:

Environment, Fish & Wildlife
Executive Office
Idaho/Montana Implementation
Fish Operations Policy & Planning
Fish and Wildlife Program

Policy and Planning
Operations Planning
Environmental Planning and Analysis
Oregon Implementation
Regional Relations (Boise)

In accordance with the above search listing, we have located 714 pages of material responsive to your request and they are being released in full. The FOIA generally requires the release of all government records upon request.

Fees:

There are no fees associated with this request.

Appeal:

You may still seek administrative appeal pursuant to Department of Energy FOIA regulations at 10 C.F.R. § 1004.8 if you feel the search was not adequate. If you choose to appeal, you must do so in writing within 30 days, and include the following information:

- (1) The nature of your appeal - denial of records, partial denial of records, adequacy of search, or denial of fee waiver;
- (2) Any legal authorities relied upon to support the appeal; and
- (3) A copy of this determination letter.

Clearly mark both your letter and envelope with the words "FOIA Appeal," and direct it to the following address:

Director, Office of Hearings and Appeals
Department of Energy
1000 Independence Avenue SW
Washington DC 20585-1615

Pursuant to 10 C.F.R. Part 1004.7(b)(2), I am the individual responsible for the determination to withhold BPA information, as outlined above. I and my staff appreciate the opportunity to assist you. If you have any questions about this communication, you may contact Sarah A. Westenberg, FOIA Case Officer, at (503) 230-3795.

Sincerely,



C. M. Frost
Freedom of Information/Privacy Act Officer

Enclosure:
CD

**Albeni Falls Wildlife Mitigation Project
Idaho Department of Fish and Game
2010 Annual Report**

Project No. 1992-061-00 – Capital

Project No. 1992-061-03 – Expense Contracts:

43139 – IDFG Administration/Implementation (03/01/09 – 06/30/10)

48187 – IDFG Administration/Implementation (07/01/10 – 06/30/11)

43681 – IDFG Albeni Falls WMA O&M (07/01/1\09 – 06/30/10)

48305 – IDFG Albeni Falls WMA O&M (07/01/10 – 06/30/11)

**Prepared for
Bonneville Power Administration**

Final

**June 2011
Idaho Department of Fish and Game**

**Region 1
2885 West Kathleen Street
Coeur d'Alene, Idaho**

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Appendix B: Lower Pack River Habitat Segment of the Pend Oreille Wildlife Management Area 2010 Habitat Evaluation Procedure Draft Report.

Appendix C: Gold Creek Habitat Segment of the Pend Oreille Wildlife Management Area 2010 Habitat Evaluation Procedure Draft Report.

Appendix D: Westmond Lake Habitat Segment of the Pend Oreille Wildlife Management Area 2010 Habitat Evaluation Procedure Draft Report.

Appendix E: Robinson Creek Habitat Segment of the Coeur d'Alene River Wildlife Management Area 2010 Habitat Evaluation Procedure Draft Report.

Background

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Public Law 96-501) directed that measures be implemented by Bonneville Power Administration (BPA) to protect, mitigate and enhance fish and wildlife to the extent affected by development and operation of hydropower projects on the Columbia River system. The Act created the Northwest Power Planning Council, now referred to as the Northwest Power and Conservation Council (Council), which in turn developed the Columbia River Basin Fish and Wildlife Program (Program). Under the Act, BPA has the authority and obligation to fund fish and wildlife mitigation activities that are consistent with the Council's Program. The Idaho Department of Fish and Game (IDFG) implemented their first acquisition under the Program in 1997.

The entire process started much earlier, however, when in 1985, IDFG formed a diverse coalition of biologists for the purpose of determining wildlife impacts associated with the construction of the Albeni Falls hydroelectric project. The coalition members included the IDFG, the Kalispel Tribe (KT), Upper Columbia United Tribes, the U.S. Forest Service (USFS), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Army Corps of Engineers (USACE). Using the standardized Habitat Evaluation Procedures (HEP) process (USFWS 1980), coalition members estimated a net wildlife loss of 28,587 habitat units (HU) for a eight target species, including wintering and breeding bald eagle (*Haliaeetus leucocephalus*), black-capped chickadee (*Parus atricapillus*), mallard duck (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), yellow warbler (*Dendroica petechia*), muskrat (*Ondatra zibethicus*), white-tailed deer (*Odocoileus virginianus*) and redhead duck (*Aythya americana*) (Martin *et al.* 1988). The coalition found that the construction of the dam resulted in the loss of 6,617 acres of wetland habitat and the inundation of 8,900 acres of deepwater marsh. The Albeni Falls Wildlife Mitigation Project (Project) is designed to mitigate those losses, in addition to protecting and enhancing critical habitat for a wide variety of species dependant on wetland and riparian habitats and associated uplands.

Six members from the original working group formally adopted a set of Operating Guidelines in 1998, and established a local decision-making process to address mitigation implementation issues. These active work group members included the IDFG, the Kalispel Tribe, the Kootenai Tribe of Idaho, the Coeur d'Alene Tribe, the U.S. Fish and Wildlife Service (USFWS), and the U.S. Army Corps of Engineers (USACE). Initially, the U.S. Forest Service (USFS) and non-profit organizations such as the Inland Northwest Land Trust, Ducks Unlimited (DU), and The Nature Conservancy (TNC) attended meetings and shared information. However, the IDFG and the three tribal entities have been the only active members implementing mitigation over the past decade, receiving on-going funding under the Program. These four members continue to implement mitigation activities under the Project.

In 2010, the wildlife crediting for the Albeni Falls Wildlife Mitigation Project by all implementing entities is reported by BPA¹ to be at 41.5% mitigated, with an estimated

¹ Crediting information obtained from the BPA website on March 4, 2011.

11,894 HU. In total, IDFG has mitigated about 15% of the total Albeni Falls Hydroelectric Project wildlife losses by securing the protection of about 4,194 acres of wildlife habitat (Appendix A for maps) and crediting BPA with 3,807 protection habitat units in five subbasins (Table 1). Operation and maintenance activities have resulted in a total of about 569 enhancement habitat units. The majority of the habitat units (76%) are provided from projects in the Pend Oreille subbasin, where IDFG has focused mitigation implementation. About 24% of all habitat units are from projects implemented out-of-basin.

The IDFG mitigation lands are managed under three separate Wildlife Management Areas (WMA) that include the 1) Boundary Creek/Smith Creek WMA, 2) the Pend Oreille WMA, and 3) the Coeur d'Alene River WMA (Figure 1). Management plans have been completed on all Project lands for the Boundary Creek/Smith Creek WMA (2,049 acres). The Pend Oreille Management Plan is continually being updated as new parcels are protected and enrolled under the Project. The Pend Oreille WMA is composed of 27 habitat segments totaling 6,650.68 acres as of 2010, and scattered across northern Idaho in the Pend Oreille and Clark Fork subbasin (Figure 2). Twelve of the 27 WMA habitat segments are wildlife mitigation parcels totaling 1,793.36 acres. Interim management plans under the Coeur d'Alene WMA are in place for the Lower St. Joe and Robinson Creek parcels until restoration projects for these properties are completed.

Topographical surveys have recently been completed for the two Coeur d'Alene River basin properties and IDFG is currently collaborating with several partners to design and development restoration plans. IDFG is working with the USFS and the Avista Corporation to combine a 78-acre floodplain parcel with the 62-acre St. Joe parcel for future management and restoration activities. Also, IDFG is collaborating with the USFWS, the U.S. Environmental Protection Agency (EPA) and the Coeur d'Alene Basin Natural Resource Trustees to design and implement a restoration project for the Robinson Creek parcel.

Further, IDFG and partners are designing and developing field studies for local elementary school children on the Robinson Creek parcel based on the success of the Sandpoint High School HEP field work study program. The intent of the educational efforts is to instruct students about the Albeni Falls Wildlife Mitigation Project and how to conduct HEP surveys and calculate wildlife losses. For the past five years, IDFG has worked with the Sandpoint High School and their statistical, forestry, biology and ecology teachers to develop a lecture and field work study focused on the Albeni Falls Wildlife Mitigation Project and HEP survey methods. Over 150 students visit either the Gold Creek or Rapid Lightning Creek Habitat Segments of the Pend Oreille WMA each year and while wearing waders they collect forested, scrub-shrub and herbaceous wetland habitat information. It is hoped that in the future an educational program can also be developed for students on the Lower St. Joe parcel.

Legend

-  WMA Mitigation Properties
-  Subbasins
-  Idaho Counties

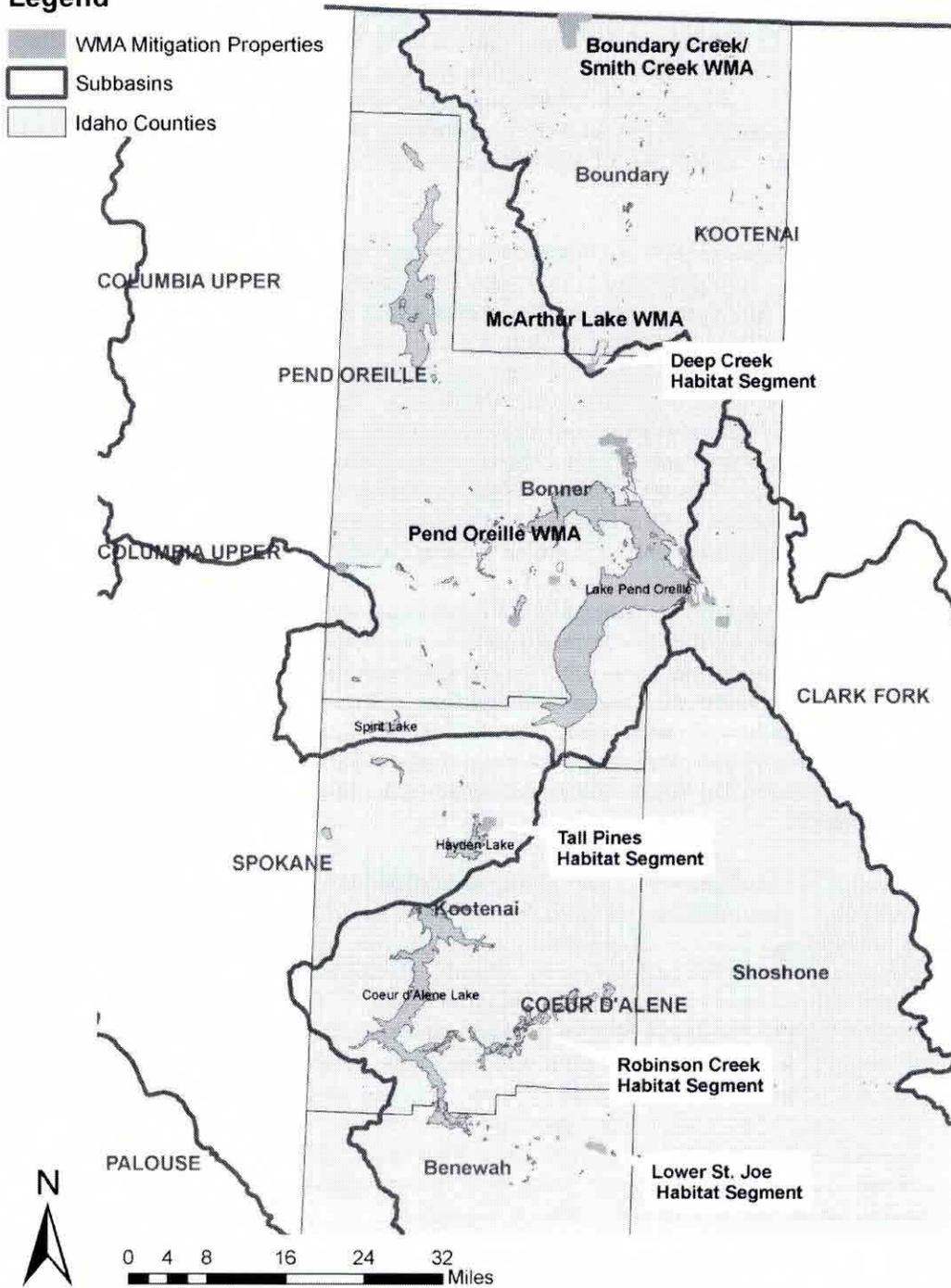


Figure 1. Map showing the IDFG wildlife management areas, subbasins, and Idaho counties in the Albeni Falls Wildlife Mitigation Project area.

Table 1. Showing the dates, acres and habitat units for all IDFG wildlife mitigation acquisitions between July 1997 – February 2011. (Enhancement Credits are HU calculated from five-year HEP reports less the protection credits calculated from the baseline HEP.) *BPA contributed 29.8% of total purchase cost and so receives 29.8% of the total habitat units. ± BPA receives only 10% of the total habitat units as Smith Creek and Pearl Island were donated to the Department.

Project	Year Acquired	Acres	Protection Credits	Enhancement Credits	Total Credits	
Boundary Creek/Smith Creek WMA (Kootenai Subbasin)						
Boundary Creek	June 1, 1999	1,405	295*	311.96	606.96*	
Smith Creek	January 7, 2007	640	86±	0	86±	
	July 28, 2008	24	24	0	24	
	Total acres	664				
Deep Creek	July 19, 2005	40	77.53	0	77.53	
Totals		2,089	482.53	311.96	794.49	
Pend Oreille WMA (Pend Oreille/Clark Fork Subbasins)						
Albeni Cove	September 16, 1999	70	60.08		95.1	
	September 23, 1999			35.02	27	
	September 5, 2008	27	27			
	Total acres	97		Total HU	122.1	
Carter's Island	August 28, 1997	96	293.1	0	293.1	
Cocolalla Lake	November 1, 1999	98	84.09	59.55	186.13	
	February 1, 2010	20	20	0	20	
	Total acres	118		Total HU	206.13	
Denton Slough	December 11, 1997	17	41.44	1.53	42.98	
Derr Creek	July 7, 1997	240	371.02	0	371.02	
Gold Creek	November 29, 2005	310	606.22	152.68	758.88	
Lower Pack River	September 18, 1999	28.5				
	July 26, 2006	0.26				
	March 9, 2007	0.55	84.3	3.33	87.63	
	December 5, 2007	0.74				
	Total acres	30.05				
Pearl Island	July 2009	12	2.08±	0	2.08±	
Rapid Lightning Creek	January 20, 1999	110				
	July 27, 2006	41	187	0	603.62	
	April/October 2007	210.5				
	Total acres	361.5				
Tall Pines (Spokane Subbasin)	February 5, 2011	203	203	0	203	
Trout Creek	October 7, 1999	216				
	Avista cost-share	December 11, 2007	27.3	315	0	446.33
		February 13, 2008	5			
		September 30, 2009	67	67		67
	Total acres	315.3		Total HU	513.33	
Westmond Lake	November 1, 1999	65	77.24	5.45	82.69	
White Island	September 28, 2010	131.58	112		112	
Totals		1,996.44	3,098.54	257.55	3,356.09	
Coeur d'Alene River WMA (Coeur d'Alene Subbasin)						
Lower St. Joe River	March 9, 2007	62	86.45	0	86.45	
Robinson Creek	November 6, 2009	49.3	49	0	49	
Totals		108.07	226.74	0	226.74	
Grand Totals		4,193.51	3,807.81	569.51	4,376.96	



Figure 2. Locations of all Pend Oreille WMA properties. Individual parcels under the Albeni Falls Wildlife Mitigation Project are shown in Appendix A. A total of 12 properties totaling about 1,793.4 acres (shown in bright green) are designated as wildlife mitigation properties under the Project. Also included as a wildlife mitigation property is the 12-acre Pearl Island donation (aerial photograph taken in 2004).

Wildlife Mitigation Implementation

In 2010/2011, IDFG completed three land acquisition projects under the Program adding about 151 acres to the Pend Oreille WMA and protecting another 203 acres near Hayden Lake in the Spokane subbasin.

Cocolalla Lake, Pend Oreille Subbasin

The 20-acre Cocolalla Lake acquisition was completed on February 1, 2010, for a total cost of \$300,000. The subject property adjoins 103-acres already protected and managed by the Department. In 1959, IDFG secured five acres at the inlet to Cocolalla Lake to install a weir intended to stop sucker spawning runs in Cocolalla and Fish Creeks. The weir has since been abandoned. Then in 1999, IDFG purchased 98 acres under the Albeni Falls Wildlife Mitigation Project and some modest restoration work was completed on the parcel with the creation of several small ponds.

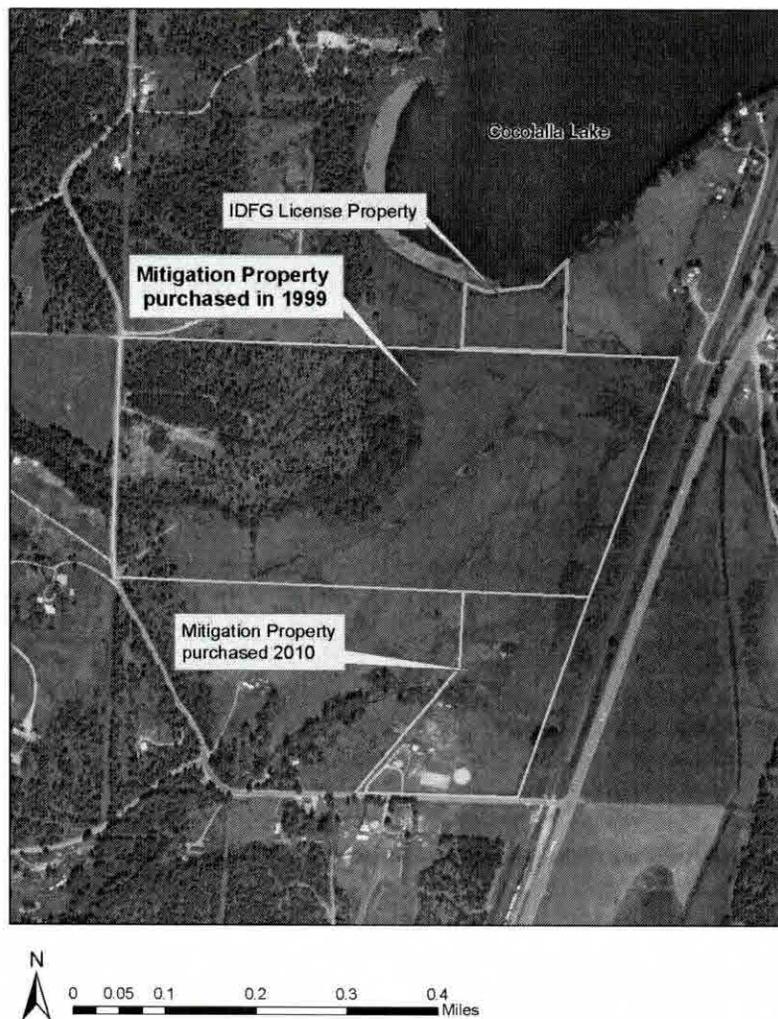


Figure 3. Map showing the IDFG Cocolalla Lake habitat segment of the Pend Oreille WMA.

Historically, the Cocolalla Lake Habitat Segment was dominated by scrub-shrub and forested wetlands and consisted of an impressive beaver complex. The wetland area was changed when landowners trapped the beavers, cleared the land and redirected Fish Creek to flow along the rail road.

In early 2009, IDFG met with the Department of Environmental Quality (DEQ), the Idaho Transportation Department (ITD), and the Natural Resources Conservation Service (NRCS) to develop a cost-share comprehensive wetland / stream restoration project. The partners quickly identified the need to acquire the 20-acre lowland wetland area if any meaningful restoration work was to be completed on the larger habitat segment. Fortunately, the landowner who owned the low lying ground was interested in selling the 20-acre property.

After the purchase of the property in February, IDFG volunteers have worked to dismantle and move the barn and outbuildings and sell the modular home. The barn and outbuildings were relocated to other WMA parcels and are being used to store equipment and supplies. The modular home was sold in January 2011, and the funds from the sale of the home were spent on the purchase of a pole shed to store equipment purchased under the program. Over the next few years, IDFG intends to partner with other agencies and groups, such as the Cocolalla Lake Association, to develop and implement a comprehensive wetland and stream restoration project that will increase groundwater recharge, help address a nutrient discharge issue to Cocolalla Lake, and improve the habitat quality for wildlife species.

White Island, Pend Oreille Subbasin

On September 28, 2010, IDFG acquired 131.58 acres from a private landowner in Bonner County. The total cost of the acquisition was \$1,124,800. The property is located to the south of the Clark Fork River delta and approximately 10 miles south of the town of Clark Fork. The property is in two parcels, with the northern parcel having approximately 110 acres and fronting the Clark Fork River and the southern 21-acre parcel fronting the south fork of the Clark Fork River (Figure 4).

The Department manages over 400 acres in the Clark Fork River delta including a boat ramp on the South Fork of the Clark Fork River. Other wildlife acquisitions under the Project nearby include Carters Island and Derr Creek (Figure 2). Acquisition of the subject property would consolidate ownership on the southern most area of the Clark Fork River delta, thereby reducing trespass issues and improving management. In addition, acquisition of this property will also assist the Department in implementing habitat improvement projects to reduce erosion in the delta.

The parcel will be added to the Pend Oreille WMA and a total of 112 HU are credited to BPA until the baseline HEP is completed next year. IDFG identified and proposed to cost-share the acquisition with funds from Ducks Unlimited in the amount of \$185,000; however, BPA was unable to determine a process to accept the cost-share.



Figure 4. Map showing the IDFG White Island Habitat Segment of the Pend Oreille WMA.

Tall Pines, Spokane Subbasin

The 203-acre fee title acquisition was completed on February 4, 2011, for a total of \$1,750,000. The subject property is located in Kootenai County to the northeast of Hayden Lake and is adjacent to U.S. Forest Service ownership and a 320-acre conservation easement held by the IDFG (Figure 5). Future opportunities exist to protect more land with several landowners interested in conservation easements.

The Tall Pines property is located in an area that is experiencing accelerated urban development. The property is highly desirable because of the location to Hayden Lake and the spectacular views from the property of the lake and surrounding area. The Tall Pines property is almost entirely composed of forested wetlands with many seeps that feed three jurisdictional wetland areas. If the property was developed, then these wetland areas would disappear. Vegetation cover within the Tall Pines property consists of deciduous scrub-shrub, wet meadow, and mixed coniferous forest.

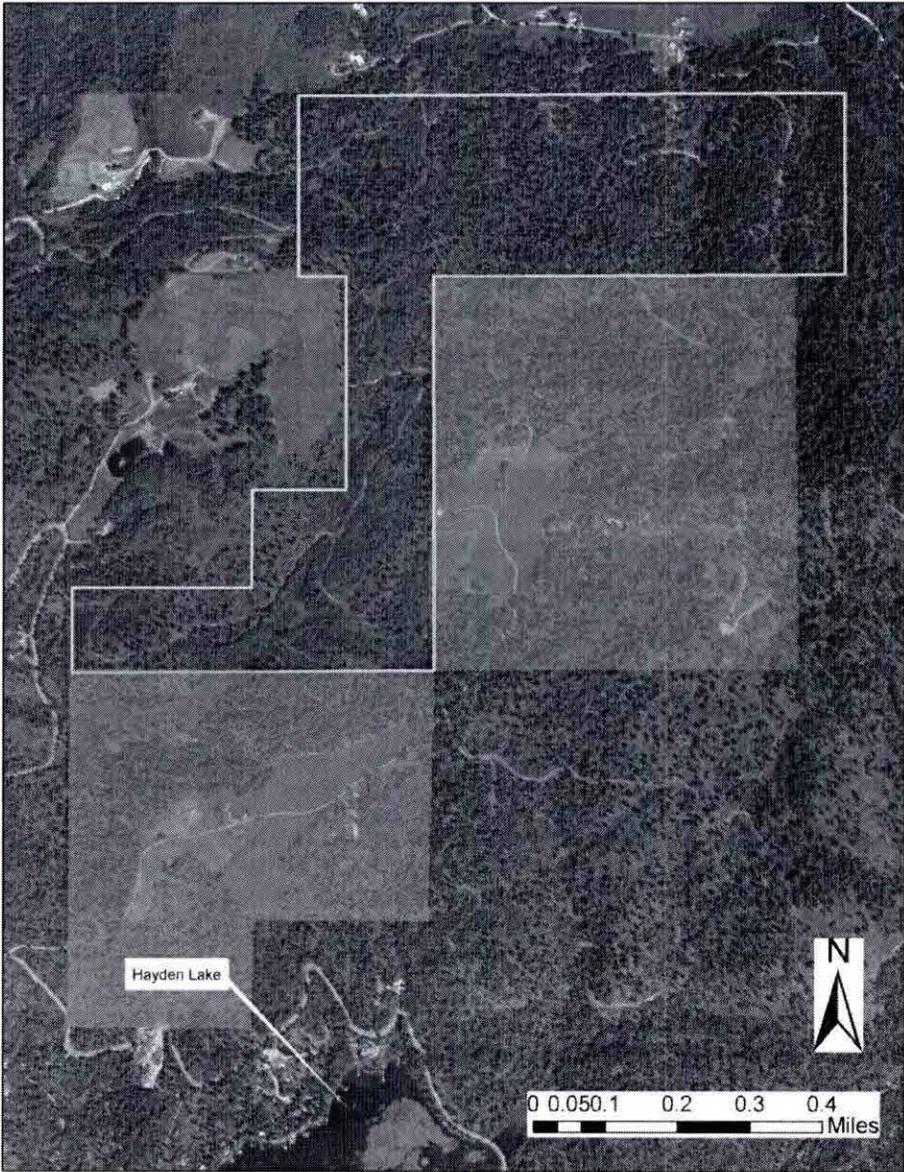


Figure 5. Aerial photograph showing the 203-acre Tall Pines property (outlined in yellow). The shaded green area is the 320-acre conservation easement held by IDFG.

Land Management

Boundary-Smith Creek WMA

Wetland Management

Water levels on the Boundary-Smith Creek Wildlife Management Area (BSCWMA) are managed to mimic natural floodplain hydrology. Generally, this means high spring water levels that peak in June, receding summer water levels, and naturally recovering fall/winter water levels. The WMA is composed of a total of nine basin wetland cells (Figure 6). Advantages to this hydrology include facilitated nutrient cycling, establishment of diverse emergent plant assemblages, and productive habitat for waterfowl, shorebirds, and other wildlife.



Figure 6. Boundary-Smith Creek Wildlife Management Area wetland complex.

During late-fall and winter, run-off due to periodic precipitation is naturally stored in wetland basins. From mid-March to mid-June, water from Boundary Creek is used to raise water levels to desired annual maximums. Habitat Managers attempt to reach maximum water elevations by early April to prevent flooding duck nests established in shoreline vegetation; however, to mimic natural floodplain hydrology, peak water level elevations should be reached by early June (the time of natural peak flooding). Water levels typically begin to recede after this time and concentrate food items at the soil/water interface for duck broods and shorebirds. This recession also facilitates development of

diverse assemblages of emergent plant species, which increase habitat complexity. By October, fall precipitation may slow the rate of decline and increase water levels.

Water levels across the BSCWMA wetland complex have been recorded monthly since March 2001, by measuring down from the top of selected water control structures to the water level. Wetland surface area is determined by the measured water elevation (Table 2).

Table 2. Wetland surface area (acre) determined by water elevation.

Water Elevation (feet)	Wetland Surface Area Acreage (excluding slough channel surface area).								
	BC 1	BC 2	BC 3	BC 4	BC 5	BC 6	SC 1	SC 2	SC 3
1,749.0	0	0	25.4	0	0	0	22.5	0	0.2
1,749.5	0	0	43.7	0	0	0	34.9	1.7	0.2
1,750.0	0	0	62.0	2.2	0	0.4	47.3	3.4	0.2
1,750.5	0	0	75.5	3.6	0	2.8	58.6	12.4	0.2
1,751.0	0	0	89.0	5.0	0	5.2	69.9	21.5	0.2
1,751.5	3.2	2.0	107.9	32.0	2.1	6.8	84.8	29.8	0.6
1,752.0	6.4	4.9	126.7	59.0	4.1	8.4	99.6	38.0	1.0
1,752.5	9.3	13.1	139.5	76.4	11.6	10.0	108.9	45.5	1.4
1,753.0	12.1	16.3	152.3	93.8	19.0	11.5	118.2	52.9	1.7
1,753.5	16.4	19.5	167.2	114.4	28.3	13.4	129.6	52.9	1.7
1,754.0	20.6	22.7	182.0	135.0	37.6	15.3	141.0	52.9	1.7
1,754.5	28.3	25.7	197.3	153.0	48.5	16.8	147.8	52.9	1.7
1,755.0	35.9	28.6	212.6	171.0	59.3	18.3	154.5	52.9	1.7

Water diversion from Boundary Creek to the WMA began in March 2010. Most wetland cells, with the exception of Cell 3, were at full pool by May or June and remained so until July (Figure 7). Diversion water input was shut off on July 15 and water levels were allowed to naturally recede throughout the remainder of the summer and fall. Cell 4 was an exception as water levels were drawn down significantly after July to create mudflats and moist soil conditions (Figure 8). Water levels in Cell 4 were at 35% full pool in September, October, and November. These low water levels also allowed for cattail control in the fall. Water was pumped into Cell 6 during September and October to increase waterfowl hunter opportunity.



Figure 7. Wetland Cell BC1 at high water in May 2010.



Figure 8. Wetland Cell BC4 at low water levels in July 2010, during moist soil drawdown.

Public Access and Use Facilities

Public use facilities of several picnic areas, two restrooms, and parking areas were regularly maintained in 2010. Existing gates and fences were maintained and walking/biking trails were regularly mowed to facilitate non-motorized public use of the BCWMA. A quarter mile gravel trail was developed, extending from the Smith Creek picnic area to join with a trail to the west (Figure 9), and a wetland education sign was erected at the Smith Creek picnic area (Figure 10).

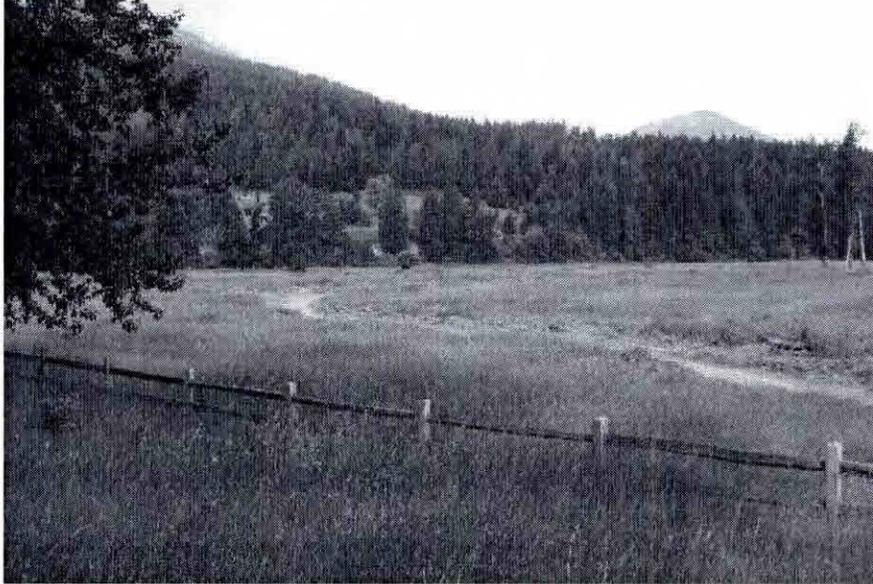


Figure 9. Hiking/biking trail developed at the Smith Creek picnic area.



Figure 10. Wetland education sign erected at the Smith Creek picnic area.

Habitat Maintenance and Enhancement

Native Tree and Shrub Re-establishment

An important habitat restoration measure for the BSCWMA is re-establishment of native trees and shrubs on the floodplain portion of the area. Tree and shrub plantings have been completed on the BSCWMA since fall of 2001. Plantings included 5 to 8 foot long cottonwood post-cuttings and one-gallon containerized plants of cottonwood other species. Planting holes were dug using a six-inch posthole auger. Plantings were conducted during dormancy in fall (late October or early November) and spring (early April). Plants were protected from girdling by small mammals using four-inch diameter black corrugated drainpipe cut into eight-inch sections and placed around the plant. Plantings were protected from ungulate browsing by erecting eight-foot high deer fencing in a 10 by 25 foot enclosure around blocks of plantings. Single plantings were protected using 48-inch utility wire fencing cut in three-foot sections and formed into a 12-inch diameter tube that was placed over the plant and anchored using bamboo sticks. Use of 3 by 3 foot weed control mats is not recommended because small mammals used the mats for shelter and girdled nearby plants.

In addition to supplemental planting, natural tree and shrub establishment is important to the BSCWMA. Black cottonwoods are adapted to periodic flooding where high water elevations reduce competing vegetation in inundated areas. They shed their seed about the time floodwaters begin receding, after which they are deposited in drift-lines on exposed mudflats and germinate within hours to days. Provided water levels are not too high in subsequent years, established cottonwood seedlings will survive. In 2003, 2004, and 2007, conditions at the BCWMA were very good for black cottonwood germination. As a result, many black cottonwood and willow saplings were observed emerging from the cattails surrounding the perimeter of many of the wetland cells in 2007 and 2008. Receding water elevations in late June and July will help to reduce cottonwood seedling mortality associated with extended periods of soil saturation.

In 2010, efforts were focused on protecting natural tree and shrub regeneration by fencing off areas of regeneration to protect against ungulate browsing. Previous plantings were treated with herbicide to decrease grass competition and protective fencing was maintained.

Protect Existing Native Forest Vegetation

The BSCWMA supports approximately 200 acres upland coniferous forest on the western boundary as the floodplain transitions to the foothills of the Selkirk Mountains. Tree species include western red cedar, Douglas fir, western larch, grand fir, western white pine, black cottonwood, paper birch, aspen, and a few scattered ponderosa pine.

Infections of white pine blister rust were identified on BSCWMA. White pine blister rust is caused by a fungus that infects white pine through the needles. The fungus then grows into the main branch and kills the branch, creating a "flag", a dying brown branch (Figure 11). The infection spreads to the bole of the tree, eventually killing the tree above the

point of infection. Blister rust does not spread from tree to tree, but requires an alternate host, a shrub in the genus *Ribes*, to complete its life cycle. White pine branches closer to the ground are most susceptible to infection due to environmental conditions (i.e., higher humidity and low wind) that are more favorable to fungus growth. Pruning the lower branches of trees greatly lowers the risk of infection. The majority of white pine stands on BSCWMA were pruned in 2010 (Figure 12).



Figure 11. White pine blister rust “flags” on BSCWMA white pine trees.



Figure 12. Pruned white pine stand on BSCWMA to protect against white pine blister rust infection.

Native Grass Establishment

In 2010, six acres were planted to native grass cover, a basin wildrye cultivar that provides excellent structure for nesting habitat and winter cover. Establishment of perennial grasses is often slow during the first few years, therefore, the plantings will be closely monitored and managed to insure success.

Wetland Vegetation

Emergent wetland plants have been established throughout the nine-basin wetland complex. Stands of soft-stem bulrush, cattail, *Alisma plantago-aquatica*, *Ceratophyllum demersum*, *Elodea canadensis*, *Eleocharis* spp., *Chara* spp., *Potamogeton* spp., and *Sagittaria* spp. were observed. Many other species occurred in scattered small groups across the area.

Cattail control was conducted on wetland cell BC4 during wetland drawdown. Portions of Cattail patches were mowed in October during low water levels (Figure 13) to provide more structural and plant diversity in the vegetation cover. The mowed areas are flooded as quickly as possible the following spring to drown the cattails and to prohibit regrowth.



Figure 13. Cattail control efforts on Wetland Cell BC4 in October 2010.

Noxious Weed Control

Overall, the amount of herbicide treatment for noxious weed control on the BSCWMA has continued to decline with the severity of infestations. In 2010, approximately 1,000 acres were inventoried and mapped for weed infestations, leading to 270 acres being treated (Figure 14). Four different types of spray equipment were used; back-pack sprayers, ATV sprayer, truck sprayer, and tractor boom spray. A total of approximately 75 gallons of herbicide were applied (not including adjuvants). Herbicides used consisted mainly of 2,4-d, Milestone (aminopyralid), Transline (clopyralid), Surflan (oryzalin), and Fusilade (fluazifop).

Due to a long cold and wet spring, efforts consisted of chemical spraying during mid-May to early August, mechanical control by hand-pulling weeds during inclement weather, and broadcast spraying Canada thistle in October. The primary noxious weeds controlled on the properties in 2010, include the State listed Noxious Weeds of Canada thistle, houndstongue, oxeye daisy, orange and meadow hawkweed, and spotted knapweed. Additionally, weed species listed by Boundary County, (i.e., St. John's wort, common tansy, and absinth wormwood) were also targeted during control efforts.



Figure 14. Effects of weed control efforts along the Kootenai River dike on BSCWMA in 2010.

Rearing of Native Fish Species

One of the objectives of the Long Range Management Plan for BSCWMA is to “Explore opportunities to enhance aquatic habitat for migration, spawning, and rearing of native fish species compatible with wildlife and habitat management objectives.” There is a large coordinated effort to re-establish a burbot (*Lota lota maculosa*) population in the Kootenai River among many groups including the IDFG, Kootenai Tribe of Idaho, Kootenai Valley Resource Initiative, University of Idaho, U.S. Fish and Wildlife Service, British Columbia Ministry of Environment, and others.

Burbot are a freshwater cod native to the Kootenai River in Idaho, Montana, and British Columbia. The Kootenai River burbot population has declined drastically over the last half-century, primarily due to habitat alteration and loss, and the population is considered

functionally extinct within Idaho borders. The most recent abundance estimates by IDFG are approximately 50 fish.

One component of the larger multifaceted and international conservation approach is the development of burbot culture for future release into natural habitat. In support of these efforts, the IDFG has created two external rearing ponds on BSCWMA, for the purpose of raising newly hatched burbot to a fingerling stage, which will then be released into the Kootenai River in Idaho.

Two burbot external rearing ponds were constructed on BSCWMA (Figure 15). Each pond is 100 ft by 50 ft and 8 ft deep with 3 to 1 slopes. The excavated material was used to armor the Kootenai River dike at an eroding bend nearby. Following construction, bare soils were immediately seeded to grass.



Figure 15. Aerial view of the burbot external rearing ponds on BSCWMA.

Pend Oreille WMA

Water Management

All water control structures were inspected and maintained as needed to ensure a safe and functional condition. Beavers have continued to be problematic at the Albeni Cove Habitat Segment where they repeatedly plug the smaller structures. We have fabricated a modification to the inlet structure that consists of a plate to protect the drop logs from beaver access and a 20 foot section of perforated culvert (Figure 16). The grated and

submerged culvert should allow water flow through the water control structure (WCS) even if beavers attempt to build against the structure itself.

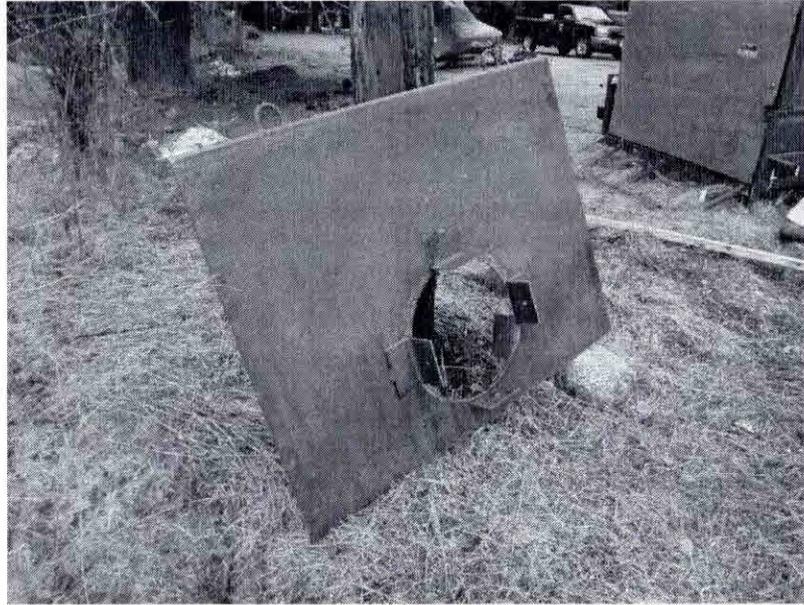


Figure 16. The top photograph shows the plate to block beaver access to and protect WCS drop logs. The bottom photograph shows the perforated culvert to maintain water flow.

In cooperation with BPA, the POWMA continues to assist with monitoring erosion on WMA lands. Bank pins were established at multiple WMA sites to help evaluate erosion related to altered water level management resulting from Albeni Falls Dam operations.

Public Access and Use Facilities

All fences, gates, signs, and public parking areas were inspected and maintained as needed to ensure a safe and functional condition. The graveled portion of the Rapid lightning access road was extended again in 2010, to reduce dust complaints from neighbors and improve all weather access. A new gate was installed on the access road at the east end of the Albeni Cove property to address recurrent problems with trespass dumping.

In cooperation with BPA roads for administrative access and power line maintenance were improved on the Derr Creek Habitat Segment (Figure 17). This included some widening and realignment of roads and graveling them to allow wet weather access. Roads were placed to minimize disturbance to waterfowl and other wildlife.



Figure 17. New administrative access and maintenance road at the Derr Creek Habitat Segment.

A manufactured home acquired with the new Cocolalla Lake addition has been sold and removed. The foundation will be broken and the rubble buried in place. The existing gravel drive and re-graded former home site will be revised to provide public access and parking. Proceeds from the house sale were reinvested in a new equipment shed to protect and house an expanded inventory of tools and equipment used to manage the POWMA.

Habitat Maintenance

Dense monotypic seasonally flooded wetlands were deep plowed to improve the diversity and heterogeneity of both the plant community and water column depth. Anecdotal observation suggests a good response to this disturbance. Open water persisted on these sites longer than undisturbed adjacent sites. Waterfowl were noted to preferentially feed in the treated areas. Herptofauna appeared more abundant, but it is not clear whether this is an actual numerical response or if they were just more visible because of reduced plant densities. Approximately 20 acres of goose pasture was maintained by mowing. Previous shrub plantings were inspected and maintained.

Two miles of fence were maintained at the Gold Creek Habitat Segment and 800 feet were maintained at the Denton Slough parcel to exclude grazing cattle. These properties are located in open range herd districts and it is the landowner's responsibility to fence cattle off their ownership. Unneeded infrastructure including gates, fences, and corrals used to manage livestock were removed from the newly acquired Cocolalla Lake parcel.

Noxious Weed Control

All wildlife mitigation parcels purchased under the Albeni Falls Wildlife Mitigation Project were inspected for noxious weeds. Herbicides were applied to approximately 87.5 acres of the WMA mitigation parcels to control noxious weed infestations. Newer acquisitions to the Cocolalla Lake and Trout Creek Habitat segments were heavily infested and required focused efforts. Parcels that have been under management for some time mostly require spot treatments or work focused on hand-spraying difficult to access portions of the property.

Coeur d'Alene River WMA

St. Joe Restoration Project

The 62-acre Lower St. Joe parcel was purchased under the Albeni Falls Wildlife Mitigation Project in 2007. Directly adjacent and upstream of this mitigation parcel, the Avista Corporation owns approximately 62 acres in fee-title (Figure 18). Avista's property includes approximately three quarters of a mile of St. Joe River frontage and associated riparian area. A portion of the Avista property was deeded to the U.S. Forest Service (USFS) for the Shadowy St. Joe Campground. The USFS developed a campground with parking and public access. The proposed restoration project will include both the IDFG wildlife mitigation parcel and the Avista ownership impacting a total of 124 acres of flood plain and about one and half miles of river frontage.

The restoration project will be funded primarily by Avista to meet their requirements of a Federal Energy Regulatory Commission (FERC) approved *Five-Year Wetland and Riparian Habitat Protection & Enhancement Plan, 2010 to 2014*. On June 18, 2009, FERC issued a

new license for the Spokane River Project that included the Post Falls Hydroelectric Development. Ordering paragraph D of the license incorporated the Idaho Department of Environmental Quality's (IDEQ) Certification Conditions under Section 401 of the Federal Clean Water Act. Section IV. 2. of the IDEQ Certification Condition states that Avista shall consult with IDFG and IDEQ annually to implement the measures of the five-year plan. The proposed restoration project for the Lower St. Joe parcel is therefore a cost-share project with Avista. The overall purpose of the project is to restore and create a self-sustaining wetland complex along the St Joe River.

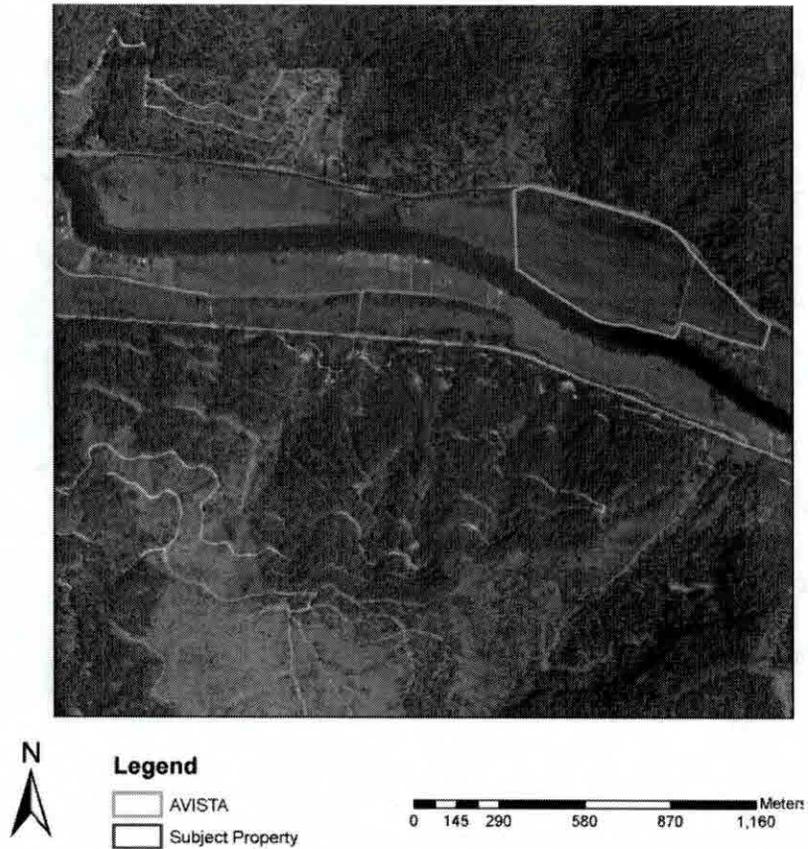


Figure 18. The 62-acre Lower St. Joe project (subject property) and the Avista ownership fronting the St. Joe River.

Historical aerial photographs provide information on past conditions and changes for the project location. The earliest photograph obtained was from August 6, 1947 (Figure 19). The 1947 photograph demonstrates that the Avista parcel was not being drained at this point in time, but was being used partially for agricultural activities mainly on the higher ground closest to the river bank. The western section of the IDFG parcel was already being used for agricultural activities at this time with drain ditches through the shallow existing wetlands (old St. Joe River channel scars). The Miesen Creek channel is hard to define in the 1947 photograph, but appears to run through the two buildings and then

possibly flows or is routed to the east into the large depressional floodplain basin to the east. Also, there does not appear to be any constructed creek channel allowing the creek to flow back to the river. An aerial photograph from 1948, shows the St. Joe during a flood event. The average daily flow from the USGS gage at Calder, Idaho, was reported at 21,100 cubic feet per second (cfs) on this date. The 21,100 cfs flow equates to approximately a five-year event. It can be expected from the flow frequency results for the St. Joe River that the project site will be inundated on a fairly frequent basis and restoration efforts and components should try to account for this flooding event to some degree.



Figure 19. Top: aerial photograph from August 6, 1947, of entire project area. Bottom: aerial photograph from May 26, 1948, showing flooding conditions on St. Joe River- 21,100 cfs.

By 1958, the Avista parcel had the major east-west drain ditch that is located at the northern toe of the highway and also had the north-south drain ditches funneling all water to the river (Figure 20). Miesen Creek has been channeled to the east then directly south to the river. This drain ditch appears much like today with an open channel to the river. For the main north-south drain ditch on the Avista property, there appears to be controlled outlet to the river indicating a pump station or at a minimum and pipe and flap gate. By 1958, all the remaining interior vegetation had been removed with only trees remaining along the edges. Other aerial photos were evaluated, but these two sets contain the most revealing changes.

In its unaltered state (sometime prior to 1947), the restoration site would have likely contained four distinct habitat types that are still found in the watershed today, but generally only in small isolated pockets due to widespread alteration of the floodplain. These habitats include open water wetlands, emergent wetlands, wetland meadow and riparian forest. In the absence of regular large-scale disturbance, it is recognized that the wetland meadow habitat type in particular would almost certainly have contained a significant wetland shrub community as is observed in many such areas of the watershed today. The proportion of shrub coverage may have varied from a few scattered individual plants to nearly complete canopy coverage that would more appropriately be described as scrub-shrub wetland under most wetland classification systems. Today, the IDFG mitigation site contains about four acres of forested wetlands, 52 acres of pasture/herbaceous wetland, and over eight acres of shrub wetland. The Avista parcel consists of about six acres of forested wetland, 56 acres of herbaceous wetland, including a deep marsh area, and over 12 acres of campground/road/parking access area (Figure 21).



Figure 20. Enlarged Miesen Creek area from July 28, 1958, photo showing Miesen Creek channeled to the river through a drain and open ditch.

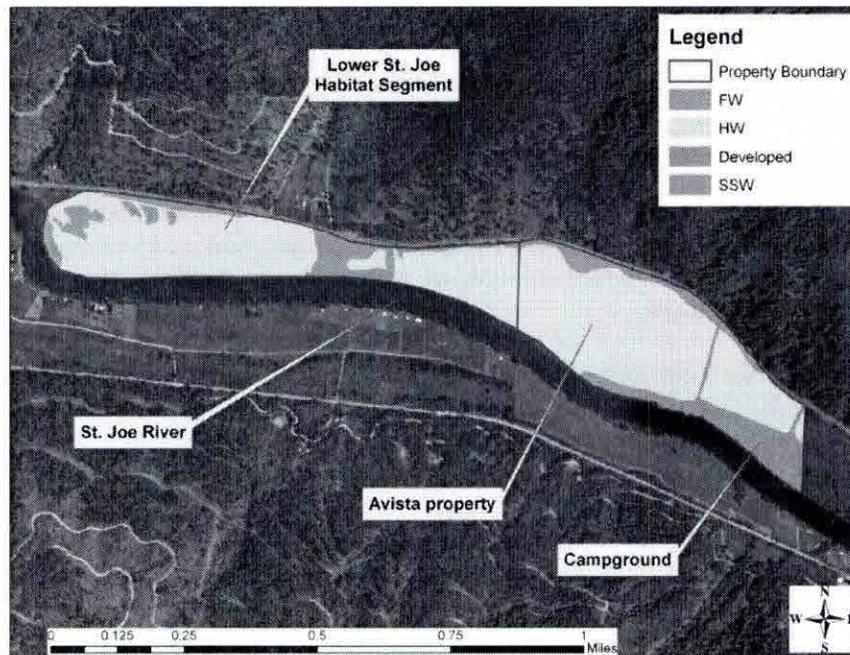


Figure 21. Showing the distribution of habitat cover types on the restoration project site (FW=forested wetland; SSW=scrub-shrub wetlands; HW=herbaceous wetland).

The most significant feature of the vegetation on both parcels is the abundance of reed canarygrass (*Phalaris arundinacea*). Reed canarygrass was the dominate species or a co-dominate species in all sample areas. Even the forested wetland sample area was dominated by reed canarygrass with a cover of 75% in spite of tree coverage of 40 % and shrub coverage of over 50%. Two sample areas were monocultures of reed canarygrass where virtually all other species were excluded.

In development of restoration alternatives for the parcels topography, hydrology (surface and ground water sources), existing vegetation communities and soils were investigated. Monitoring of ground and surface water will continue in 2011, and data used to complete final designs. The primary objective of the restoration project is to restore a relatively self-sustaining wetland complex that will provide high quality habitat for fish and wildlife. The proposed project will include restoration or creation of 1) wetland habitats, 2) a stream channel associated with realignment of Miesen Creek and 3) adjacent areas of upland riparian forest habitat. For budgeting, logistical and workload reasons, the project may be implemented in several phases and in conjunction with other potential projects at the site, such as bank stabilization and development of interpretive features.

During field investigations, it was determined that Miesen Creek has little current or potential value as a fishery resource due to inadequate base flows. Miesen Creek currently flows under the highway and into the project site though a 48 by 36 inch pipe arch culvert. A portion of the outlet end of the pipe is currently filled with gravel deposits. Discharge was estimated at less than two cfs. It appears that there has been

some historic earth work just downstream of the culvert that may have included dredging or straightening. Historically, it is likely that the road/floodplain interface was a modestly formed alluvial fan and that the flow path of Miesen Creek over the floodplain and to the St. Joe changed on a relatively frequent basis, especially during larger flood and sediment transport events. In the current alignment, Miesen Creek has low sinuosity and heads rather directly towards the river, where over its last several hundred feet it becomes deeply incised in the floodplain terrace to meet the bed elevation of St. Joe River. There was no indication of recent channel affecting flow events and channel is considered very stable. At observed discharges there was little to any viable salmonid habitat: there is an absence of scour and deposition features to create any significant water column depth; it is exceedingly narrow and choked with vegetation along much of its length; and it does not appear it has sufficient base or flood flows to create viable habitat. Thus, the lower reach of Miesen Creek, in the project area, appears to have little existing or potential as a fish bearing tributary. Relative to the existing channel alignment, it is believed that routing the channel in and towards the existing depression wetlands, or newly created wetlands, would return the most promising habitat enhancements. Specifically, such an alignment will help raise the floodplain water table, one project objective. The necessary pilot channel work would not need to be overly involved due to both the discharge regime and desired out of bank discharge onto the existing flood plain, where historic swales and channels would route flows back to the St. Joe River.

Therefore, the design approach for the re-routed Miesen Creek is focused on providing conveyance of flows over the floodplain to re-charge shallow groundwater during normal and flood flows versus the creation of specific in-channel habitat features such as pools, riffles and runs (Figure 22). The general channel form will have a top width between three and six feet, and between one and two feet deep, varying along its length (non-uniform). Where the channel is being excavated through higher floodplain surfaces, the main conveyance channel will have overbank benches on both sides ranging from four to ten feet; these benches will then grade up to the existing floodplain surface. The purpose of the overbank benches is to provide flood conveyance and soil conditions capable of supporting planted riparian vegetation. When the channel grade line allows, the benches are eliminated with any out-of-bank flows allowed to disperse over the existing floodplain surface.

Future drafts and the final restoration designs will include potential locations and configurations for interpretive trails and signs. The trail and signs will provide the public information about the wetland restoration project and the site's history. These opportunities will, at a minimum, be located on the Avista parcel, which borders the USFS Shadowy St. Joe Campground and includes the abandoned log landing.

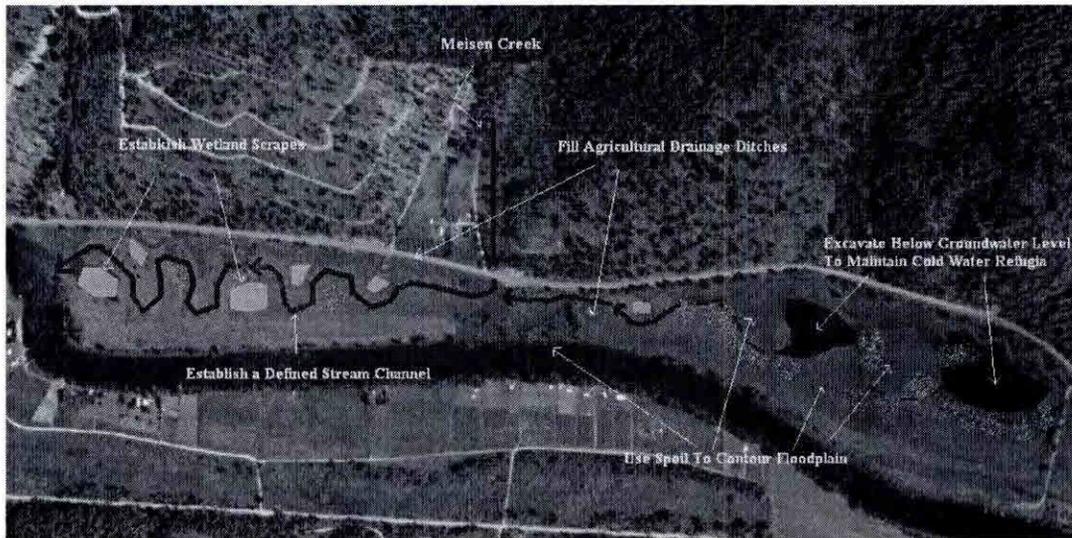


Figure 22. Conceptual restoration project design for the Lower St. Joe and adjacent Avista parcels overlaid on a 2006 aerial photograph.

Monitoring and Evaluation

Habitat Evaluation Procedures (HEP)

A total of four HEP surveys were completed in 2010, including three surveys for parcels in the Pend Oreille subbasin and one survey in the Coeur d'Alene subbasin (Appendices B to E). Analyses of the data was completed and reports generated using a crediting matrix that more closely follows how the Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan (Martin *et al.* 1988) calculated wildlife losses. The consequence of the Albeni Falls loss assessment lacking a crediting matrix showing how target species are applied to wildlife habitat cover types is that there have been several different approaches to crediting between years, and between proponents implementing mitigation under the Program. This has caused inconsistencies in how wildlife losses are calculated against the Albeni Falls ledger. This has also caused difficulties in comparing the findings of baseline HEP reports to 5- and 10-year HEP assessments.

For instance, the 10-year HEP survey completed between May 10 and 11, 2010, for the Lower Pack River Habitat Segment found a 4.3% increase in habitat units from the 5-year HEP and only a 3.8% increase from the baseline. These increases found in the habitat units was due to a combination of increases in acreage, habitat improvements and how the target species were applied to different cover types. In total, the 10-year HEP analysis found that the 30.73-acre parcel provides 87.63 habitat units or 2.85 HU per acre (Appendix B). The baseline HEP analysis completed in 2000, reported that a total of 84.30 HU (2.81 HU/acre) were protected through the purchase of the property. At that time, the parcel consisted of about 28 acres of forested wetland and no other significant cover types; however, a survey was not completed for the property and the original authors believed the parcel consisted of 30 acres. Further, the HEP survey was

completed in mid-September, late in the growing season and well past any breeding or brooding activity for target species. Since then, the total acreage of the property has changed from the baseline such that the property now consists of about 31 acres with the acquisition of three small recreational lots. Also, the parcel now consists of three habitat types: herbaceous wetland, forested wetland and scrub-shrub wetland. And last, all HEP surveys are completed in the spring when the target species are breeding. As a result, the changes in acreage and in habitat cover, as well as the change in the crediting matrix and standardization of the HEP methodology has resulted in the four percent increase in habitat units on the parcel.

The second survey involved the five-year HEP review for the Gold Creek Habitat Segment managed under the Pend Oreille WMA. A HEP survey was completed between May 11-17, 2010, and the analysis found that the parcel provides 758.9 HU on 316 acres (Appendix C). This is an increase of about 153 HU from the baseline survey completed in 2006. The habitat units per acre increased from 1.92 HU/acre to 2.40 HU/acre. It appears that the exclusion of cattle and the control of noxious weeds improved the vegetative cover on the Gold Creek parcel. For example, the vegetation in the scrub-shrub wetlands improved with an increase in height and shrub crown cover. Also, the vegetation height in the herbaceous wetland areas increased in height and the appearance of noxious weeds such as spotted knapweed – *Centaurea stoebe* and common St. Johnswort – *Hypericum perforatum* was much reduced.

The third HEP survey was completed on the Westmond Lake Habitat Segment between May 18 and 19, 2010 (Appendix D). This 10-year HEP assessment found that the parcel provides 82.69 HU on 65.60 acres (1.26 HU/acre). Overall, this parcel has not significantly changed from the baseline condition with the exception that a small wetland forest (0.35 acres) has started to grow into the herbaceous wetland area. The forested wetland is too small in area to apply the black-capped chickadee and bald eagle HEP models, but over time will eventually contribute to these target species. One could argue that there has been an increase of about seven percent in HU from the baseline conducted in 2000, as BPA was credited with 77.24 protection HU for the parcel (the baseline report did not include the 9.01 HU generated from the pasture areas), but in reality, the conditions of the parcel have not significantly changed.

There was, however, a noted decline of four habitat units from the Westmond Lake 5-year HEP report, demonstrating the importance of conducting HEP surveys at the appropriate time of year. For instance, the 5-year HEP survey was completed in late-June and the 10-year HEP survey was completed in mid-May. The grass height, a variable that impacts the outcome for both the mallard duck and goose HEP models, is much longer in the later summer than it is in the spring. Mallard duck nesting success is the highest in cover with the greatest height-density of residual vegetation (i.e. the ducklings are concealed from all directions). The optimum vegetation height for the Canada goose shore nesting areas is between 4 and 16 inches. Thus, the mallard duck prefers the taller grasses when nesting while the Canada goose prefers the shorter grasses. It could be argued that the habitat values determined in the spring are more reflective of the conditions that breeding ducks and geese would encounter, as that is when they are breeding. Overall, there was a loss of 3.79 HU between the two assessments just because

the survey was conducted earlier in the growing season. Although all attempts are made to conduct HEP surveys at the same time of year, it should be noted that it is not always possible given the Program restraints of booking the Regional HEP team.

The last HEP survey conducted on August 3, 2010, was the baseline on the newly acquired Robinson Creek parcel (Appendix E). In total, the protection of the Robinson Creek Habitat Segment provided 140.29 HU on 46.07 acres (3.05 habitat units per acre). Historically, Robinson Creek meandered across the property and eventually emptied into the Coeur d'Alene River. Since then, the railroad and other highways interfered with the creek and its path to the river. Also, Robinson Creek was straightened and shifted to the north side of the floodplain. The property has historically been used as a grazing pasture for livestock and for hay production. The creek floods each spring and the pasture is often inundated for one to two months. Waterfowl use of the property is typically heavy during the spring migration. Presently, the property consists of two habitat cover types: 15.58 acres of deciduous forested wetland and 30.39 acres of herbaceous wetland. The herbaceous wetland area is composed of 13.21 acres of dry meadow and 17.18 acres of marsh. There are no areas of open water except for Robinson Creek. Future acquisitions and restoration plans are being proposed and it is hoped that the HU value will increase with these improvements.

Vegetation Monitoring

In 2010, vegetation monitoring efforts were conducted on four mitigation properties that included Derr Creek, Gold Creek, Lower Pack River, and Trout Creek in the Pend Oreille WMA. The investigator collected 34 line-intercept samples from June through August. Each sample consisted of six transects of 40 points each. A total of 8,066 points were surveyed with 14,432 plants identified at the points. In all, 288 different species of plants were encountered. The investigator collected data to estimate the percent coverage of each vascular plant species encountered.

The samples were classified by habitat cover types as follows:

- 1) 11 were upland forests;
- 2) nine were forested wetland;
- 3) ten were herbaceous wetland (including seven meadows and three marshes);
- 4) three were scrub-shrub wetland; and,
- 5) one was upland grassland.

The samples were also classified by wildlife-habitat type as follows:

- 1) eight were lowland conifer-hardwood forest;
- 2) eight interior mixed conifer forests;
- 3) one was agriculture, pasture, and mixed environs;
- 4) ten were herbaceous wetlands,
- 5) two were montane coniferous wetlands; and,
- 6) five were interior riparian wetlands.

Nine samples were completed on the Derr Creek HS from July 19 to July 21. A total of 2,147 individual points (~240 points per sample area) were surveyed with an average of

1.42 different plants encountered per point. Forty-three different species were encountered in the Derr Creek samples. Three of the nine samples were classified as forested upland habitat cover type, needle-leaf community type. All of the forest samples were classified as a ponderosa pine (*Pinus ponderosa*) series. One of the nine samples at Derr Creek HS was classified as upland grassland habitat cover type (unclassified grassland series). Five of the nine samples were classified as herbaceous wetland habitat cover type, further classified into three emergent vegetation and two meadow community types. The emergent vegetation community types were classified as reed canarygrass (*Phalaris arundinacea*) series and the meadow community types were classified as unclassified grassland series. The top five species of total cover overall for Derr Creek HS were quackgrass (*Elymus repens*; 29.3%), meadow foxtail (*Alopecurus pratensis*; 25.3%), reed canarygrass (24.0%), red fescue (*Festuca rubra*; 19.8%), and Kentucky bluegrass (*Poa pratensis*; 16.0%).

Eighteen samples were completed on Gold Creek HS from June 15 to July 14. A total of 4,291 individual points (~240 points per sample area) were surveyed with an average of 2.02 different plants encountered per point. Within Gold Creek samples, 255 different species were encountered. Eight of the eighteen samples were classified as forested upland habitat cover type, including six needle-leaf community types (three *Abies grandis* series and three *Pseudotsuga menziesii* series) and two broad-leaf community types (*Abies grandis* series and *Pseudotsuga menziesii* series). Six of the eighteen samples were classified as forested wetland habitat cover type, including three needle-leaf community types (two *Thuja plicata* and an unclassified needle-leaf series) and three broad-leaf community types (*Populus balsamifera trichocarpa*, *Populus tremuloides*, and unclassified broadleaf series). One of the eighteen samples at Gold Creek HS was classified as herbaceous wetland habitat cover type, meadow community type (unclassified grassland series). Three of the eighteen samples were classified as scrub-shrub wetland habitat cover type, further classified into two gray alder (*Alnus incana*) series and one Drummond's willow (*Salix drummondiana*) series. The top five species of total cover overall for Gold Creek HS were paper birch (*Betula papyrifera*; 18.8%), Douglas fir (12.0%), common snowberry (*Symphoricarpos albus*; 10.9%), gray alder (*Alnus incana*; 9.5%), and western redcedar (*Thuja plicata*; 6.6%).

Three samples were completed on Lower Pack River HS from June 3 to June 8. A total of 668 individual points (~240 points per sample area) were surveyed with an average of 1.83 different plants encountered per point. 101 different species were encountered in the Lower Pack River samples. Two of the three samples were classified as forested wetland habitat cover type, needle-leaf community type (*Abies grandis* series and *Thuja plicata* series). One of the three samples at Lower Pack River HS was classified as herbaceous wetland habitat cover type, further classified into a meadow community type (reed canarygrass series). The top five species of total cover overall for Lower Pack River HS were wild sarsaparilla (*Aralia nudicaulis*; 19.8%), paper birch (*Betula papyrifera*; 16.0%), common snowberry (*Symphoricarpos albus*; 12.7%), reed canarygrass (*Phalaris arundinacea*; 12.3%), and Engelmann spruce (*Picea engelmannii*; 12.0%).

Four samples were completed on Trout Creek HS (Shields Addition) from August 10 to August 18. A total of 960 individual points (~240 points per sample area) were surveyed

with an average of 1.55 different plants encountered per point. Seventy-six different species were encountered in the Trout Creek samples. Three of four samples were classified as herbaceous wetland habitat cover type, further classified into a meadow community type (unclassified grassland series). One of the four samples at Trout Creek was classified as forested wetland habitat cover type, broad-leaf community type (*Populus balsamifera trichocarpa* series). The top five species of total cover overall for Trout Creek HS were red fescue (*Festuca rubra*; 73.4%), black cottonwood (*Populus balsamifera trichocarpa*; 18.9%), white clover (*Trifolium repens*; 9.7%), creeping bentgrass (*Agrostis stolonifera*; 7.8%), and black hawthorn (*Crataegus douglasii*; 6.2%).

Rare Plants

Rare plants were discovered and identified during vegetation monitoring on two mitigation properties (Gold Creek and Lower Pack River). On July 12, two individual plants of bristlystalked sedge (*Carex leptalea*) were discovered on Gold Creek HS within a *Thuja plicata/Athyrium filix-femina* habitat type. From June 24 to July 8, 42 individual plants of Maryland sanicle (*Sanicula marilandica*) were discovered at four different locations on Gold Creek HS within *Populus trichocarpa/Symphoricarpos albus*, *Thuja plicata/Athyrium filix-femina*, *Alnus incana/Spiraea douglasii*, and unclassified (birch forest) habitat types. On June 3 and June 7, 43 individual plants of Maryland sanicle were discovered at two different locations on Lower Pack River HS within *Abies grandis/Clintonia uniflora* and *Thuja plicata/Asarum caudatum* habitat types. All of the plants species identified on Gold Creek and Lower Pack River HS during 2010 were previously discovered in prior years of vegetation monitoring.

Wildlife Habitat Type Reference Areas

To date, IDFG has mapped the wildlife habitat types, structural elements and habitat elements on all mitigation properties and is analyzing the information in collaboration with the Northwest Habitat Institute. In theory, vegetative and wildlife community structure of intact terrestrial habitats, or “reference areas” can act as a benchmark for the effectiveness of restoration management. In 2010, a total of nine cover types on the Pend Oreille WMA were identified using the Interactive Biodiversity Information System (IBIS) classification for the various vegetative cover types found on the Pend Oreille WMA. Interactive Biodiversity Information System (IBIS) cover types 1, 5, 6, 19, 20, 21, 22, 24 and 25 are described in Table 3. Wildlife habitat reference areas were identified for seven of these cover types and are shown in Figures 23- 29. Agricultural (cover type 19) and urban areas (cover type 20) are present on the WMA but are not the desirable management goal and so are not identified for future monitoring efforts.

Seven areas were found, however, that best represented each of the IBIS cover type descriptions, and next year a subset of permanent sample points will be retrospectively identified from each cover type. These reference sample points will be sampled for three consecutive years to establish a strong baseline data set. Each reference site might serve against which restoration management may be evaluated.

Table 3. IBIS wildlife habitat cover type descriptions.

Cover Type No.	Wildlife Habitat Cover Type Description (Johnson and O'Neil 2001)
1	Westside Lowlands Conifer-Deciduous Forest: This lowland to low montane upland forest occurs over most of western Washington, the Coast Range of Oregon, the western slopes of the Cascades in Oregon, and around the margins of the Willamette Valley. This forest is dominated by one or more of the following species: Western hemlock, Western red cedar, Douglas-fir, Sitka spruce, red alder, Port-Orford cedar, or bigleaf maple. It does not, however, include dry Douglas-fir forests where western hemlock is not able to grow. <i>This classification does include coastal forests of shorepine and Sitka spruce.</i>
5	Eastside (Interior) Mixed Conifer Forest: These comprise the productive closed upland forests of eastern Washington and Oregon. They include the variety of montane Douglas-fir, grand fir, Western red cedar and Western hemlock forests in the east Cascades, Okanogan Highlands and Blue Mountains. Seral Western larch and Western white pine forests are part of this habitat, and ponderosa pine is sometimes co-dominant.
6	Lodgepole Pine Forest and Woodlands: Lodgepole Pine dominated stands located on uplands in the Cascades and east. Found within subalpine, mid-montane and low elevation forests primarily as fire induced seral forests or woodland (30-100% tree cover).
19	Agriculture, Pastures, and Mixed Environs: This habitat is dominated by intensive agriculture, including managed (planted) and unmanaged pasture, row crops, and orchards/vineyards. It also includes associated scattered dwellings and intervening areas of weedy vegetation. On the westside, shrublands dominated by exotic species such as Himalayan blackberry and Scots broom are included here.
20	Urban and Mixed Environs: Urban development occurs within or adjacent to nearly every habitat type in Oregon and Washington, and often replaces habitats that are valuable for wildlife. The highest urban densities normally occur in lower elevations along natural or human-made transportation corridors, such as rivers, railroad lines, coastlines, or interstate highways. These areas often contain good soils with little or no slope and lush vegetation. Once level areas become crowded, growth continues along rivers or shores of lakes or oceans, and eventually up elevated sites with steep slopes or rocky outcrops.
21	Lakes, Ponds, Reservoirs, and Rivers: This habitat includes all areas of open freshwater and shorelines, gravel bars, sand bars associated with these habitats throughout the region.
22	Herbaceous Wetlands: Wet meadows, marshes, fens, and aquatic beds are included here, except those that are unique to high elevations and included within subalpine parkland. These are wetlands or riverine floodplains that are dominated by herbaceous vegetation. Common dominants include cattails, sedges, grasses, bulrushes, or various forbs. Aquatic rooted plants that extend to the surface or floating aquatic plants are also included here as dominants. <i>(No shrubs or trees)</i>

Cover Type No.	Wildlife Habitat Cover Type Description (Johnson and O'Neil 2001)
24	Montane Coniferous Wetlands: Forested wetlands at middle to high elevations in the mountains that are dominated by conifers. Major indicator tree species are mountain hemlock, Pacific silver fir, Alaska yellow-cedar, and Engelmann spruce. Western hemlock, Western red cedar, quaking aspen, subalpine fir, or lodgepole pine can also be important, the first two on the westside and the latter three on the eastside.
25	Eastside (Interior) Riparian-Wetlands: These are forests, woodlands and shrublands influenced by streams and wetlands in the east Cascades and east, including the Columbia Plateau. They are mostly composed of deciduous trees, i.e. black cottonwood, white alder, quaking aspen, and shrubs, especially thinleaf alder, red-osier dogwood, and willow. Riparian Douglas-fir and ponderosa pine within the shrub-steppe zone on the Columbia Basin are included here, but montane coniferous wetlands are not. This habitat occurs at all elevations below the subalpine parkland and alpine zones.

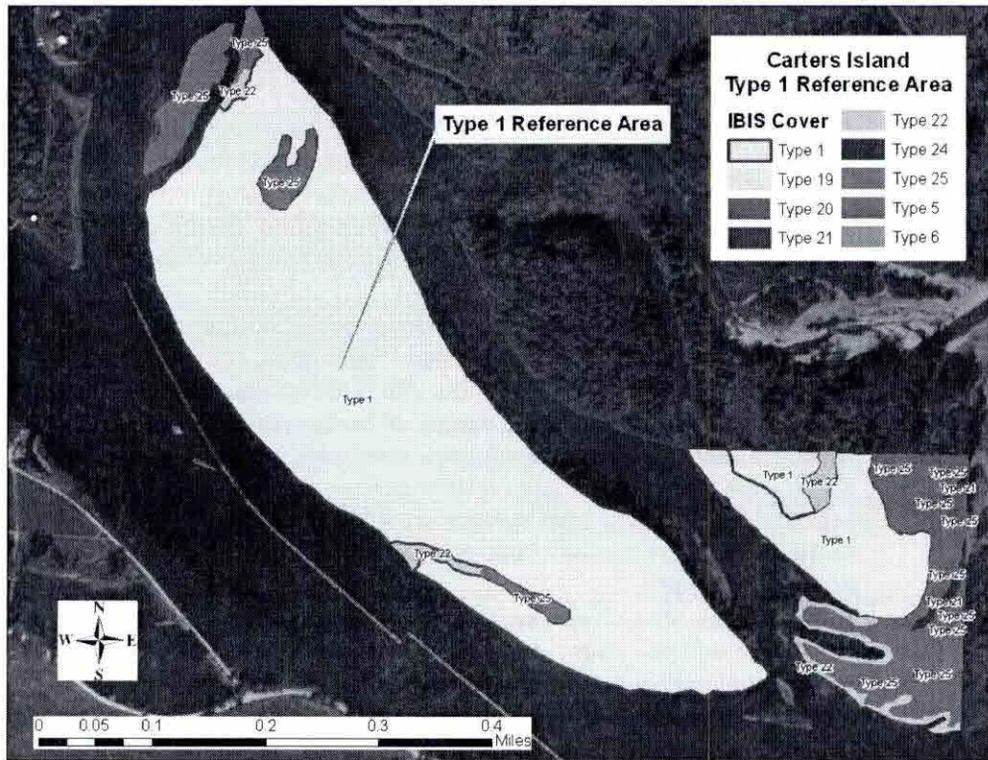


Figure 23. Reference Area for Cover Type No. 1 – Westside Lowlands Conifer-Deciduous Forest.

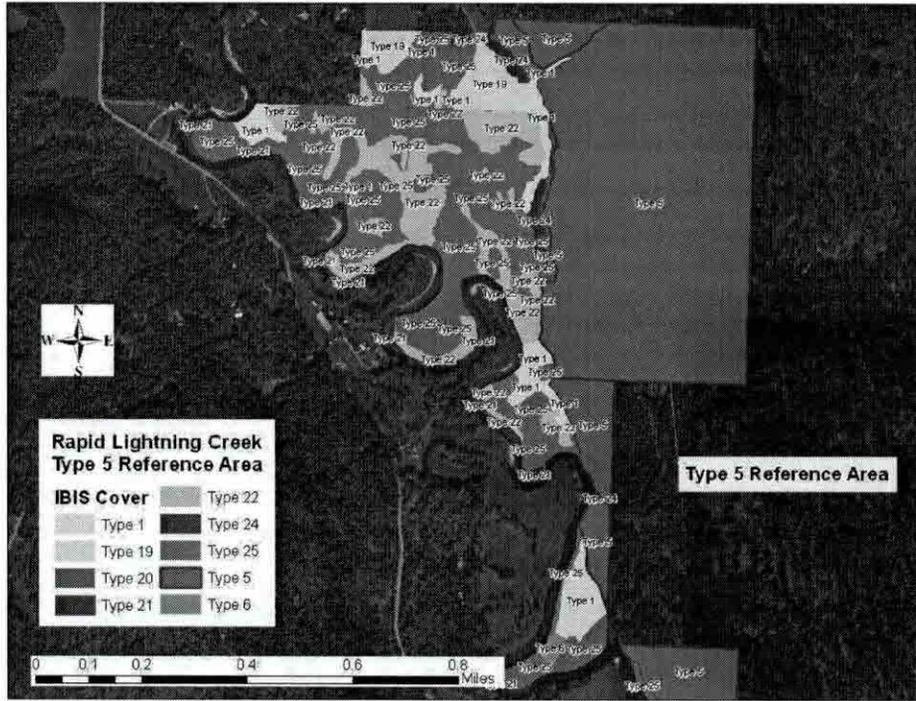


Figure 24. Reference Area for Cover Type No. 5 – Eastside (Interior) Mixed Conifer Forest.

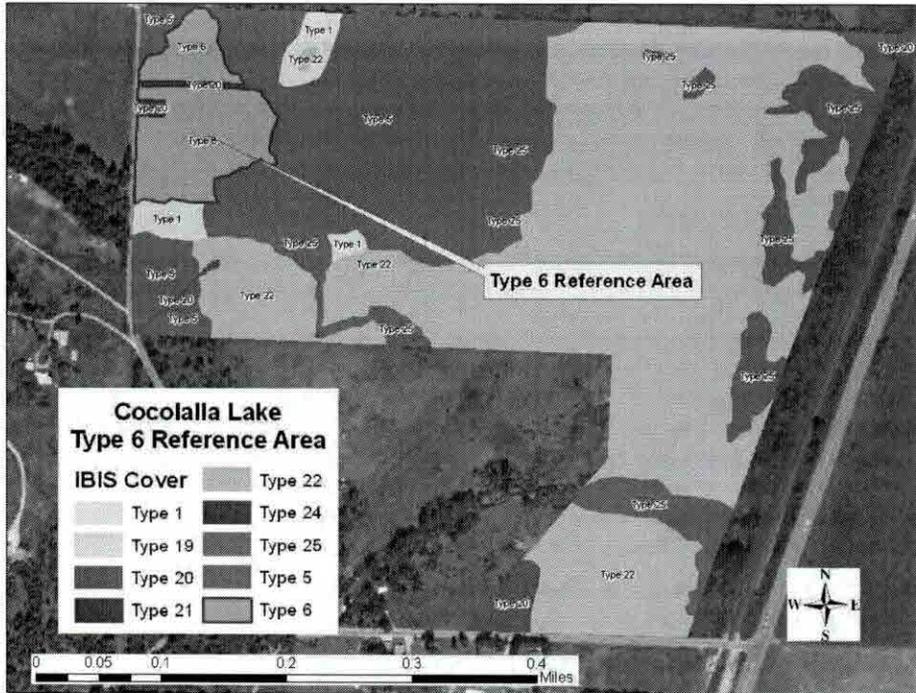


Figure 25. Reference Area for cover type No. 6 – Lodgepole Pine Forest and Woodlands.

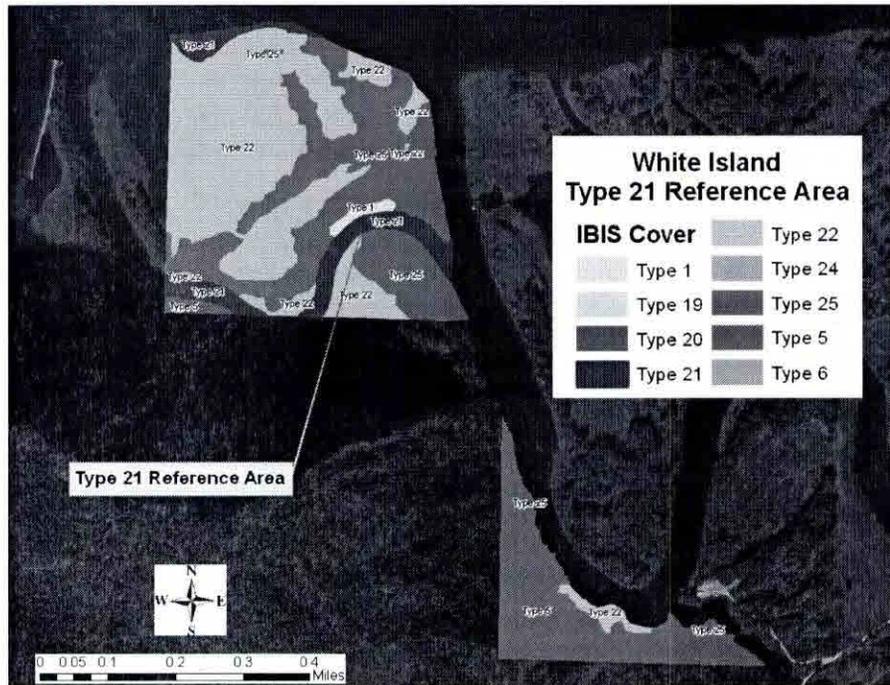


Figure 26. Reference Area for cover type No. 21 – Lakes, Ponds, Reservoirs, and Rivers.

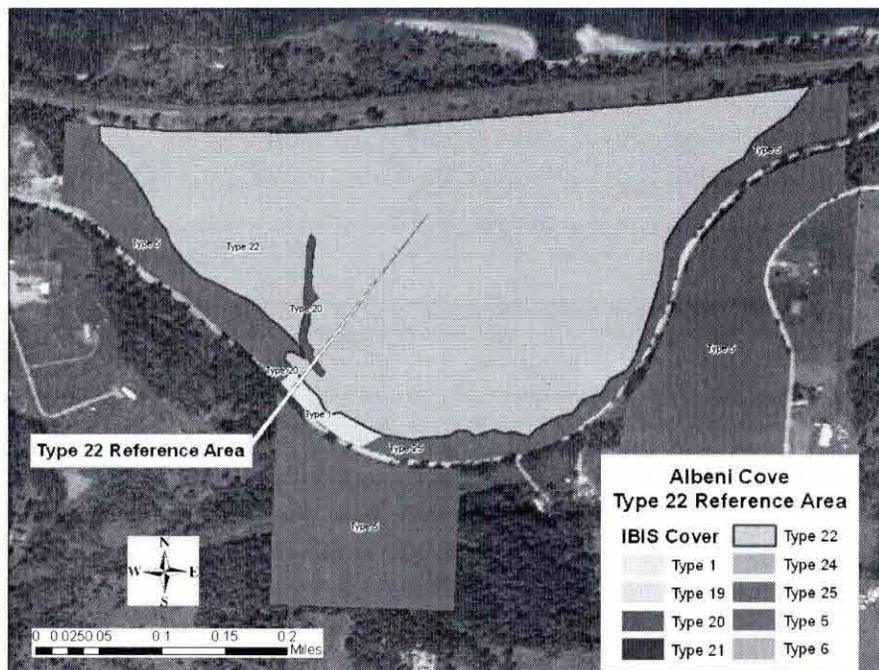


Figure 27. Reference Area for cover type No 22. – Herbaceous Wetlands.

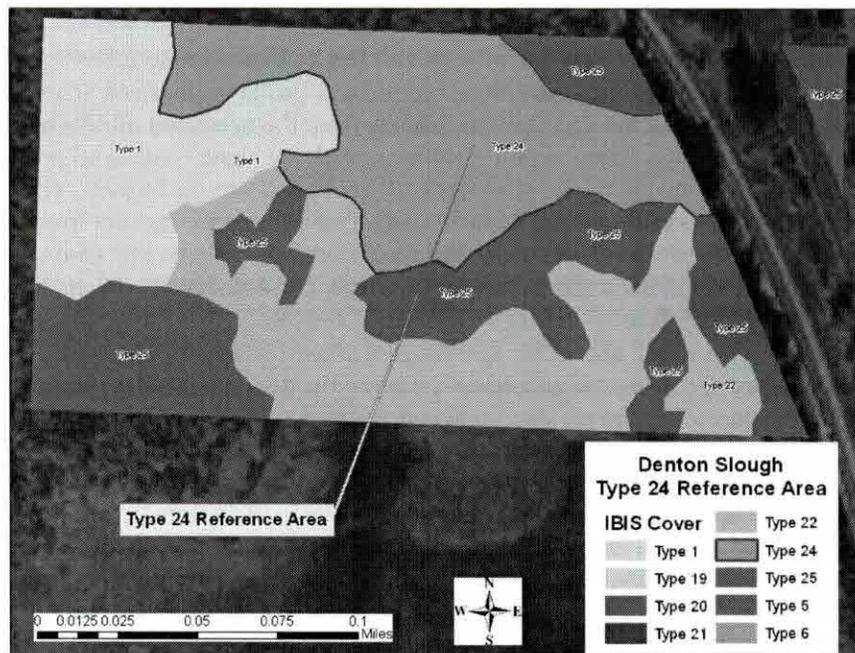


Figure 28. Reference Area for cover type No. 24 – Montane Coniferous Wetlands.

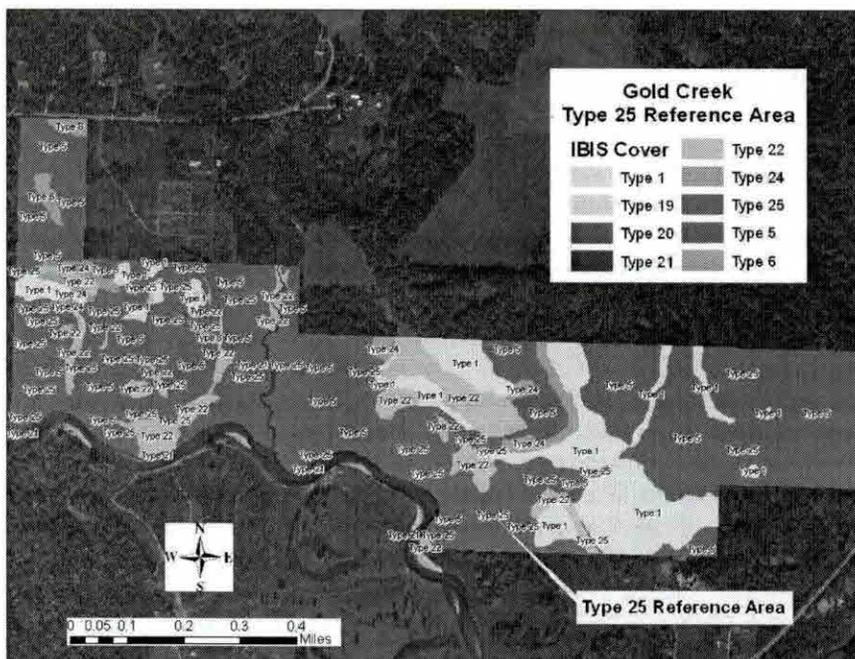


Figure 29. Reference Area for cover type No. 25 – Eastside (Interior) Riparian-Wetlands.

Erosion of the Shorelines of Lake Pend Oreille and Pend Oreille River

In November 2009, IDFG partnered with BPA and Ducks Unlimited to insert four foot bank pins along the shorelines of Lake Pend Oreille and Pend Oreille River to evaluate the rate of erosion of shoreline and riparian habitats from the operation of Albeni Falls dam. Bank pins were established at multiple sites to help evaluate erosion related to altered water level management resulting from Albeni Falls Dam operations. The shorelines Lake Pend Oreille and the Pend Oreille River experience erosion from the on-going operations of the Albeni Falls dam. But there are also concerns that changed operations could affect these erosion rates of shorelines and associated wetland areas, and could redistribute or displace wintering waterfowl, fishery habitat in the Pend Oreille and lower Clark Fork rivers, and access for sportsmen/women. In addition, there are concerns about how the proposed altered operation of the dam might affect Kokanee spawning habitat in the long term, should this operational scheme become a norm.

A total of 27 bank pin sites were chosen and the pin elevations surveyed in early January 2010 (Figure 30). It should be noted that the winter pool level for this year was held at its lowest level of 2,051 feet. Photographs and bank pin elevations for each site were included in Appendix E of the 2009 Annual Report. Seven of these sites were specific Kokanee spawning habitats and the remaining sites were located on IDFG wildlife management areas consisting of high priority wetland and wildlife habitats. The seven Kokanee spawning sites were chosen to look at the distribution of gravel on the shorelines and to determine if the distribution changes with changes in the operations of the Albeni Falls dam. These wildlife habitat sites were located on shorelines along the Pend Oreille River, the Pack River in the delta, and the Clark Fork River delta (Figure 31). These sites will be monitored over the next three years in an attempt to understand the current impacts of the dam's operations on the lake and river shorelines, and to detect differences in erosion rates if the dam's operations were changed.

In 2010, the winter pool level was held at 2,055 feet, and so as a consequence all of the Kokanee spawning sites were inundated and the pins could not be seen. In November 2010, pin sites in the Clark Fork River and the Pack River deltas were partially located with one site completely gone along the south bank of the Clark Fork River. Site CFRD5 slumped away within six weeks of the bank pins being inserted (Figure 32) and only two pins remain at site CFRD3 (Figure 33). The only site remaining on the south bank of the Clark Fork River is site CFRD4 (Table 4). The annual erosion rate appears to be about two feet along this shoreline. Pin sites along the westerly shorelines of Area 4 had erosion rates of about half a foot, while the pin site along the north fork of the Clark Fork (CFRD 7) experienced an erosion rate a little less at 0.38 feet per year. The soils of the delta are saturated when the lake level is held to 2,062 feet in the summertime. These water saturated soils are heavy and slump away, along with any vegetation (Figure 33), when the lake level is drawn down to the winter pool level of either 2,051 or 2,055 feet.

Pin sites were also located and measured for locations along the banks and islands in the Pend Oreille River (Table 4). With the exception of the site at Riley Creek, which had about 0.38 feet of deposition, the average erosion rate at other sites was about half a foot per year.

Table 4. Elevation (in feet), position and orientation for each bank pin site on the Lake Pend Oreille and Pend Oreille river deltas (Idaho State Plane WGS 1984). Also included are pin observations after one year of operation by the Albeni Falls dam (values measured in feet, Positive values = Erosion; Negative values = Sedimentation).

SITE DESIGNATION	ELEVATION	NORTHING	EASTING	LATITUDE	LONGITUDE	ORIENTATION	Status After One Year
STRONGS ISLAND SITE							
SI-STAKE	2,077.49	2375224.55	2329037.66	48°10'31.15"N	116°57'42.01"W	T-POST	T-post was down/replaced
SI-0	2,051.83	2375269.10	2329055.95	48°10'31.59"N	116°57'41.76"W	VERTICAL	Could not find
SI-1	2,052.77	2375267.78	2329055.51	48°10'31.57"N	116°57'41.76"W	VERTICAL	0.54
SI-2	2,053.21	2375264.60	2329054.84	48°10'31.54"N	116°57'41.77"W	VERTICAL	0.69
SI-3	2,054.54	2375262.32	2329054.55	48°10'31.52"N	116°57'41.78"W	VERTICAL	0.63
SI-4	2,055.50	2375259.13	2329053.54	48°10'31.49"N	116°57'41.79"W	VERTICAL	0.71
SI-5	2,056.60	2375256.55	2329052.75	48°10'31.46"N	116°57'41.80"W	VERTICAL	0.00
SI-6	2,064.95	2375228.69	2329039.12	48°10'31.19"N	116°57'42.00"W	HORIZONTAL	Not found; under slump
SI-7	2,067.93	2375226.71	2329038.20	48°10'31.17"N	116°57'42.01"W	HORIZONTAL	Not found; under slump
PRIEST RIVER DOWNSTREAM ISLAND SITE							
PRDSI-STAKE	2,065.95	2374831.12	2346787.83	48°10'29.94"N	116°53'20.08"W	T-POST	Present
PRDSI-0	2,051.05	2374629.38	2346664.58	48°10'27.93"N	116°53'21.86"W	VERTICAL	Water was too deep to detect pin
PRDSI-1	2,052.12	2374649.13	2346675.29	48°10'28.13"N	116°53'21.70"W	VERTICAL	Water was too deep to detect pin
PRDSI-2	2,052.88	2374671.83	2346687.96	48°10'28.35"N	116°53'21.52"W	VERTICAL	Water was too deep to detect pin
PRDSI-3	2,053.86	2374691.21	2346700.41	48°10'28.55"N	116°53'21.34"W	VERTICAL	Water was too deep to detect pin
PRDSI-4	2,054.93	2374714.37	2346714.62	48°10'28.78"N	116°53'21.14"W	VERTICAL	0.17
PRDSI-5	2,055.89	2374731.34	2346725.79	48°10'28.95"N	116°53'20.98"W	VERTICAL	0.31
PRIEST RIVER UPSTREAM ISLAND SITE							
PRUSI-STAKE	2,067.90	2374127.34	2348274.13	48°10'23.21"N	116°52'58.00"W	T-POST	Almost gone/on bank edge
PRUSI-0	2,051.13	2374057.66	2348209.02	48°10'22.52"N	116°52'58.95"W	VERTICAL	Water was too deep to detect pin
PRUSI-1	2,052.06	2374071.31	2348221.89	48°10'22.65"N	116°52'58.76"W	VERTICAL	Water was too deep to detect pin
PRUSI-2	2,053.05	2374078.31	2348228.86	48°10'22.72"N	116°52'58.66"W	VERTICAL	Water was too deep to detect pin
PRUSI-3	2,054.18	2374084.09	2348234.46	48°10'22.78"N	116°52'58.58"W	VERTICAL	0.60
PRUSI-4	2,055.17	2374093.78	2348244.19	48°10'22.88"N	116°52'58.44"W	VERTICAL	0.52
PRUSI-5	2,056.26	2374103.20	2348252.84	48°10'22.97"N	116°52'58.31"W	VERTICAL	Covered with bank slump
PRUSI-6	2,063.70	2374126.84	2348270.80	48°10'23.21"N	116°52'58.05"W	HORIZONTAL	Covered with bank slump
RILEY CREEK SITE							
RC-STAKE	2,064.87	2367840.13	2371860.57	48°09'24.46"N	116°47'08.81"W	T-POST	Deposition from the creek on this site; stake present
RC-0	2,050.98	2367716.39	2371994.03	48°09'23.26"N	116°47'06.82"W	VERTICAL	Water was too deep to detect pin
RC-1	2,052.04	2367734.17	2371973.42	48°09'23.43"N	116°47'07.13"W	VERTICAL	Water was too deep to detect pin

SITE DESIGNATION	ELEVATION	NORTHING	EASTING	LATITUDE	LONGITUDE	ORIENTATION	Status After One Year
RC-2	2.053.11	2367745.94	2371960.28	48°09'23.54"N	116°47'07.32"W	VERTICAL	Water was too deep to detect pin
RC-3	2.054.11	2367756.54	2371949.41	48°09'23.65"N	116°47'07.49"W	VERTICAL	Water was too deep to detect pin
RC-4	2.055.30	2367764.08	2371940.91	48°09'23.72"N	116°47'07.61"W	VERTICAL	-0.38
RC-5	2.056.30	2367776.11	2371928.39	48°09'23.84"N	116°47'07.80"W	VERTICAL	-0.38
HOODOO CREEK SITE							
HC-STAKE	2.065.97	2367811.54	2377438.79	48°09'24.91"N	116°45'46.54"W	T-POST	Present
HC-0	2.051.17	2367965.43	2377308.46	48°09'26.41"N	116°45'48.50"W	VERTICAL	Water was too deep to detect pin
HC-1	2.052.14	2367947.99	2377327.08	48°09'26.24"N	116°45'48.22"W	VERTICAL	Water was too deep to detect pin
HC-2	2.053.24	2367924.40	2377346.19	48°09'26.01"N	116°44'47.93"W	VERTICAL	Water was too deep to detect pin
HC-3	2.054.38	2367896.82	2377369.41	48°09'25.74"N	116°45'47.58"W	VERTICAL	Water was too deep to detect pin
HC-4	2.055.48	2367864.25	2377397.47	48°09'25.42"N	116°45'47.16"W	VERTICAL	0.42
HC-5	2.056.92	2367852.46	2377406.84	48°09'25.31"N	116°45'47.02"W	VERTICAL	0.35
HC-6	2.063.19	2367815.13	2377434.97	48°09'24.95"N	116°45'46.60"W	VERTICAL	1.17
NAV STATION SITE							
NS-STAKE	2.060.64	2387719.05	2377178.66	48°10'58.64"N	116°43'17.90"W	T-POST	Present
NS-0	2.051.05	2387719.05	2377117.09	48°10'58.04"N	116°43'16.67"W	VERTICAL	Water was too deep to detect pin
NS-1	2.052.23	2387709.17	2377124.57	48°10'58.11"N	116°43'16.82"W	VERTICAL	Water was too deep to detect pin
NS-2	2.053.27	2387700.29	2377131.35	48°10'58.18"N	116°43'16.95"W	VERTICAL	Water was too deep to detect pin
NS-3	2.054.41	2387693.06	2377136.63	48°10'58.23"N	116°43'17.06"W	VERTICAL	Water was too deep to detect pin
NS-4	2.055.63	2387664.00	2377157.75	48°10'58.43"N	116°43'17.49"W	VERTICAL	Water was too deep to detect pin
NS-5	2.056.58	2387650.75	2377168.03	48°10'58.43"N	116°43'17.69"W	VERTICAL	0.63
SPRINGY POINT SITE							
SP-STAKE	2.063.14	2397402.31	2420726.80	48°14'22.04"N	116°35'12.98"W	T-POST	Present
SP-0	2.051.13	2397488.71	240673.27	48°14'22.89"N	116°35'13.79"W	VERTICAL	Water was too deep to detect pin
SP-1	2.052.29	2397477.83	2420680.95	48°14'22.78"N	116°35'13.67"W	VERTICAL	Water was too deep to detect pin
SP-2	2.053.39	2397467.61	2420688.13	48°14'22.68"N	116°35'13.56"W	VERTICAL	Water was too deep to detect pin
SP-3	2.054.82	2397455.50	2420696.15	48°14'22.56"N	116°35'13.44"W	VERTICAL	Underwater; 0.17 exposed
SP-4	2.056.08	2397445.39	2420702.10	48°14'22.46"N	116°35'13.35"W	VERTICAL	0.25
SP-5	2.057.17	2397437.69	2420707.00	48°14'22.39"N	116°35'13.28"W	VERTICAL	0.19
CLARK FORK RIVER DELTA – SITE 1							
CFRD 1-STAKE	2.063.79	2365998.25	2505767.93	48°09'19.37"N	116°14'13.66"W	T-POST	Present
CFRD 1-1	2.051.51	2365794.87	2505511.76	48°09'17.34"N	116°14'17.42"W	VERTICAL	Water was too deep to detect pin
CFRD 1-2	2.052.47	2365800.67	2505517.31	48°09'17.40"N	116°14'17.34"W	VERTICAL	-0.01
CFRD 1-3	2.053.08	2365807.49	2505524.14	48°09'17.47"N	116°14'17.24"W	VERTICAL	-0.13
CFRD 1-4	2.053.98	2365812.96	2505532.98	48°09'17.52"N	116°14'17.11"W	VERTICAL	0.16

SITE DESIGNATION	ELEVATION	NORTHING	EASTING	LATITUDE	LONGITUDE	ORIENTATION	Status After One Year
CFRD 1-5	2,055.32	2365832.84	2505557.10	48°09'17.72"N	116°14'16.76"W	VERTICAL	0.21
CFRD 1-6	2,057.10	2365848.89	2505577.85	48°09'17.88"N	116°14'16.45"W	VERTICAL	0.17
CFRD 1-7	2,056.30	2365872.73	2505607.31	48°09'18.12"N	116°14'16.02"W	VERTICAL	0.07
CLARK FORK RIVER DELTA – SITE 2							
CFRD 2-STAKE	2,061.93	2366579.23	2504819.55	48°09'25.04"N	116°14'27.71"W	T-POST	Present
CFRD 2-1	2,051.41	2366441.24	2504751.31	48°09'23.67"N	116°14'28.70"W	VERTICAL	Water was too deep to detect pin
CFRD 2-2	2,052.56	2366459.40	2504759.30	48°09'23.85"N	116°14'28.58"W	VERTICAL	Water was too deep to detect pin
CFRD 2-3	2,053.26	2366493.53	2504775.38	48°09'24.19"N	116°14'28.35"W	VERTICAL	0.87
CFRD 2-4	2,054.07	2366514.45	2504785.35	48°09'24.40"N	116°14'28.20"W	VERTICAL	0.64
CFRD 2-5	2,054.59	2366530.19	2504792.89	48°09'24.56"N	116°14'28.09"W	VERTICAL	0.34
CFRD 2-6	2,057.06	2366551.82	2504804.30	48°09'24.77"N	116°14'27.93"W	VERTICAL	1.85
CLARK FORK RIVER DELTA – SITE 3							
CFRD 3-STAKE	2,065.59	2364216.42	2504688.85	48°09'01.71"N	116°14'29.41"W	T-POST	Present
CFRD 3-1	2,050.83	2364243.23	2504702.48	48°09'01.98"N	116°14'29.21"W	VERTICAL	Could not find
CFRD 3-2	2,052.17	2364242.04	2504701.06	48°09'01.97"N	116°14'29.23"W	HORIZONTAL	Could not find
CFRD 3-3	2,054.83	2364237.27	2504699.97	48°09'01.92"N	116°14'29.25"W	HORIZONTAL	1.8
CFRD 3-4	2,057.50	2364230.20	2504697.30	48°09'01.85"N	116°14'29.29"W	VERTICAL	2.5
CFRD 3-5	2,060.47	2364228.93	2504690.85	48°09'01.84"N	116°14'29.38"W	HORIZONTAL	Could not find; under slump
CLARK FORK RIVER DELTA – SITE 4							
CFRD 4-STAKE	2,063.76	2364042.15	2506978.11	48°09'00.14"N	116°13'55.63"W	T-POST	Present
CFRD 4-1	2,053.18	2364074.05	2506964.01	48°09'00.45"N	116°13'55.85"W	HORIZONTAL	Could not find
CFRD 4-2	2,055.14	2364072.43	2506964.99	48°09'00.44"N	116°13'55.83"W	VERTICAL	0.55
CFRD 4-3	2,055.63	2364069.24	2506966.22	48°09'00.40"N	116°13'55.81"W	VERTICAL	0.5
CFRD 4-4	2,057.55	2364062.67	2506969.06	48°09'00.34"N	116°13'55.77"W	VERTICAL	0.95
CFRD 4-5	2,058.89	2364055.52	2506971.92	48°09'00.27"N	116°13'55.73"W	VERTICAL	1
CFRD 4-6	2,059.78	2364049.84	2506973.28	48°09'00.21"N	116°13'55.71"W	VERTICAL	0.2
CFRD 4-7	2,061.51	2364049.83	2506973.29	48°09'00.21"N	116°13'55.71"W	HORIZONTAL	0.55
CLARK FORK RIVER DELTA – SITE 5							
CFRD 5-STAKE	2,061.93	2364055.54	2505054.09	48°09'00.15"N	116°D14'24.01"W	T-POST	All pins were gone by January 28, 2010. Only the stake remains.
CLARK FORK RIVER DELTA – SITE 6							
CFRD 6-STAKE	2,064.11	2369252.21	2504224.83	48°09'51.38"N	116°14'36.73"W	T-POST	Could not find
CFRD 6-1	2,051.49	2369875.71	2504322.10	48°09'57.54"N	116°14'35.35"W	VERTICAL	Water was too deep to detect pin
CFRD 6-2	2,051.72	2369827.30	2504309.86	48°09'57.06"N	116°14'35.53"W	VERTICAL	Water was too deep to detect pin
CFRD 6-3	2,051.94	2369778.69	2504298.14	48°09'56.58"N	116°14'35.70"W	VERTICAL	Water was too deep to detect pin
CFRD 6-4	2,052.27	2369729.82	2504288.81	48°09'56.10"N	116°14'35.83"W	VERTICAL	Water was too deep to detect pin

SITE DESIGNATION	ELEVATION	NORTHING	EASTING	LATITUDE	LONGITUDE	ORIENTATION	Status After One Year
CFRD 6-5	2,052.37	2369681.04	2504278.87	48°09'55.62"N	116°14'35.97"W	VERTICAL	0.53
CFRD 6-6	2,052.55	2369631.75	2504268.79	48°09'55.13"N	116°14'36.12"W	VERTICAL	0.13
CFRD 6-7	2,052.86	2369582.20	2504262.36	48°09'54.64"N	116°14'36.21"W	VERTICAL	0.44
CFRD 6-8	2,053.30	2369532.28	2504256.46	48°09'54.15"N	116°14'36.29"W	VERTICAL	0.22
CFRD 6-9	2,053.46	2369482.87	2504249.00	48°09'53.66"N	116°14'36.40"W	VERTICAL	0.22
CFRD 6-10	2,053.69	2369433.63	2504241.68	48°09'53.17"N	116°14'36.50"W	VERTICAL	0.38
CFRD 6-11	2,054.08	2369383.79	2504236.76	48°09'52.68"N	116°14'36.57"W	VERTICAL	0.48
CFRD 6-12	2,055.23	2369334.51	2504228.93	48°09'52.19"N	116°14'36.68"W	VERTICAL	0.62
CFRD 6-13	2,058.23	2369285.27	2504223.21	48°09'51.71"N	116°14'36.76"W	VERTICAL	0.50
CFRD 6-14	2,060.47	2369244.80	2504201.26	48°09'51.31"N	116°14'37.08"W	VERTICAL	Could not find
CFRD 6-15	2,061.61	2369243.56	2504204.19	48°09'51.29"N	116°14'37.03"W	HORIZONTAL	-0.47
CFRD 6-15	2,061.63	2369243.55	2504204.21	48°09'51.29"N	116°14'37.03"W	HORIZONTAL	Could not find
CLARK FORK RIVER DELTA – SITE 7							
CFRD 7-STAKE	2,067.40	2369388.60	2506729.53	48°09'52.88"N	116°13'59.80"W	T-POST	Present
CFRD 7-1	2,051.76	2369453.23	2506738.20	48°09'53.52"N	116°13'59.67"W	VERTICAL	Could not find
CFRD 7-2	2,052.39	2369442.95	2506736.63	48°09'53.42"N	116°13'59.70"W	VERTICAL	Could not find
CFRD 7-3	2,053.31	2369431.30	2506735.07	48°09'53.31"N	116°13'59.72"W	VERTICAL	Could not find
CFRD 7-4	2,054.32	2369422.33	2506733.65	48°09'53.22"N	116°13'59.74"W	VERTICAL	0.2
CFRD 7-5	2,055.49	2369413.18	2506732.46	48°09'53.13"N	116°13'59.75"W	VERTICAL	0.25
CFRD 7-6	2,056.00	2369407.76	2506731.93	48°09'53.07"N	116°13'59.76"W	VERTICAL	0.1
CFRD 7-7	2,057.54	2369397.98	2506731.01	48°09'52.98"N	116°13'59.77"W	VERTICAL	0.15
CFRD 7-8	2,058.62	2369394.48	2506730.74	48°09'52.94"N	116°13'59.78"W	VERTICAL	0.4
CFRD 7-9	2,059.84	2369391.84	2506730.79	48°09'52.92"N	116°13'59.78"W	HORIZONTAL	0.65
CFRD 7-9	2,059.86	2369391.87	2506730.78	48°09'52.92"N	116°13'59.78"W	HORIZONTAL	0.95
CFRD 7-10	2,060.59	2369391.57	2506730.97	48°09'52.91"N	116°13'59.77"W	HORIZONTAL	0.75
CFRD 7-10	2,060.63	2369391.58	2506730.97	48°09'52.91"N	116°13'59.77"W	HORIZONTAL	0.2
CFRD 7-11	2,063.00	2369389.38	2506730.51	48°09'52.89"N	116°13'59.78"W	VERTICAL	0.25
CLARK FORK RIVER DELTA – SITE A1							
A1-STAKE	2,063.96	2366876.26	2505743.66	48°09'28.03"N	116°14'14.10"W	T-POST	Present
A1-1	2,059.80	2366871.05	2505738.93	48°09'27.98"N	116°14'14.17"W	VERTICAL	0.25
A1-2	2,060.08	2366872.00	2505739.56	48°09'27.99"N	116°14'14.16"W	HORIZONTAL	0.2
A1-3	2,061.15	2366872.08	2505739.48	48°09'27.99"N	116°14'14.17"W	HORIZONTAL	0.35
A1-4	2,062.86	2366873.23	2505741.15	48°09'28.00"N	116°14'14.14"W	VERTICAL	0.35
CLARK FORK RIVER DELTA – SITE A2							
A2-STAKE	2,063.82	2367140.01	2505731.33	48°09'30.63"N	116°14'14.31"W	T-POST	Present

SITE DESIGNATION	ELEVATION	NORTHING	EASTING	LATITUDE	LONGITUDE	ORIENTATION	Status After One Year
A2-1	2,060.57	2367133.74	2505725.80	48°09'30.57"N	116°14'14.39"W	VERTICAL	0.2
A2-2	2,060.70	2367135.05	2505726.91	48°09'30.58"N	116°14'14.38"W	HORIZONTAL	0.5
A2-3	2,061.43	2367135.39	2505727.27	48°09'30.59"N	116°14'14.37"W	HORIZONTAL	0.05
A2-4	2,063.46	2367137.27	2505729.11	48°09'30.60"N	116°14'14.34"W	VERTICAL	0.65
CLARK FORK RIVER DELTA – SITE A3							
A3-STAKE	2,063.60	2367374.55	2505767.16	48°09'32.95"N	116°14'13.80"W	T-POST	Present
A3-1	2,060.49	2367375.05	2505761.40	48°09'32.95"N	116°14'13.89"W	VERTICAL	0.25
A3-2	2,060.32	2367374.29	2505764.40	48°09'32.95"N	116°14'13.84"W	HORIZONTAL	0.95
A3-3	2,061.08	2367374.15	2505764.77	48°09'32.94"N	116°14'13.84"W	HORIZONTAL	1.35
A3-4	2,063.17	2367373.94	2505765.94	48°09'32.94"N	116°14'13.82"W	VERTICAL	2.5
CLARK FORK RIVER DELTA – SITE A4							
A4-STAKE	2,063.42	2367604.22	2505536.77	48°09'35.20"N	116°14'17.22"W	T-POST	Present
A4-1	2,060.01	2367599.52	2505530.92	48°09'35.15"N	116°14'17.31"W	VERTICAL	0.45
A4-2	2,060.10	2367600.61	2505532.55	48°09'35.16"N	116°14'17.29"W	HORIZONTAL	0.45
A4-3	2,060.85	2367600.60	2505532.97	48°09'35.16"N	116°14'17.28"W	HORIZONTAL	0.55
A4-4	2,062.64	2367601.87	2505534.21	48°09'35.18"N	116°14'17.26"W	VERTICAL	0.15
CLARK FORK RIVER DELTA – SITE A5							
A5-STAKE	2,064.87	2367837.28	2505560.29	48°09'37.50"N	116°14'16.90"W	T-POST	Present
A5-1	2,060.78	2367836.72	2505552.84	48°09'37.50"N	116°14'17.01"W	VERTICAL	Covered over with a slump
A5-2	2,061.10	2367837.41	2505554.71	48°09'37.50"N	116°14'16.98"W	HORIZONTAL	0.7
A5-3	2,062.03	2367837.57	2505554.89	48°09'37.50"N	116°14'16.98"W	HORIZONTAL	0.4
A5-4	2,062.90	2367837.65	2505557.18	48°09'37.51"N	116°14'16.94"W	VERTICAL	0.2
PACK RIVER DELTA							
PRD -STAKE	2,063.01	2423658.67	2472394.42	48°18'45.99"N	116°22'32.80"W	T-POST	Present
PRD 8-1	2,056.12	2423667.37	2472409.01	48°18'46.08"N	116°22'32.58"W	VERTICAL	0.63
PRD 8-1	2,056.46	2423666.59	2472407.69	48°18'46.07"N	116°22'32.60"W	VERTICAL	0.42
PRD 8-2	2,058.00	2423664.89	2472404.92	48°18'46.05"N	116°22'32.64"W	VERTICAL	1.88
PRD 8-3	2,058.89	2423663.83	2472403.53	48°18'46.04"N	116°22'32.66"W	VERTICAL	1.87
PRD 8-4	2,059.87	2423662.27	2472401.36	48°18'46.03"N	116°22'32.70"W	VERTICAL	1.50
PRD 8-5	2,060.77	2423661.58	2472400.49	48°18'46.02"N	116°22'32.71"W	VERTICAL	1.19
PRD 8-6	2,061.81	2423660.21	2472398.43	48°18'46.01"N	116°22'32.74"W	HORIZONTAL	Covered over with a slump



Figure 30. Aerial photograph (taken 2004) of Lake Pend Oreille showing the 27 bank pin locations. Note that there are 12 bank pin locations in the Clark Fork River delta (see Figure 31).

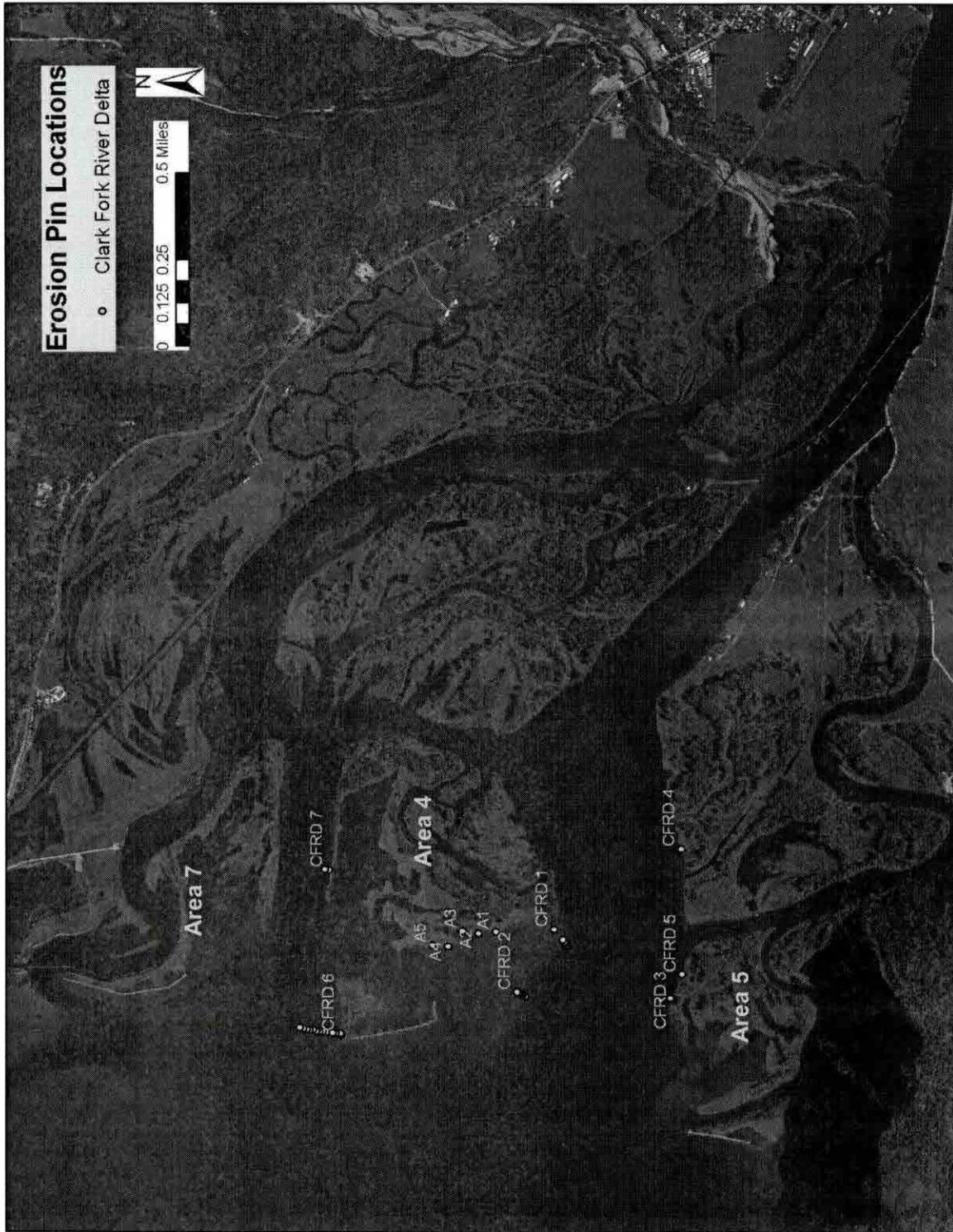


Figure 31. Aerial photograph (taken 2004) of the Clark Fork River delta showing the 12 bank pin locations.



Figure 32. Bank pin site CFRD5: top photograph of the site was taken on November 16, 2009, the day the pins were inserted; bottom photograph of the site was taken on January 28, 2010, showing that the bank pins are gone and the only the t-post marking the location remains.



Figure 33. Top photograph is showing the bank pin site CFRD3 looking toward the west taken on November 17, 2010. An engineer is collecting information on the remaining pines. Bottom photograph is showing bank pin site CFRD3 looking toward the east. This photograph shows wildlife habitat cover being lost along due to banks slumping into the river.

Future Mitigation Projects

Current projects identified in 2010, and still on-going are the fee-title acquisition of about 44 acres and the purchase of a 17-acre conservation easement on the North Fork of the Coeur d'Alene River. These project proposals are being cost-shared with the Avista Corporation. The due diligence portion of the acquisitions are being funded through the IDFG Project expense contracts while the capital funds to purchase the property will be funded by Avista. The U.S. Forest Service is also involved in the project as 10-acre parcel splits the 44-acre ownership. Acquisition of the northern parcel and protection of the southern property by a purchased conservation easement will provide protection of an integral portion of the North Fork Coeur d'Alene River that provides cold water refuge to westslope cutthroat trout. Similar to the St. Joe River, a growing trend along the North Fork of the Coeur d'Alene River is the development of campsites and RV lots. Much of the cottonwood gallery and riparian vegetation along this river is being removed for these purposes. This proposal will protect over 60 acres of riparian vegetation and offer opportunities to educate the public on the importance of riparian vegetation for wildlife.

New proposals for 2011/2012, include the fee-acquisition of about 26 acres in the Pend Oreille basin, the donation of 6-acres and a cost-share purchase of a flood easement in the Coeur d'Alene basin, and the purchase of an access easement to the Pack River delta. Also proposed is a restoration project for the Pack River delta.

Rapid Lightning Habitat Segment, Pend Oreille Subbasin

The Ginter family have been long time residents of the Rapid Lightning Creek area on the Pack River and owned over 300 acres adjacent to the Rapid Lightning Habitat Segment and Trout Creek Habitat Segments of the Pend Oreille Wildlife Management Area (WMA). The Ginter family conveyed Rapid Lightning (110 acres) to the Department via the BPA wildlife mitigation program in 1999, and then another 237 acres in 2007. Mr. Ginter now is requesting that the Department acquire his remaining 26.24 acres. The subject property is located in Bonner County, east of the Pack River and approximately ten miles north of highway 200 where the Rapid Lightning road intersects Ginter Lane. There is a house and barn on the property. Both of these structures would be removed.

The IDFG and the public access the Rapid Lightning Creek parcel using an easement roadway that lies along the easternmost boarder of the proposed acquisition (Figure 34). The Bureau of Land Management (BLM), Idaho Department of Lands (IDL), U.S. Forest Service (USFS), and two other private landowners use the same access roadway. The access road is also located along the west side of a neighboring landowner who is unhappy with the public using the road. This acquisition would allow for the relocation of the public access road away from the neighbor. The acquisition would also allow for the protection and buffer of wetlands to the north of the current mitigation parcel.

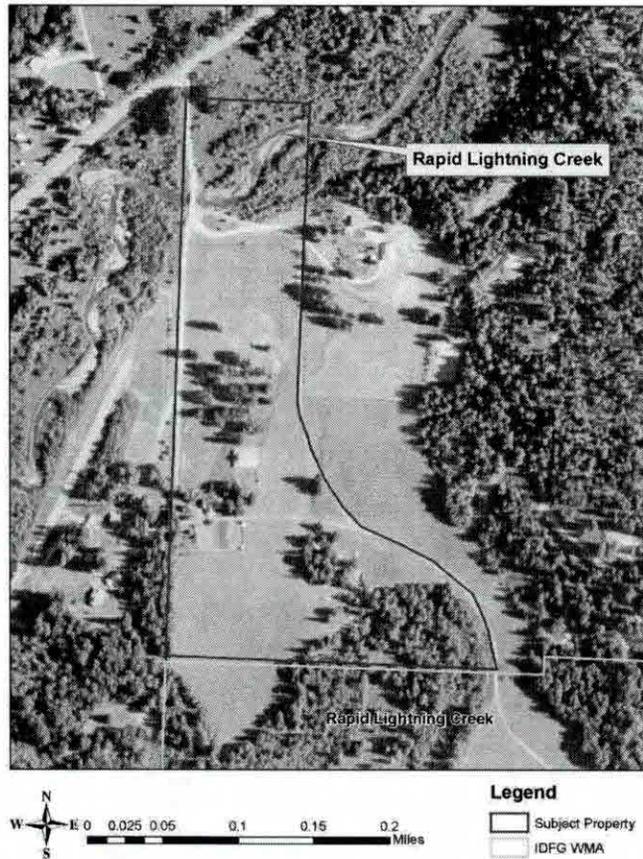


Figure 34. Aerial photograph (2009) showing the proposed acquisition adjacent to the Rapid Lightning Creek Habitat Segment of the Pend Oreille WMA. The access road to the WMA is along the eastern border of the subject property.

Robinson Creek Habitat Segment, Coeur d'Alene Subbasin

This is a proposal to increase the wetland area adjacent to the Robinson Creek Habitat Segment on the Coeur d'Alene River Wildlife Management Area (WMA). This increase in area will allow the IDFG the ability to complete a restoration project for the Robinson Creek parcel. The Idaho Transportation Department (ITD) own and manage a 6- acre mitigation parcel directly to the north of the Robinson Creek parcel and are interested in quit claiming their property to IDFG. In addition, Thomas and Sheryl Hayman, landowners to the west of the Robinson Creek parcel are also willing to sell to the IDFG a perpetual flood easement on the lower portions of their ownership. The acquisition of the flood easement and the acceptance of the ITD donation are critical for the completion of the wetland restoration of the Robinson Creek parcel (Figure 35).

The Department purchased the Robinson Creek parcel in November 2009, under the Project. The Robinson Creek parcel consists of about 46 acres of uncontaminated floodplain located in Kootenai County, adjacent to Lane Marsh in the Lower Coeur

d'Alene River Valley. This was the first Albeni Falls Wildlife Mitigation Project completed in Kootenai County. This was also the first time the Albeni Falls wildlife mitigation activities had been coordinated with the U.S. Fish and Wildlife Service's efforts to address heavy metal contamination issues in the Lower Coeur d'Alene River Valley. The USFWS is a member of the Coeur d'Alene Basin Natural Resource Trustees (Trustees). The Trustees interest in the Robinson Creek property originates from a legally mandated obligation to compensate for tundra swans injured or killed by exposure to the mining waste generated heavy metals which contaminate many of lower Coeur d'Alene River Wetlands. It is possible that the Trustees may provide funding to purchase the flood easement.

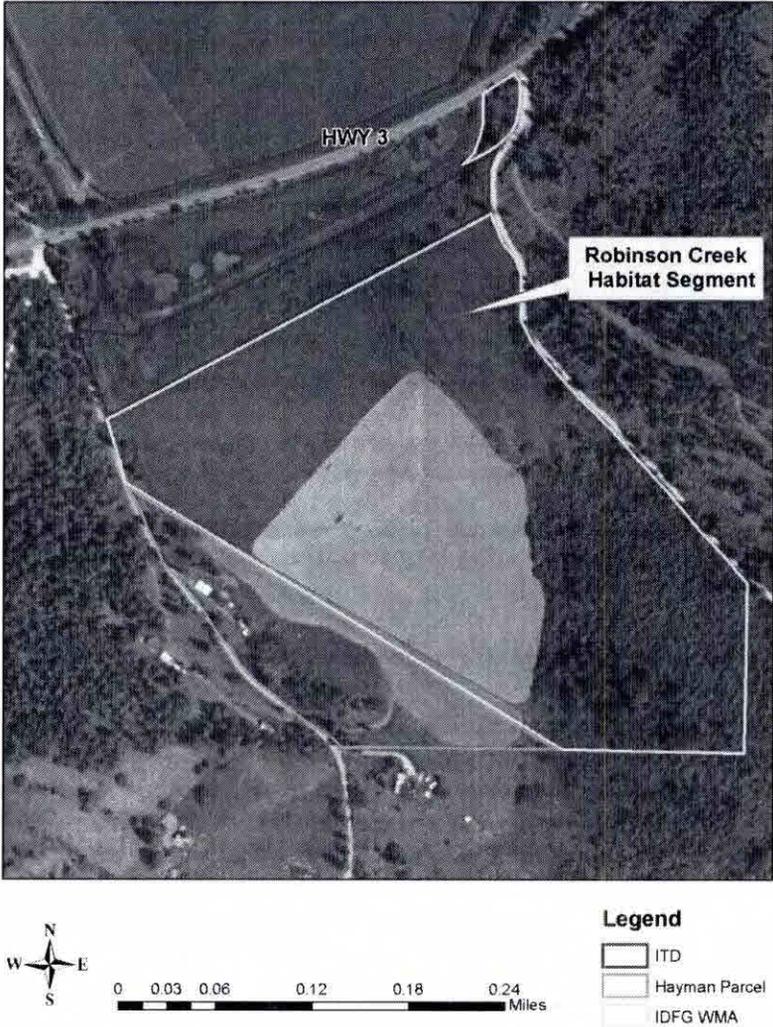


Figure 35. Aerial photograph showing the Robinson Creek Habitat Segment in relation to the ITD and Hayman ownerships.

To compensate for impacts to tundra swans, the Trustees have focused on restoring converted agricultural land to desirable wetland habitat. It should be noted that the ITD mitigation project adjoins a 390 wetland restoration project (Schlepp conservation easement) completed by the Trustees in 2006. If IDFG acquired the ITD property and worked with the Hayman family to secure a flood easement, then this would consolidate a 450 acre block of restored wetlands (Figure 36) and strengthen a growing partnership between the IDFG, the BPA Albeni Falls Wildlife Mitigation Project, Trustees and neighboring landowners. It should be further noted that the Trustees have tentatively agreed to cost-share the wetland restoration costs.

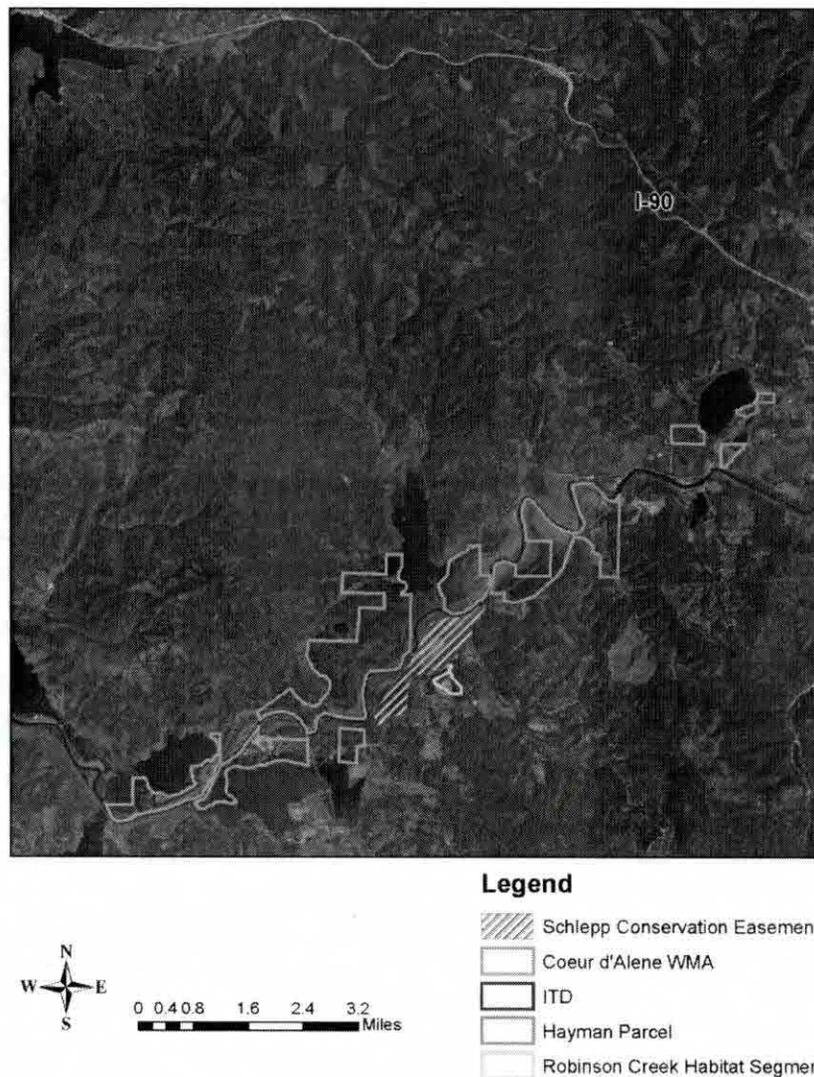


Figure 36. Aerial photograph showing the vicinity of the Robinson Creek Habitat Segment in relation to the Coeur d'Alene River WMA and the Schlepp conservation easement.

Pack River Delta Access Easement

IDFG has secured temporary access easements for past restoration efforts in the Pack River delta. IDFG and restoration partners repaired and reinforced the roadway in exchange for its use. The roadway can now support the travel of heavy equipment to the delta area.

The landowners of the roadway are now experiencing financial issues and are interested in allowing IDFG to purchase a permanent access easement. Securing a permanent access easement will ensure that IDFG can continue to effectively monitor the restoration site, as well as to facilitate future restoration activities. Also, IDFG will be able to control noxious weeds on the access area.

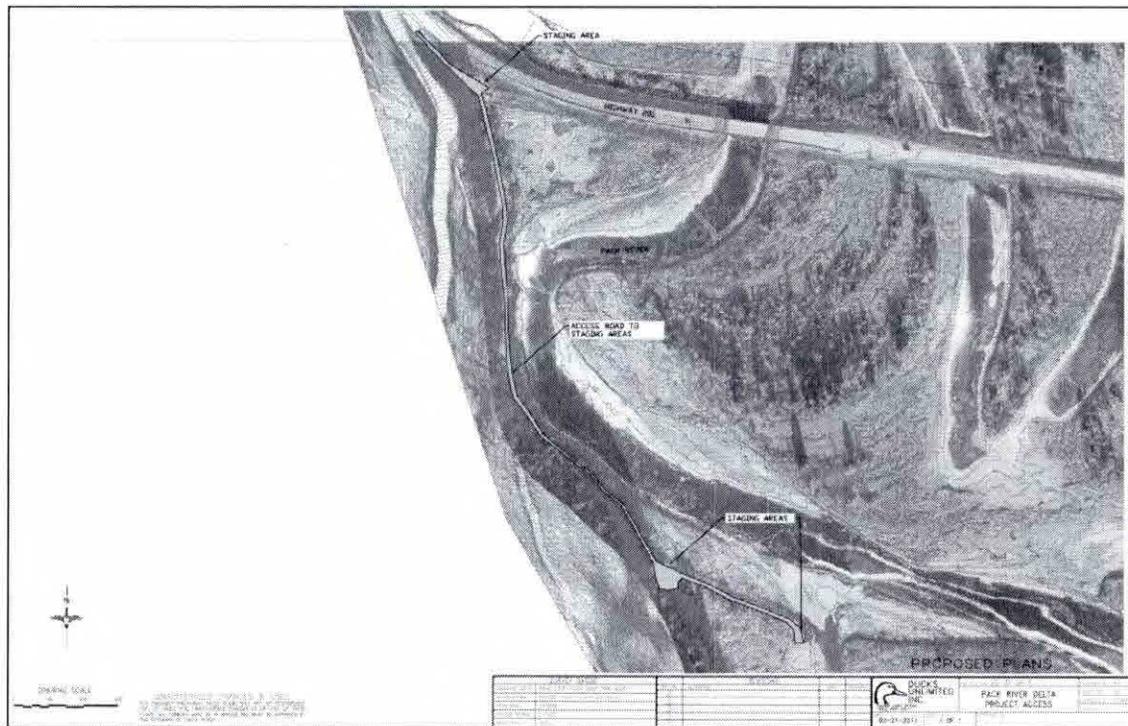


Figure 37. Proposed acquisition of a permanent access easement to the Pack River delta restoration project.

Pack River Delta Restoration – Phase II

Purpose and Need

Construction of the Pack River delta restoration project began on December 1, 2008, and was completed on March 18, 2009. The overall purpose of the Pack River delta enhancement project was to protect and improve riparian and wetland habitats in the

delta, and enhance important bird, fish and wildlife habitat. Overall, most everything that was attempted worked very well and demonstrated that restoration on-site is possible. Therefore, a second phase of construction is proposed for the Pack River delta as a pilot study to see how restoration efforts can be funded and credited under the Albeni Falls Wildlife Mitigation Project.

The first phase of the Pack River delta project had several goals such as 1) protecting the remaining islands in the Pack River delta from further erosion resulting from the operation of the Albeni Falls dam; 2) increasing the height and stability of the summertime submerged islands in the delta to improve their functionality, and availability to birds, year-round; 3) constructing engineered log structures and soil bioengineering components to increase the deposition of sediments in the delta area; and 4) investigating restoration methods and their applicability for future mitigation projects. The second phase of construction and bioengineering work would be to 1) add one rock vane on the Pack River; 2) increase the height of the bankfull benches in six areas and plant them with willows; 3) protect the south facing shoreline of Island 7; and, 4) increase the area of Island 8 and create three islands to the north of the island. All of these actions support the overall purpose of the first restoration project and could provide partial wildlife habitat mitigation for the construction and inundation of Albeni Falls Dam. These actions are also proposed as they would create wildlife habitat that was lost to the ongoing operation of the Albeni Falls dam.

Phase I – Past Restoration

By the end of March 2009, a total of eight islands (Figure 38) in the Pack River delta were rebuilt to approximately 18-24 inches above the summer pool elevation of Lake Pend Oreille (i.e. 2,062 ft). Erosion protection measures consisting of large woody debris were utilized on the leading edges of some rebuilt islands and also incorporated was the use of rock armor on the most southern island. After the construction phase, the newly constructed islands were broadcast seeded using two perennial grass mixes; one seed mix was for the drier portions of the islands and another seed mix for the shoreline and wetter portions. In April, an intensive planting effort using volunteers from local schools and the general public was undertaken to plant willow whips, and a mix of native bare root and potted woody stock, and later in July, over 16,000 herbaceous plugs were planted along the island shorelines.

In the first phase of work, the engineered log structures appeared to have all performed well in that they stayed in place and reduced surface wave action during two full summer pools. The coir blankets tended to have a positive effect on plant growth, coverage, and robustness, protecting soil and seed, and possibly trapping moisture and acting as mulch. It was learned that some river-end anchor stones needed to be flatter and longer as rounder and shorter stones tended to fall off the logs. All borrow and fill areas were functioning well.

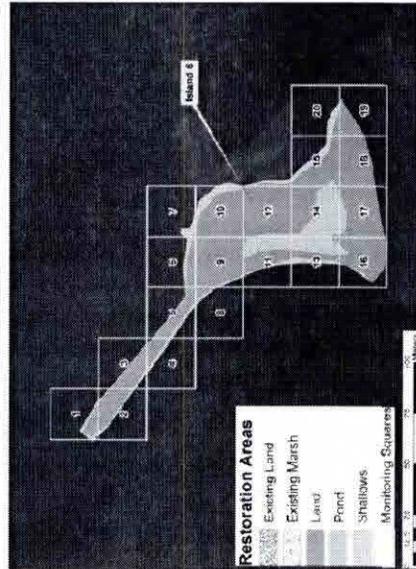
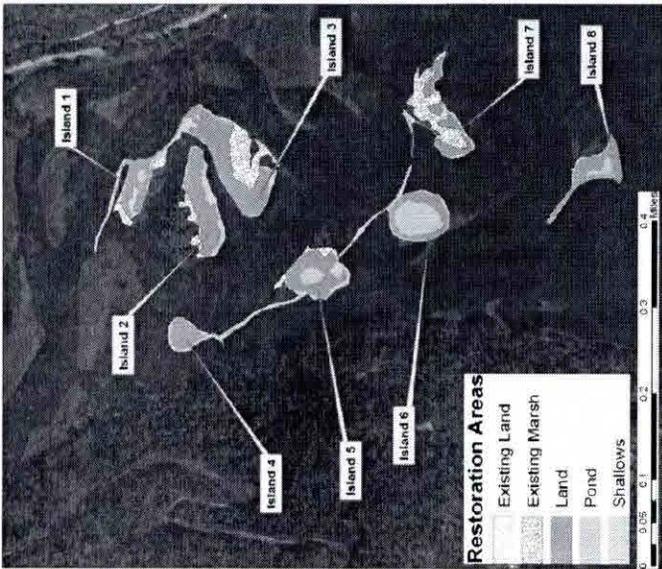


Figure 38. Top left figure showing a detailed map of Pack River Delta Restoration Project. Land, pond, and shallow areas were created during the restoration project. Bottom left showing Island 8 with geotube extending northwest from the Island and a 25m x25m-monitoring survey grid overlay. Right showing an aerial photograph of the project area after the completion of construction and at full summer pool of 2,064 ft taken in July 2009.

Waterfowl, including swans were frequenting the ponds created by the borrow areas. It was found that the willow wattles and fascines on several bank full bench areas did not return results compared to the overall effort and amount of material used. In these cases the tops of the bank full benches needed to be at least five inches higher.

There was evidence of browsing by deer and elk, as well as activity by beavers. On two occasions prints of a bear were observed in the delta soils. Only two small areas less than ten feet in width on two bank full benches were rebuilt in December 2009. The coir blankets tended to have a positive effect on plant growth, coverage, and robustness, protecting soil and seed, and possibly trapping moisture and acting as mulch. The engineered log structures appeared to have all performed well in that they stayed in place and reduced surface wave action during full summer pool.

A total of 174 grid squares were surveyed on the eight islands of the restoration project (Figure 38 and Table 5). The survey estimated percent of each different type of ground cover found within each grid square. Since a grid square is 25m², each percent of estimated ground cover represents an area of 6.25m² (0.00154 acres). These grid square areas can be accumulated to estimate the area of each ground cover type within the grid square matrix. The survey found that the newly formed soils suitable for planting woody plants was 11.13 acres (1.49 acres of bare sand, 2.62 acres of bare clay, and 7.01 acres of redistributed sod). The acreage of ground cover types found within the grid square matrix of each island is reported in Table 5.

Based on the willow cuttings found during the monitoring efforts, the cuttings were planted at a density of 161 cuttings per acre. The planting densities for the various island ranged from 32 cuttings per acre for Island 3 to 759 cuttings per acre for Island 4. Table 6 lists the number and density of willow cuttings found on each island. Table 6 also presents the planting success of the clipped and unclipped willow cuttings. The percent success rate is defined as the number live cuttings found during the survey divided by total number of willow cuttings found times 100.

A total of 3,560 nursery stock trees and shrubs were planted in the newly created soils of the eight islands. The average planting density was 246 plants per acre. The planting densities varied among the islands ranging from 157 plants per acre on Island 5 to 398 plants per acre on Island 6. During the survey only 2,738 nursery stock plants were found. This included both living and dead plants. There were 2,525 living nursery stock plants found. The overall planting success [(number found alive / number planted) X 100] was 70.9%. The individual island success rates ranged from 43.3% on Island 7 to 98.7% on Island 6 (Table 7).

Table 5. Ground cover types found within the 25 meter grid square matrix.

Island	Grid Squares Surveyed	Ground Cover Types Found (in Acres)							Existing Water Vegetation	Open Water	Rock Breakwater
		Newly Formed Ground Covers			Existing Land Vegetation		Total				
		Bare Sand	Bare Clay	Redistributed Sod	Existing Vegetation	Existing Water Vegetation					
Island 1	14	0.18	0.00	0.72	0.10	0.90	0.27	0.90	0.00		
Island 2	25	0.00	0.00	1.34	0.97	1.34	0.18	1.37	0.00		
Island 3	36	0.06	0.00	2.66	0.11	2.72	0.74	1.99	0.00		
Island 4	10	0.64	0.00	0.00	0.00	0.64	0.00	0.91	0.00		
Island 5	23*	0.00	0.00	1.66	0.09	1.66	0.49	1.31	0.00		
Island 6	26	0.00	0.45	0.64	0.02	1.08	1.11	1.81	0.00		
Island 7	20	0.62	0.61	0.00	0.02	1.23	0.95	0.89	0.00		
Island 8	20	0.00	1.56	0.00	0.00	1.56	0.00	1.45	0.07		
Totals	174	1.49	2.62	7.01	1.30	11.13	3.74	10.63	0.07		

* Grid numbers 21 and 24 not surveyed on Island 5 because no land was found within those grid squares

Table 6. Willow cuttings (poles and whips) planting success.

Island	Willow Cuttings Counted	Density (cuttings per acre)	Unclipped Cuttings			Cutting with Clipped Tops		
			Alive	Dead	Percent Success*	Alive	Dead	Percent Success*
Island 1	31	35	31	0	100.0	0	0	
Island 2	178	133	29	4	87.9	96	49	66.2
Island 3	87	32	66	4	94.3	8	9	47.1
Island 4	483	759	73	57	56.2	225	128	63.7
Island 5	115	69	60	6	90.9	41	8	83.7
Island 6	375	346	88	24	78.6	223	40	84.8
Island 7	229	186	26	5	83.9	145	53	73.2
Island 8	297	190	63	43	59.4	175	16	91.6
Totals	1,795	161	436	143	75.3	913	303	75.1

* (Number found alive / Total number found) X 100

Table 7. Pack River Delta Project planting densities and success rates of the nursery stock plantings.

Island	Number planted	Density (plants/acre)	Nursery Stock Plants Found in Survey			Percent Success*
			Total	Alive	Dead	
Island 1	274	238	214	197	17	71.9
Island 2	506	276	369	364	5	71.9
Island 3	757	189	513	487	26	64.3
Island 4	152	181	115	105	10	69.1
Island 5	310	157	260	245	15	79.0
Island 6	395	398	431	390	41	98.7
Island 7	681	263	324	295	29	43.3
Island 8	485	328	512	442	70	91.1
Totals	3,560	246	2,738	2,525	213	70.9

*(Number found alive / Number planted) X 100

Phase II – Proposed Restoration

The second phase of construction and bioengineering work is proposed to complete the project and provide further protection from wind and wave erosion due to the operations of the Albeni Falls dam. The construction would consist of building several vegetated rock structures as well as building three new islands between Island 7 and Island 8 (Figures 38 and 39).

The first task will be to reinforce and prepared the access road and staging area (Figure 39). One rare/sensitive plant species was found in the in the staging area during the past restoration efforts. The species was the purple meadowrue, *Thalictrum dasycarpum*. The construction of a vegetated rock bankfull bench in this area would protect the Pack River channel as well as remove a large stand of invasive tansy (*Tanacetum vulgare*). Reinforcing and raising the bankfull benches and then planting them with willows is proposed along four other areas along the Pack River in the northern portion of the project area. These areas were originally constructed about 3-6 inches below the summertime full pool level, and as a consequence, the willow fascines did not survive. Over time the soil in these sections of bankfull bench will erode away. This proposal is to reinforce these areas with rock and raise these portions to just above the full pool and have them planted with soil choked willows.

In the southern portion of the project area (Figure 40), one bankfull bench area along the Pack River between Islands 6 and 7 would be sturdier with the construction of an additional rock vane and further reinforcement and planting along the bankfull bench. Two small mounds would also be raised and planted with willows along the bankfull bench between Islands 5 and 6. The single log vane currently at this location is not sufficient to redirect the flow of the Pack River and the bank is slowly eroding. The current proposal would help to redirect the flow of the Pack River away from the bank and reduce the current erosion.



Figure 39. Proposed restoration plans for the northern portion of Pack River delta project area



Figure 40. Proposed restoration plans for the southern portion of Pack River delta project area.

The proposal would also include the protection of the south facing shoreline of Island 7 where the original restoration project tested the effectiveness of logs and coir matting to address wind and wave erosion. The logs and coir matting alone were found to only marginally protect the newly filled areas from wind and wave erosion and so a vegetated rock breakwater is proposed for this purpose.

Also, the first phase of the restoration project lacked the funds and logs to complete the construction of Island 8 and fifth rootwad roughness structure between Islands 7 and 8. Therefore, this proposal would include an addition to the northeastern part of Island 8 and the construction of three smaller islands to the north of this addition (Figure 40). The extensions to Island 8 will act like a rootwad roughness structure, redirecting flow from the Pack River, as well as acting as a breakwater to reduce wave action behind the islands. The wind and wave action in this part of the delta is much greater than in the northern portion, and so all of the newly constructed southern shorelines will be protected with a vegetated rock breakwater (Figure 41). Past restoration efforts demonstrated that it is possible to plant soil choked willows in a rock breakwater (Figure 42), and it is hoped that if these vegetated rock breakwaters perform well, then this technology could be used in the Clark Fork River delta.

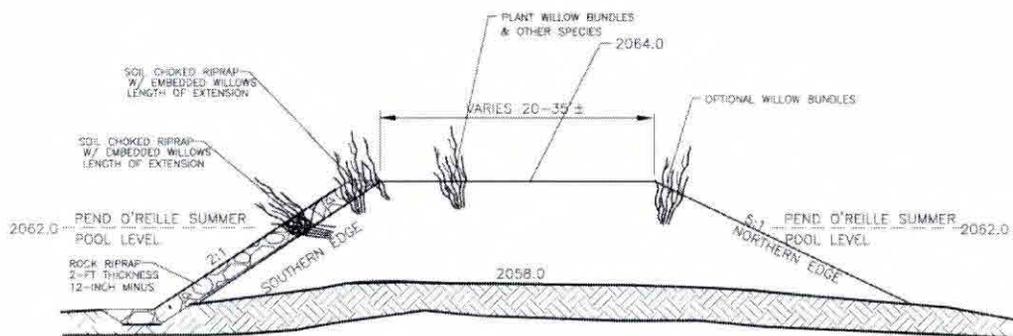


Figure 41. Schematic diagram showing a typical section of an island improvement with soil choked willows embedded in a protective rock breakwater.



Figure 42. Willows growth in a rock breakwater on Island 8 during summer full pool level (Photograph dated July 29, 2010).

The estimated cost for the proposed restoration effort is \$597,000 (Table 8). The production costs include an indirect line item for Ducks Unlimited to subcontract the construction. Also, the cost for the planting is only for the plant stock and does not include any costs for planting or monitoring the planting success. The plant cost also does not include the cost for harvesting and storing the willow stock.

DU Project Name: PACK RIVER PROJECT
 DU Project #: ID-56-1

2/23/2011
 Brian Heck

ENGINEER'S ESTIMATE FOR PROJECT COSTS

Item #	Item	Unit	#Units	Unit \$	Total
EQUIPMENT					
1	Mobilization	L.S	1	\$ 25,000	\$ 25,000
2	Tracked Dump Trucks	HR	876	\$ 150	\$ 131,387
3	LGP Dozer	HR	240	\$ 145	\$ 34,800
4	Cat 320 Excavator	HR	544	\$ 145	\$ 78,820
5	Skid Steer	HR	80	\$ 65	\$ 5,200
6	Laborers	HR	300	\$ 40	\$ 12,000
MATERIALS					
7	Riprap (12-inch minus)	CY	4264	\$ 16	\$ 68,225
8	Gravel -Access Improvement	CY	300	\$ 12	\$ 3,600
9	Filter Fabric	SY	3000	\$ 2	\$ 6,000
10	Coir Matting	L.S	1	\$ 10,000	\$ 10,000
11	Silt Fence	L.F	1650	\$ 5	\$ 8,250
12	Plantings	L.S	1	\$ 25,000	\$ 25,000
13	Contingency		20%		\$ 75,006
				SUBTOTAL	\$ 483,289
PRODUCTION COSTS					
14	DESIGN/CONTRACTING/CONSTRUCTION MANAGEMENT		14%		\$ 67,660
15	INDIRECTS (if DU contracts construction)		8.36%		\$ 46,059
				TOTAL \$	597,009

Table 8. Table prepared by Brian Heck, an engineer for Ducks Unlimited, showing estimated equipment, material and production costs for completing the proposed restoration work in the Pack River delta.

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**Albeni Falls Wildlife Mitigation Project
Idaho Department of Fish and Game
2011 Annual Report**

Project No. 1992-061-00 – Capital

Project No. 1992-061-03 – Expense Contracts:
48187 – IDFG Administration/Implementation (07/01/10 – 06/30/11)
48305 – IDFG Albeni Falls WMA O&M (07/01/10 – 06/30/11)

**Prepared for
Bonneville Power Administration**

FINAL

**June 2012
Idaho Department of Fish and Game**

**Region 1
2885 West Kathleen Street
Coeur d'Alene, Idaho**

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Background

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Public Law 96-501) directed that measures be implemented by Bonneville Power Administration (BPA) to protect, mitigate and enhance fish and wildlife to the extent affected by development and operation of hydropower projects on the Columbia River system. The Act created the Northwest Power Planning Council, now referred to as the Northwest Power and Conservation Council (Council), which in turn developed the Columbia River Basin Fish and Wildlife Program (Program). Under the Act, BPA has the authority and obligation to fund fish and wildlife mitigation activities that are consistent with the Council's Program. The Idaho Department of Fish and Game (IDFG) implemented their first acquisition under the Program in 1997.

Using the standardized Habitat Evaluation Procedures (HEP) process (USFWS 1980), authors of the Albeni Falls Wildlife Protection, Mitigation and Enhancement Plan (Martin *et al.* 1988) estimated a net wildlife loss of 28,587 habitat units (HU) for eight evaluation species. The evaluation species included the wintering and breeding bald eagle (*Haliaeetus leucocephalus*), black-capped chickadee (*Parus atricapillus*), mallard duck (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), yellow warbler (*Dendroica petechia*), muskrat (*Ondatra zibethicus*), white-tailed deer (*Odocoileus virginianus*) and redhead duck (*Aythya americana*). The construction of the dam resulted in the estimated loss of 6,617 acres of wetland habitat and the inundation of 8,900 acres of deepwater marsh (Martin *et al.* 1988). The Albeni Falls Wildlife Mitigation Project (Project) is designed to mitigate the losses, in addition to protecting and enhancing critical habitat for a wide variety of species dependant on wetland and riparian habitats and associated uplands.

In 2011, the wildlife crediting for the Albeni Falls Wildlife Mitigation Project by all implementing entities is reported by BPA¹ to be at 49% mitigated, with an estimated 14,050 HU mitigated for according to the ledger.

In total, IDFG has mitigated about 17% of the total Albeni Falls Hydroelectric Project wildlife losses by securing the protection of about 4,196 acres of wildlife habitat (Appendix A for maps) and crediting BPA with about 3,784 protection habitat units in five subbasins (Table 1). Operation and maintenance activities have resulted in a total of about 975 enhancement habitat units. IDFG focused their mitigation efforts in-basin, so the majority of the habitat units (71%) are provided from projects implemented in the Pend Oreille subbasin. About 19% of habitat units are from projects implemented out-of-basin.

The IDFG mitigation lands are managed under five separate Wildlife Management Areas (Figure 1) that include:

- 1) Boundary/Smith Creek WMA
- 2) McArthur WMA
- 3) Pend Oreille WMA
- 4) Farragut WMA
- 5) Coeur d'Alene River WMA

¹ Crediting information obtained from the BPA website on June 13, 2012.

Legend

-  WMA Mitigation Properties
-  Subbasins
-  Idaho Counties

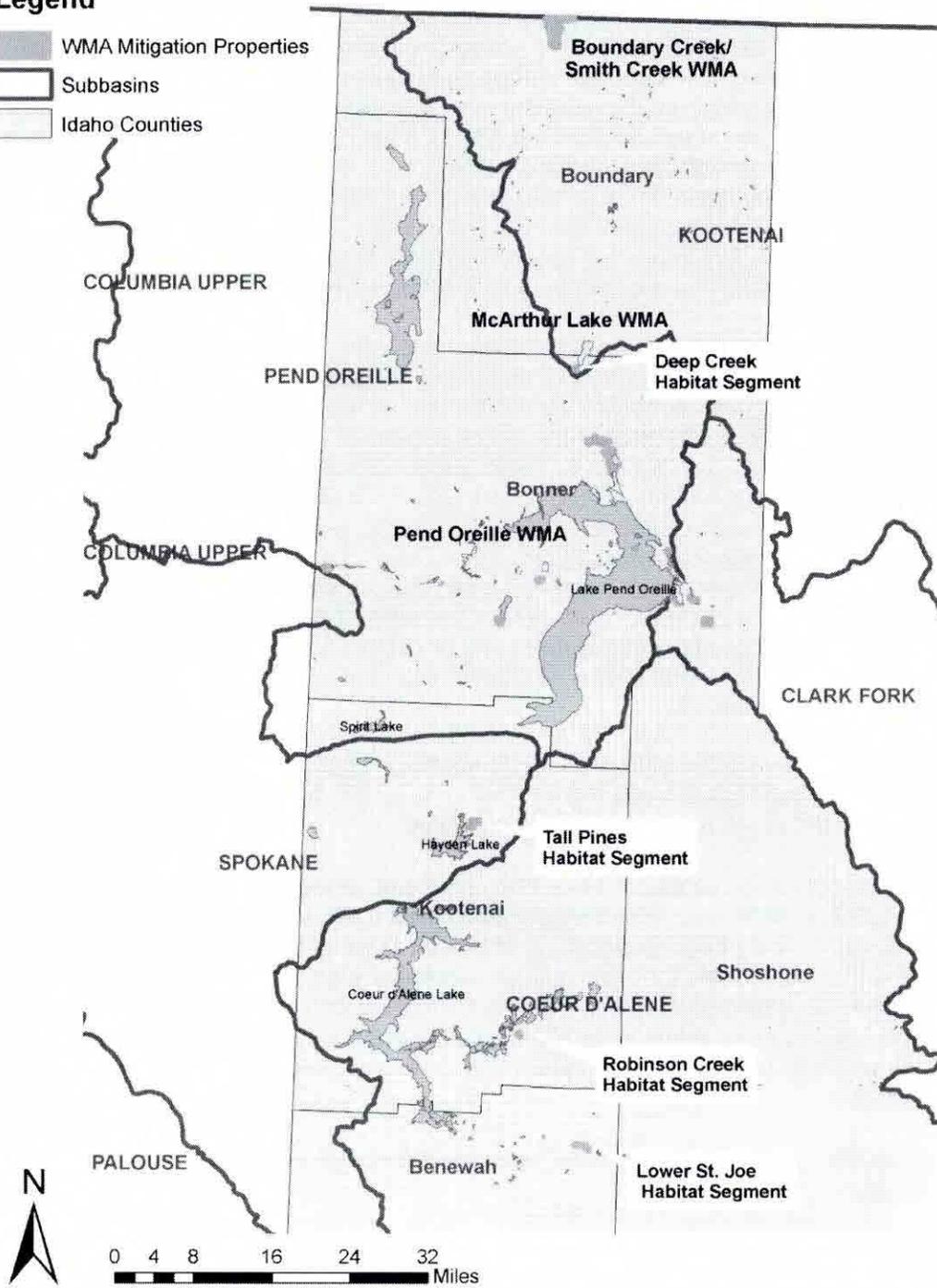


Figure 1. Map showing the IDFG wildlife management areas, subbasins, and Idaho counties in the Albani Falls Wildlife Mitigation Project area.

Table 1. Showing the dates, acres and habitat units for all IDFG wildlife mitigation acquisitions between July 1997 – January 2012. (Enhancement Credits are HU calculated from five- or ten-year HEP reports less the protection credits calculated from the baseline HEP.) *BPA contributed 28.9% of total purchase cost and so receives 28.9% of the total habitat units. ± BPA receives only 10% of the total habitat units as Smith Creek and Pearl Island were donated to the Department.

Project	Date Acquired	Acres	Protection Credits	Enhancement Credits	Total Credits
Boundary Creek/Smith Creek WMA (Kootenai Subbasin)					
Boundary Creek	June 1, 1999	1,405	*295	*311.96	*605.55
Smith Creek	January 7, 2007	620	±86	0.00	±86.00
	July 28, 2008	24	24	0.00	24.00
WMA Totals		2,049	405	312	716
McArthur WMA (Kootenai Subbasin)					
Deep Creek	July 19, 2005	39.85	76.68	17.61	94.29
Pend Oreille WMA (Pend Oreille/Clark Fork Subbasins)					
Albeni Cove	September 16, 1999	97.97	60.08	169.11	266.35
	September 5, 2008				
Carter's Island	August 28, 1997	97.33	293.10	0.00	293.10
Cocolalla Lake	November 1, 1999	117.49	84.09	201.74	331.93
	February 1, 2010				
Denton Slough	December 11, 1997	17.08	41.44	1.53	42.98
Derr Creek	July 7, 1997	239.40	371.02	0.00	371.02
Gold Creek	November 29, 2005	316.20	606.22	152.66	758.88
Lower Pack River	September 18, 1999	29.18	84.30	3.35	87.65
	July 26, 2006	0.26			
	March 9, 2007	0.55			
	December 5, 2007	0.74			
	Total acres	30.73			
Pearl Island	July 2009	7.72	±2.08	0.00	±2.08
Rapid Lightning Creek	January 20, 1999	110.00	603.62	0.00	603.62
	July 27, 2006	41.00			
	April/October 2007	210.47			
	Total acres	361.47			
Trout Creek Avista cost-share	October 7, 1999	216.00	315.00	111.76	446.33
	December 11, 2007	26.30	0.00		
	February 13, 2008	5.00	5.00		
	September 30, 2009	67.00	67.00		
	Totals	314.30			
Westmond Lake	November 1, 1999	65.64	77.24	5.45	82.69
White Island	September 28, 2010	131.58	112.00		112.00
WMA Totals		1,796.91	2,722.19	645.60	3,465.63
Farragut WMA (Spokane Subbasin)					
Tall Pines	February 5, 2011	203.00	354.23	0.00	354.23
Coeur d'Alene River WMA (Coeur d'Alene Subbasin)					
Lower St. Joe River	March 9, 2007	62.00	86.45	0.00	86.45
Robinson Creek	November 6, 2009	46.07	140.29	0.00	140.29
WMA Totals		108.07	226.74	0.00	226.74
Grand Totals		4,196.83	3,784.84	975.17	4,856.44

Management plans have been completed on all Project lands for the Boundary Creek/Smith Creek WMA (2,049 acres). The Pend Oreille Management Plan is updated as new parcels are protected and enrolled under the Project. The Pend Oreille WMA is composed of 27 habitat segments totaling 6,650.68 acres as of 2011, and scattered across northern Idaho in the Pend Oreille and Clark Fork subbasin (Figure 2). Twelve of the 27 WMA habitat segments are wildlife mitigation parcels totaling 1,796.91 acres (Table 1). Interim management plans under the Coeur d'Alene River WMA are in place for the Lower St. Joe and Robinson Creek parcels until restoration projects for these properties are completed.

Topographical surveys were completed last year for the two Coeur d'Alene River subbasin properties and IDFG is currently collaborating with several partners to design and develop restoration plans for these properties. IDFG is working with the U.S. Forest Service and the Avista Corporation to combine a 62-acre floodplain parcel with the 62-acre Lower St. Joe parcel for future management and restoration activities. Also, IDFG is collaborating with the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency (EPA) and the Coeur d'Alene Basin Natural Resource Trustees to design and implement a restoration project for the Robinson Creek parcel.

A topographical survey has also been recently completed for the Cocolalla Lake Habitat Segment in the Pend Oreille subbasin to understand how water flowing from Fish Creek can be redirected to flood the parcel. The restoration proposal includes plans to create small ponds and increase the habitat cover diversity. IDFG is collaborating with the Idaho Department of Environmental Quality (DEQ), Natural Resources Conservation Service (NRCS) and Ducks Unlimited to complete this restoration project.

Further, IDFG and partners are continuing to design and develop field studies for local elementary school children on the Robinson Creek parcel based on the success of the Sandpoint High School HEP field work study program. The intent of the educational efforts is to instruct students about the Albeni Falls Wildlife Mitigation Project and how to conduct HEP surveys and calculate wildlife losses. For the past five years, IDFG has worked with the Sandpoint High School and their statistical, forestry, biology and ecology teachers to develop a lecture and field work study focused on the Albeni Falls Wildlife Mitigation Project and HEP survey methods. Over 150 students visit either the Gold Creek or Rapid Lightning Creek Habitat Segments of the Pend Oreille WMA each year and while wearing waders they collect forested, scrub-shrub and herbaceous wetland habitat information. It is hoped that in the future an educational program can also be developed for students on the Lower St. Joe parcel.



Figure 2. Locations of all Pend Oreille WMA properties. Individual parcels under the Albani Falls Wildlife Mitigation Project are shown in Appendix A. A total of 12 properties totaling about 1,793.4 acres (shown in bright green) are designated as wildlife mitigation properties under the Project (aerial photograph taken in 2004).

Wildlife Mitigation Implementation

In 2011, IDFG completed one fee-title land acquisition project under the Program adding 203 acres to the Farragut WMA. The 203-acre Tall Pines acquisition was completed on February 4, 2011, for a total of \$1,750,000. The subject property is located in Kootenai County to the northeast of Hayden Lake and is adjacent to U.S. Forest Service ownership and a 320-acre conservation easement held by the IDFG (Figure 3). Future opportunities exist to protect more land with several landowners interested in conservation easements.

The Tall Pines property is located in an area that is experiencing accelerated urban development. The property is highly desirable because of the location to Hayden Lake and the spectacular views from the property of the lake and surrounding area. The Tall Pines property is almost entirely composed of forested wetlands with many seeps that feed three jurisdictional wetland areas. If the property was developed, then these wetland areas would disappear. Vegetation cover within the Tall Pines property consists of deciduous scrub-shrub, wet meadow, and mixed coniferous forest.

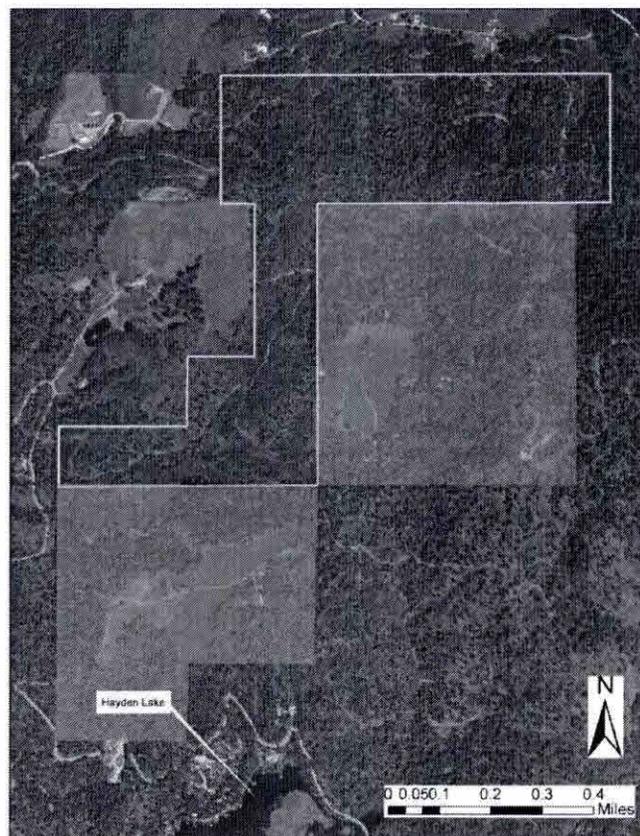


Figure 3. Aerial photograph showing the 203-acre Tall Pines property (outlined in yellow). The shaded green area is the 320-acre conservation easement held by IDFG.

Land Management

Boundary-Smith Creek WMA

Wetland Management

Water levels on the Boundary-Smith Creek Wildlife Management Area (BSCWMA) are managed to mimic natural floodplain hydrology. Generally, this means high spring water levels that peak in May/June, receding summer water levels, and naturally recovering fall/winter water levels (Figure 4). The WMA is composed of a total of nine basin wetland cells (Figure 5). Advantages to this hydrology include facilitated nutrient cycling, establishment of diverse emergent plant assemblages, and productive habitat for waterfowl, shorebirds, and other wildlife.



Figure 4. Eastern view over the Boundary-Smith Creek Wildlife Management Area wetland complex.

During late-fall and winter, run-off due to periodic precipitation is naturally stored in wetland basins. From mid-March to mid-June, water from Boundary Creek is used to raise water levels to desired annual maximums. Habitat Managers attempt to reach maximum water elevations by early April to prevent flooding duck nests established in shoreline vegetation; however, to mimic natural floodplain hydrology, peak water level elevations should be reached by early June (i.e., the time of natural peak flooding). Water levels typically begin to recede after this time and concentrate food items at the soil/water interface for duck broods and shorebirds. This recession also facilitates development of diverse assemblages of emergent plant species, which increases habitat complexity. By October, fall precipitation may slow the rate of decline and increase water levels.

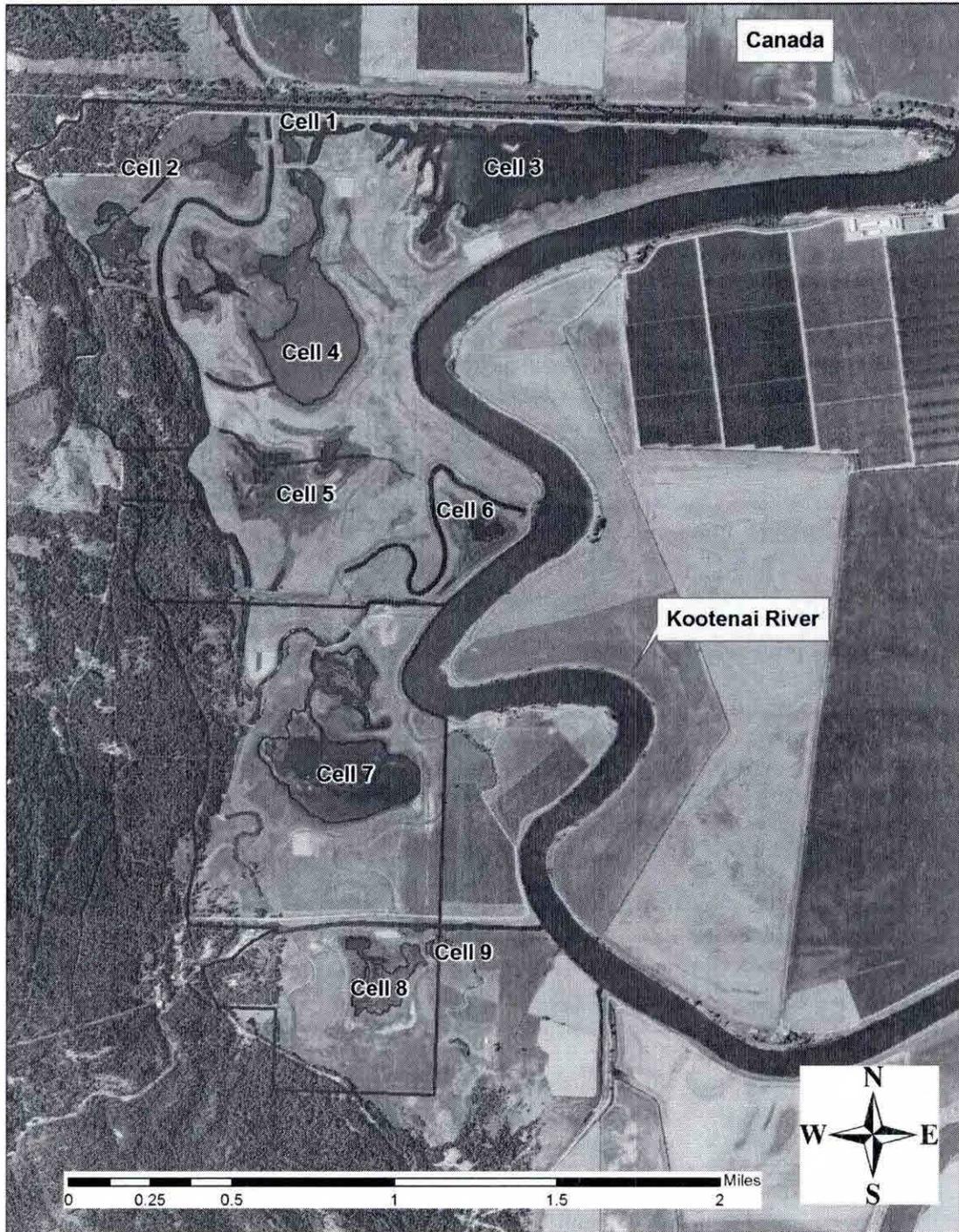


Figure 5. Map of the Boundary-Smith Creek WMA showing the location of the nine wetland cells.

Water levels across the BSCWMA wetland complex have been recorded monthly since March 2001, by measuring down from the top of selected water control structures to the water level. Wetland surface area is determined by the measured water elevation (Table 2).

Table 2. Wetland surface area (in acres) determined by water elevation. BC=Boundary Creek and SC=Smith Creek.

Water Elevation (feet)	Wetland Surface Area Acreage (excluding slough channel surface area).								
	BC 1	BC 2	BC 3	BC 4	BC 5	BC 6	SC 1	SC 2	SC 3
1,749.0	0	0	25.4	0	0	0	22.5	0	0.2
1,749.5	0	0	43.7	0	0	0	34.9	1.7	0.2
1,750.0	0	0	62.0	2.2	0	0.4	47.3	3.4	0.2
1,750.5	0	0	75.5	3.6	0	2.8	58.6	12.4	0.2
1,751.0	0	0	89.0	5.0	0	5.2	69.9	21.5	0.2
1,751.5	3.2	2.0	107.9	32.0	2.1	6.8	84.8	29.8	0.6
1,752.0	6.4	4.9	126.7	59.0	4.1	8.4	99.6	38.0	1.0
1,752.5	9.3	13.1	139.5	76.4	11.6	10.0	108.9	45.5	1.4
1,753.0	12.1	16.3	152.3	93.8	19.0	11.5	118.2	52.9	1.7
1,753.5	16.4	19.5	167.2	114.4	28.3	13.4	129.6	52.9	1.7
1,754.0	20.6	22.7	182.0	135.0	37.6	15.3	141.0	52.9	1.7
1,754.5	28.3	25.7	197.3	153.0	48.5	16.8	147.8	52.9	1.7
1,755.0	35.9	28.6	212.6	171.0	59.3	18.3	154.5	52.9	1.7

Water diversion from Boundary Creek to the WMA in 2011, began on March 21. On June 13th, the diversion was halted because all wetland cells had been at full pool for almost two months. The total surface area acreage reached 98% capacity in April and remained at 100% through May and June, dropping to 98% in July. By October, the total area had dropped only to 71%. Also, many of the areas of the WMA that are not set up to be measured held surface water for several months in the spring (Figure 6).



Figure 6. High spring water levels produced flooded areas across the WMA in 2011.

For one month in the fall, from September 21st to October 19th, water was pumped out of the central slough overflow channel using the irrigation pump. This was done to create surface water habitat for migrating waterfowl in an area that had been planted with millet in 2010. The resulting pond was 1.1 acres in size (Figures 7 and 8).

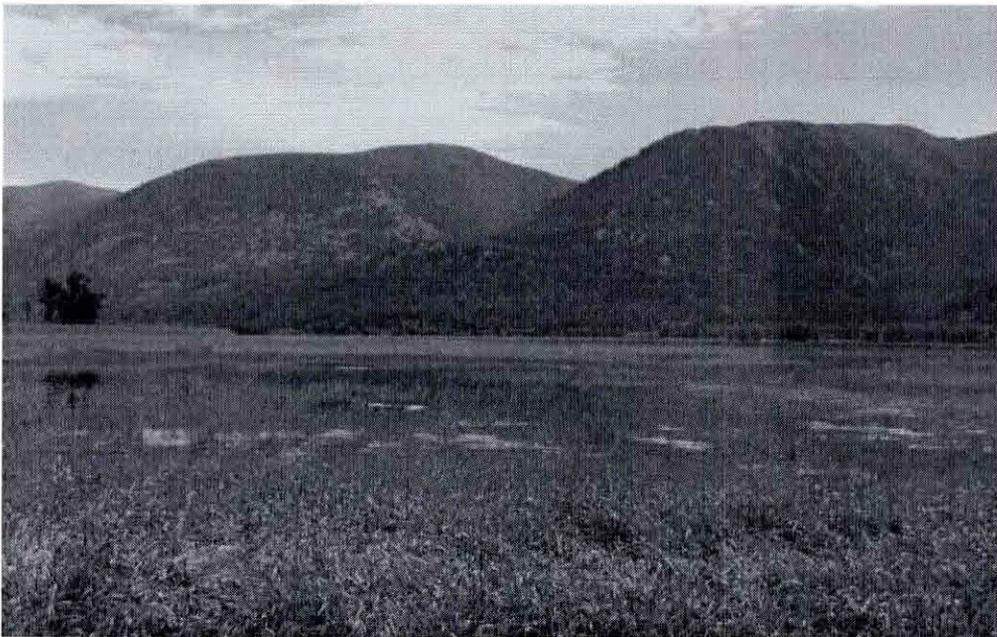


Figure 7. Fall flooded millet field.



Figure 8. Birds feeding in the flooded millet field.

Public Access and Use Facilities

Public use facilities of several picnic areas, two restrooms, and parking areas were regularly maintained in 2011 (Figure 9). Existing gates and fences were maintained and walking/biking trails were regularly mowed to facilitate non-motorized public use of the WMA.



Figure 9. Smith Creek Picnic Area.

Habitat Maintenance and Enhancement

Native Tree and Shrub Re-establishment

An important habitat restoration measure for the BSCWMA is re-establishment of native trees and shrubs on the floodplain portion of the area. Tree and shrub plantings have been completed on the BSCWMA since fall of 2001. In 2011, 860 plants, comprised of sixteen different species, were planted (Figure 10). Plantings were conducted during dormancy in the fall (i.e., late October or early November). Plantings were protected from ungulate browsing by erecting eight-foot high deer fencing in a 10 by 25 foot enclosure around blocks of plantings.

In addition to supplemental planting, natural tree and shrub establishment is important to the BSCWMA. Black cottonwoods are adapted to periodic flooding where high water elevations reduce competing vegetation in inundated areas. They shed their seed about the time floodwaters begin receding, after which they are deposited in drift-lines on exposed mudflats and germinate within hours to days. Provided water levels are not too high in subsequent years, established cottonwood seedlings will survive. As a result of water level management, many black cottonwood and willow saplings can be observed emerging from the cattails surrounding the perimeter of many of the wetland cells. Efforts to protect the natural regeneration include fencing off these areas.



Figure 10. Tree and shrub planting on the Boundary-Smith Creek WMA.

Native Grassland Management

Across the grasslands on the WMA, the control of weed species result in a minimal forb component within the grass stands. To counteract this effect, forb species are planted in several-acre strips that permit the control of weeds with spot treatment and mechanical methods such as and mowing. Eleven forb strips, totaling seven acres, occur across the WMA. Over the course of several years, each forb strip becomes dominated by grass; therefore, the strips are replanted every 3-4 years.

In the spring of 2011, seven forb strips were replanted with clover, alfalfa, and small burnett (Figure 11). These forb strips provide varied structure within the grasslands and conditions attractive to insects. The forb strips provide high quality brood habitat for pheasants and other wildlife.

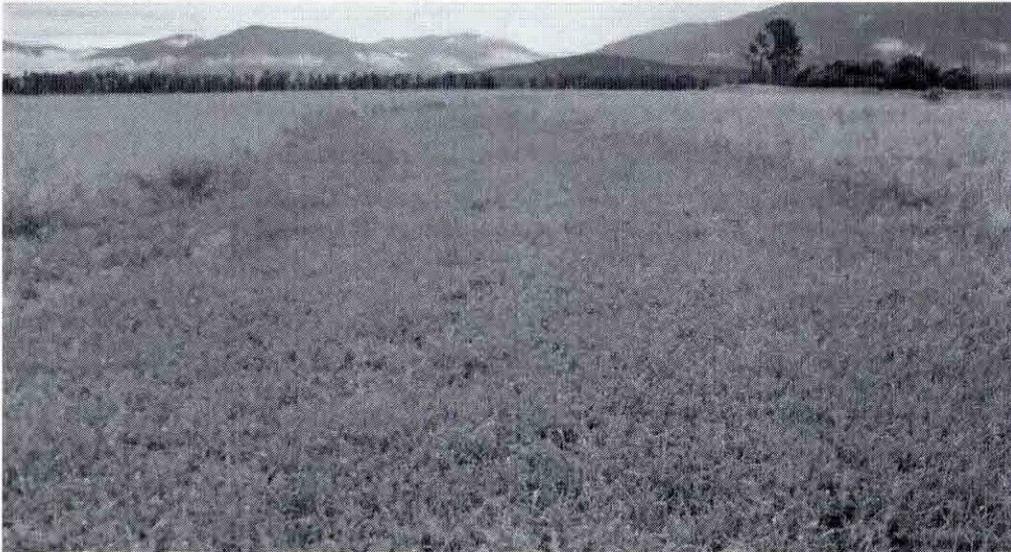


Figure 11. Forb strip within the grassland on the Boundary-Smith Creek WMA.

Wetland Vegetation

Emergent wetland plants have been established throughout the nine-basin wetland complex. Stands of soft-stem bulrush, cattail, *Alisma plantago-aquatica*, *Ceratophyllum demersum*, *Elodea canadensis*, *Eleocharis* spp., *Chara* spp., *Potamogeton* spp., and *Sagittaria* spp. were observed. Many other species occurred in scattered small groups across the area. Water level management was continued across the wetland cells to promote a variety of wetland habitat features and wetland plant species (Figure 12).



Figure 12. Cinnamon teal pair on a wetland cell on the Boundary-Smith Creek WMA.

Noxious Weed Control

Overall, the amount of herbicide treatment for noxious weed control on the BSCWMA has continued to decline with the severity of infestations. In 2011, approximately 1,000 acres were inventoried and mapped for weed infestations, leading to 264 acres being treated. Four different types of spray equipment were used; back-pack sprayers, ATV sprayer, truck sprayer, and tractor boom spray. A total of approximately 75 gallons of herbicide were applied (not including adjuvants). Herbicides used consisted mainly of 2,4-d, Milestone (aminopyralid), Transline (clopyralid), Surflan (oryzalin), and Fusilade (fluazifop).

Due to a long cold and wet spring, efforts consisted of chemical spraying during June and July, mechanical control by hand-pulling weeds, and broadcast spraying Canada thistle in October (Figures 13 and 14). The primary noxious weeds controlled on the properties in 2011 include the State listed Noxious Weeds of Canada thistle, houndstongue, oxeye daisy, orange and meadow hawkweed, and spotted knapweed. Additionally, weed species listed by Boundary County, (i.e., St. John's wort, common tansy, and absinth wormwood) were also targeted during control efforts.



Figure 13. Effects of weed control efforts to Canada thistle on the WMA.

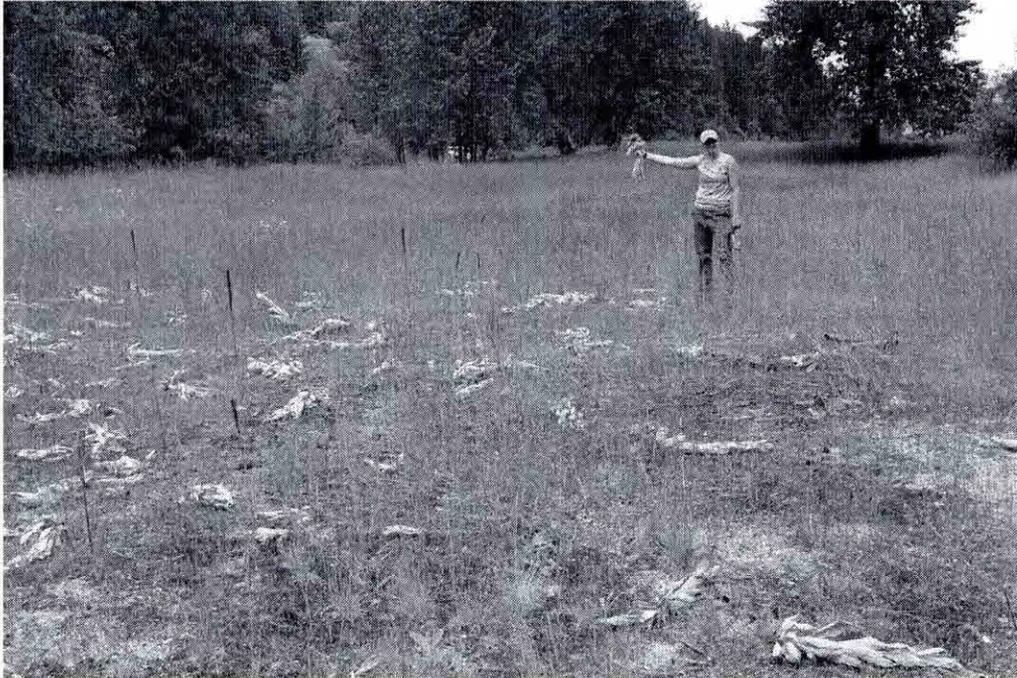


Figure 14. Hand-pulling efforts for common mullein control on the WMA.

Rearing of Native Fish Species

One of the objectives of the Long Range Management Plan for BSCWMA is to “Explore opportunities to enhance aquatic habitat for migration, spawning, and rearing of native fish species compatible with wildlife and habitat management objectives.” There is a large coordinated effort to re-establish a burbot (*Lota lota maculosa*) population in the Kootenai River among many groups including the IDFG, Kootenai Tribe of Idaho, Kootenai Valley Resource Initiative, University of Idaho, U.S. Fish and Wildlife Service, British Columbia Ministry of Environment, and others.

Burbot are a freshwater cod native to the Kootenai River in Idaho, Montana and British Columbia. The Kootenai River burbot population has declined over the last half-century, primarily due to habitat alteration and loss, and the population is considered functionally extinct within Idaho borders. The most recent abundance estimates by IDFG are approximately 50 fish.

One component of the larger multifaceted and international conservation approach is the development of burbot culture for future release into natural habitat. In support of these efforts, the IDFG has created two external rearing ponds on BSCWMA, for the purpose of raising newly hatched burbot to a fingerling stage, which will then be released into the Kootenai River in Idaho.

Two burbot external rearing ponds were constructed on BSCWMA (Figure 15). During the summer of 2011, approximately 1,000 newly hatched burbot were transplanted into the ponds, and captured and released into the Kootenai River several weeks following.



Figure 15. External Burbot Rearing Ponds on the Boundary Creek WMA.

Pend Oreille WMA

Water Management

All water control structures were inspected and maintained as needed to ensure a safe and functional condition. The Rapid Lightning Creek habitat segment water control structure has been reconstructed in the past due to poor design and installation. Nearby fill has been used to elevate the water control structure dike, preventing water overflow across the dike. Continued water control structure monitoring is required to further address spring high flow erosion problems.

Public Access and Use Facilities

All fences, gates, signs, and public parking areas were inspected and maintained as needed to ensure a safe and functional condition. A graveled parking area with rock barriers was created at the newly acquired piece of property at the Cocolalla Lake Habitat Segment. A new gate was installed on the parking lot access road for administrative use (Figure 16). Proceeds from the Cocolalla Lake WMA house sale were reinvested in an equipment shed to protect and house an expanded inventory of tools and field equipment used to manage the POWMA (Figure 17).



Figure 16. Cocolalla Lake Habitat Segment new public parking area, Pend Oreille WMA.



Figure 17. New equipment shed at Trout Creek Habitat Segment, Pend Oreille WMA.

Habitat Maintenance

Due to high spring runoff from above normal levels of mountain snowpack, a reduced number of goose pasture acreage was maintained. Approximately five acres of goose pasture was maintained by mowing. Previous shrub plantings were inspected and maintained. Two miles of fence were maintained at the Gold Creek Habitat Segment and 800 feet were maintained at the Denton Slough parcel to exclude grazing cattle. Approximately two miles of fence at the Tall Pines parcel was maintained by the adjacent landowners and IDFG assisted in this fence maintenance also. These properties are located in open range herd districts and it is the landowner's responsibility to fence cattle off their ownership. Unneeded infrastructure including gates, fences, and corrals used to manage livestock were removed from the newly acquired Cocolalla Lake and Trout Creek Habitat Segments.

In cooperation with the Pend Oreille Chapter of Master Naturalists and local Audubon chapter, nine bluebird boxes were installed at the Rapid Lightning Creek Habitat Segment to improve bluebird habitat (Figure 18). Information on the use of these nest boxes will be collected by volunteers and maintained each season.

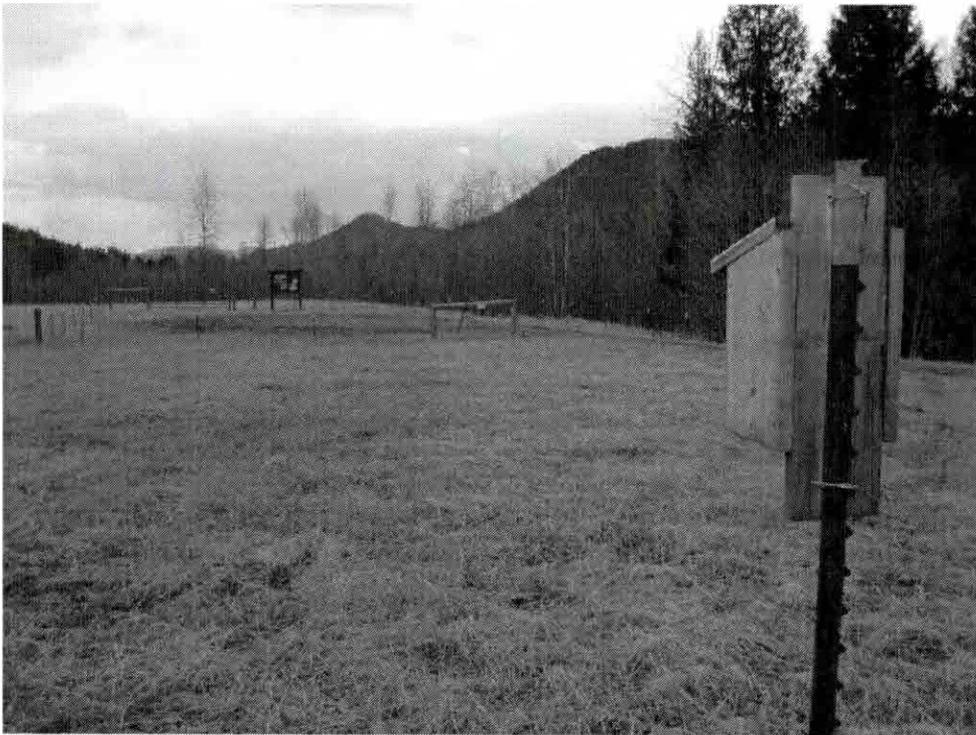


Figure 18. Bluebird boxes at Rapid Lightning Creek Habitat Segment, Pend Oreille WMA.

Approximately 122 Canada goose platforms were surveyed for nesting activity and serviced for repairs throughout the Pend Oreille WMA. A total of 68 Wood Duck cavity boxes were surveyed for nesting success and serviced for future nesting. Approximately 45% of the platforms and cavity boxes were used this last season.

Four forb food plots have been prepped this year to seed into a broadleaf form mix for upland bird and big game forage. One to two acre plots at Gold Creek, Trout Creek, Rapid Lightning Creek and Cocolalla Lake habitat segments will undergo a Fall dormant seeding to promote early spring germination. The seed mix will include broadleaf forbs such as alfalfa, small burnett, and red clover. A total of five acres of forb food plots will be established by Spring 2013.

Noxious Weed Control

All wildlife mitigation parcels purchased under the Albeni Falls Wildlife Mitigation project were inspected for noxious weeds. Herbicides were applied to approximately 60 acres of the WMA mitigation parcels to control noxious weed infestations (Figure 19). Above normal spring snow melt, flooding and reduced staff decreased the total number of acres that could be treated throughout the POWMA. Herbicide application was also contracted out to a private company to help cover the staffing shortage. Approximately 25 acres of the total 60 acres were commercially applied. ATV sprayer equipment was predominantly used due to easy site access and excellent herbicide coverage. Herbicides used consisted of Milestone (aminopyralid), 2,4-d, and Transline (clopyralid). The primary noxious weeds controlled on the WMAs included common tansy, spotted knapweed, oxeye daisy, St. John's wort and orange hawkweed. Parcels that have been under management for some time mostly require minimal spot treatments.



Figure 19. Herbicide treated parcel at Rapid Lightning Creek Habitat Segment, Pend Oreille WMA.

Cocolalla Lake Habitat Segment Cost-share and Restoration Project

In 1959, IDFG secured five acres at the inlet to Cocolalla Lake to install a weir intended to stop sucker spawning runs in Cocolalla and Fish Creeks. The weir has since been abandoned. Then in 1999, the Department purchased 98 acres adjacent to the old weir site using BPA funds associated with wetland mitigation for Albeni Falls Dam. Only modest wetland restoration work (Figure 20) has since been completed on this property because of the risk of flooding adjacent private ownership with more rigorous restoration work.

However, the initiation of a comprehensive wetland/stream restoration project became possible when IDFG acquired an adjacent low lying property under the Project in 2010. A topographical survey for the restoration area was completed in early 2012 (Figure 21), and IDFG began to collaborate with interested partners such as DEQ, NRCS and Ducks Unlimited to develop a conceptual design (Figure 22). The design concept includes realigning Fish Creek so it flows across the parcel and creating several shallow ponds. Another goal of the restoration effort is to increase habitat cover type diversity by reducing the uniform reed canarygrass cover.



Figure 20. Overview of the Cocolalla Lake Habitat Segment in early spring 2011. Excavated areas are full of water and water is flowing from Fish Creek toward Cocolalla Lake.

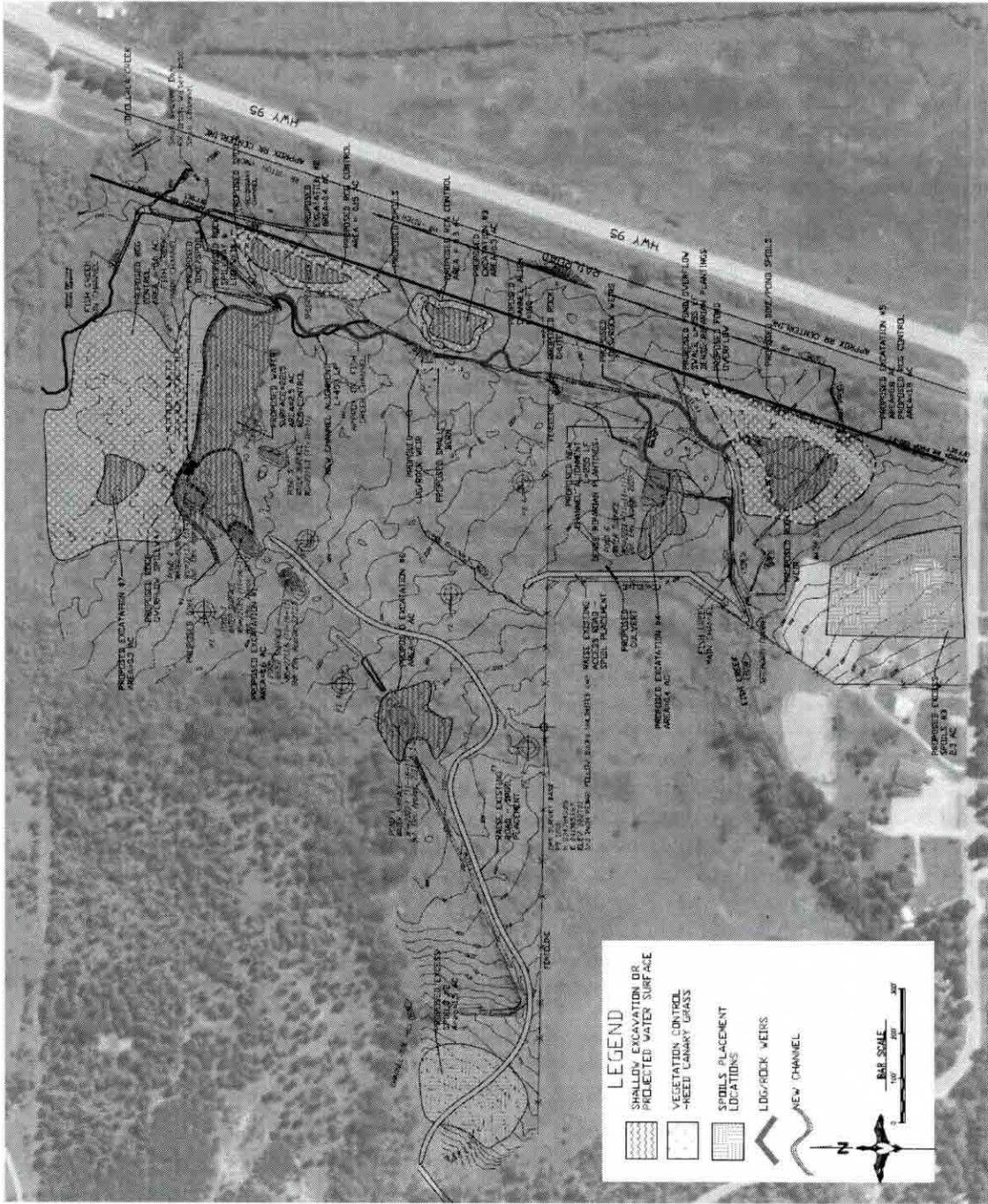


Figure 22. Preliminary conceptual design for the Cocolalla Lake Habitat Segment, Pend Oreille WMA.

Coeur d'Alene River WMA

Robinson Creek Habitat Segment Cost-share and Restoration Project

IDFG purchased the 46-acre Robinson Creek parcel in November 2009, under the Albeni Falls Wildlife Mitigation Project (Figure 23). The parcel consists of a pasture/hay field bisected by Robinson Creek. A dense scrub-shrub and small forested wetland is also present on the parcel. Robinson Creek has been straightened by previous landowners and shifted to the north side of the floodplain. The creek floods each spring and the pasture is often inundated for about two months. The parcel lies adjacent to Lane Marsh in the Lower Coeur d'Alene River Valley. The restoration of Robinson Creek parcel is important since it is an uncontaminated site and a safe wetland area for tundra swans and other waterfowl to feed. The Robinson Creek Habitat Segment is now part of the Coeur d'Alene River WMA, and preliminary restoration planning efforts for the habitat segment are on-going between DEQ and IDFG.

This was the first Albeni Falls Wildlife Mitigation Project completed in Kootenai County. This was also the first time the Albeni Falls wildlife mitigation activities have been coordinated with the U.S. Fish and Wildlife Service's (USFWS) efforts to address heavy metal contamination issues in the Lower Coeur d'Alene River Valley. The USFWS is a member of the Coeur d'Alene Basin Natural Resource Trustees (Trustees). The Trustees interest in the Robinson Creek property originated from a legally mandated obligation to compensate for tundra swans injured or killed by exposure to the mining waste generated heavy metals which contaminate many of Lower Coeur d'Alene River wetlands.

In 2011, IDFG acquired the adjoining 6.12-acre Idaho Transportation Department's (ITD) mitigation property (Figure 23). The ITD mitigation project adjoins a 390 acre wetland restoration project, known as the Schlepp conservation easement, completed by the Trustees in 2006. IDFG acquired another 10 acres (i.e., Hayman parcel) directly adjacent to the Robinson Creek parcel in June 2012, using mitigation funds from the HECLA mining settlement. Acquisition of this parcel was critical for the completion of a wetland restoration project on the Robinson Creek parcel. Restoration of the Robinson Creek parcel could provide partial habitat mitigation for Page Repository Expansion mitigation project, which is part of the Bunker Hill superfund site cleanup efforts. It is expected that Department of Environmental Quality (DEQ), through the Page Repository Mitigation, will fund the restoration project and provide site surveys, engineering and administration for the Robinson Creek habitat segment restoration.



Figure 23. Map showing the Robinson Creek habitat segment and the locations of the ITD and Hayman property acquisitions.

The overall topography of the property appears to be intact (Figure 24), with the exception of alterations to the northern half of the property. These alterations included the straightening of approximately 900 feet of Robinson Creek toward the northeast corner of the property to allow for more land to be hayed or pastured. Also absent is the native wetland scrub-shrub habitat due to mechanical removal and hydrologic changes from stream straightening. As a consequence, reed canarygrass (*Phalaris arundinacea*) is now the predominant vegetation in the hayed/pasture area.

Some of the restoration goals for Robinson Creek parcel include: 1) realigning both Robinson and Canary Creeks to more natural stream channel configurations; 2) converting the reed canarygrass cover type to a more diversified native herbaceous wetland cover type; 3) establishing scrub-shrub and riparian forested habitat along the realigned stream zones to provide connectivity with the relatively intact block of this habitat type that currently exists in the southeastern corner of the property; 4) creating a single large shallow pond with a depth of three to five feet to provide clean and safe foraging for tundra swans; and 5) creating multiple smaller shallow water excavations throughout the site to increase habitat diversity throughout the property. The latter goals will also improve habitat for other waterfowl species, shorebirds and amphibians.

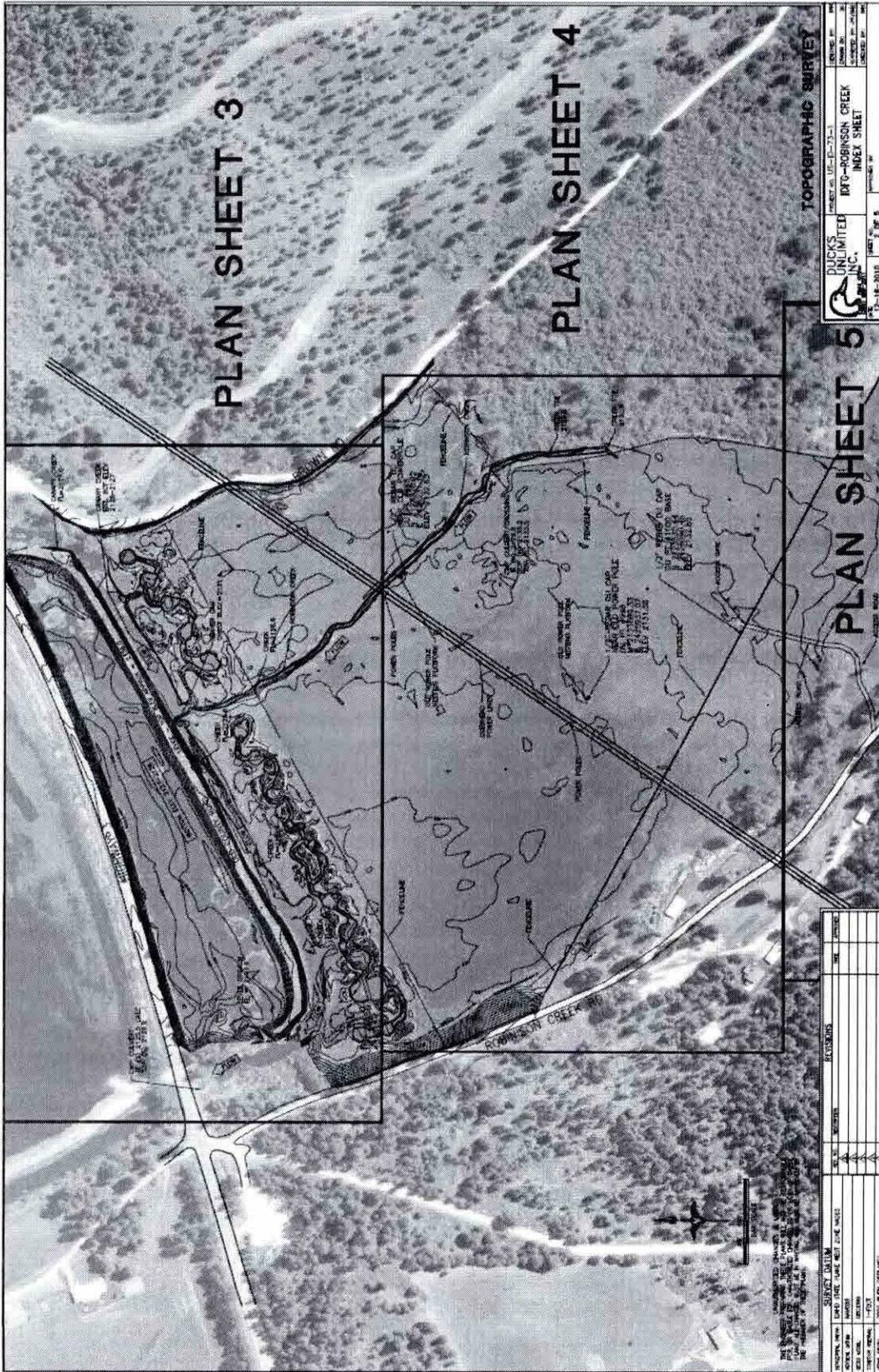


Figure 24. Topographical survey for the Robinson Creek habitat segment, Coeur d'Alene River WMA.

Lower St. Joe Restoration Project

The 62-acre Lower St. Joe parcel was purchased under the Albeni Falls Wildlife Mitigation Project in 2007. The Avista Corporation owns approximately 62 acres in fee-title directly adjacent and upstream of the mitigation parcel. Avista's property includes approximately three quarters of a mile of St. Joe River frontage and associated riparian area. A portion of the Avista property was deeded to the U.S. Forest Service (USFS) for the Shadowy St. Joe Campground. The USFS developed a campground with parking and public access.

A restoration project has been proposed for both the IDFG wildlife mitigation parcel and the Avista ownership impacting a total of 124 acres of flood plain and about one and half miles of river frontage. The primary objective of the restoration project is to restore a relatively self-sustaining wetland complex that will provide high quality habitat for fish and wildlife. The proposed project will include restoration or creation of 1) wetland habitats, 2) a stream channel associated with realignment of Miesen Creek and 3) adjacent areas of upland riparian forest habitat (Figure 25). For budgeting, logistical and workload reasons, the project is being implemented in several phases and in conjunction with other potential projects at the site, such as bank stabilization and development of interpretive features.

A with-in year budget change request to fund the restoration efforts on the BPA mitigation parcel was submitted to the Budget Oversight Group (BOG) in late 2011, and then resubmitted in early 2012, but this request was not supported. BPA reasons for not supporting the project was that it was not considered a priority and budget constraints were forcing BPA to manage within their current Program spending levels. BPA did acknowledge the value of the work and the benefit of the cost-share.

As a consequence of BPA's decision not to fund the budget request for the restoration project, the majority of the project will be funded by the Avista Corporation to meet their requirements of a Federal Energy Regulatory Commission (FERC) approved *Five-Year Wetland and Riparian Habitat Protection & Enhancement Plan, 2010 to 2014*.

Monitoring and Evaluation

Habitat Evaluation Procedures (HEP)

A total of six HEP surveys were conducted in 2011, that included the following habitat segments: Albeni Cove, Cocolalla Lake, Deep Creek, Tall Pines, White Island and Boundary-Smith Creek WMA. Because of the exceptionally deep snow pack for 2011, the spring flooding events were also higher than normal. As a consequence, the HEP team was unable to access some inundated areas on the Boundary-Smith Creek WMA and the survey to White Island was rescheduled for later in the summer. Some areas on Boundary-Smith Creek and White Island remained inundated and so attempts to access these areas will occur in the summer of 2012. For this reason, the HEP reports for Boundary-Smith Creek and White Island will be completed later in 2012.

Analyses of the data was completed and reports generated using a crediting matrix that more closely follows how the wildlife losses were calculated for the Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan (Martin *et al.* 1988). The consequence of the Albeni Falls loss assessment lacking a crediting matrix showing how target species are applied to wildlife habitat cover types is that there have been several different approaches to crediting between years, and between proponents implementing mitigation under the Program. This has caused inconsistencies in how wildlife losses are calculated against the Albeni Falls ledger. This has also complicated comparisons of baseline HEP reports to 5- and 10-year HEP assessments.

The Albeni Cove 10-year HEP survey was completed on June 13 and 16, 2011, and results from the HEP analysis found that the habitat segment provides a total of 266.35 habitat units (HU) on 97.97 acres or 2.72 habitat units per acre (Appendix B). This is an increase of about 169 habitat units (or about a 64% increase) from the five-year HEP assessment. This increase in habitat units is primarily due to 1) a change in the crediting matrix, 2) an addition of 27 acres to the habitat segment, and 3) management enhancement actions. The total number of species applied to each habitat cover type (i.e., species stacking) has increased over time and so the total number of habitat units estimated in this assessment is greater just due to the increase in species stacking. With the addition of 27 acres in 2008, the herbaceous wetland area increased by 12.04 acres and the scrub-shrub wetland area increased by 3.53 acres. This increase in acreage directly increased the parcel's habitat units; however, the enhancement efforts by IDFG also increased the habitat quality, and so this too resulted in an increase of habitat units.

The second survey conducted between May 11-17, 2011, involved the 10-year HEP for the Cocolalla Lake Habitat Segment (Appendix C). The results from the HEP analysis found that the habitat segment provides a total of 331.93 HU on 117.5 acres (2.83 habitat units per acre). This is an increase of about 188 habitat units (or about a 57% increase) from the five-year HEP assessment. Similar to the Albeni Cove HEP results, this increase in habitat units for the Cocolalla Lake parcel is due to 1) a change in the crediting matrix, 2) an addition of 20 acres to the habitat segment, and 3) management enhancement actions. The herbaceous wetland area on the Cocolalla Lake habitat segment increased by 12.04 acres and the scrub-shrub wetland area increased by 3.53 acres with the addition of the 20-acre parcel in 2010. This increase in acreage

directly increased the habitat units. Increases in the herbaceous and scrub-shrub wetland areas on the Cocolalla Lake HS were especially important as these cover types directly contributed to the habitat units for all species except the black-capped chickadee. However, substantive future increases in habitat units will require the completion of a restoration project that will increase the area of open water and redirect the water from Fish Creek to flow across the parcel.

The five-year HEP survey for the Deep Creek habitat segment was completed on June 23, 2011 (Appendix D). In total, the five-year HEP review found that the Deep Creek HS provides a total of 94.29 HU on 39.85 acres (2.37 habitat units per acre). This is an increase of 16.76 HU from the baseline assessment completed in 2006. Although the habitat units per acre went from 1.94 to 2.37, not much has changed in terms of wildlife habitat quality on the habitat segment over the past five years. The Deep Creek HS has seen little disturbance, even before it was purchased and protected under the Program in 2005, and so the management of the parcel has been mainly one of a custodial nature. Therefore, it was not surprising to find that the habitat quality had not appreciably changed, suggesting that the increase in habitat units is primarily due to the change in the crediting matrix.

The fourth and final HEP report completed in 2011, was for the newly acquired Tall Pines property (Appendix E). The baseline HEP survey was completed for the Tall Pines parcel on June 20 and 21, 2011. Using the crediting matrix presented in the 2009 Annual Report, the baseline report found the Tall Pines HS provides a total of 354.23 HU on 203 acres (1.74 habitat units per acre). A summary of management recommendations generated from the HEP analysis include:

- Continue to exclude livestock grazing on the parcel.
- Encourage the expansion of the forested wetlands.
- Protect snags from loss to provide enhanced opportunity for chickadee nesting.
- Encourage expansion of the herbaceous and scrub-shrub wetland areas.
- Select herbicides that are safe for shrubs to ensure shrubs are protected during weed control activities. This will allow scrub-shrub vegetation to continue to develop and expand, improving yellow warbler and white-tailed deer habitat.
- Consider management actions to create several small open water ponds.

Vegetation Monitoring

Vegetation monitoring efforts were conducted on the following seven mitigation properties for the Pend Oreille WMA in 2011: Albeni Cove; Carters Island; Cocolalla Lake; Denton Slough; Rapid Lightning Creek; Trout Creek; and, Westmond Lake. A total of 51 line-intercept samples were collected between May and August. Each sample consisted of six transects of 40 points each. A total of 12,174 points were surveyed with 21,859 plants identified at points. In all, 367 different species of plants were encountered and the information analyzed to estimate the percent coverage of each vascular plant species encountered (Appendix F). The samples were classified by HEP habitat cover types: 14 samples were upland forests; 14 samples were forested wetland; 17 samples were herbaceous wetland (including 13 meadow samples and 4 marsh samples); and, six samples were scrub-shrub wetland. The samples were also classified by wildlife-habitat type

(O'Neil and Johnson, 2001), with seven samples classified as lowland conifer-hardwood forest; 14 interior mixed conifer forests, 18 were herbaceous wetlands, one was montane coniferous wetlands, and 12 were interior riparian wetlands.

Four samples were completed on Albeni Cove HS in mid-July. A fifth sample previously completed in 2007, was inaccessible due to greater retention of water in the Albeni Cove pond. A total of 960 individual points (~240 points per sample area) were surveyed with an average of 1.39 different plants encountered per point. One hundred and sixteen different species were encountered in the Albeni Cove samples. One of the four samples was classified as forested wetland habitat cover type, needle-leaf community type (*Thuja plicata* series). Three of the four samples were classified as herbaceous wetland habitat cover type, further classified into two emergent vegetation types (*Phalaris arundinacea* series) and one meadow community types (unclassified grassland series). The top five species of total cover overall for Albeni Cove HS were reed canarygrass (30.0%), meadow foxtail (*Alopecurus pratensis*; 18.0%), smooth brome (*Bromus inermis*; 16.3%), common snowberry (*Symphoricarpos albus*; 14.3%), and paper birch (*Betula papyrifera*; 7.5%).

Five samples were completed on Carters Island HS from August 8 to August 10. A total of 1,185 individual points (~240 points per sample area) were surveyed with an average of 1.83 different plants encountered per point. Within Carters Island samples, 76 different species were encountered. Five of the five samples were classified as forested wetland habitat cover type, needle-leaf community types (one *Abies grandis* series and four *Thuja plicata* series). The top five species of total cover overall for Carters Island HS were grand fir (*Abies grandis*; 78.4%), western redcedar (*Thuja plicata*; 21.0%), paper birch (*Betula papyrifera*; 15.0%), black cottonwood (*Populus balsamifera trichocarpa*; 12.6%), and Rocky Mountain maple (*Acer glabrum*; 11.6%).

Five samples were completed on Cocolalla Lake HS from May 23 to July 7. A total of 1,200 individual points (~240 points per sample area) were surveyed with an average of 1.70 different plants encountered per point. One hundred and fifty-seven different species were encountered in the Cocolalla Lake samples. Two of the five samples were classified as forested wetland habitat cover type, broad-leaf community type (*Populus tremuloides* series and unclassified broad-leaf forest series). Two of the five samples were classified as forested upland habitat cover type, needle-leaf community type (*Pseudotsuga menziesii* series and *Tsuga heterophylla* series). One of the five samples at Cocolalla Lake HS was classified as herbaceous wetland habitat cover type, further classified into a meadow community type (unclassified grassland series). The top five species of total cover overall for Cocolalla Lake HS were common snowberry (*Symphoricarpos albus*; 14.8%), Douglas fir (*Pseudotsuga menziesii*; 11.3%), rose spirea (*Spiraea douglasii*; 10.8%), paper birch (*Betula papyrifera*; 9.4%), and reed canarygrass (*Phalaris arundinacea*; 8.3%).

Three samples were completed on Denton Slough HS from July 25 to July 28. A total of 718 individual points (~240 points per sample area) were surveyed with an average of 2.81 different plants encountered per point. Eighty-five different species were encountered in the Denton Slough samples. One of the three samples at Denton Slough was classified as forested wetland habitat cover type, needle-leaf community type (*Thuja plicata* series) and two of three samples classified as herbaceous wetland habitat cover type, further classified into a meadow community

type (*Phalaris arundinacea* series). The top five species of total cover overall for Denton Slough HS were reed canarygrass (40.4%), skunk cabbage (*Lysichiton americanus*; 39.1%), paniced bulrush (*Scirpus microcarpus*; 19.5%), western redcedar (*Thuja plicata*; 18.9%), and threepetal bedstraw (*Galium trifidum*; 16.4%).

Sixteen samples were completed on Rapid Lightning Creek HS on June 9 to July 20. A total of 3,817 individual points (~240 points per sample area) were surveyed with an average of 2.22 different plants encountered per point. Two hundred and forty-seven different species were encountered in the Rapid Lightning samples. Six of the 16 samples were classified as forested upland habitat cover type, needle-leaf community type (one *Pseudotsuga menziesii* series, one *Thuja plicata* series, and four *Tsuga heterophylla* series). Four of the 16 samples were classified as forested wetland habitat cover type, further classified into one needle-leaf community type (unclassified palustrine forest series) and three broad-leaf community type (*Populus balsamifera trichocarpa* series). One of the 16 samples was classified as herbaceous wetland habitat cover type, further classified into a meadow community type (unclassified grassland series). Five of the 16 samples were classified as scrub-shrub habitat cover type (two *Alnus incana* series, two *Salix bebbiana* series, and one *Spiraea douglasii* series). The top five species of total cover overall for Rapid Lightning HS were rose spirea (*Spiraea douglasii*; 23.4%), reed canarygrass (*Phalaris arundinacea*; 16.6%), western redcedar (*Thuja plicata*; 16.1%), common snowberry (*Symphoricarpos albus*; 12.1%), and western hemlock (*Tsuga heterophylla*; 11.0%).

Fourteen samples were completed on Trout Creek HS on May 9 to August 23. A total of 3,334 individual points (~240 points per sample area) were surveyed with an average of 1.45 different plants encountered per point. One hundred and eighty-six different species were encountered in the Trout Creek samples. Six of the 14 samples were classified as forested upland habitat cover type, needle-leaf community type (two *Pseudotsuga menziesii* series and four *Thuja plicata* series). One of the 16 samples were classified as forested wetland habitat cover type, further classified into a broad-leaf community type (*Populus balsamifera trichocarpa* series). Six of the 14 samples were classified as herbaceous wetland habitat cover type, further classified into a meadow community type (unclassified grassland series). One of the 14 samples was classified as a scrub-shrub habitat cover type (unknown scrub-shrub series). The top five species of total cover overall for Trout Creek HS were red fescue (*Festuca rubra*; 32.9%), Douglas fir (*Pseudotsuga menziesii*; 16.3%), quackgrass (*Elymus repens*; 6.1%), common snowberry (*Symphoricarpos albus*; 5.7%), and oceanspray (*Holodiscus discolor*; 5.5%).

Four samples were completed on Westmond Lake HS on August 1 to August 3. A total of 960 individual points (~240 points per sample area) were surveyed with an average of 1.33 different plants encountered per point. Sixty-seven different species were encountered in the Westmond Lake samples. All four of the samples were classified as herbaceous wetland habitat cover type, further classified into one emergent vegetation (*Phalaris arundinacea* series) and three meadow community types (unclassified grassland series). The top five species of total cover overall for Westmond Lake HS were Canada bluegrass (*Poa compressa*; 32.0%), creeping bentgrass (*Agrostis stolonifera*; 28.4%), reed canarygrass (*Phalaris arundinacea*; 17.7%), quackgrass (*Elymus repens*; 16.7%), and meadow foxtail (*Alopecurus pratensis*; 8.4%).

Rare Plants

Rare plants were discovered and identified during vegetation monitoring on one mitigation property (Rapid Lightning Creek). From June 29 to August 15, individual plants of Maryland sanicle (*Sanicula marilandica*) were discovered at three different locations on Rapid Lightning Creek HS within *Populus trichocarpa*/*Symphoricarpos albus*, *Spiraea douglasii*, and unclassified palustrine forest habitat types. Two of the three sampling sites with Maryland sanicle plants identified during 2011, were previously discovered in prior years of vegetation monitoring, however, one site was newly discovered in 2011 (Figure 26).



Figure 26. Photograph of Maryland sanicle (*Sanicula marilandica*) found on the Rapid Lightning Creek Habitat Segment, Pend Oreille WMA.

Erosion of the Shorelines of Lake Pend Oreille and Pend Oreille River

To better understand the gains and/or losses of land area of the Clark Fork River delta on Lake Pend Oreille after the construction of the Albeni Falls dam in 1955, IDFG partnered with Duck Unlimited engineers and GIS specialists. The boundaries of islands in the delta and the river/lake boundaries of the adjacent mainland were digitized off of aerial photography from ten different years between 1946 and 2009. The area was divided into 12 different subsections based on the locations of various islands on the 1946 base-year imagery (Figure 27). The total area for land masses was calculated for each year and a table of acreage for these ten years was developed. Total acres gained/lost and percent area gained/lost for the entire delta and for each

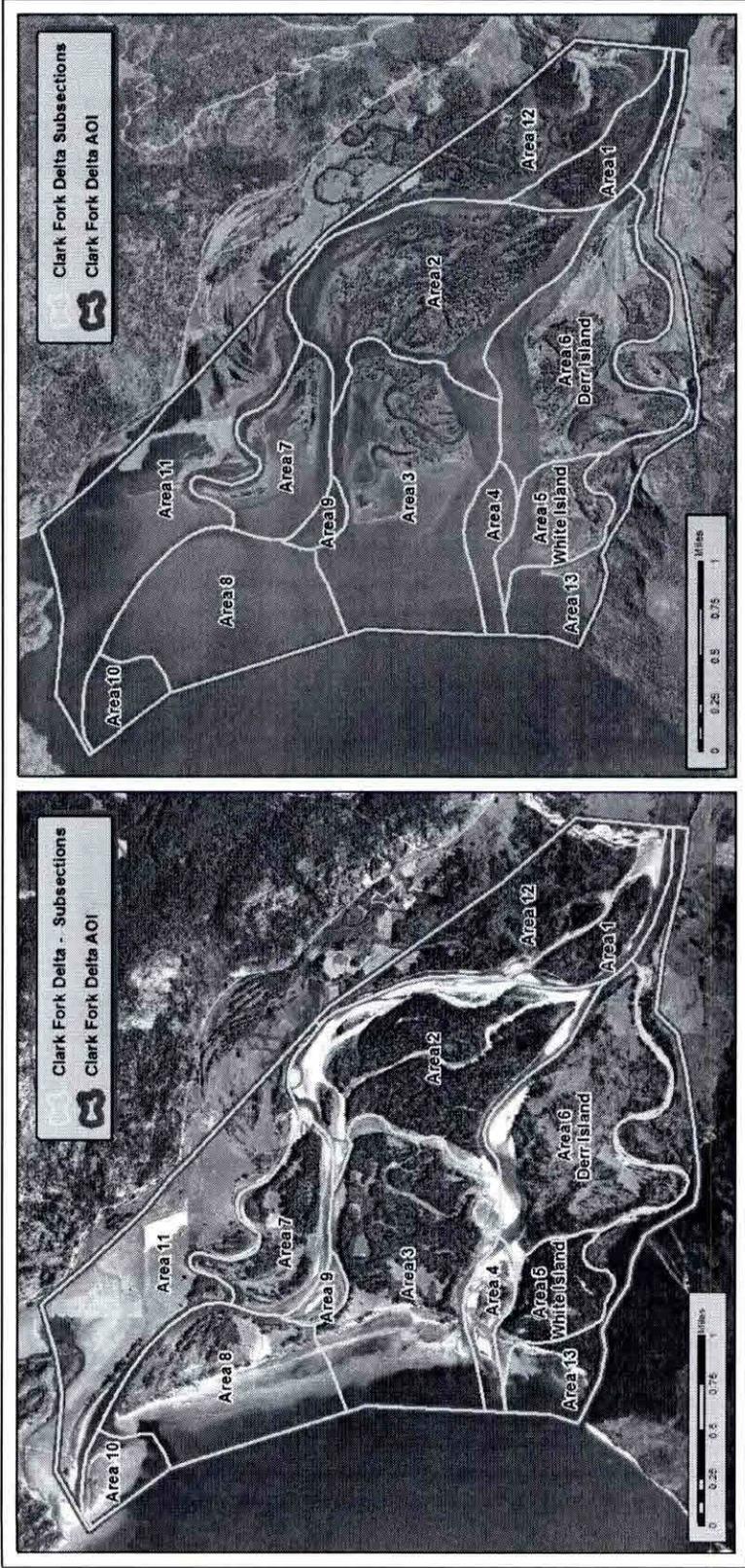


Figure 27. Clark Fork River Delta - Analysis area and subsections overlaid on 1946 and 2009 aerial photos.

subsection was calculated for all combinations of years. The measured area of the lost delta habitat was 1,617 acres (45%) of total land area between 1946 and 2009. About 34% of the total loss occurred between 1946 and 1953, and 11% more between 1953 and 1965. The change in total land area of the delta has been less than one percent from 1965 through 2009, although significant changes continue to occur within many of the sub-sections of the delta.

Methods

Air photo acquisition and rectification

Aerial Photograph data sets were acquired for 26 different years between 1935 and 2011, through downloads from a variety of publicly accessible websites and other sources. Several of these photo sets did not provide full coverage of the entire delta, and the quality and/or resolution of several other photograph sets were not suitable for this analysis. A goal was set to identify at least one photo set from each decade to use in the analysis. Multiple photo sets were available within a few of the decades. In these cases, it was decided that digitizing photographs from consecutive years was cost prohibitive and would likely not add significant insight to the analysis. Therefore, photograph sets that were separated by a minimum of 3 to 5 years were chosen. The final dataset used in the analysis was comprised of photograph sets from ten different years: 1946, 1953, 1965, 1970, 1975, 1981, 1993, 1998, 2006, and 2009.

The photographic sets for years 2006 and 2009, acquired from the National Agriculture Imagery Program (NAIP) of the Farm Services Administration, were received as geo-rectified images. Photographs from most other years were not geo-rectified. The 2009 image was used as a base to which photographs from other years were rectified.

Polygon delineation

Land mass boundaries were digitized using two different methods. At the onset of the project, Definiens Developer ("eCognition") software was used to automatically define image segments based on the spectral properties in the digital air photos. These segments were then mapped into "Land" and "Water" classes. The image segment boundaries were then dissolved on this Land/Water split to produce polygons representing the boundaries of the land masses. This automated method was tested because it was expected to quickly produce general boundaries between land and water without the need to hand digitize every one of these lines. This worked relatively well, but there were noticeable errors, especially in boundary areas with tree shadows. The automated polygon boundaries often followed the tree shadows out into the river or back into the forested areas on land (Figure 28). Significant amounts of time were required to re-shape the polygons in these areas, and it was decided that it would be more efficient, to just digitize all boundaries by hand. Definiens Developer segmentation was used for years 1946, 2006, and 2009. The hand digitizing method was used for the remainder of the aerial photographic sets.

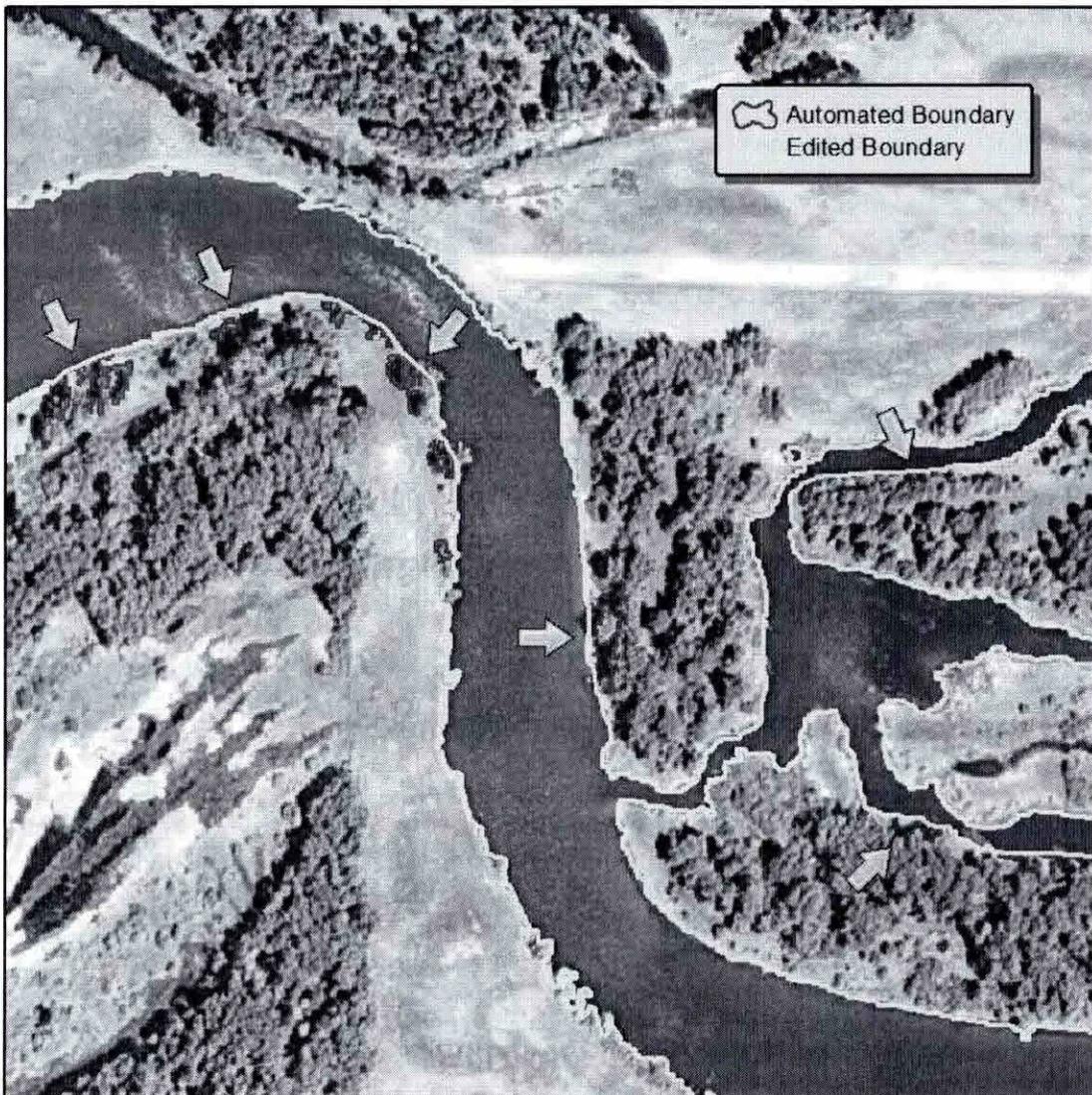


Figure 28. Example of errors in the automated polygons and the corrected polygon boundaries.

The hand-digitizing method involved "heads-up", on-screen digitizing of the polygons in ESRI's ArcMap software. To increase speed and consistency of digitizing the boundaries, the polygons from a year that was already digitized were often copied and used as a starting point for subsequent years. This allowed the digitizer to identify areas of change only, rather than re-digitizing unchanged areas repeatedly. Because existing polygons from a completed year were often used as a starting point in a new year, some final polygons from hand digitized years may include portions of eCognition derived line segments.

In general, digitizing followed the main vegetated land masses and excluded many or most sand bars/gravel bars from the land areas. If a gravel bar/island appeared to have vegetation present, then it was included in the land area. Large, non-vegetated gravel bars that were consistently exposed over several image dates were also often included in the land areas. No consistent rule set could be defined for the decision to include/exclude the widely varying formations and occurrences of gravel bars observed throughout the ten photo sets. The final decision to include or exclude a gravel bar was left to the digitizer's judgment.

Once digitizing was complete for all years, the final land/water polygon boundaries were then clipped with the subsection boundaries and acreage was calculated for each feature. Acreage figures were then exported to an Excel spreadsheet. Total acres gained/lost and percent area gained/lost for the entire delta and for each subsection was calculated for all combinations of years. Figure 29 depicts the overall loss in land area of the delta between 1946 and 2009.

Resolution of project data

This project was intended to be a quick assessment of the land area across the Clark Fork River delta. Boundaries were digitized relatively quickly and it is known that the defined boundaries are not exact. There is some error associated with the geo-rectification of the ten different photographic sets. High quality control points available for reference in the rectification processes were very limited in number and also varied with each year because many buildings, road intersections and other features appeared, disappeared or changed over the 63-year time span represented by the photographic sets. Additional error was inevitably introduced during the digitizing process. To assess the degree of error, a subset of the digitized polygons from two different years were examined. Additional time was spent to re-digitize and correct many of the small errors and inconsistencies in the two years of data. This involved recalculating the acreages and comparing the first re-digitized dataset to its original, and then the other re-digitized dataset to its original, and finally comparing the year-to-year differences between the original pair and the re-digitized pair. In most instances the difference in acreage calculations came to two percent or less of the total area analyzed. Therefore, when viewing the final table of acreage summaries, it should be assumed that a change of +/- 2% or less is insignificant and should be considered to represent "No Change".

Results

Final datasets for this project include:

- Geo-rectified images for the 10 different years analyzed in the study;
- ArcGIS polygon shapefiles of Land/Water boundaries clipped by the subsection boundaries; and,
- Excel spreadsheet showing total acres gained/lost and percent area gained/lost for the entire delta and for each subsection for all combinations of years (Appendix G).

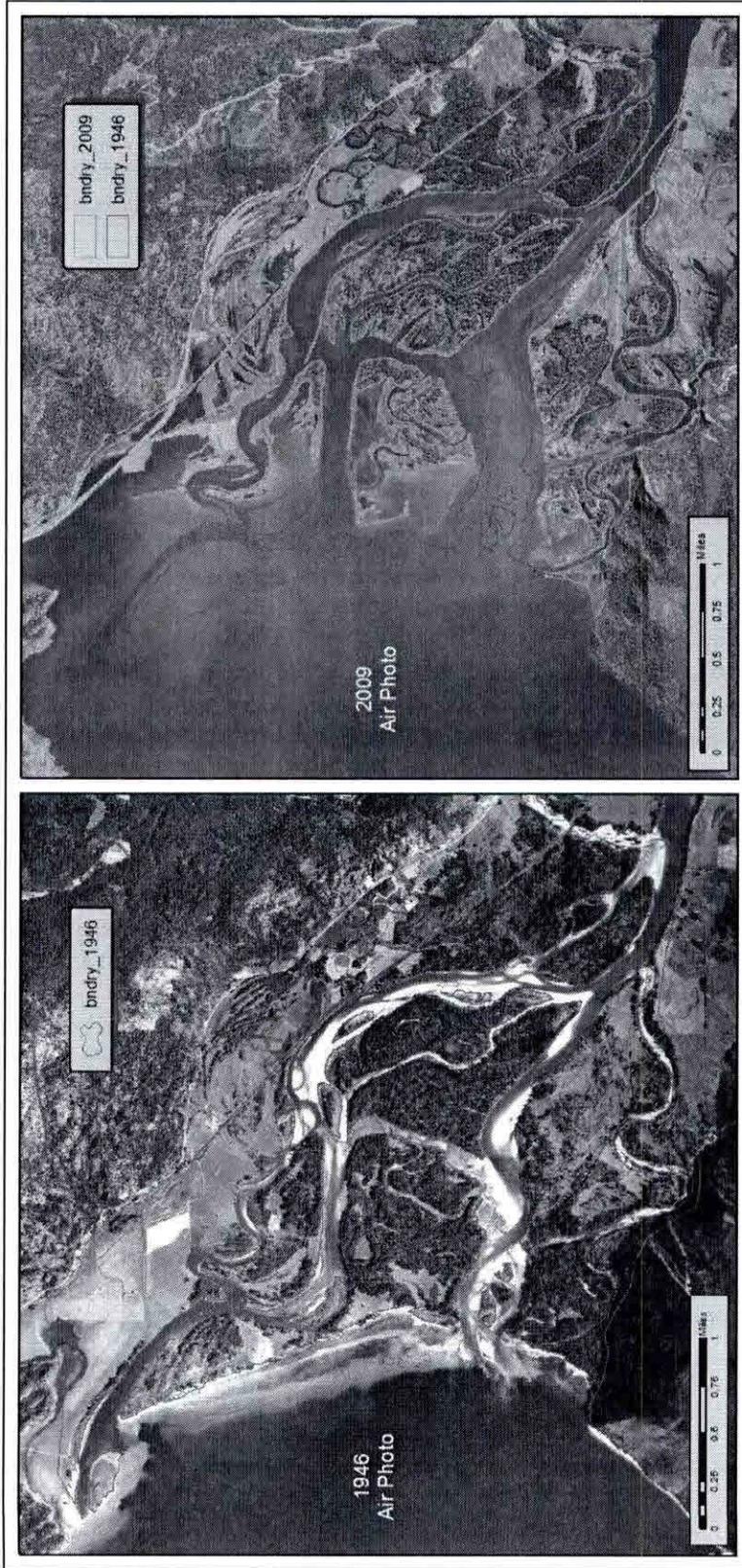


Figure 29. 1946 and 2009 polygon boundaries overlaid on 1946 and 2009 air photos to show total land loss on the Clark Fork River Delta.

Literature Cited

Johnson, D.H. and T.A. O'Neil. 2001. *Wildlife-Habitat Relationships in Oregon and Washington*. Oregon State University Press. Corvallis, OR. 736 pp.

Martin, R. C., H. J. Hansen, and G. A. Meuleman. 1988. *Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan*. Idaho Department of Fish and Game. 123 pp.



Cumulative Status Report History

(data as of 01/25/2009)

Status Reports Accepted For the Period May-Jun 2008 (5/1/2008 - 6/30/2008) through Oct-Dec 2008 (10/1/2008 - 12/31/2008)

Project: 2007-246-00 Restoration Of Bull Trout Pass

Contract: 37624

Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS

Contractor: Kalispel Tribe

COTR: Matthew, Carlos

G = will complete by the end date
 Y = may not complete by the end date
 R = will not complete by the end date
 Gray-shaded milestones are Complete, Canceled, or outside the scope of the current reporting period.

A: 165. Obtain necessary permits and set up contract for genetic analysis

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
A: Federal fish and wildlife permit	05/01/08	05/02/08	Yes					
B: Idaho scientific collection permit	05/01/08	05/02/08	Yes					
C: Idaho transport permit	05/01/08	05/02/08	Yes					
D: Produce Idaho scientific collection permit annual report	12/03/08	01/31/09	Yes					
E: Apply for 2009 Idaho collection permit	02/01/09	02/28/09	No					
F: Apply for 2009 transport permit	02/01/09	02/28/09	No					
G: Apply for 2009 federal fish and wildlife permit	02/01/09	02/28/09	No					
H: Deliverable: Idaho scientific collection, transportation, and federal permits		02/28/09	No	G	G	G		

B: 157. Angling for bull trout

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Spring angling	05/01/08	06/30/08	Yes					
C: Fall angling	09/15/08	11/30/08	Yes		G			
D: Deliverable: Angling for bull trout below Albeni Falls Dam		11/30/08	No	G	G	R	Two trips will be completed in the early spring of 2009	ok



C: 157. Weekly electrofishing collecting a representative sample of bull trout below Albeni Falls Dam

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Spring electrofishing	05/02/08	04/30/09	No	G	G	G		
C: Summer electrofishing	07/01/08	08/31/08	Yes					
D: Fall electrofishing	09/01/08	11/15/08	Yes		G			
E: Deliverable: Weekly electrofishing collection of bull trout below Albeni Falls Dam		04/30/09	No	G	G	G		

D: 158. Implant combination radio acoustic transmitter into bull trout

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Implant CART tags and PIT tags in up to 27-40 bull trout	05/02/08	04/15/09	No	G	G	G		
C: Deliverable: Implanting of radio tags		04/30/09	No	G	G	G		

E: 157. Rapid response genetic analysis of bull trout biopsy samples

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Collect bull trout tissue samples	05/02/08	04/15/09	No	G	G	G		
C: Send bull trout tissue samples	05/02/08	04/15/09	No	G	G	G		
D: Abernathy Lab to process tissue samples and send results	05/02/08	04/17/09	No	G	G	G		
E: Deliverable: Genetic Analysis		04/30/09	No	G	G	G		

F: 28. Transport bull trout above Albeni Falls Dam

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Capture bull trout	05/02/08	04/15/09	No	G	G	G		
C: Transport bull trout	05/02/08	04/15/09	No	G	G	G		



F: 28. Transport bull trout above Albeni Falls Dam

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
D: Deliverable: Bull trout transported above Albeni Falls Dam		04/30/09	No	G	G	G		

G: 70. Annual overhaul and recalibration of ground receiver stations

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Overhaul, refurbish, and retest ground receiving stations	03/03/09	03/28/09	No					
C: Deliverable: Annual maintenance of monitoring equipment		03/28/09	No	G	G	G		

H: 157. Compile electronic spread sheet data base of electrofishing data

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Electrofishing data entry	05/02/08	04/15/09	No	G	G	G		
C: Deliverable: Electrofishing data entry		04/30/09	No	G	G	G		

I: 157. Download stationary ground radio receiving station

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Inspect and download receiver stations 26 times per year	05/15/08	04/30/09	No	G	G	G		
C: Deliverable: Downloading stationary ground radio receiver		04/30/09	No	G	G	G		

J: 157. Mobile tracking surveys by fixed wing aircraft, vehicle, and boat

Milestone Title	Start	End	Complete	May- Jun	Jul- Sep	Oct- Dec	Contractor Comments	BPA Comments
A: Environmental compliance requirements complete	05/01/08	05/02/08	Yes					
B: Aircraft tracking	05/15/08	04/30/09	No	G	G	G		
C: Boat tracking	05/15/08	04/30/09	No	G	G	G		
D: Vehicle tracking	05/15/08	04/30/09	No	G	G	G		



J: 157. Mobile tracking surveys by fixed wing aircraft, vehicle, and boat

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
E: Deliverable: Tracking of radio tagged fish with aircraft, vehicle, and boat.		04/30/09	No	G	G	G		

K: 189. Project coordination among all stakeholders

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
A: Ongoing coordination between stakeholders	05/01/08	04/30/09	No	G	G	G		
B: Deliverable: Project coordination among stakeholders		04/30/09	No	G	G	G		

M: 119. Manage Project

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
A: Accrual - Submit September estimate to BPA	09/01/08	09/10/08	Yes					
B: Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	01/30/09	04/30/09	No					
C: Deliverable: Funding Package - Submit draft to COTR		02/01/09	No	G	G	G		

N: 132. Submit Annual Report for the period (5/1/2008) to (4/30/2009)

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
A: Review annual report format requirements	11/01/08	12/15/08	Yes					
B: Submit report for internal contractor review	02/25/09	02/28/09	No					
C: Submit report for external review	03/02/09	03/02/09	No					
D: Email draft of report to COTR for review	03/10/09	03/10/09	No					
E: Receive COTR review comments	03/11/09	04/11/09	No					
F: Finalize Annual Report	04/30/09	04/30/09	No					
G: Deliverable: Final report uploaded to the BPA website		04/30/09	No	G	G	G		

O: 162. Data reduction and analysis

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
A: GIS generated tracking maps	11/10/08	04/15/09	No			G		



O: 162. Data reduction and analysis

Milestone Title	Start	End	Complete	May-Jun	Jul-Sep	Oct-Dec	Contractor Comments	BPA Comments
B: Statistical comparisons of run timing, genetic assignments, and spawning tributaries	11/10/08	04/30/09	No			G		
C: Deliverable: Data analysis of tracking data		04/30/09	No	G	G	G		

Status Report Summary

Status Period	Stage	Date Due	Submitted	Accepted	Contractor Comments	BPA Comments
May-Jun 2008 (5/1/2008 - 6/30/2008)	Completed	07/15/08	07/15/08	07/15/08	<Submitted by Jason Olson>	<Reviewed By Carlos Matthew>
Jul-Sep 2008 (7/1/2008 - 9/30/2008)	Completed	10/15/08	09/30/08	10/01/08	<Submitted by Jason Olson>	<Reviewed By Carlos Matthew>
Oct-Dec 2008 (10/1/2008 - 12/31/2008)	Completed	01/15/09	01/06/09	01/07/09	<Submitted by Jason Olson>	<Reviewed By Carlos Matthew>

Brown,Cecilia K (BPA) - KEWM-4

From: Maslen,Bill (BPA) - KEW-4
Sent: Monday, June 04, 2012 7:05 AM
To: Watts,Virgil L (BPA) - KEWM-4; Bettin,Scott W (BPA) - KEWR-4; Brown,Cecilia K (BPA) - KEWM-4; Krueger,Paul Q (BPA) - KEWM-4
Subject: FW: Albeni Falls FWO Letter
Attachments: Bodi-Albeni Falls LTR 6-1-12 .PDF

Final letter.

From: Cogswell,Peter (BPA) - DKR-7
Sent: Friday, June 01, 2012 3:27 PM
To: Wright,Stephen J (BPA) - A-7; Adams,Hub V (BPA) - LC-7; Harwood,Holly C (BPA) - PGB-5; Oliver,Stephen R (BPA) - PG-5; Maslen,Bill (BPA) - KEW-4; Johnson,G Douglas (BPA) - DKPM-7; Williams,John J (BPA) - DKR-BOISE; Barco III,John W (BPA) - A-7
Cc: Decker,Anita J (BPA) - K-7; Drummond,William K (BPA) - D-7; Marker,Douglas R (BPA) - DK-7; Bodi,Lorri (BPA) - KE-4
Subject: FW: Albeni Falls FWO Letter

It is done. In addition, Idaho decided against doing a press release, so talking points are for responding to calls. Doug Johnson is coordinating with Governor's Office in ID.

Thanks everyone for you patience and willingness to continue to work this one through.

From: John Chatburn [mailto:John.Chatburn@oer.idaho.gov]
Sent: Friday, June 01, 2012 3:18 PM
To: Bodi,Lorri (BPA) - KE-4; Cogswell,Peter (BPA) - DKR-7
Cc: Tom Perry; Mark Warbis; David Hensley; Irich@co.bonner.id.us; crasor@co.bonner.id.us; mnielsen@co.bonner.id.us; mayor@ci.sandpoint.id.us; Karen_Roetter@crapo.senate.gov; aaron.calkins@mail.house.gov; sid_smith@risch.senate.gov; Katie Brodie (katiebrodie62@yahoo.com); jbbroadsword@senate.idaho.gov; eanderson@house.idaho.gov; Shawn Keough (shawn@idahologgers.com); George Eskridge; Bill Booth; Yost, Jim; Allen, Jeff (jallen@NWCouncil.org)
Subject: Albeni Falls FWO Letter

Ms. Bodi, attached is a letter of agreement regarding operations of the Albeni Falls Dam. We appreciate your efforts and assistance as we worked to refine the details of this agreement.

John Chatburn
Administrator
Idaho Office of Energy Resources
304 N. 8th Street, Ste. 250, Boise, Idaho
(208) 332-1660
john.chatburn@oer.idaho.gov

OFFICE OF ENERGY RESOURCES

C.L. "BUTCH" OTTER
Governor



304 N. 8th Street, Suite 250, P.O. Box 83720
Boise, Idaho 83720-0199

JOHN CHATBURN
Interim Administrator

(208) 332-1660
FAX (208) 332-1661

June 1, 2012

Ms. F. Lorraine Bodi
Vice President, Environment, Fish and Wildlife
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621

Dear Ms. Bodi:

Idaho reaffirms its support for the concept of using the existing hydroelectric system to generate additional energy for the region. The Columbia Basin's economy and families need the low-cost, clean, renewable power hydroelectric provides. Idaho also remains committed to protecting Lake Pend Oreille and rebuilding the lake's fishery. To date, BPA and the State have collaborated on numerous monitoring and mitigation efforts that have benefited natural resources of the Pend Oreille basin. This letter of agreement is intended to further our mutual commitment to addressing monitoring and mitigation efforts in the Lake Pend Oreille basin associated with the operation of Albeni Falls Dam consistent with BPA's legal authorities under the Northwest Power Act.

On behalf of the State of Idaho, we concur with the terms of agreement, as described in your October 28th, 2011 letter and subsequent discussions, restated as follows.

BPA makes the following commitments pertaining to the effect of the existing operations of Albeni Falls Dam:

- Through federal fiscal year 2014, BPA will provide IDFG a total of \$3,000,000 in funding (\$1,000,000 per year for 3 years) for erosion management actions. This funding would use \$1,000,000 per year for 3 years of the approximately \$1,500,000 BPA currently provides to IDFG for mitigation of wildlife impacts from the construction and inundation (C/I) of Albeni Falls Dam, but this \$3,000,000 would not "count" or be credited against wildlife mitigation. The remaining \$500k/year will remain available for continued mitigation of C/I losses, or upon mutual agreement between BPA and IDFG, applied to erosion control and habitat restoration without being credited against mitigation for C/I losses. The shape and timing of this spending will be negotiated and mutually agreed upon by BPA and IDFG.
- BPA will provide IDFG an additional \$150,000 (\$50,000 per year, for three years) to the existing monitoring efforts by IDFG. This funding will be used to hire an independent

third party to examine erosion impacts and study gravel placement for spawning at lower elevation. BPA and Idaho will work together to ensure coordination with parties in the Basin, including the Kalispel Tribe.

- BPA agrees to negotiate in good faith to reach a mutually agreed upon long-term settlement for mitigation of construction, inundation, and any operational impacts on fish and wildlife resources attributed to the Albeni Falls project.

In consideration of these commitments, Idaho agrees to the following:

- Idaho will recommend and support drafting Lake Pend Oreille to elevation 2,051 in fall 2011 (already recommended); to 2,055 feet in the fall of 2012; and to elevation 2,051 in the fall of 2013. BPA and IDFG will work cooperatively on lake-level management during these three winter operation periods to implement erosion control and habitat restoration actions as outlined in BPA bullet 1, above. After 2013, Idaho's recommendation for the appropriate elevation management of Lake Pend Oreille will be determined, after mutual discussion, based on the latest information available on the needs of kokanee, the fishery, and other resources. Additional information governing appropriate lake levels may also come from the provisions of any new bull trout Biological Opinions.
- Idaho agrees that dollars spent on erosion control and restoration will be counted against mitigation for operational losses if a loss assessment determines mitigation needs exist (consistent with BPA mitigation responsibilities under the Northwest Power Act).
- Idaho supports using the existing hydroelectric system to meet regional power needs, including Flexible Winter Power Operations (FWPO). Based on discussions with you and Administrator Wright after your October 28 letter, Idaho and BPA have agreed to meet as necessary to discuss any significant new information from this monitoring or significant changed circumstances related to Albeni Falls operations. BPA will determine the appropriate next steps in coordination with Idaho and other interested entities, which could include adjustments in monitoring or mitigation.
- Through May 31, 2017, Idaho will not initiate or participate in a capacity as plaintiff or petitioner in any administrative or legal challenges to the EA, the FWPO, or current operations of Albeni Falls, and will not object to the filing of this letter of agreement in any such proceedings initiated by other entities.

Prior to expiration of this commitment, Idaho and BPA will discuss appropriate extension of this commitment.

- In addition, it is Idaho's intent, consistent with our past practice and the provisions of Idaho's various mitigation agreements and accords with BPA, to seek resolution of any disputes that may arise through good faith and candid discussion without resorting to administrative, judicial, or other formal dispute resolution procedures. Should such

discussion not resolve a dispute on this issue, Idaho would propose non-binding mediation before initiating any legal or administrative proceeding.

- Idaho agrees to negotiate in good faith to reach a mutually agreed upon long-term settlement for mitigation of construction, inundation, and any operational impacts on fish and wildlife resources attributed to the Albeni Falls project.

As a separate matter, regarding issues of icing under FWPO, Idaho appreciates the fact that the Corps and BPA are implementing a new standard operating procedure (SOP) to help minimize the risk of damage to structures around Lake Pend Oreille. We understand that the SOP entails monitoring ice conditions around structures on Lake Pend Oreille and actively fluctuating the lake during the winter when power operations are not occurring, and that the purpose of the SOP is to maintain some minimum lake fluctuation sufficient to maintain the active cracks around structures (e.g., piles) and a hinge crack along the shoreline of the lake. This was an important concern for citizens of Idaho who live and recreate on the lake, and we are encouraged that the SOP may over the long term decrease the overall risk of damage to structures.

Finally, we affirm that nothing in this letter of agreement is intended to change the respective legal authorities of BPA, the state of Idaho, the Kalispel Tribe, or other sovereigns involved in the Pend Oreille Basin.

We look forward to working with BPA to carry out the mutual commitments described in this exchange of letters.

Sincerely,



John Chatburn
Interim Administrator

Brown,Cecilia K (BPA) - KEWM-4

From: Maslen,Bill (BPA) - KEW-4
Sent: Friday, November 04, 2011 1:00 PM
To: Watts,Virgil L (BPA) - KEWM-4; Krueger,Paul Q (BPA) - KEWM-4; Bettin,Scott W (BPA) - KEWR-4; Mercier,Bryan K (BPA) - KEWR-4; Brown,Cecilia K (BPA) - KEWM-4
Cc: Renner,Marcella P (BPA) - KEW-4
Subject: FW: Albeni Falls Letter Agreements

fyi. I'll ask Marcella to set up an internal meeting so that we can discuss more specifics, including some process-related issues (won't be till end of month or early December).



AF Idaho BPA
10-28-11.pdf



AF Kalispel
11-02-11 PDF.pdf



Department of Energy

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

ENVIRONMENT, FISH AND WILDLIFE

October 28, 2011

In reply refer to: KE-4

Mr. John Chatburn, Interim Administrator
Office of Energy Resources
304 North 8th Street, Suite 250
Boise, ID 83720-0199

Dear Mr. Chatburn:

Bonneville Power Administration (BPA) and State of Idaho (State) have had many discussions over the last several years pertaining to monitoring and mitigation efforts associated with the construction and operation of Albeni Falls Dam. BPA recognizes that Lake Pend Oreille is an important natural resource and offers valuable recreational opportunities. To date, BPA and the State have collaborated on numerous monitoring and mitigation efforts that have benefited natural resources of the Pend Oreille basin. This letter of agreement is intended to further BPA's commitment to work with the State in addressing monitoring and mitigation efforts in the Lake Pend Oreille basin associated with the operation of Albeni Falls Dam and pursuant to BPA's legal authorities under the Northwest Power Act.

BPA and the State have discussed the following mutual agreements pertaining to the effect of the existing operations of Albeni Falls Dam:

- Idaho Department of Fish and Game (IDFG) will recommend and support drafting Lake Pend Oreille to elevation 2051 in fall 2011 (already recommended); to 2055 feet in the fall of 2012; and to elevation 2051 feet in the fall of 2013. BPA and IDFG will work cooperatively on lake level management during these three winter operations periods to implement erosion control and habitat restoration actions discussed in bullet 3, below. After 2013, the IDFG's recommendation for the appropriate elevation of Lake Pend Oreille will be determined, after mutual discussion, based on the latest information available on the needs of kokanee and other resource management needs. Additional information governing appropriate lake levels may also come from the provisions of any new bull trout Biological Opinions.
- BPA will provide an additional \$150,000 (\$50,000 per year, for three years), to the existing monitoring efforts by IDFG. This funding will be used to hire an independent third party to examine erosion impacts and study gravel placement for spawning at lower elevation. BPA and Idaho will work together to ensure coordination with parties in the Basin, including the Kalispel Tribe.

- BPA will provide a total of \$3,000,000 in expense funding (\$1,000,000 per year for 3 years) for erosion management actions. This funding would use \$1,000,000 per year for 3 years of the approximately \$1,500,000 capital funds BPA currently provides to IDFG for mitigation of wildlife impacts from the construction and inundation (C/I) of Albeni Falls Dam, but this \$3,000,000 would not "count" or be credited against wildlife mitigation. The remaining \$500k/year will remain available for continued mitigation of C/I losses, or upon mutual agreement between BPA and IDFG applied to erosion control and habitat restoration without being credited against mitigation for C/I losses. IDFG agrees that dollars spent on erosion control and restoration will be counted against mitigation for operational losses if a loss assessment determines mitigation needs exist (consistent with BPA mitigation responsibilities under the Northwest Power Act). BPA and the State have a shared goal of negotiating a long term settlement of construction, inundation, and operational impacts in the future. As such, the shape and timing of this spending will be negotiated and mutually agreed upon by the parties.
- BPA appreciates the State of Idaho's support for using the existing hydroelectric system to meet regional power needs, including the Flexible Winter Power Operations (FWPO). Idaho will not support or participate in any administrative or legal challenges to the Environmental Assessment (EA), the FWPO, or current operations, and will not object to filing of the State's letter of agreement in any such proceedings.
- In the future, BPA and Idaho agree to negotiate in good faith to reach a mutually agreed upon long term settlement for mitigation of construction, inundation, and any operational impacts on fish and wildlife resources attributed to the Albeni Falls project.

On the subject of the FWPO, the EA describes and confirms our view that the FWPO would not contribute significantly to ongoing effects; BPA and the U.S. Army Corps of Engineers have addressed the State's comments in the final EA. As a separate matter, regarding issues of icing under FWPO, the Corps and BPA are implementing a new standard operating procedure (SOP) to help minimize the risk of damage to structures around Lake Pend Oreille. The SOP entails monitoring ice conditions around structures on Lake Pend Oreille and actively fluctuating the lake during the winter when power operations are not occurring. The purpose of the SOP is to maintain some minimum lake fluctuation sufficient to maintain the active cracks around structures (i.e. piles) and a hinge crack along the shoreline of the lake. The implementation of the SOP may over the long term decrease the overall risk of damage to structures.

Nothing in this letter of agreement is intended to change the respective legal authorities of BPA, the State of Idaho, the Kalispel Tribe, or other sovereigns involved in the Pend Oreille Basin.

Please respond with your concurrence on these agreements through a letter on behalf of the State of Idaho.

Sincerely,

/s/ F. Lorraine Bodi

F. Lorraine Bodi
Vice President, Environment, Fish and Wildlife

cc:

Mr. Bill Booth, Northwest Power and Conservation Council
Mr. Jeff Allen, Northwest Power and Conservation Council
Colonel Bruce A. Estok, U.S. Army Corps of Engineers
Mr. Stuart R. Cook, U.S. Army Corps of Engineers
Mr. Olton Swanson, U.S. Army Corps of Engineers
Mr. G. Witt Anderson, U.S. Army Corps of Engineers
Mr. Rock D. Peters, U.S. Army Corps of Engineers
Ms. Gail Lear, U.S. Army Corp of Engineers



Department of Energy

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

ENVIRONMENT, FISH AND WILDLIFE

November 2, 2011

In reply refer to: KE-4

Chairman Glen Nenema
Kalispel Tribe of Indians
P.O. Box 39
Usk, WA 99180

Dear Chairman Nenema:

The U.S. Army Corps of Engineers (Corps), the Bonneville Power Administration (BPA), and the Kalispel Tribe have had many discussions over the last several years pertaining to monitoring and mitigation efforts associated with the construction and operation of Albeni Falls Dam. The federal agencies recognize the sovereignty of the Kalispel Tribe and the importance of Pend Oreille Basin fisheries and natural resources to the Tribe. To date, the Corps, BPA and the Kalispel Tribe have collaborated on numerous monitoring and mitigation efforts that have benefited natural resources of the Pend Oreille basin, including the negotiation of a ten year Memorandum of Agreement. While we await the formal signing of the MOA in the near future, this letter of agreement is intended to further our commitment to work with the Kalispel Tribe in addressing monitoring and mitigation efforts in the Pend Oreille Basin associated with the operation of Albeni Falls Dam.

BPA and the Tribe have discussed and agree to the following terms pertaining to the effect of the existing operations of Albeni Falls Dam:

- A meeting will be convened with leaders from BPA, the Kalispel Tribe and the Corps to improve partnership, collaboration and implementation, on the broader issues of fish passage at Albeni Falls Dam consistent with the negotiated MOA. This meeting will occur as early as possible, but before mid-December.
- BPA will provide the Kalispel Tribe additional funding of \$100,000 per year for 2 years to expand current trap and haul of bull trout from below to above Albeni Falls Dam as a measure to provide for upstream passage of fish while other passage facilities are evaluated. This funding will be in addition to that provided in the MOA, and may be used to increase the level of effort of current electrofishing/angling as well as potentially expanding the geographic scope to include capturing fish in areas where they may be holding (e.g., cool water refugia) where fish are more abundant or where they may be more easily captured.
- BPA will provide the Kalispel Tribe additional funding of \$50,000 per year for 2 years to conduct studies to better understand the magnitude of entrainment associated with operation of Albeni Falls Dam. This funding will be in addition to that provided in the MOA, and may be used for tagging in conjunction with the aforementioned trap and haul effort, or other methods such as hydroacoustics or radio telemetry. BPA, Corps, and the Kalispel Tribe will work collaboratively with fishery managers on an approach that the parties agree will provide information that will be useful to future management decisions.

In addition, BPA and the Tribe have discussed and agree to the following terms pertaining to the effect of the existing operations of Albeni Falls Dam:

- BPA will reprogram \$3,000,000 in expense funding over three years to Idaho Department of Fish and Game (IDFG) for erosion management actions.
- BPA will provide an additional \$150,000 (\$50,000 per year, for three years) to IDFG to hire an independent third party to examine erosion impacts and study gravel placement for spawning at lower elevation. BPA will coordinate with the Kalispel Tribe regarding the scope and implementation of this study.
- BPA and the Tribe will jointly support the drafting of Lake Pend Oreille to elevation 2051 feet in the fall of 2011; to 2055 feet in the fall of 2012; and to elevation 2051 feet in the fall of 2013. After 2013, BPA and the Tribe will discuss appropriate elevation levels based on the latest information available, including study results and the provisions of any new bull trout Biological Opinions.
- Upon signature of the MOA, the Tribe agrees with BPA that it will not support or participate in any administrative or legal challenges to Albeni Falls Dam Flexible Winter Power Operations Environmental Assessment, the flexible winter power operations, or current operations for the duration of the MOA.

BPA appreciates your support and patience in working through these issues. Nothing in this letter of agreement is intended to change the respective legal authorities of BPA or the Kalispel Tribe, or other sovereigns involved in the Pend Oreille Basin.

Please respond with your concurrence on this letter of agreement through a letter on behalf of the Tribe.

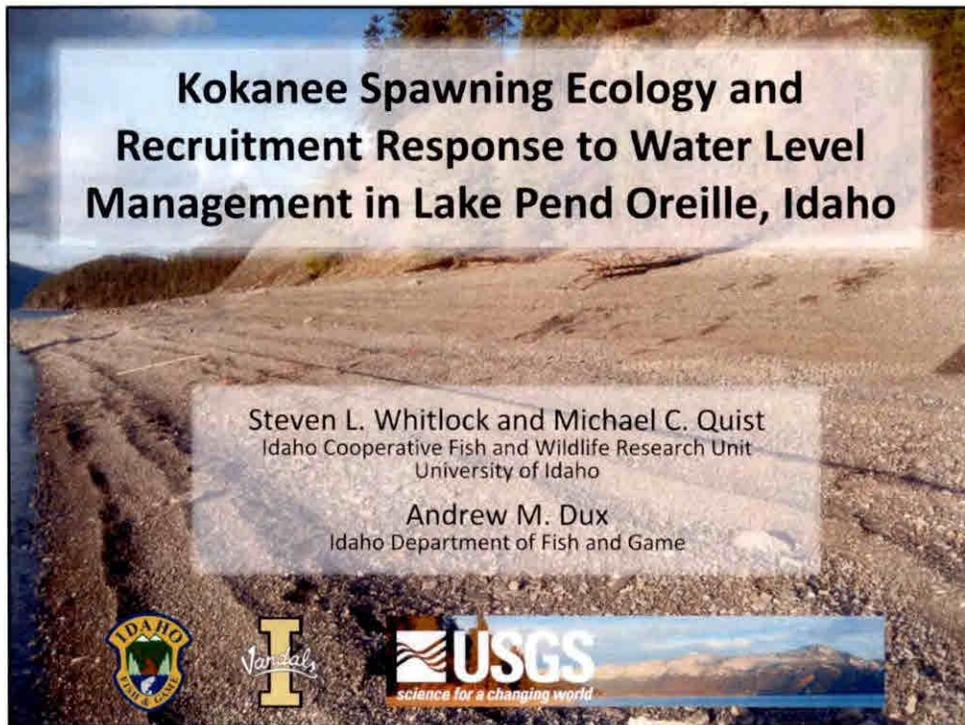
Sincerely,

/s/ William C. Maslen for

F. Lorraine Bodi, Vice President
Environment, Fish and Wildlife

cc:

Colonel Bruce A. Estok, U.S. Army Corps of Engineers
Mr. Stuart R. Cook, U.S. Army Corps of Engineers
Mr. Rock D. Peters, U.S. Army Corps of Engineers
Ms. Gail Lear, U.S. Army Corp of Engineers
Mr. Dean Osterman, Kalispel Tribe of Indians



We've heard a lot this morning about food web interactions and how those are being managed in western lakes and reservoirs. I'm going to continue that theme by discussing the response we've seen to lake trout suppression efforts in Lake Pend Oreille, Idaho. This has been a large-scale effort to manipulate a food web from the top down by mechanically removing predators. If your not familiar, lake trout suppression is a management strategy that has increased in popularity in recent years as a means of minimizing negative impacts that nonnative lake trout have on both native fish populations and sport fisheries. The feasibility of suppression is still being evaluated and Lake Pend Oreille has been one of the leading test cases for whether this can be achieved, especially on a large scale. Today I'll provide some background on the issue and describe the response we've seen by both lake trout and species we seek to benefit from this program. Acknowledge coauthors.

Lake Level Hypothesis

- Low kokanee abundance attributed to recruitment failure
- Winter water level
 - Limited shoreline spawning habitat
 - Experimentally raised in recent years to enhance recruitment



Changes in the way the water level was regulated are blamed for repeated recruitment failure, which is thought to be the cause of the decline. I will define recruitment as survival beyond the first 3 months after emergence, which can be considered a critical period.

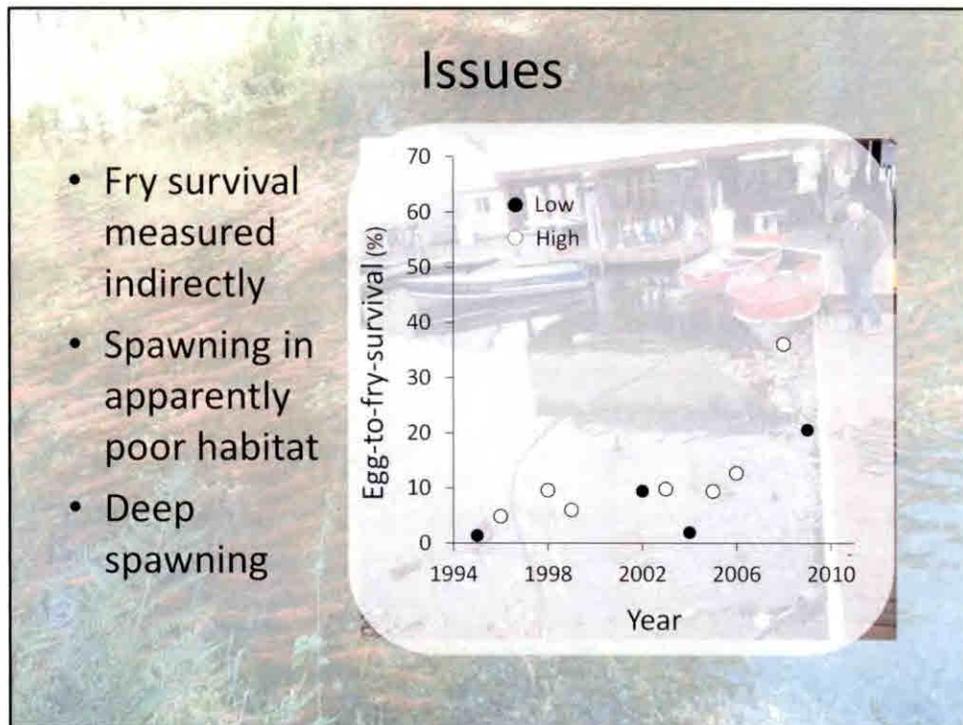
The mechanism for how recruitment is affected by water level is that when the winter lake elevation began being drawn down lower in the winter prior to spawning, all of the clean wave washed gravel (indicated by this red shading)

[CLICK]

Becomes dewatered, relegating kokanee to poor gravel below, subsequently reducing egg-to-survival to the point where recruitment is affected

[CLICK]

For the last 15 years the Idaho Department of Fish and Game has been alternating between the preexisting lake elevation, set by dam operators, and an experimental elevation about 1.3m higher a lake elevations in an attempt to restore kokanee recruitment to historic levels.



Although the water level management strategy has been ongoing for 15 years the effect of water level on kokanee egg-to-fry survival and abundance remains unclear. This is due to problems with the way the strategy has been evaluated and uncertainties about several of the premises of the water level hypothesis.

The egg-to fry survival estimator that is used to assess the water level management hypothesis is problematic because it is indirect. The assessment method also combines data from a lot of different sampling methods which give the estimator some unstable properties, that I won't go into. In addition to problems with the estimator itself there are spawning observations that appear to undermine the water level hypothesis

[CLICK]

For instance decades of shoreline spawning surveys reveal that the highest density of spawning in the lake occurs in Scenic Bay which has a lot of shoreline development and a lot of fine sediment. High spawning density in an area like this begs the question: If quality substrate is limiting, why would kokanee continually spawn in apparently unsuitable habitat?

[CLICK]

Along similar lines, there has also been the recent discovery of kokanee spawning at depths in excess of 10 m and even up to 30 m. If kokanee are able to spawn successfully in deep habitats that might suggest that water level fluctuations in the nearshore area have a minor effect on the available shoreline habitat

The goal of my thesis was to design a series of studies and experiments that would provide new insights into the spawning behavior and habitat requirements of shoreline spawners while at the same time rigorously testing water level management hypothesis

Study Objectives

- Objective 1
 - Describe survival-habitat relationship using a laboratory experiment and an in-lake egg incubation study
- Objective 2
 - Evaluate the water-level hypothesis using an in-lake egg incubation study
- Objective 3
 - Evaluate the water-level hypothesis using long term trawl survey data

For my first chapter I used a laboratory experiment and an *in situ* egg-box experiments to describe the relationship between habitat and survival, with a large emphasis on substrate composition. Our *in situ* study took place during a winter which had a low water level so we were unable to measure the survival benefit from a higher water level.

[CLICK]

The water level was higher during the second year of my research so for my second chapter I designed a spatially extensive *in situ* study to test whether kokanee survival was greater in the habitat made available by the higher water level.

[CLICK]

The third chapter of my thesis had the same goal as the second but did not involve any field work at all. Instead, I used 30 years worth of trawling data to test kokanee egg-to-fry survival was enhanced by water-level using a stock recruitment model

Objective 1

- Relate substrate composition to survival
 - Laboratory egg incubation experiment
 - Egg incubation study in lake
- Measure viability of deep spawning
 - Egg incubation study in lake

The main objectives of the first chapter were to describe the relationship between substrate and egg-to-fry survival in a shoreline environment.

[CLICK]

The laboratory study was fixated on comparing survival in relation to substrate treatments.

[CLICK]

The in situ study measured the effect of substrate, but also looked into the viability of deep-spawned eggs.

Egg-to-Fry Survival

- Whitlock-Vibert egg box
- Preemergent survival
 - 1 mm mesh bags



We measured survival under different incubation conditions using Whitlock-Vibert boxes.

Fifty eggs were placed in Whitlock-Vibert egg box, which were then wrapped in 1mm. Whitlock-vibert boxes are plastic boxes with a top compartment that eggs and are placed in.

We measure survival to two stages of development but I will on just survival to the preemergent stage of development, which is the point after hatching but before emergence, when kokanee remain in the gravel absorbing their yolk sac.

The mesh bag prevented sac-fry from escaping horizontally so that they could be counted

Lake Pend Oreille Study Sites

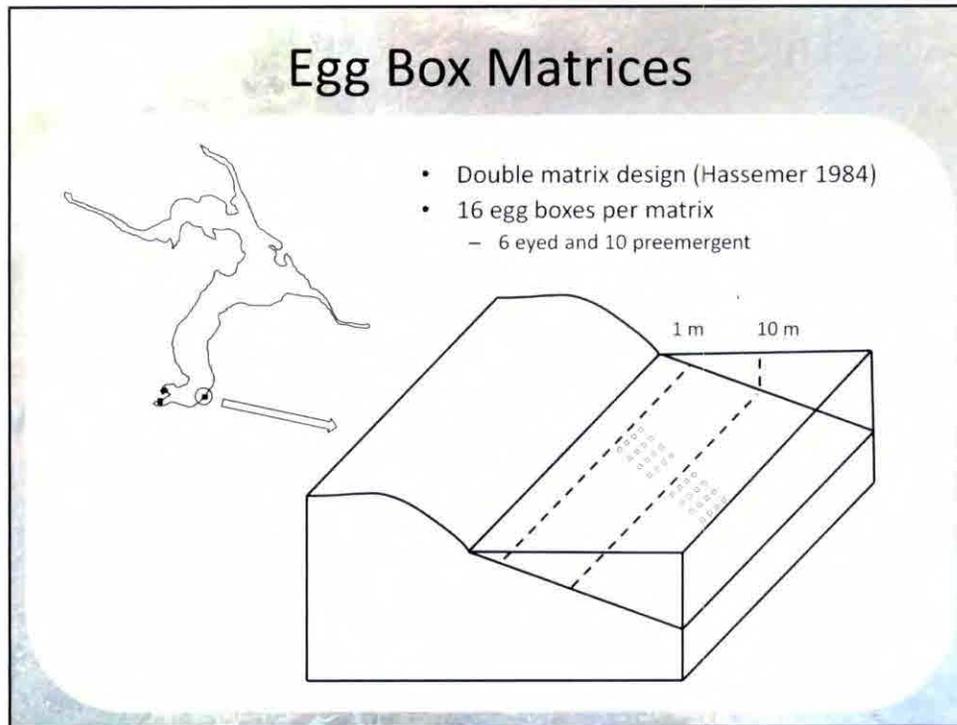


Although the laboratory experiment was uninformative the *in situ* study was much more interesting

We selected three sites in southern LPO that were major spawning areas and which represented three different habitat types.

Scenic Bay was the most protected area from wave action and is generally silty. The opposite extreme is Bernard mine which our the most exposed site, it is steep and contains lose talus material. Eagle Marina located in Idlewilde Bay, and is a a middle ground (in terms of exposure and contains heterogeneous mixture of particle sizes, everything from fines to 4 inch cobbles

Egg Box Matrices



We laid out closely spaced egg boxes using a double matrix design based on one used by Hassemer in a similar study in Lake Coeur d'Alene in 1984.

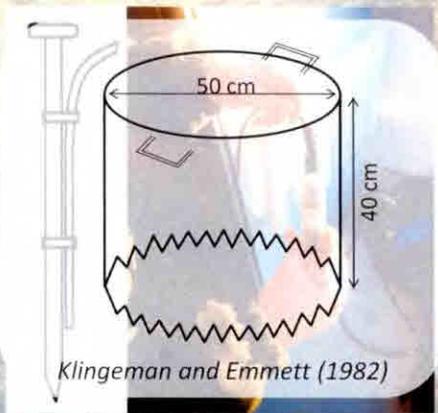
[CLICK]

At each of the sites we laid out a total of 32 egg boxes in two 4 x 4 matrices, one at a shallow (between 1-4m) and one at a deep isobath (between 10-14m),

[CLICK]

We had sixteen egg boxes per site. We retrieved 6 egg boxes for eyed survival and 10 for preemergent survival determination.

Habitat Assessment



- Dissolved oxygen measured monthly
 - DO stakes (Leonetti 1996)
 - YSI Probe
- Substrate sampling
 - Bulk core sampling

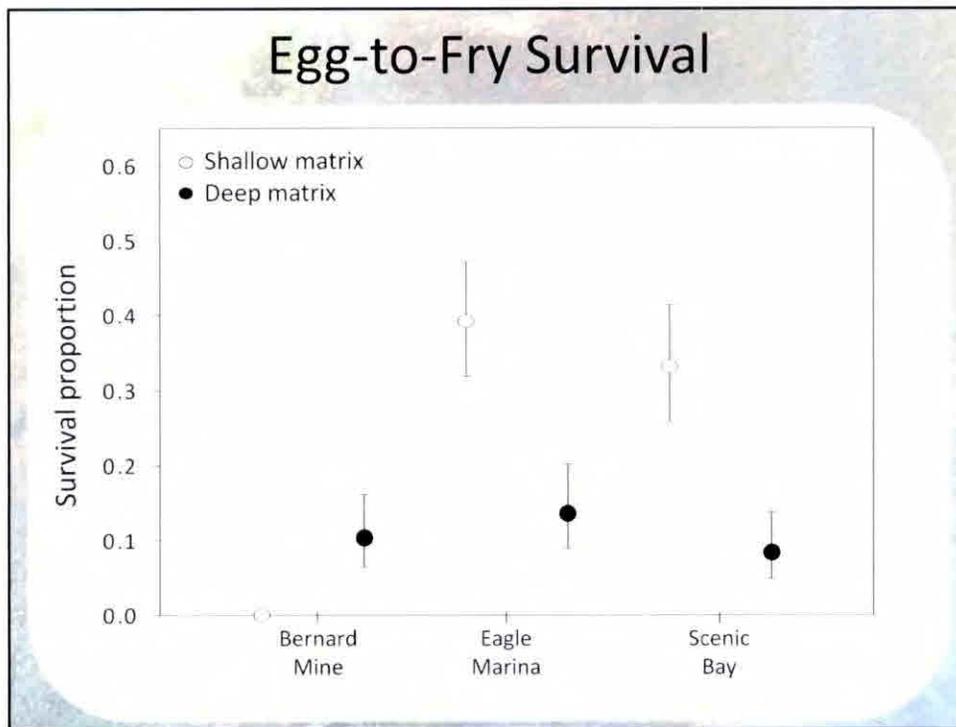
Over the course of the study we measured dissolved oxygen at half of the boxes, by extracting intragravel water samples from stakes containing tubing, that were driven into substrate.

[CLICK]

At the end of the study we collected bulk substrate samples from each site, using a demersal bulk sampling device, known as a cookie cutter

[CLICK]

We then sifted the gravel using size bins from the laboratory experiment and summarized particle distributions using median particle diameter for use in modeling.

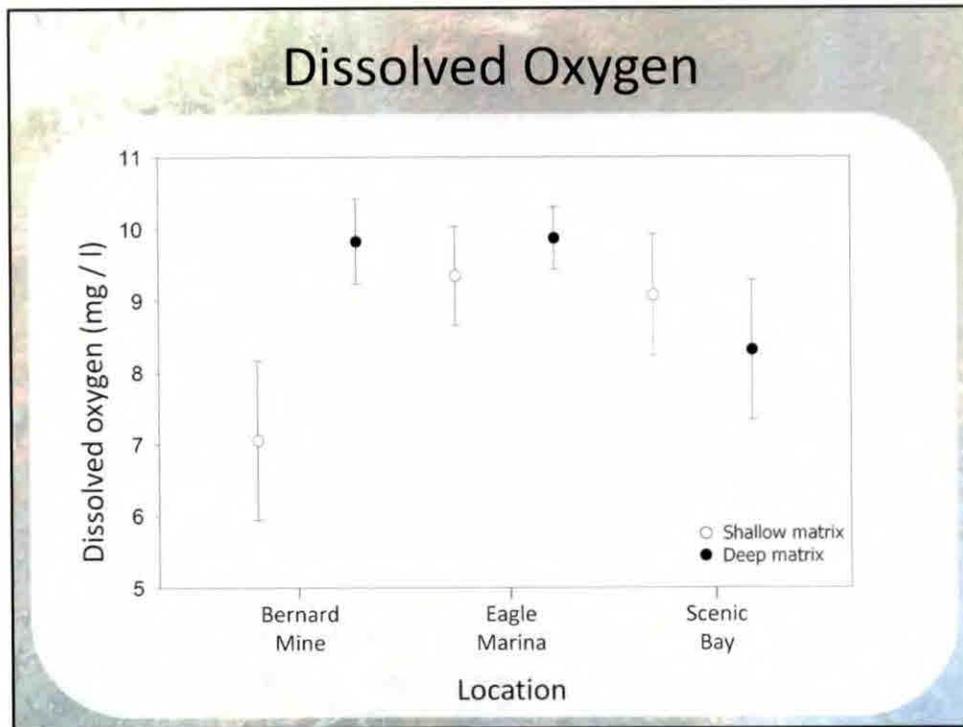


This is a plot of egg-to-fry survival by matrix with 95% profile likelihood confidence intervals.

Two of the shallow sites had highest survival, but that there was 100% mortality at the shallow site in Bernard Mine.

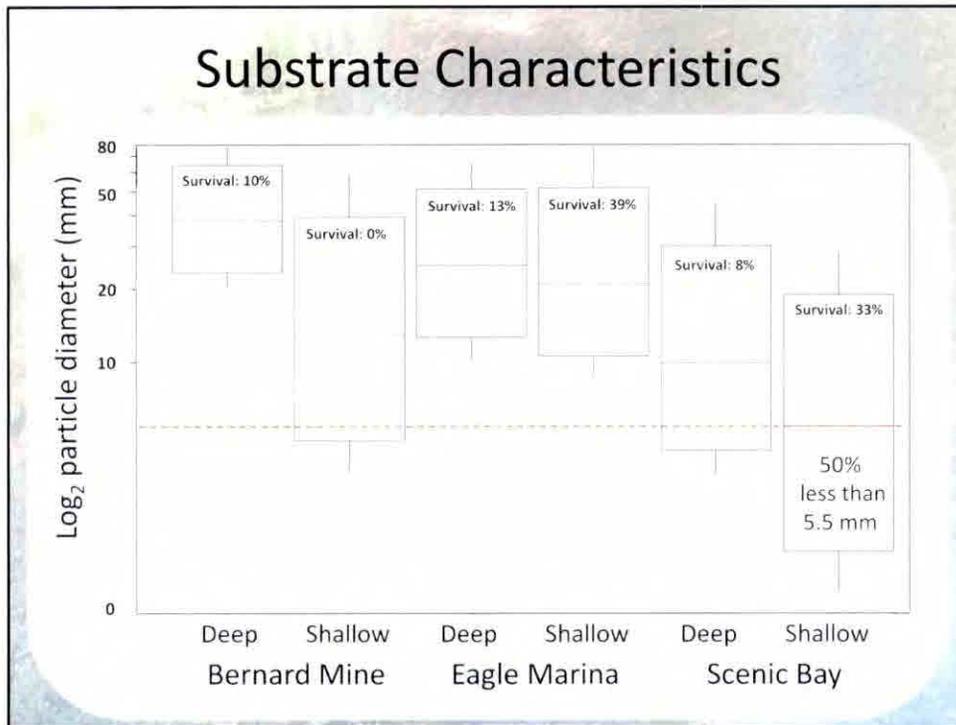
This indicated that deep sites did not have low survival as a rule.

As our model selection confirmed, differences in egg survival are reflected in differences in dissolved oxygen.



Here's dissolved oxygen averaged over time intervals and across boxes. You can see that the site that had the 0% survival also had the lowest dissolved oxygen.

I was intrigued by the fact that substrate composition mattered so little and that we saw such high survival in areas with apparently poor habitat.



Here are box plots of showing substrate composition at each matrix

Particle diameter is on the y axis on the Log base 2 scale. Notice how the shallow Scenic Bay site has the 2nd highest survival but also the greatest contribution of fine sediment. Which is finer than the worst lab treatment.

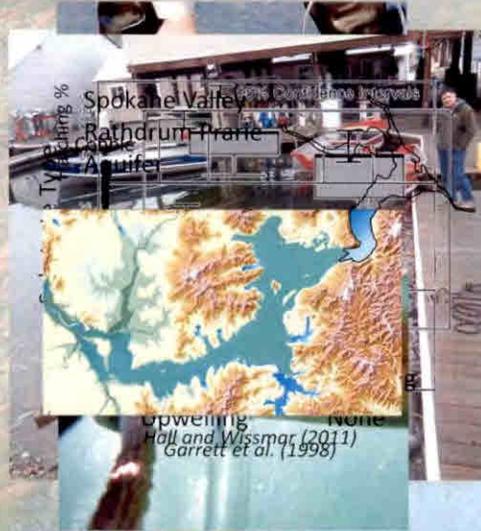
[CLICK]

The position of the median indicates that on average half of the volume of particles in substrate at the Scenic Bay Shallow site were less than 5.5 mm in diameter. 20% were less than 2mm.

So why is survival so high in Scenic Bay when substrate quality is so poor?

Why is Survival so High in Scenic Bay?

- Upwelling and downwelling enhances survival
 - Less selective about substrate
- Measured downwelling at study sites



And in general why do more kokanee spawn in Scenic Bay than anywhere else in the lake? The shoreline is highly developed and has a lot of fine sediment.

The disconnect between substrate quality and survival, caused us to consider groundwater influence as a potential explanation

[CLICK]

In a study on stream spawning kokanee done by Garrett et al. in 1998 it was shown that redds in areas of upwelling had higher hatching success, despite the fact that they also had larger amounts of fine sediment

[CLICK]

In a study of sockeye redd site selection in off channel ponds Hall and Wissmar showed that not only did sockeye select redd sites in areas influenced by groundwater but that when they spawned in groundwater areas they were less selective about substrate quality.

[CLICK]

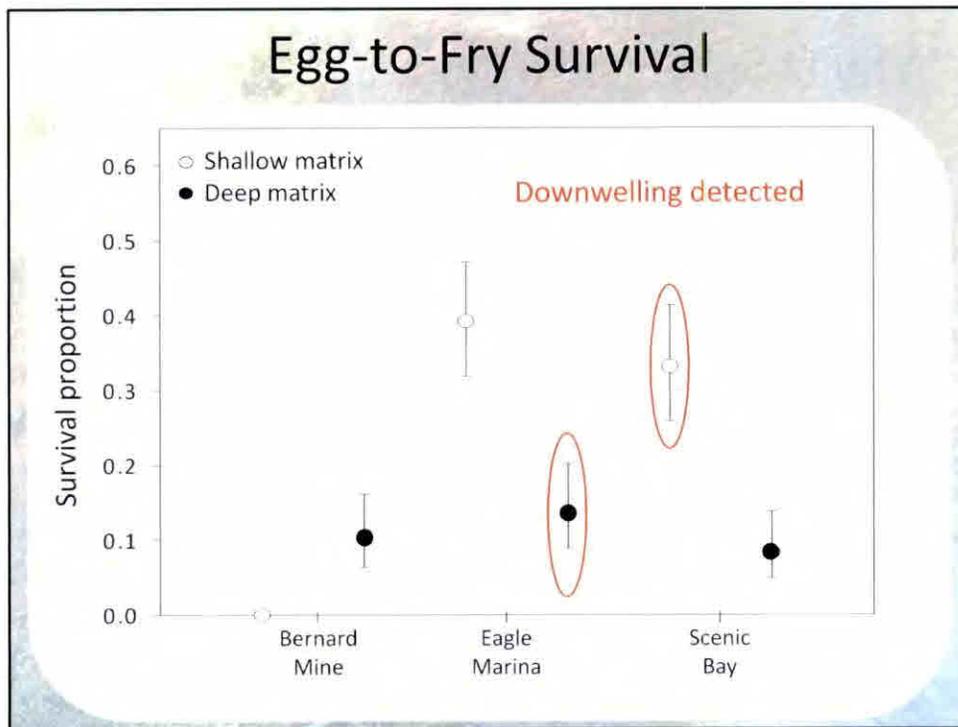
Based on these studies and our knowledge of the fact that scenic Bay sits on a major recharge area for the Spokane valley Rathdrum Prairie aquifer.

We initiated a post-hoc investigation of groundwater influence at each of our sites.

The method we used to measure groundwater was a qualitative test, where we inserted a probe into the gravel and compared the hydraulic head of the intragravel water to the surface water. When the water surface in the tubing is higher then you have upwelling and when it is lower you have downwelling.

[CLICK]

Here's an image of what we saw when we detected downwelling. You can see that height of the intragravel water is below the surface water



Out of our six matrices we detected downwelling at 2 of them.
Eagle Marina Deep and Scenic Bay Shallow

The shallow site at Scenic Bay was, where we suspected might be occurring because survival appeared high given the quality of substrate.

This post hoc study confirmed our suspicions and suggested that groundwater measurements should be included in the *in situ* study the following year.

We also learned that microhabitat was an important factor that we might be better served in the future by having more sites and fewer boxes per site.

Objective 2

- Compare survival above and below the 2051' (625.1 m) lake elevation



Our second year study shared many of the same methods as the first one except there was no lab experiment and the water level was higher so we could finally place egg boxes in the red shaded area. We dramatically increased the number of sites from 3 to 60 and the total number of egg boxes from .

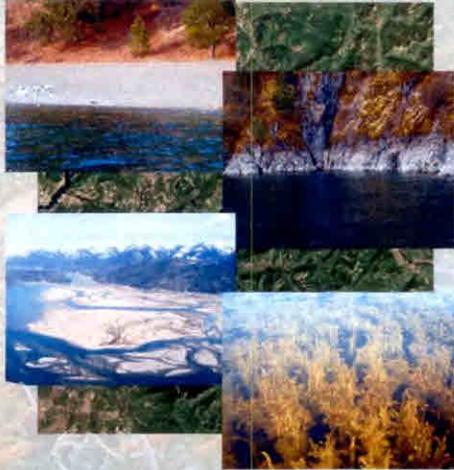
[CLICK]

This is a diagram of what each of our sixty sites looked like. We had three pairs of egg boxes spaced ten meters apart. With boxes in each pair positioned 0.5 m above and 0.5 m below the low water mark, so the upper boxes are placed in the gravel that is made available by the higher water level.

We wanted to representatively test the hypothesis so we used sample survey principles to design our study and analyze our data.

Sampling Design

- Shoreline habitat survey
- Exclusion criteria
 - Macrophytes
 - Bedrock
 - Immovable substrate
 - Mudflat



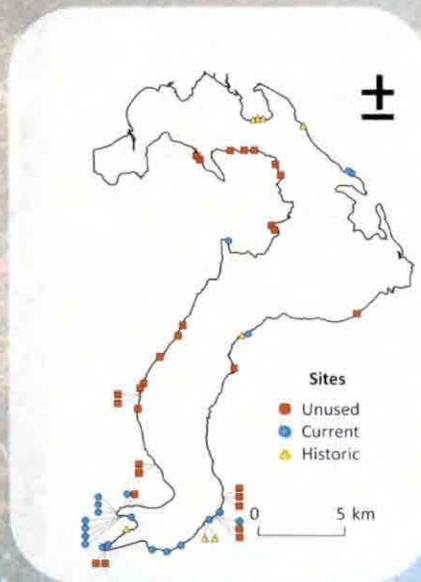
The first thing that we did was survey the shoreline in order to construct a sampling frame from which study sites could be selected. We surveyed the lake because although some areas of Lake Pend Oreille contain nice beaches like this
[CLICK]

There are also a lot of habitats with just bedrock, there are two large deltas with a lot of sediment deposition, as well as macrophyte beds where kokanee would be almost guaranteed not to use for spawning.
[CLICK]

After assembling the sampling frame, we randomly selected incubation sites.

Habitat Survey

- Sampleable habitat mapped
- Divided into strata
 - Unused (30 sites)
 - Current (22 sites)
 - Historic (8 sites)
- 60 total sites
 - Randomly selected from strata



We further delineated the sampling frame into three strata based shoreline spawner surveys. Unused areas were those in which kokanee spawners have never been observed. Current areas were those where spawners had been observed at least twice in the previous 15 years. Historic sites were areas where kokanee were known to have spawned in the 1950's prior to the population decline, but not since.

Here are the different strata,

[CLICK]

And here are the sites that were selected from each strata

[CLICK]

We selected a total of 60 sites half of which were allocated to unused areas. The remaining sites were then proportionally allocated to current and historic sites.

Habitat Variables

- Box position
 - Above vs. below
- Dissolved oxygen
- Substrate size
 - Median particle diameter



Along with box position, above and below the low water line. Many of the same habitat characteristics were measured additional habitat variables including dissolved oxygen. We measured dissolved oxygen in the intragravel area using the same method [CLICK]

We measured substrate composition at each egg box by taking bulk samples of substrate this time with a highly sophisticated coffee can technique.

Habitat Variables

- Box position
 - Above versus below
- Dissolved oxygen
- Substrate size
 - Median particle diameter
- Wave disturbance
- Downwelling influence



In addition to box-level characteristics we also indexed the depth of wave disturbance among sites by placing a strip of crushed limestone perpendicular to the shoreline and measuring the depth to which the line had been eroded at the end of incubation.

Here is what it looks like underwater,

[CLICK]

And here it is from the boat

[CLICK]

Groundwater influence was also measured at the site using the same techniques as before. We classified sites as having groundwater influence if at least one of the box locations had greater than 2 cm difference between the water in the tubing and the water at the surface.

Results

Variable	P-value
Substrate	0.80
Disturbance	0.67
Position	0.17
Downwelling	0.04*
DO	<0.01*

- No evidence that water level affects survival
- Support for DO and downwelling effects

However, that is not what we saw

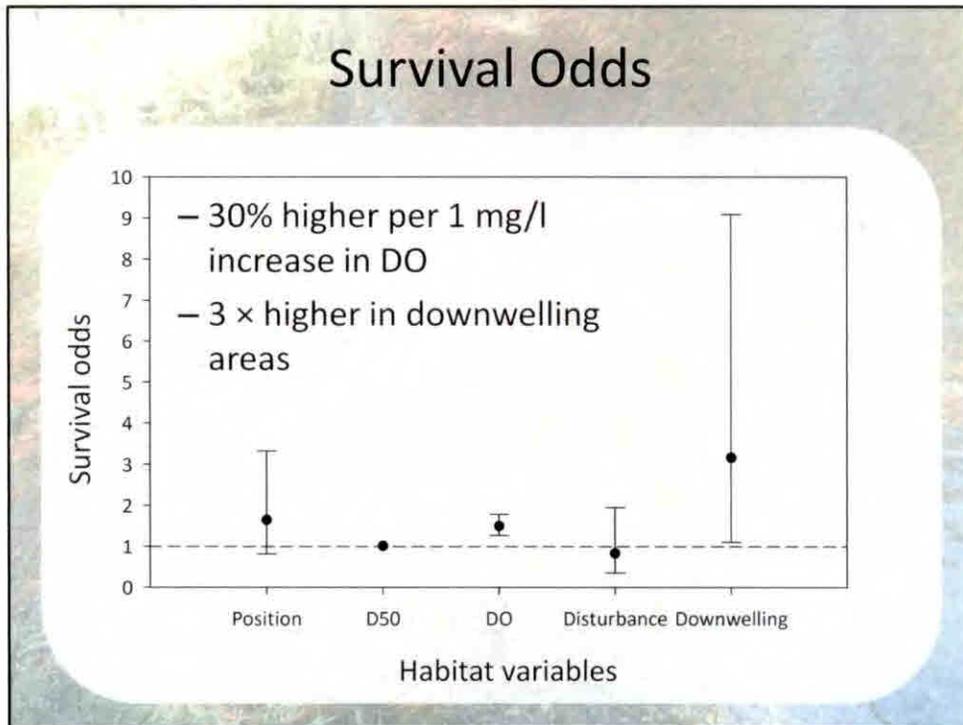
[CLICK]

Our data did not support the water level hypothesis because neither box position or substrate were significant predictors of survival.

Wave disturbance also did not appear to have an effect

[CLICK]

Intragravel dissolved oxygen and groundwater were important predictors. I should also mention that downwelling was the only type of groundwater influence detected.



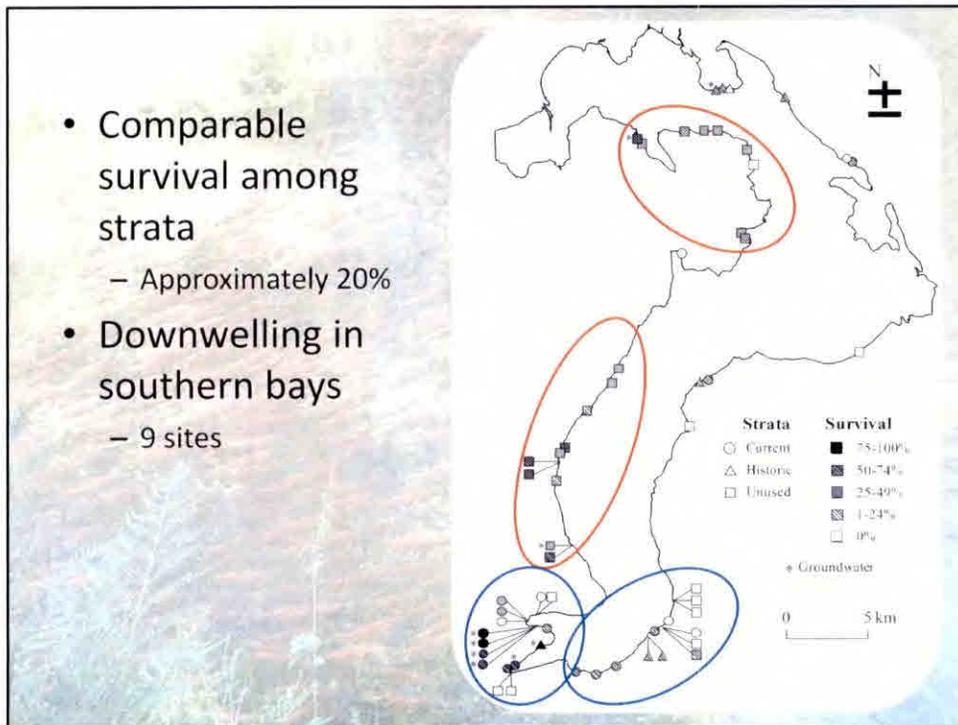
This is a plot of odds ratio estimates for different habitat variables. Odds ratios are interpreted as the multiplicative effect of a single unit increase in continuous variable or a level of a categorical variable. If the 95% confidence interval overlaps with 1 then the variable isn't significant.

[CLICK]

So we see each mg/l increase in dissolved oxygen increases the odds of an egg surviving by 30%, because the odds ratio is 1.3

[CLICK]

And that eggs from sites with downwelling on average have three times higher odds of survival than eggs in sites without downwelling



Here is a map of the average survival at sites around the lake. I understand that this is a lot of information to take in, but the important thing is that darker symbols represent higher survival.

[CLICK]

Average survival among strata was around 20%, although survival was pretty multinomial

A few patterns jump out immediately. First, it appears that there are a lot of unused sites on the west shore that have moderate survival.

[CLICK]

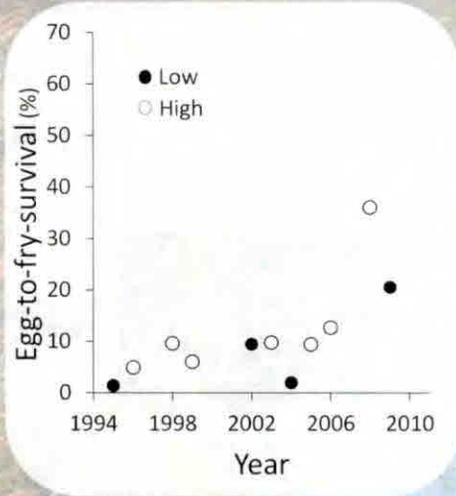
The highest survival is in a current spawning area in in the southwestern part of the lake which also happens to be an area with a lot of downwelling as indicated by the asterisk. Which was in the vicinity of Scenic Bay where downwelling was detected it before

[CLICK]

The southeastern shore is also a current spawning area however survival was surprisingly poor given the substrate character. Which I'll go into now.

Objective 3

- Use existing data to test whether higher water level enhances recruitment
- Improve upon the existing assessment method



The third chapter of my thesis involved absolutely no field work.

The goal was to use existing data to test the water level hypothesis

[CLICK]

And to improve upon the shortcomings of the previous assessment method.

Egg-to-Fry Survival Estimate

$$\text{Shoreline egg-to-fry survival} = \frac{\text{Fry abundance}}{\text{Potential eggs deposited}}$$



Fall (t)



Spring (t + 1)

The estimate is back-calculated by dividing the fry abundance the following year by the number of eggs that are estimated to have been deposited.

Egg-to-Fry Survival Estimate

$$\text{Shoreline egg-to-fry survival} = \frac{f \times w}{[(a \times m \times s) - h] \times e}$$

f = fry abundance
 w = shoreline fry proportion
 a = adult abundance
 m = maturity proportion
 s = sex ratio
 h = stream-spawning females
 e = fecundity

Hydroacoustics
Trawling
Hydroacoustics
Trawling
Assumed 1:1
Granite Creek weir
Granite Creek weir

This ratio isn't as simple as it appears because it uses estimates from a number of sampling methods all of which involve various biases and sampling variability.

Alternative Method

- Include more data
 - Use only trawl data
- Model spawner density
 - Stock-recruitment model
- Account for sampling variability



We came up with an alternative method with three major improvements in mind.

First to incorporate as many years of data as possible, we used standardized trawling records which stretch back an additional 15 years.

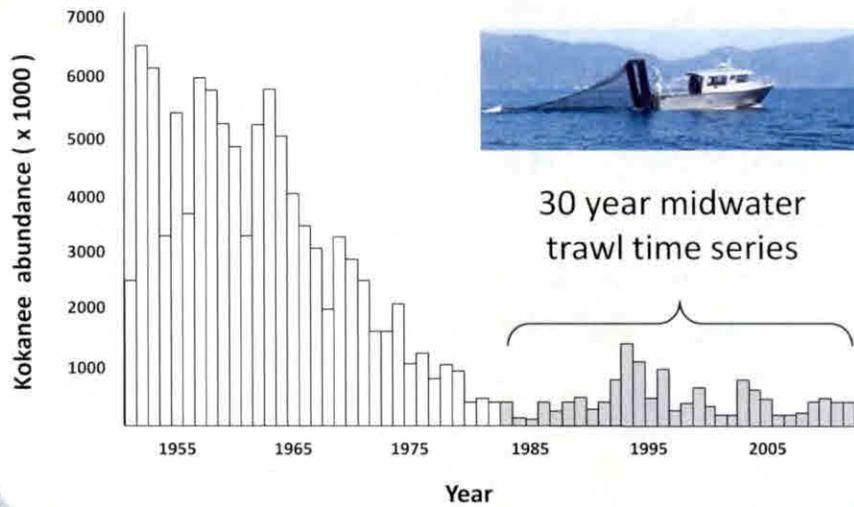
[CLICK]

A second improvement was that we wanted account for spawner density. The reason behind including spawner density was the idea that the habitat nearshore habitat may only become limiting when there are enough spawners to take advantage of it. We accomplished using a generalized a stock-recruitment model

[CLICK]

The third improvement was to propagate sampling variability using a resampling method Because we expected there to be variability in the trawling abundance estimates. And we wanted that to be represented in our test of the water level hypothesis

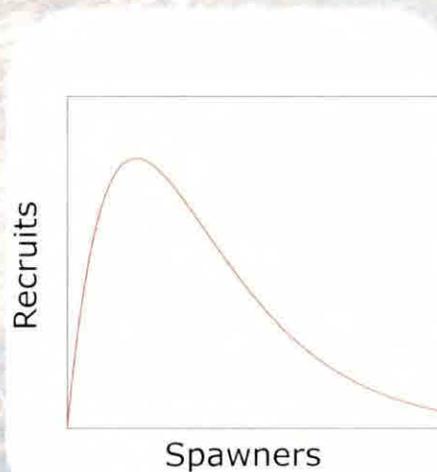
Midwater Trawling



We used 30 years worth of standardized midwater trawl data . In the interest of time I won't describe the trawling protocol except to say that it involves estimating age specific abundances for hatchery and wild kokanee. Hatchery and wild kokanee can be separated using thermal marks. Hatchery origin kokanee spawn in the lakes tributaries, so thermal marks can be used to separate shoreline spawners from the rest.

Stock-Recruitment Model

- Use trawl data to see if more recruits produced following raised winter lake level
- Generalized Ricker stock-recruitment model



We chose the Ricker model to describe the stock recruitment relationship because it is often used to model kokanee and sockeye populations.

The Ricker model describes a depensatory relationship, such that peak recruitment is possible when the number of spawners is at an optimal level, after which the number of recruits per spawner, and recruitment overall declines

[CLICK]

The Ricker model can be generalized to include additional covariates that govern the degree of depensation, which is the height of the apex and the slope of the decrease.

[CLICK]

The convenient thing about the Ricker model is that it can be linearized if you divide the number of recruits by the spawners and log transform both sides

When you do that you end up with something that looks very similar to linear regression, and the interpretation is pretty easy

[CLICK]

We added a parameter, gamma, which described the effect of water level on the degree of depensation

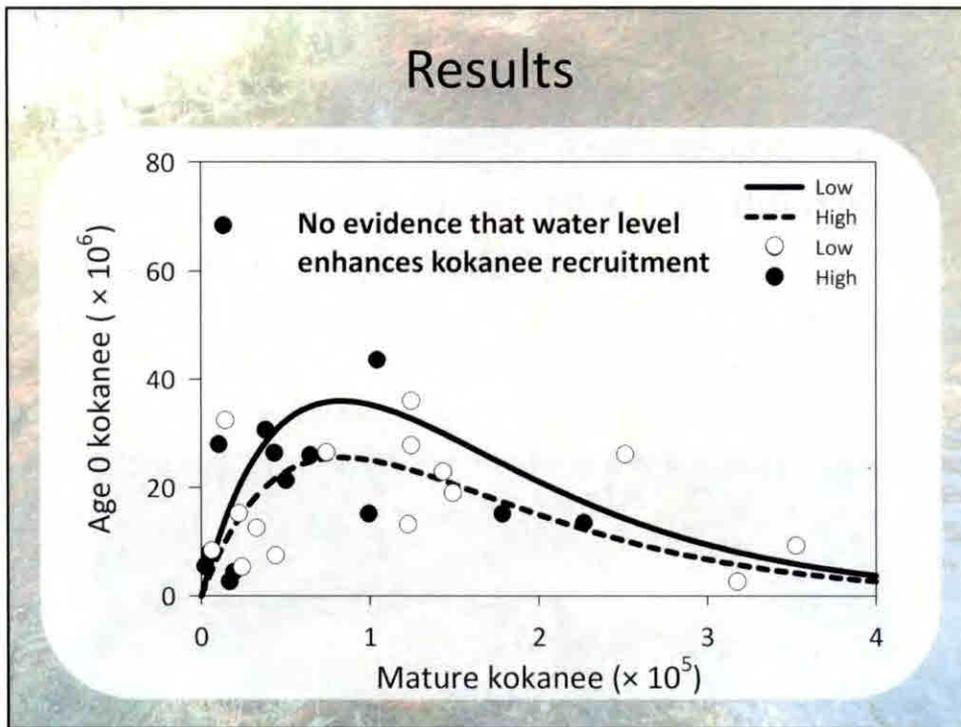
[CLICK]

We wanted our parameter estimators to be robust and to reflect the uncertainty in the sampling method. So we used a bootstrap regression approach.

[CLICK]

We wanted to

Results



Although the gamma parameter was not different from zero. Here are the fitted values for the Ricker model with high and low water levels. You'll notice that the low water level is actually slightly albeit not significantly higher.

Conclusions

- No evidence that intragravel survival or recruitment is enhanced by a higher water level
- Shoreline spawning habitat does not appear to be limiting factor
 - Deep spawning is viable
 - Downwelling enhances survival in Scenic Bay



Combining what we learned from all three chapters we can come to some conclusions that are useful for managing kokanee in Lake Pend Oreille

[CLICK]

We did not find evidence to support the hypothesis that water level affects kokanee recruitment, based on what I believe to be through spatial and temporal evaluations.

[CLICK]

Furthermore are findings suggest that shoreline spawning habitat is not nearly as limiting as the water level hypothesis presupposes. This is due to the fact that deep habitat may also be suitable and that groundwater influence affords high survival in areas with fine sediment.

Because there was not clear evidence of an effect of water level currently or in the recent past, this also suggests that alternative explanations for the kokanee decline should take precedent over water level.

Conclusions

- Substrate characteristics should not be taken at face value
 - Complex set of factors determines egg incubation success
- Downwelling areas contribute significantly to recruitment



Combining what we learned from all three chapters we can come to some conclusions that are useful for managing kokanee in Lake Pend Oreille

[CLICK]

We did not find evidence to support the hypothesis that water level affects kokanee recruitment, based on what I believe to be through spatial and temporal evaluations.

[CLICK]

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Because there was not clear evidence of an effect of water level currently or in the recent past, this also suggests that alternative explanations for the kokanee decline should take precedent over water level.

Management Implications

- Study results do not support future requests for experimental winter lake level strategy to benefit kokanee recruitment
- Investigate spawning habitat enhancement strategies in areas with downwelling



Onto more broad conclusions about the shoreline spawning environment. It seems that at least under the overwinter conditions that we observed and simulate, substrate composition alone is not a useful predictor of incubation success.

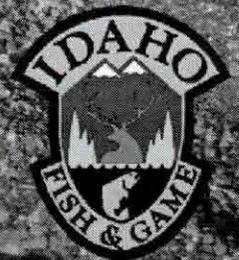
[CLICK]

Although upwelling is commonly reported, it seems that downwelling also has a favorable effect on shoreline spawning and that downwelling areas can contribute significantly to annual recruitment, because these areas are selected and yield relatively high survival.

This concludes my presentation

Lake Pend Oreille Update: Lake Level Influence on Kokanee Embryo Survival

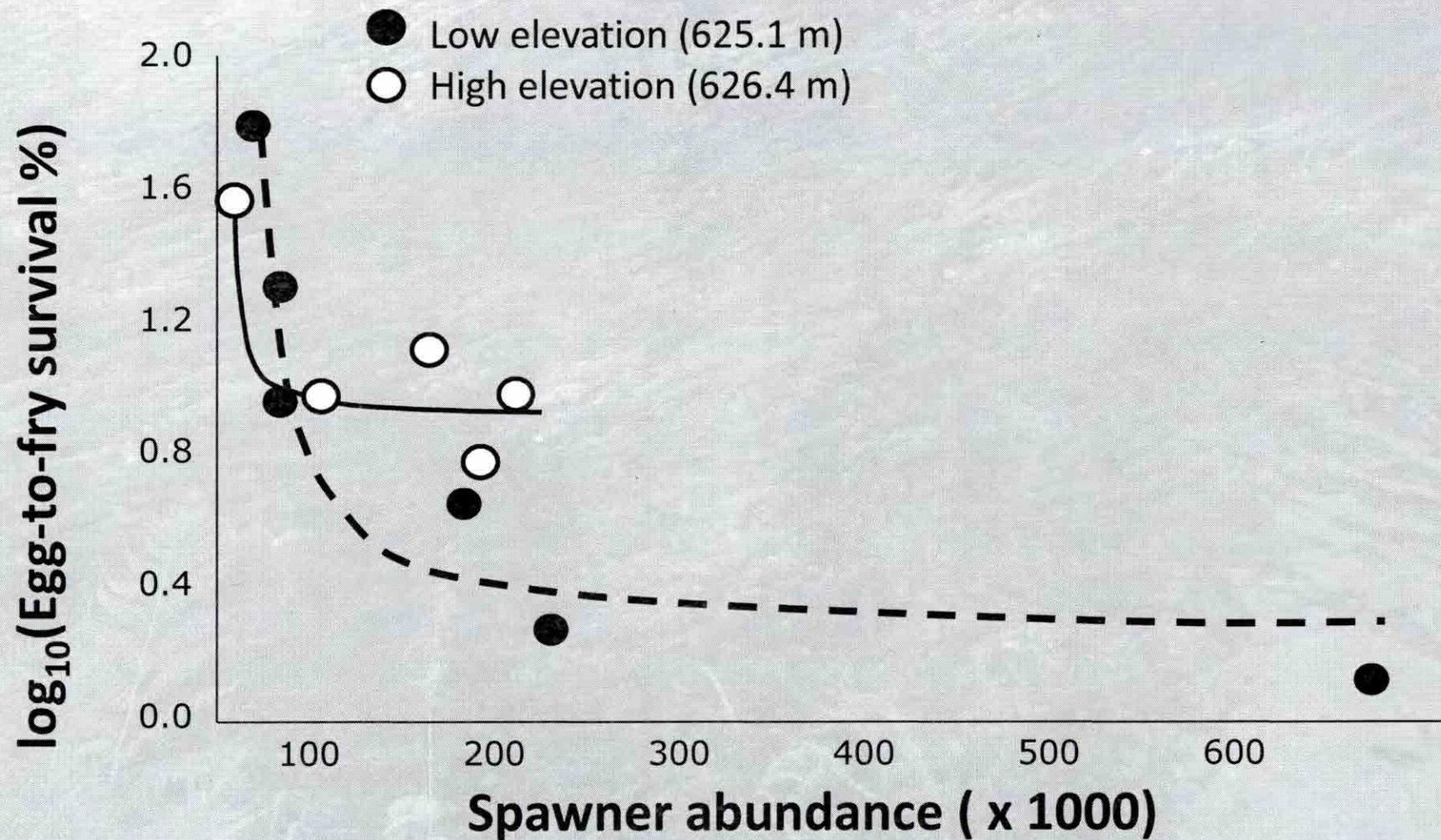
Pend Oreille Basin Commission
October 5, 2012



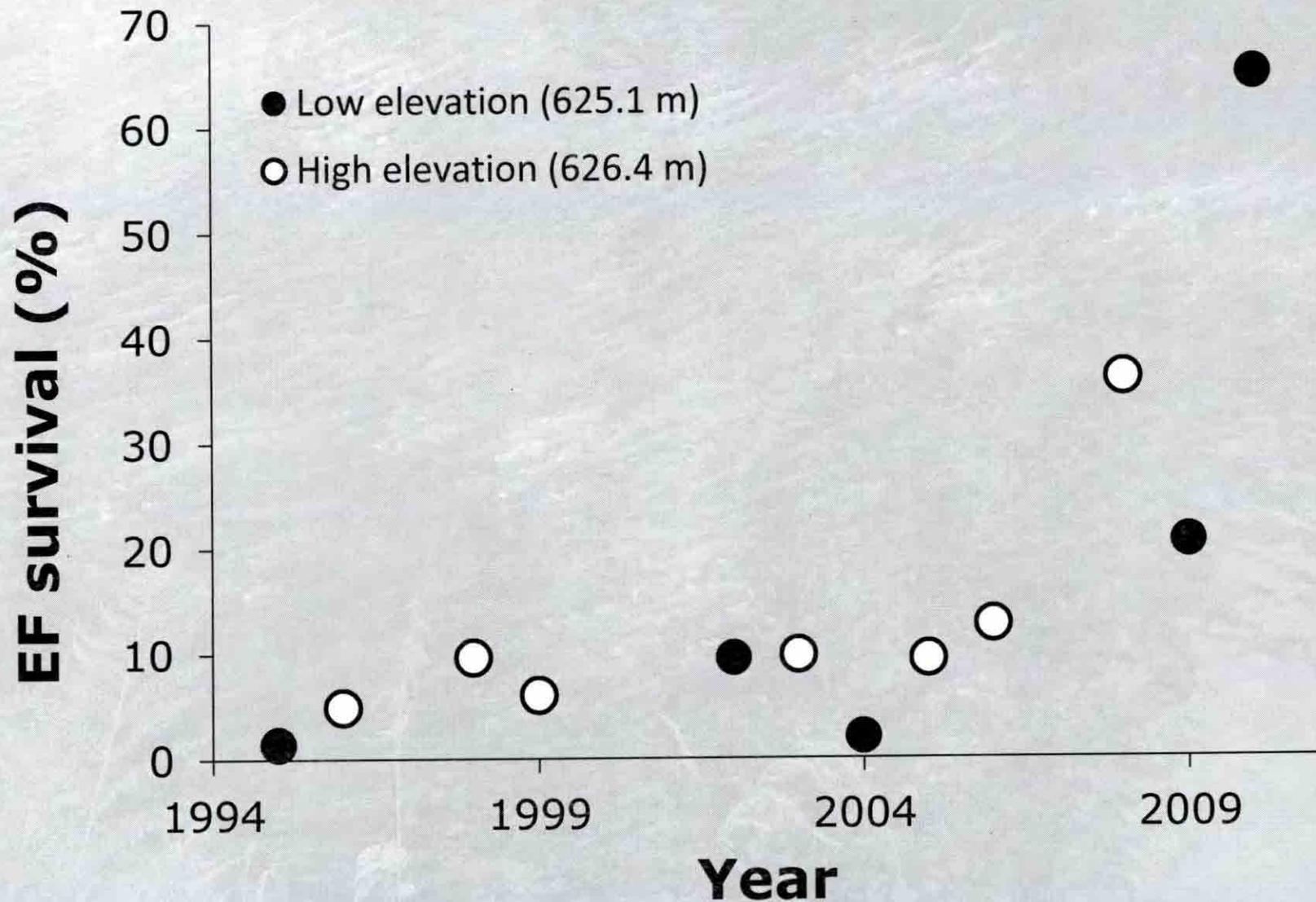
Lake Level Experiment - Background

- *Testable Hypothesis:* Kokanee embryo survival is significantly higher when more shoreline habitat is available for spawning under a raised winter lake level.
- *Experimental design:* Winter lake elevation is set at 2055' instead of 2051' in some years to provide additional spawning habitat. Estimate egg-to-fry survival annually and test for difference between each elevation.
 - Experiment began in 1996

Initial Egg-to-Fry Relationship



Egg-to-Fry Survival Data Set



New Research Project: 2011-12

Evaluation of Kokanee Egg-to-Fry Survival Estimates in Lake Pend Oreille, Idaho

Steven Whitlock, Andrew Dux, Dr. Michael Quist



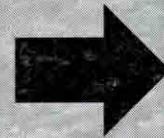
- Sensitivity analysis to understand which sub-estimates produce most variation in overall estimate
- Bootstrapping procedure to generate confidence intervals for annual estimates

Egg-to-Fry Survival Metric

$$\text{Lakeshore spawner EF survival} = \frac{\text{Wild fry abundance}}{\text{Potential eggs deposited (PED)}}$$



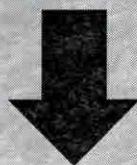
Fall (y)



Spring (y + 1)

Potential Egg Deposition Calculation

$$\text{Mature females} = \text{Adult abundance} \times \text{Proportion mature} \times \text{Proportion female (0.5)}$$



$$\text{Wild mature females} = \text{Mature females} - \text{Hatchery females}$$



$$\text{PED} = \text{Wild mature females} \times \text{Fecundity}$$

Wild Fry Abundance Calculation

$$\text{Wild fry abundance} = \text{Fry abundance} \times \text{Proportion wild}$$

Egg-to-Fry Survival Estimate

Lakeshore
spawner
egg-to-fry
survival

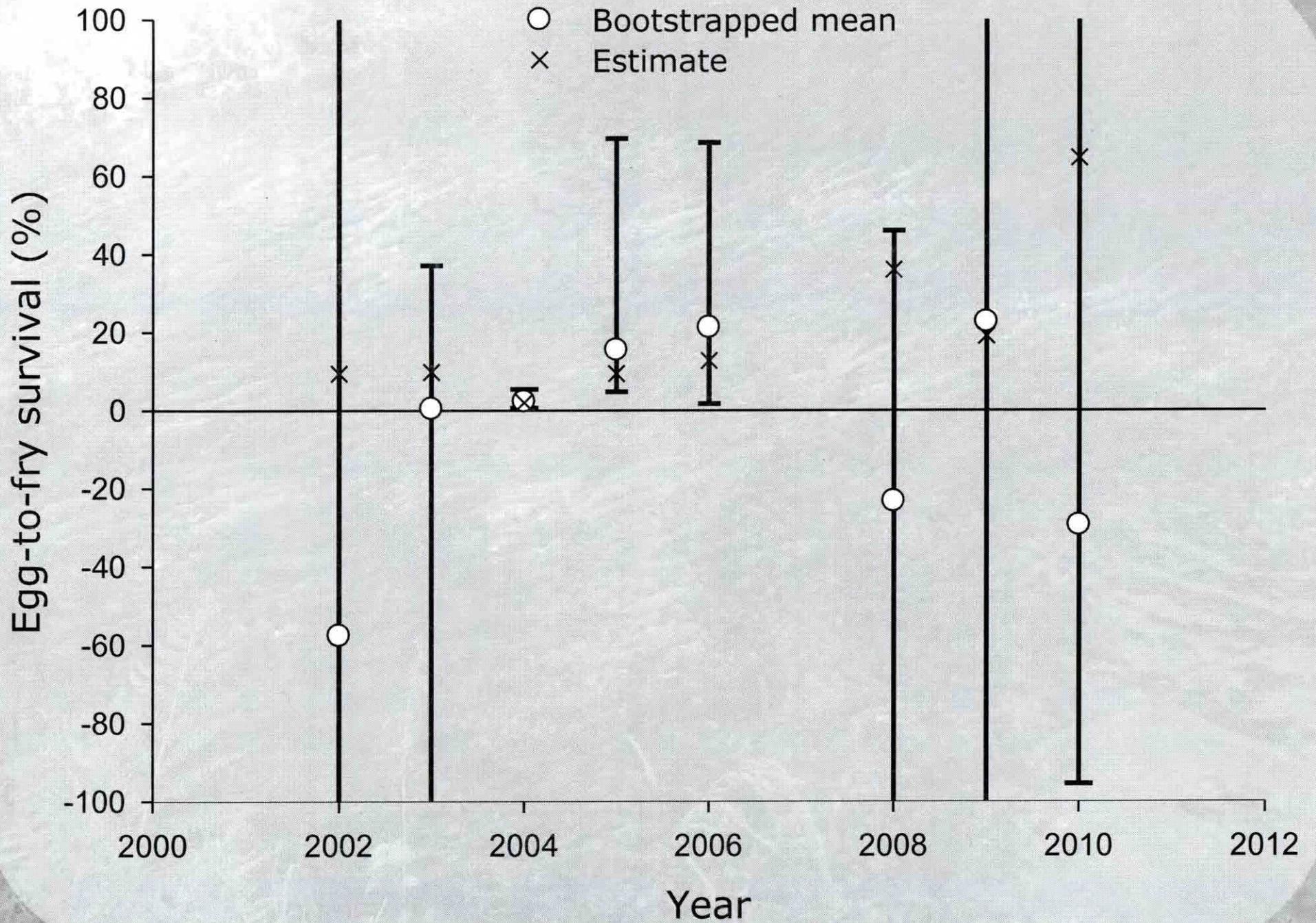
$$= \frac{f \times w}{[(a \times m \times s) - h] \times e}$$

f = fry abundance
 w = wild fry proportion
 a = adult abundance
 m = maturity proportion
 s = sex ratio
 h = hatchery females
 e = fecundity

Hydroacoustic
Trawling
Hydroacoustic
Trawling

Assumed 1:1
Granite Creek Weir
Granite Creek Weir

CONSTANTS



Summary of Results

- The kokanee EF survival estimate is strongly influenced by sampling variability among sub-estimates
- The EF survival estimate has the potential to produce biologically impossible values
 - Not bounded between 0-100%
- **The EF survival estimate lacks the precision to assess the influence of lake level on embryo survival**
 - **Regardless of any real effect of lake level**

What Do These Results Mean?

- We cannot say whether or not lake levels have benefitted kokanee recruitment
- Does not mean that lake level is unimportant
- But, we need evidence that lake level strategy benefits kokanee to justify implementation
- Different approach needed to evaluate lake level effects
 - Large data set exists; exploring whether retrospective analysis using other methods is possible (e.g., modeling)
 - Direct evaluation of embryo incubation success in various habitat types is underway

What Lies Ahead for Lake Levels?

- Decision tree that guides selection of winter lake level needs to be modified
 - 70k female kokanee cannot currently be supported
- Flexible Winter Pool Operations (FWPO) now in effect
 - Depends on a 2051' winter pool level
- Bull trout BiOp currently being re-evaluated
 - May or may not influence lake level decisions in future
- Winter lake level set for next two years
 - 2055' in 2012-13; 2051' in 2013-14
 - Gives us some time to further evaluate lake levels and formulate strategy for moving forward
 - Lake level request in 2014-15 and beyond will be determined using best available science at that time

Kokanee Recovery: Where Are We?

- Fishery closed in 2000 and population reached record low in 2007
 - Lake level experiment severely hampered by predation issue that emerged
- Lake trout suppression has been huge success
- Kokanee population has responded favorably
 - Rebounded to pre-2000 levels; limited fishery proposed for 2013
- We are making progress towards recovery
- Stronger population improves our ability to understand role of limiting factors other than predation (e.g., spawning habitat) and develop management actions

Research Direction

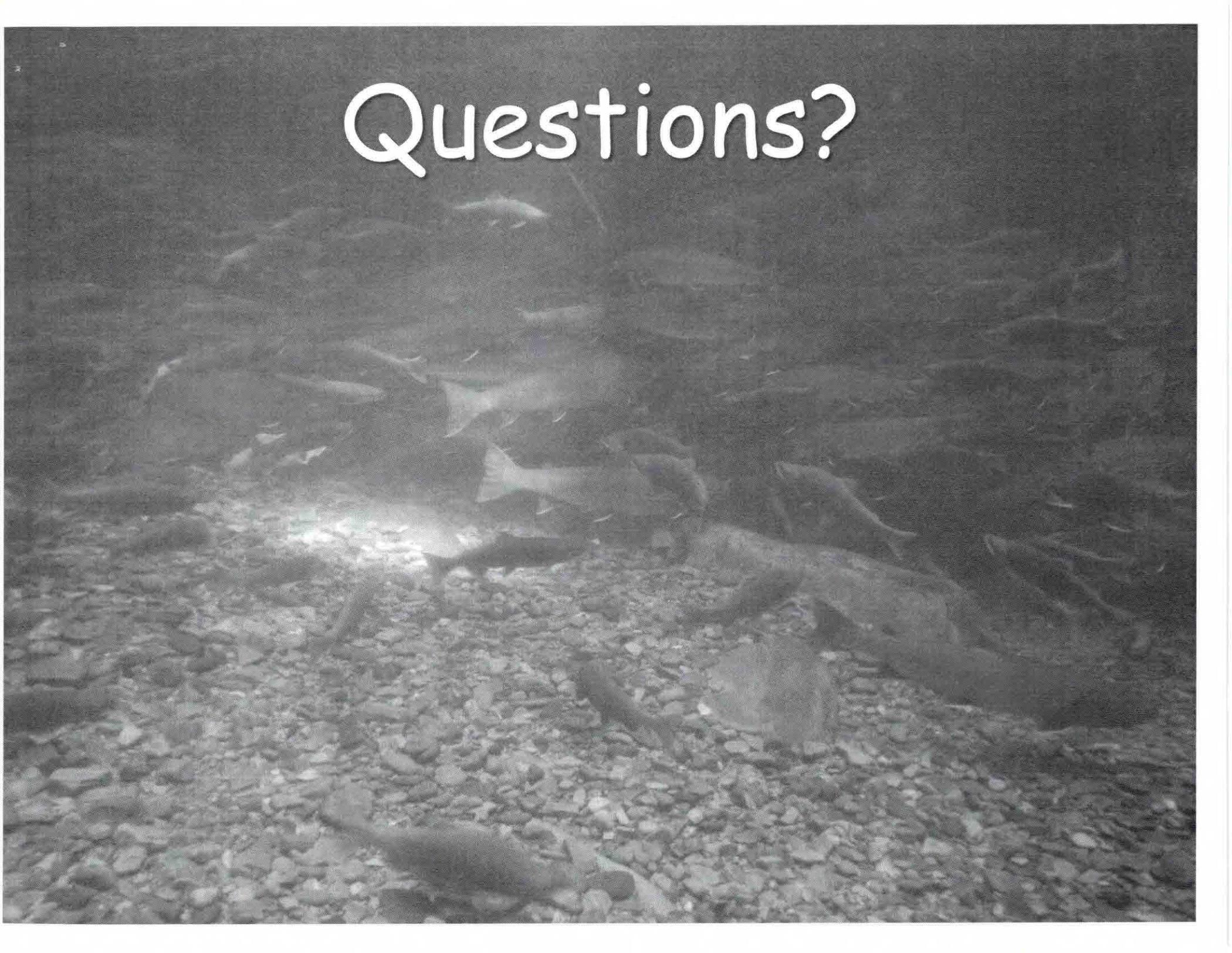
- **Current research**

- Spawning ecology (U of I – Whitlock/Quist)
- Emergence timing modeling
- Fry release timing evaluation
- Mysid/zooplankton dynamics (U of I – Reams/Wilhelm)
- Bathymetric mapping (USGS)
- Paleo-coring study (Advanced Eco-Solutions)
- Twin Cr. spawning channel evaluation
- Predator research and monitoring

- **Proposed research**

- Spawning gravel addition pilot study
- Trawling capture efficiency study
- Recruitment dynamics (fry survival, diet, growth)

Questions?



Document ID #P133938

FY 2012 Progress Report
For
**Pend Oreille River Basin Initiative: Land Acquisitions,
Watershed Restoration, Conservation Hatchery**

Project 2011-018-00

Contract No. 58411

Reporting Period FY 2012

8/15/2012 – 7/31/2013

Prepared By:

Joseph R. Maroney
Director of Fishery and Water Resources
Kalispel Natural Resources Department
Usk, WA

July 10, 2013

Introduction:

This report is a summary of activities conducted over the fiscal year 2012 contract period to fulfill requirements and deliverables for the Pend Oreille River Basin Initiative. This project supports implementing larger-scale projects to improve local watershed health and ecosystem conditions and function within the Pend Oreille subbasin, consistent with the Northwest Power and Conservation Council's Sub-Basin Plan. The Kalispel Tribe (Tribe) has a history of matching & leveraging funds from various sources (e.g. SRFB, DOE, DOT, BIA, USFS) to implement large scale watershed projects. An opportunity existed during this fiscal year to implement a high priority cost share project with the U.S. Forest Service. A total of 3 culverts that were blockages to fish passage were replaced in Cee Cee Ah (CCA) Creek. Two of these culverts were in areas where brook trout were eradicated through another BPA funded project (Non-Native Fish Suppression Project). The design for these culvert replacements were funded through the Salmon Recovery Funding Board (SRFB) in 2011.

The Tribe also initiated discussions with key stakeholders regarding a westslope cutthroat and/or bull trout conservation aquaculture facility. Key stakeholders included Idaho Fish and Game, Washington Department of Fish and Wildlife, US Fish and Wildlife Service, Pend Oreille PUD and Seattle City Light. Due to the uniqueness and complexity of this type of program, much more collaboration will take place in the future to determine stakeholder roles and feasibility of a conservation aquaculture facility.

Summary of Activities:

Cee Cee Ah Culvert Removal Project

In 2012, 3 fish passage barrier culverts in CCA Creek were replaced with fish friendly crossings. The two lowest culverts were on US Forest Service roads and the upper most culverts was on a cost-share road managed jointly by the Colville National Forest and Stimson Lumber Company. This project restored fish passage to approximately 0.4 miles of bull trout habitat and 4.0 miles of westslope cutthroat trout habitat. The work was implemented by Forest Service personnel, Tribal personnel and sub-contractors hired by the Tribe and Forest Service. Figures 1-3 show the culverts that were replaced with fish friendly culverts.

Restoration of fish passage in the CCA subbasin was identified as a high priority action for the improvement of bull trout and westslope cutthroat trout habitat by the Pend Oreille Salmonid Recovery Team (Lead Entity Strategy, 2007). Considerable efforts have been made over the last 14 years to restore habitat in the watershed and remove non-native brook trout above a natural barrier. Funding for these watershed wide projects came from Bureau of Indian Affairs, Salmon Recovery Funding Board and BPA. The two upper most culverts are in the project area where brook trout were successfully eradicated in 2008-2010 with rotenone. Westslope cutthroat trout have been translocated from a nearby watershed that is genetically pure beginning in 2010 and will continue for the next several years.



Figure 1. Site 1 Cee Cee Ah Culvert replacement.



Figure 2. Site 2 Cee Cee Ah Culvert replacement.



Figure 3. Site 3 Cee Cee Ah Culvert replacement.

Pend Oreille Basin Westslope Cutthroat Trout and Bull Trout Conservation Aquaculture

In May 2012, a meeting was held amongst key stakeholders to discuss preliminary investigation into needs for a conservation hatchery. Key stakeholders that participated in the meeting were the following.

- Idaho Department of Fish and Game
- Kalispel Tribe of Indians
- Washington Department of Fish and Wildlife
- U.S. Fish and Wildlife Service
- Pend Oreille PUD
- Seattle City Light
- Bonneville Power Administration

The purpose of the meeting was to have an informal table discussion to take a look at various interests, goals, objectives and policies that may affect conservation aquaculture facilities. Potential sites were discussed for either primary and/or satellite facilities. Key partnerships and cost sharing opportunities were discussed. Due to timing and peoples commitments for field season, a follow up meeting was not set. However the Tribe will work closely during the fall and winter of 2013, particularly with Seattle City Light on cost share opportunities.



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 42473
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: 42473
SOW Validation: Last validated 04/28/2009 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (04/08/2009) 2009 Prooperty inventory
Budget - Contract (04/30/2009) 2009-10 Line Item Budget



Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Jason Olson	Contract Manager	Kalispel Tribe	(509) 447-7290 / NA	jolson@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Joe Maroney	Supervisor	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Todd Andersen	Technical Contact	Kalispel Tribe	(509) 447-7245 / NA	tandersen@knrd.org	1981 N Leclerc Rd. Usk WA 99180
Holly McLellan	Interested Party	Eastern Washington University	(509) 359-7498 / NA	hmclellan@mail.ewu.edu	Eastern Washington University 258 Science Building Cheney WA 99004
Brian Bellgraph	Technical Contact	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Allan Scholz	Interested Party	Eastern Washington University	(509) 359-6397 / NA		
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Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kivleuven@bpa.gov	P.O Box 3621 Mailstop - NSSP-4 Portland, OR 97208-3621
Jolene Seymour	Administrative Contact	Kalispel Tribe	(509) 445-1147 / NA	jseymour@kalispeltribe.com	
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232

Work Element Table of Contents:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 165. Produce Environmental Compliance Documentation - Obtain necessary permits and set up contract for genetic analysis		\$4,011	(2 %)
B : 157. Collect/Generate/Validate Field and Lab Data - Angling for bull trout	*	\$4,752	(2 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Weekly electrofishing collecting a representative sample of bull trout below Albeni Falls Dam	*	\$40,894	(20 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
D : 158. Mark/Tag Animals - Implant combination radio acoustic transmitter into bull trout	*	\$24,386	(12 %)
E : 157. Collect/Generate/Validate Field and Lab Data - Rapid response genetic analysis of bull trout biopsy samples	*	\$6,089	(3 %)
F : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$8,229	(4 %)
G : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$8,755	(4 %)
H : 157. Collect/Generate/Validate Field and Lab Data - Compile electronic spread sheet data base of electrofishing data	*	\$10,450	(5 %)
I : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving station	*	\$20,806	(10 %)
J : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft and vehicle	*	\$27,543	(14 %)
K : 189. Coordination-Columbia Basinwide - Project coordination among all stakeholders		\$5,629	(3 %)
L : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$2,831	(1 %)
M : 119. Manage and Administer Projects - Manage Project		\$11,586	(6 %)
N : 132. Produce (Annual) Progress Report - Submit Annual Report for the period (5/1/2009) to (4/30/2010)		\$10,607	(5 %)
O : 162. Analyze/Interpret Data - Data reduction and analysis		\$12,232	(6 %)
P : 132. Produce (Annual) Progress Report - Submit Progress Report for the period (5/1/08) to (4/30/09)		\$1,200	(1 %)
Total:		\$200,000	

* Environmental Compliance (EC) needed before work begins.

Contract Description:



Bull trout in the Columbia River Basin were listed as Threatened by the US Fish and Wildlife Service (USFWS) in 1998 (USFWS 2000). Bull trout populations are threatened by habitat degradation and fragmentation, past fisheries management practices, poor water quality, and blockage of migratory corridors. Pend Oreille River and Lake is a core area within the Northeast Washington Recovery Unit of the Columbia Basin bull trout population (USFWS 2002a, 2002b). Recovery of Pend Oreille bull trout is limited by the fact that dams on the mainstem Pend Oreille River (Albeni Falls and Box Canyon dams) have blocked migration of bull trout between Lake Pend Oreille and spawning/rearing areas (USFWS 2002a, 2002b). Albeni Falls Dam is a federal facility under the responsibility of the action agencies (US Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation). Albeni Falls Dam created two types of problems for bull trout in the Pend Oreille Basin. First, bull trout from natal tributaries above the dam, that either became entrained or had elected to voluntarily pass below the dam, were unable to return to spawn in their natal tributaries. (Source populations could include bull trout spawning in the Priest River, inlet tributaries of Pend Oreille Lake, or tributaries of the Clark Fork River below or above Cabinet Gorge Dam.) Second, adfluvial bull trout that formerly spawned in tributaries below the dam and migrated upstream to a cold water refuge in Lake Pend Oreille, Idaho were no longer able to do so.

The goal of this project is to provide temporary upstream passage, investigate long term fish passage, and fill data gaps for bull trout at Albeni Falls Dam on the Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. Any bull trout captured will be biopsied via hole punch and their DNA sent to the USFWS lab in Abernathy, Washington for rapid analysis. Each DNA sample will be compared to DNA from other bull trout populations in the Priest River drainage, Pend Oreille Lake tributaries, and Clark Fork drainage and an assignment will be made as to its probable region of origin. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to ascertain if the spawning tributary it selected was the same as its assigned tributary. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title:	Obtain necessary permits and set up contract for genetic analysis
Description:	The Kalispel Natural Resource Department (KNRD) will obtain the necessary permits outlined in section D. PNNL and EWU will also obtain appropriate scientific collection permits. Additionally, the Kalispel Tribe will contract with the U.S. Fish and Wildlife Service Genetics Laboratory for conducting rapid response genetic analysis.
Deliverable Specification:	Idaho state transport permit Idaho scientific collection permit Federal Section 10 fish and wildlife collection permit
Planned Metrics:	Are herbicides used as part of work performed under this contract?: No



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Federal fish and wildlife permit	5/1/2009	5/2/2009	Completed	Acquire Fish and Wildlife permit this will be done by the time contract is issued.
B. Idaho scientific collection permit	5/1/2009	5/2/2009	Completed	Acquire Idaho Scientific collection permit this will be completed before the contract is issued.
C. Idaho transport permit	5/1/2009	5/2/2009	Completed	Acquire Idaho transport permit this will be completed before the contract is issued.
D. Produce Idaho scientific collection permit annual report	12/3/2009	1/31/2010	Completed	Compile data (fish species, total length, weight, location, and effort) produce report and send to Idaho Department of Fish and Game.
E. Apply for 2010 Idaho collection permit	1/15/2010	2/28/2010	Completed	Acquire Idaho Scientific collection permit
F. Apply for 2010 transport permit	1/15/2010	2/28/2010	Completed	Acquire Idaho transport permit
G. Apply for 2010 federal fish and wildlife permit	1/15/2010	2/28/2010	Completed	Acquire Fish and Wildlife permit
Deliverable: H. Idaho scientific collection, transportation, and federal permits		2/28/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Angling for bull trout

Description: KNRD crews will conduct angling surveys in the tailrace of Albeni Falls Dam to collect bull trout. A total of 4 days of effort will be expended annually by the crew: three days, during the spring (1 May– 30 June) and one days during the fall (15 September – 30 November). Latitude and longitude coordinates at the start and end of each angling survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by angling that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about angling efforts.

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

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Spring angling	5/2/2009	4/30/2010	Completed	Angling for bull trout will be used when the water levels in the tailrace are to high for electrofishing. Angling will also be used as an additional capture method in areas were electrofishing maybe ineffective due to depth and or water velocity. A total of seven days of angling will be conducted in the spring (5/1/09 - 4/15/10).
C. Fall angling	9/15/2009	11/30/2009	Completed	Angling for bull trout will be used when the water levels in the tailrace are to high for electrofishing. Angling will also be used as an additional capture method in areas were electrofishing maybe ineffective due to depth and or water velocity. A total of three days of angling will be conducted in the fall (9/15/09 - 11/30/09).
Deliverable: D. Angling for bull trout below Albeni Falls Dam		11/30/2009	Completed	<i>See the Deliverable Specification above</i>



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

Title: Weekly electrofishing collecting a representative sample of bull trout below Albeni Falls Dam

Description: EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 13 days of effort will be expended annually by each crew: six days, once each week, during the spring (2 May– 30 April), one day during the summer (July, August) and five days, once each week, during the fall (25 September – 15 November). PNNL biologists will assist on one survey in the spring, one in the summer and one in the fall. Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by electrofishing that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about electrofishing operations.

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

Locations: 2

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER | PEND OREILLE **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Spring electrofishing	5/2/2009	4/30/2010	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew: Six days, once each week, during the spring (2 May- 30 June 2008 and or 1 Mar- 30 April 2009). PNNL biologists will assist on one survey in the spring.
C. Summer electrofishing	7/1/2009	8/31/2009	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew: three days during the summer. PNNL biologists will assist on one survey in the summer.
D. Fall electrofishing	9/1/2009	11/15/2009	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew: Six days during the fall. PNNL biologists will assist on one survey in the fall.
Deliverable: E. Weekly electrofishing collection of bull trout below Albeni Falls Dam		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

D: 158. Mark/Tag Animals

Title: Implant combination radio acoustic transmitter into bull trout



Description: Transmitter implantation will be accomplished by EWU, KNRD, and PNNL. Bull trout from electrofishing and angling will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for PIT tags. The PIT tag number along with data on TL (mm), FL (mm), weight (g) and results of the genetic assignment from the 'rapid response genetic analysis' will be recorded on a data sheet. [If the genetic assignment is unknown at the time transmitters are implanted that information will be added when it becomes available.]

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The bull trout will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exciting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently.

Deliverable Specification: 10-30 Bull trout will be captured and undergo surgery to implant the combination radio acoustic tag. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water) or CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)]. Surgical implantation of the transmitters will be accomplished by an experienced surgeon.

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

Locations: 2
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name: EXPOSURE CREEK

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Implant CART tags and PIT tags in up to 10-50 bull trout	5/2/2009	4/15/2010	Completed	10-50 bull trout will be implanted with CART and PIT tags.
Deliverable; C. Implanting of radio tags		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Rapid response genetic analysis of bull trout biopsy samples
Description: Tissue samples will be collected from bull trout captured by electrofishing and angling. The samples will be sent by express mail to the USFWS Genetics Laboratory in Abernathy Washington. Within 48 hours the USFWS genetics lab will assign individual bull trout to a particular tributary and communicate this information to KNRD.

Deliverable Specification: Bull trout will be assigned to individual natal tributaries. Using the lab's "rapid response genetic analysis" protocol (The protocol that is being used at Cabinet Gorge Dam an Avista project)(Arden et al. 2005), the samples will be analyzed at 12 microsatellite DNA (msDNA) loci that are standard for Columbia Basin bull trout.

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

Locations: 1
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name:

Data Repositories:
Protocol:
Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Collect bull trout tissue samples	5/2/2009	4/15/2010	Completed	Bull trout tissue samples will be collect by boat electrofishing and angling in the tailrace of Albeni Falls Dam.
C. Send bull trout tissue samples	5/2/2009	4/15/2010	Completed	Send collected bull trout tissue samples to the Abernathy Lab for genetic analysis.
D. Abernathy Lab to process tissue samples and send results	5/2/2009	4/17/2010	Completed	Abernathy genetic lab will process bull trout tissue samples. The sample will assign the particular bull trout to a region. The results will then be sent back to the Kalispel Tribe.
Deliverable: E. Genetic Analysis		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

F: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam

Description: All bull trout collected in the tailrace of Albeni Falls Dam in 2009 will be released either above Albeni Falls Dam or below the dam, depending on the time of year, temperature and number of bull trout collected.

Deliverable Specification: Bull trout will be captured, radio tagged, and either transported above Albeni Falls Dam or released below the dam depending on water temperature and number of bull trout collected. Fish captured in the tailrace when the temperatures are less than 16 degrees Celsius will be evaluated and depending on the number of bull trout currently tagged below the dam may be moved above the dam and released in the town of Priest River below the confluence of Priest River.

Planned Metrics: # of fish transported: 5

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Capture bull trout	5/2/2009	4/15/2010	Completed	Bull trout will be captured by boat electrofishing and angling between Indian Creek and the tailrace of Albeni Falls Dam.
C. Transport bull trout	5/2/2009	4/15/2010	Completed	Bull trout will be transported in a water-filled cooler maintained at the proper temperature and DO level.
Deliverable: D. Bull trout transported above Albeni Falls Dam		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

G: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations

Description: Each spring PNNL and EWU will overhaul, refurbish and retest each of the eleven ground receiving stations. Not all stations may get a complete overhaul due to budget restraints.

Deliverable Specification: Functioning, tested (each station will be inspected for damage. Beacon tags and 12 volt batteries will be replaced if necessary) ground receiving stations. A trip log form and electronic version of the data will be maintained at PNNL and backed up at EWU. The annual reports will contain a description of annual overhaul and maintenance activities.

Locations: 10

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: Multiple

HUC5 Watershed: Multiple

HUC6 Name:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Overhaul, refurbish, and retest ground receiving stations	3/3/2010	3/28/2010	Completed	Each spring PNNL and EWU will overhaul, refurbish and retest each of the eleven ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
Deliverable: C. Annual maintenance of monitoring equipment		3/28/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Compile electronic spread sheet data base of electrofishing data

Description: All electrofishing and angling data will be entered into an Excel spreadsheet and maintained as an electronic data base of electrofishing records.

Deliverable Specification: All electrofishing and angling data will be entered into a excel workbook and maintained as a electronic data base of all electrofishing.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Hydrosystem
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Electrofishing data entry	5/2/2009	4/15/2010	Completed	All data collected while electrofishing and angling for bull trout will be input into a excel workbook and maintained as a electronic data base
Deliverable: C. Electrofishing data entry		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Download stationary ground radio receiving station

Description: All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download. Each station will be inspected for damage and repaired if necessary.

Deliverable Specification: All fixed receiver stations will be inspected (Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.) and downloaded (Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise).

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Hydrosystem
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 10

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

Data Repositories:

NPCC Subbasin: Multiple

HUC5 Watershed: Multiple

HUC6 Name:



Protocol:

Protocol Owner:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Inspect and download receiver stations 26 times per year	5/15/2009	4/30/2010	Completed	<p>All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.</p> <p>Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.</p> <p>Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.</p> <p>Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.</p>
Deliverable: C. Downloading stationary ground radio receiver		4/30/2010	Completed	See the Deliverable Specification above

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

Title: Mobile tracking surveys by fixed wing aircraft and vehicle

Description: Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. Air surveys will be made 12 times per year. EWU will charter a Cessna C-182 aircraft from Felts Field Aviation in Spokane, Washington for making aerial surveys. A Yagi antenna will be mounted externally underneath the wing of the aircraft. Each flight will be approximately four hours in duration. A pilot accompanied by an EWU technician will fly a similar flight plan for each survey.

Deliverable Specification: Air surveys will be made 12 times a year. The flight path will start below Albeni Falls Dam, thence up the center of the Pend Oreille River to the outlet of Pend Oreille Lake, then around the perimeter of Pend Oreille Lake. Where known bull trout spawning tributaries enter they will be followed to their source or known upper limit of bull trout occupancy. Tributaries surveyed will include: (1) Priest River to Outlet Dam, including the East River and its Middle Fork; (2) Tributaries entering the north shore of Lake Pend Oreille (Pack River, Grouse Creek and Trestle Creek); (3) Tributaries entering the Clark Fork arm of Lake Pend Oreille (Lightning Creek and tributaries, Johnson Creek and Twin Creek) and (4) Tributaries entering the east shore of Lake Pend Oreille (Granite Creek, Sullivan Springs Creek, North Gold Creek, Gold Creek). Additionally, the Clark Fork River will be flown to Cabinet Gorge Dam. Vehicle surveys will be made once monthly from June to August and once weekly from September to November.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Hydrosystem
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 9

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

NPCC Subbasin: Multiple

HUC5 Watershed: Multiple

HUC6 Name: Multiple

Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Aircraft tracking	5/15/2009	4/30/2010	Completed	Aerial surveys will be conducted 12 times a year from fixed wing aircraft.
C. Boat tracking	5/15/2009	4/30/2010	Completed	Boat tracking will be conducted 10 times a year using a directional hydrophone.
D. Vehicle tracking	5/15/2009	4/30/2010	Completed	Vehicles surveys will be made along each of the tributaries streams once monthly from June to August and once weekly from September to November.
Deliverable: E. Tracking of radio tagged fish with aircraft, vehicle, and boat.		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

K: 189. Coordination-Columbia Basinwide

Title: Project coordination among all stakeholders
Description: This project will require coordination with a number of agencies and organizations.
Deliverable Specification: Coordination activities (Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies.) will be included in project reporting. Coordination will also be done via email, land mail, and telephone randomly as questions or findings arise. Because this project will be conducted in two states and involves a federal threaten species coordination and communication will be important to obtain permits, move fish, and distribute findings.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Ongoing coordination between stakeholders	5/1/2009	4/30/2010	Completed	Coordination between PIs, USACE, WDFW, IDFG, USFWS, bull trout recovery groups, and other researchers.
Deliverable: B. Project coordination among stakeholders		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

L: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2009 (5/1/2009 - 6/30/2009)	7/1/2009	7/15/2009	Completed	
B. Jul-Sep 2009 (7/1/2009 - 9/30/2009)	10/1/2009	10/15/2009	Completed	
C. Oct-Dec 2009 (10/1/2009 - 12/31/2009)	1/1/2010	1/15/2010	Completed	
D. Jan-Mar 2010 (1/1/2010 - 3/31/2010)	4/1/2010	4/15/2010	Completed	
E. Final Apr 2010 (4/1/2010 - 4/30/2010)	4/16/2010	4/30/2010	Completed	

M: 119. Manage and Administer Projects

Title: Manage Project
Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.



Deliverable Specification: Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Accrual - Submit September estimate to BPA	9/1/2009	9/10/2009	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. Generally, this should be done by September 10.
B. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	1/30/2010	4/30/2010	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
Deliverable: C. Funding Package - Submit draft to COTR		2/1/2010	Completed	<i>See the Deliverable Specification above</i>

N: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period (5/1/2009) to (4/30/2010)
Description: Prepare and upload annual report.
Deliverable Specification: Annual report to BPA's COTR will be prepared by the EWU PI and PNNL CO-PI, with assistance from EWU's statistician and research associate, and PNNL's senior scientist. Report will summarize the results obtained that year. Reports will follow standard scientific format and include an executive summary, introduction, methods, results, discussion, recommendation, and literature cited section, as well as tables, figures, and data appendices. Reports will be reviewed by the KNRD CO-PI before submission. Upload annual report for the period (May 1, 2009 to April 30, 2010).
Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2009	12/15/2009	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Submit report for internal contractor review	2/25/2010	2/28/2010	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.
C. Submit report for external review	3/2/2010	3/2/2010	Completed	Use this milestone if the annual report requires external review. May be simultaneously reviewed by external parties and BPA COTR if desired.
D. Email draft of report to COTR for review	3/10/2010	3/10/2010	Completed	The draft annual report must be submitted to the BPA COTR in Microsoft Word format (any version of Word is fine).
E. Receive COTR review comments	3/11/2010	4/11/2010	Completed	The BPA COTR should provide review feedback and comments within 30 days of receiving the draft annual report. This milestone should therefore have a duration of 30 days.
F. Finalize Annual Report	4/30/2010	4/30/2010	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
Deliverable: G. Final report uploaded to the BPA website		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

O: 162. Analyze/Interpret Data

Title: Data reduction and analysis
Description: EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked.
Deliverable Specification: GIS maps and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
Planned Metrics:
 * Primary R, M, and E Focal Strategy : Hydrosystem
 * Primary R, M, and E Type : Status and Trend Monitoring
 * Secondary R, M, and E Focal Strategy : Population Status

Locations:



Primary Focal Species: Trout, Bull

Country:

State:

County:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Area of Inference:

NPCC Subbasin:

HUC5 Watershed:

HUC6 Name:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. GIS generated tracking maps	11/10/2009	4/15/2010	Completed	EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.
B. Statistical comparisons of run timing, genetic assignments, and spawning tributaries	11/10/2009	4/30/2010	Completed	Statistical comparisons will be made to determine if fish randomly entered spawning tributaries or if they entered the tributary predicted by their genetic assignment. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
Deliverable: C. Data analysis of tracking data		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

P: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (5/1/08) to (4/30/09)

Description: 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. Date range May 08 to Apr 09 (e.g. Apr 2001 to Mar 2002) will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	5/1/2009	5/8/2009	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	5/25/2009	6/8/2009	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.
C. Submit progress report for external review	6/8/2009	6/19/2009	Completed	Use this milestone if the progress report requires external review.
Deliverable: D. Attach Progress Report in Pisces		6/22/2009	Completed	<i>See the Deliverable Specification above</i>
E. Confirm BPA has posted the progress report	7/27/2009	7/27/2009	Completed	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.



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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP PNNL RESTORATION OF BULL TROUT PASS
Contract #: 56065 REL 6
 [ISSUED]
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Perf. Period Budget: \$90,214 **Perf. Period:** 4/5/2013 - 4/30/2014
Contract Type: Release **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Pacific Northwest National Laboratory (Prime - USDOERIC02)
BPA Internal Ref: 56065 REL 6
SOW Validation: Last validated 02/08/2013 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (02/04/2013) PNNL Property Inventory Project 2007-246-00
Budget - Contract (02/08/2013) 2013 LIB PNNL Bulltrout Pass Albeni Dam

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232
Joe Maroney	Technical Contact	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Janie Vickerman	Administrative Contact	Pacific Northwest National Laboratory	(509) 371-7260 / (509) 371-7197	janie.vickerman@pnl.gov	
Brian Bellgraph	Supervisor	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Julie Hughes	Contract Manager	Pacific Northwest National Laboratory	(509) 371-7202 / (509) 371-7203	julie.hughes@pnl.gov	Pacific Northwest National Laboratory P.O. Box 999, MS K6-79 Richland WA 99352
Ryan McNee	Technical Contact	Kalispel Tribe	(509) 447-7423 / NA	rmcnee@kalispeltribe.com	
Khanida Mote	Contracting Officer	Bonneville Power Administration	(503) 230-4599 / NA	kpote@bpa.gov	P.O. Box 3621 Mailstop NSSP-4 Portland OR 97208
Jenna Peterson	Env. Compliance Lead	Bonneville Power Administration	(503) 230-3018 / NA	jepeterson@bpa.gov	905 NE 11th Avenue KEC-4 Portland OR 97232

Work Element Table of Contents:



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Complete environmental compliance requirements		\$599	(1 %)
B : 70. Install Fish Monitoring Equipment - Test all stations prior to FY13/14 monitoring season, if applicable	*	\$8,499	(9 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Maintain and download radio receiving stations	*	\$18,226	(20 %)
D : 162. Analyze/Interpret Data - Data reduction and analysis		\$22,343	(25 %)
E : 132. Produce (Annual) Progress Report - Submit Progress Report for the period 16 November 2012 to 15 November 2013		\$9,985	(11 %)
F : 119. Manage and Administer Projects - Manage Project		\$3,090	(3 %)
G : 70. Install Fish Monitoring Equipment - Test all stations prior to FY14/15 monitoring season, if applicable	*	\$13,054	(14 %)
H : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$1,497	(2 %)
I : 70. Install Fish Monitoring Equipment - Remove telemetry stations	*	\$12,921	(14 %)
Total:		\$90,214	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

The goal of this project is to provide temporary upstream passage for bull trout at Albeni Falls Dam, Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. The fish will then be transported above Albeni Falls Dam and released near Priest River, Idaho, or re-released below the dam depending on water temperature and number of fish captured. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to track the fish to potential spawning tributaries of Pend Oreille Lake. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

- Title:** Complete environmental compliance requirements
- Description:** Provide BPA with information necessary for environmental clearance for all contract activities during FY13/14. Submit FY14/15 SOW and supporting documents as needed for BPA's Environmental Compliance Group to determine environmental compliance status, dependent on project continuation into FY14/15.
- Deliverable Specification:** Environmental compliance requirements complete for FY13/14 work. Submit FY14/15 SOW package to begin Environmental Clearance review for subsequent contract, if project continues.
- 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	4/5/2013	4/30/2014	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 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 (<i>Entosphenus tridentatus</i>) 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), macrophthalmia (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	4/5/2013	4/30/2014	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.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	4/5/2013	4/30/2014	Active	Prevent spread of invasive species
D. Complete and document public involvement activities and provide to EC Lead	4/5/2013	4/30/2014	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 Cultural/Historic Resource Consultation	4/5/2013	4/30/2014	Active	Examples include providing maps and detailed project descriptions, contracting for an archaeological survey, etc.
F. Obtain/Renew applicable local, state, federal and tribal environmental permits	4/5/2013	4/30/2014	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.
G. Obtain BPA's EC Lead sign-off that EC requirements are complete	4/5/2013	4/30/2014	Active	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.
H. Use Best Management Practices to stabilize soils and prevent spread of noxious weeds	4/5/2013	4/30/2014	Active	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.
I. Obtain BPA clearance for FY13/14 work	4/5/2013	4/30/2014	Completed	BPA provides environmental clearance to proceed with field work for FY13/14



Milestone Title	Start Date	End Date	Status	Milestone Description
J. Provide project information to BPA	11/15/2013	1/30/2014	Active	Provide FY14/15 SOW and any other documentation needed for environmental review, only if project continues into FY14/15.
K. Obtain BPA clearance for FY14/15 work	1/31/2014	4/30/2014	Active	BPA provides environmental clearance to proceed with field work for FY14/15, if applicable.
Deliverable: L. Ensure environmental compliance requirements are complete		4/30/2014	Active	<i>See the Deliverable Specification above</i>

B: 70. Install Fish Monitoring Equipment

Title: Test all stations prior to FY13/14 monitoring season, if applicable
Description: We will test and calibrate all receiver stations in spring before the primary migration season.
Deliverable Specification: Test and calibrate receivers at Albeni Falls Dam, the Mudhole, North and South Dover, and Lightning and Granite creeks.
Locations: 9
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** Multiple
State: ID **HUC5 Watershed:** Multiple
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2013	4/5/2013	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. Testing, calibration, modification of monitoring receivers	4/5/2013	6/14/2013	Completed	Test, calibrate, and modify monitoring stations prior to data collection season.
Deliverable: C. Testing and calibration of all monitoring stations		6/14/2013	Completed	<i>See the Deliverable Specification above</i>

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

Title: Maintain and download radio receiving stations
Description: All fixed receiver stations will be inspected and downloaded at least every other week during the sampling season by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble-shoot problems 3 times during the contract year. The PNNL scope also includes paying for cellular modems, which are used to remotely download data, and fixing cell modem communication problems.

Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.

Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within three working days after being collected.

Downloads will be performed primarily remotely via cellular modems, however, some stations require a person to physically download the data (because no cellular coverage). Downloading the data requires one person.
Deliverable Specification: Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU.
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 : Uncertainty Research
* Secondary R, M, and E Focal Strategy : Tributary Habitat
Locations: 11
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** Multiple



State: ID **HUC5 Watershed:** Multiple
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories:
Protocol: Verification of Bull Trout Spawning Tributaries Using Radio Telemetry v1.0
Protocol Owner: Brian Bellgraph **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2013	4/5/2013	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	4/5/2013	4/5/2013	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. Receiver stations inspected and downloaded	4/5/2013	4/30/2014	Active	Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary. Data collection at some stations will continue through the end of the contract year if necessary.
Deliverable: D. Functioning radio monitoring stations		4/30/2014	Active	See the Deliverable Specification above

D: 162. Analyze/Interpret Data

Title: Data reduction and analysis
Description: EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked during the project year, which may overlap contract periods. For each report, data will be added from the 16 November - 15 November (of the following year) period. E.g. In report to be submitted in early 2014, fish detections from the 16 November 2012 to 15 November 2013 will be added. PNNL will lead the task of storing and performing QA/QC checks on telemetry data.
Deliverable Specification: A detailed detection history for each fish will be divulged from fixed-station detections, mobile detections, and other incidental data collected on study fish (e.g., if fish captured by IDFG or detected on another study's telemetry receivers).
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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:
Primary Focal Species: Trout, Bull
Country: **NPCC Subbasin:**
State: **HUC5 Watershed:**
County: **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories: PNAMP Monitoring Methods (<http://www.monitoringmethods.org/>)
 Website
 NONE - No data repository (N/A)
 or not electronically available
Protocol: Verification of Bull Trout Spawning Tributaries Using Radio Telemetry v1.0
Protocol Owner: Brian Bellgraph **Protocol State:** Proposed
Area of Inference:

Name	Value
Bull Trout Critical Habitat - Lake	Lake Pend Oreille
NPCC Subbasins	PEND OREILLE



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	4/5/2013	4/5/2013	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. Data reduction and database compilation	10/1/2013	1/15/2014	Active	Raw data will be checked for errors, organized, loaded into, and stored in a Microsoft SQL Server relational database after each download.
C. Fish detections will be created for each fish.	10/1/2013	1/15/2014	Active	Fish location data collected through the 15 November of each year will be used to produce a detection history of each fish.
Deliverable: D. Develop a profile of each fish tracked		1/15/2014	Active	<i>See the Deliverable Specification above</i>

E: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period 16 November 2012 to 15 November 2013

Description: The annual 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. Note that any results included in the annual report will be restricted to those data collected before November 15 of the contract year. This means that data collected after November 15 will be included in the next year's report.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics:
 * Start date of reporting period : 11/16/2012
 * End date of reporting period : 11/15/2013

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	11/1/2013	11/15/2013	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Write final report	11/16/2013	1/15/2014	Active	Write progress report for work done from 16 November 2012 to 15 November 2013.
C. Submit progress report for internal contractor review	1/16/2014	2/1/2014	Active	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	2/2/2014	2/28/2014	Active	Use this milestone if the progress report requires external review.
E. Confirm BPA has posted the progress report	4/1/2014	4/30/2014	Active	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: F. Attach Progress Report in Pisces		3/31/2014	Active	<i>See the Deliverable Specification above</i>

F: 119. Manage and Administer Projects

Title: Manage Project

Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.

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.



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	9/1/2013	9/30/2013	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.	12/1/2013	1/31/2014	Active	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.	1/1/2014	1/31/2014	Active	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).	1/1/2014	1/31/2014	Active	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.)
E. #5 Funding Package - Respond to any Contracting Officer's requests for revisions within 7 days.	2/1/2014	2/10/2014	Active	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.	2/11/2014	2/28/2014	Active	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.	3/1/2014	4/30/2014	Active	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. Submit monthly invoices electronically within 45 days.	4/5/2013	4/30/2014	Active	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).
J. Submit final invoice within 90 days of end of the previous contract to facilitate contract closeout.	4/5/2013	7/5/2013	Completed	Within 90 days of the last day of the previous contract, the contractor shall issue a final invoice. The contract value for this contract does not exceed the \$100,000 threshold for the reporting.
K. Inventory - Mark/Tag all equipment purchased during the contract.	4/5/2013	4/30/2014	Active	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.)
L. Facilitate inputting Cost Share information into Pisces at the Project level.	10/1/2013	11/15/2013	Completed	If there are multiple contractors under this project, and you are not the lead project Proponent, email federal FY Cost Share information for your contract to the lead contractor (Kalispel Tribe) by Nov 1. (Milestone starts Oct 1 and ends on Nov 1 for option a, and Nov 15 for options b and c)



Milestone Title	Start Date	End Date	Status	Milestone Description
M. E-waste disposal in accordance with state and local jurisdiction, laws and policies	4/5/2013	4/30/2014	Active	Confirm that adequate waste identification and collection procedures are in place and proper disposal practices are followed according to your governmental policy. If you do not have a policy, please contact your CO and/or COTR for guidance. Purpose is to keep hazardous materials from entering the normal waste stream, becoming land-fill, or being boot-legged into unregulated reprocessing and/or metals extraction. E-Waste usually includes: batteries, light ballasts, fluorescent tubes and bulbs, modems, routers, computers and all equipment with electronic components. For current EPA guidance, please see: http://www.epa.gov/osw/conservation/materials/ecycling/rules.htm
N. Project coordination	4/5/2013	4/30/2014	Active	This project will require coordination with a number of agencies and organizations. Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies). Coordination with landowners where equipment is located will also need to be managed accordingly.
Deliverable: O. Fulfill all administrative tasks with quality products and in a timely manner.		4/30/2014	Active	<i>See the Deliverable Specification above</i>

G: 70. Install Fish Monitoring Equipment

Title: Test all stations prior to FY14/15 monitoring season, if applicable
Description: In preparation for the following contract year, if the project continues, we will test and calibrate all receiver stations in spring before the primary migration season.
Deliverable Specification: Testing and calibration of all monitoring stations

Locations: 9
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER

NPCC Subbasin: Multiple
HUC5 Watershed: Multiple
HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2013	4/30/2014	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. Testing, calibration, modification of monitoring receivers	3/15/2014	4/30/2014	Active	Test receivers
Deliverable: C. Testing and calibration of all monitoring stations		4/30/2014	Active	<i>See the Deliverable Specification above</i>

H: 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:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Apr-Jun 2013 (4/5/2013 - 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. Jan-Mar 2014 (1/1/2014 - 3/31/2014)	4/1/2014	4/15/2014	Active	
E. Final Apr 2014 (4/1/2014 - 4/30/2014)	4/16/2014	4/30/2014	Active	

I: 70. Install Fish Monitoring Equipment

Title: Remove telemetry stations
Description: Remove Gold Creek, Lightning Creek, and Granite Creek monitoring stations
Deliverable Specification: Equipment will be uninstalled and stored at PNNL.

Locations: 4
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER

NPCC Subbasin: Multiple
HUC5 Watershed:
HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2013	4/30/2014	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. Uninstall Lightning, Granite, and Gold creek stations	10/1/2013	11/30/2013	Completed	Uninstall stations because project scaling-down in future study years...
Deliverable: C. Equipment removed and stored		11/30/2013	Completed	<i>See the Deliverable Specification above</i>

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Albeni Falls Wildlife Mitigation-Idaho Department of Fish and Game (IDFG)
Project #: 1992-061-03
Contract Title: 1992-061-03 EXP ALBENI FALLS WL IDF&G ADMIN
Contract #: 57962
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 205740 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Idaho Department of Fish and Game (IDFG) (Prime - IDFISGAM00)
BPA Internal Ref: 57962
SOW Validation: Last validated 06/20/2012 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (04/12/2012) Property Inventory
 Budget - Contract (06/19/2012) 2012 LIB IDFG Admin Contract Albeni Falls

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kjvleuven@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland, OR 97208-3621
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232
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Katherine Cousins	Contract Manager	Idaho Department of Fish and Game (IDFG)	(208) 769-1414 / (208) 769-1418	kathy.cousins@idfg.idaho.gov	2885 W. Kathleen Aveue Coeur D'Alene ID 83815-
Conan Chiu	Administrative Contact	Idaho Department of Fish and Game (IDFG)	(208) 287-2813 / (208) 334-2148	conan.chiu@idfg.idaho.gov	Bureau of Administration P.O. Box 25 Boise ID 83707-
Jenna Peterson	Env. Compliance Lead	Bonneville Power Administration	(503) 230-3018 / NA	jepeterson@bpa.gov	905 NE 11th Avenue KEC-4 Portland OR 97232
Rosemary Mazaika	Interested Party	Bonneville Power Administration	(503) 230-5869 / (503) 230-5699	rxmazaika@bpa.gov	P.O. Box 3621 Mailstop - KEWL-4 Portland OR 97208-3621
Katey Grange	Interested Party	Bonneville Power Administration	(503) 230-4047 / NA	kcgrange@bpa.gov	PO Box 3621, KEC-4 Portland OR 97208

Work Element Table of Contents:



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Environmental Compliance		\$1,000	(0 %)
B : 172. Conduct Pre-Acquisition Activities - Identify willing landowner participants		\$2,200	(1 %)
C : 172. Conduct Pre-Acquisition Activities - Pursue site information, title search & conservation easement		\$2,200	(1 %)
D : 172. Conduct Pre-Acquisition Activities - Coordinate completion of Hazardous Waste Surveys		\$1,200	(1 %)
E : 189. Coordination-Columbia Basinwide - Coordinate with other members implementing Albeni Falls wildlife mitigation		\$3,200	(1 %)
F : 189. Coordination-Columbia Basinwide - Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus		\$12,200	(5 %)
G : 189. Coordination-Columbia Basinwide - Build relationships with entities interested in wildlife mitigation		\$12,200	(5 %)
H : 189. Coordination-Columbia Basinwide - Meet with County Commissioners		\$4,700	(2 %)
I : 189. Coordination-Columbia Basinwide - Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans		\$11,165	(5 %)
J : 114. Identify and Select Projects - Identify cost-share partnerships and projects		\$12,200	(5 %)
K : 99. Outreach and Education - Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project		\$10,200	(5 %)
L : 87. Prepare HEP Report - Coordinate and conduct baseline and 5- and 10-year HEP surveys		\$26,200	(12 %)
M : 157. Collect/Generate/Validate Field and Lab Data - Coordinate and conduct vegetative monitoring surveys	*	\$26,200	(12 %)
N : 157. Collect/Generate/Validate Field and Lab Data - Coordinate, collect and generate field data to assist IBIS	*	\$5,200	(2 %)
O : 174. Produce Plan - Develop site-specific wildlife management plans	*	\$10,200	(5 %)
P : 119. Manage and Administer Projects - Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending		\$35,900	(16 %)
Q : 175. Produce Design and/or Specifications - Prepare designs and plans to protect and restore delta area in the Project Area	*	\$30,000	(13 %)
R : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$1,200	(1 %)
S : 132. Produce (Annual) Progress Report - Submit Progress Report for the period (July 1, 2012) to (June 30, 2013)		\$15,000	(7 %)
Total:		\$222,365	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

Background

The Pacific Northwest Electric Power Planning and Conservation Act (Act) of 1980 (Public Law 96-501) directed that measures be implemented by Bonneville Power Administration (BPA) to protect, mitigate, and enhance fish and wildlife to the extent affected by development and operation of hydropower projects on the Columbia River system (Martin et al. 1988). The Act created the Northwest Power Planning and Conservation Council (Council), which in turn developed the Columbia River Basin Fish and Wildlife Program (Program). Under the Act, BPA has the authority and obligation to fund fish and wildlife mitigation activities that are consistent with the Council's Fish and Wildlife Program (USDE 1996). Part of the Program was the development of wildlife protection, mitigation and enhancement plans for each of the hydropower facilities on the Columbia River system and ultimately, implementation of the plans to mitigate wildlife habitat losses. The Idaho Department of Fish and Game (IDFG) developed a mitigation plan in 1987, for the Albeni Falls hydroelectric facility that was constructed by the U.S. Army Corps of Engineers (ACOE) on the Pend Oreille River in Bonner County, Idaho between 1951 and 1955 (Martin et al. 1988). Mitigation plans for wildlife habitat losses at each of the Columbia River Basin dams were submitted by BPA to the Council in 1989, including the mitigation plan for Albeni Falls Dam in Idaho (USDE 1996). The Council reviewed and approved the Albeni Falls plan in 1990 (USDE 1996). The Northern Idaho Wildlife Mitigation Agreement was jointly prepared and approved by the IDFG and BPA in June 1997 (BPA and IDFG 1997).

The Albeni Falls Wildlife Management Plan Final Environmental Assessment (BPA 1996) addressed the potential environmental effects of a proposed wildlife habitat protection and enhancement program. Based on the analysis in the environmental assessment, the Bonneville Power Administration (BPA) concluded that funding the development and implementation of the Project would enable the IDFG, as well as other federal agencies and sovereign nations to protect and enhance a variety of wetland and riparian habitats, restore 28,587 Habitat Units (HU) lost as a result of construction of the Albeni Falls Dam, and implement long-term wildlife management activities. The Project also complies with the Wildlife Mitigation Program Final Environmental Impact Statement (BPA 1997) and the standardized planning and implementation process prescriptions set forth in the Record of Decision. In-lieu of annualizing habitat unit losses the Council decided to mitigate losses at a 2:1 ratio. That is, for every two HU protected the HU ledger would be reduced by one HU. In 2002, however, BPA decided to maintain a 1:1 crediting policy. The issue of how to address the annualized wildlife habitat losses remains unresolved.

This contract is one of two IDFG contracts for protection, mitigation and enhancement of wildlife habitats in Northern Idaho. This contract covers all management and administrative responsibilities for implementing mitigation projects. The second contract under this Project number covers all operational and maintenance of wildlife mitigation parcels. Thus, the Project goals are twofold and are: 1) to continue the administration and ongoing implementation of the Albeni Falls Wildlife Mitigation Project; and, 2) to protect, restore, maintain, and manage wetland, riparian and upland coniferous forest habitats on three wildlife management areas in Northern Idaho.

This contract has been developed to cover personnel, mitigation implementation and monitoring costs for a 12-month contract period (July 1, 2012 - June 30, 2013) with the following objectives:

- Identify potential mitigation actions by identifying willing landowner participants and cost-sharing partnerships, building relationships with entities interested in wildlife mitigation and meeting with County Commissioners.
- Secure conservation easements, fee-title, and lease agreements by pursuing site information and title search, writing easement terms and conditions with landowners, verifying maps, fence boundaries, and legal descriptions, coordinating completion of property appraisal and review, and developing option/purchase agreements.
- Fulfill NEPA and BPA funding requirements by coordinating completion of cultural resource surveys, hazardous waste surveys and providing information for NEPA assessment.
- Provide cost-share funding to other project entities by determining cost-share entity's role in the proposed project.
- Coordinate completion of biological baseline surveys of specific habitat areas to determine starting point for monitoring and evaluation of biological objectives.
- Coordinate and implement information and education program. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours.
- Provide assistance with monitoring and evaluation activities on mitigation lands. Activities may include continuing HEP analysis to determine changes in habitat quality, site-specific monitoring and/or sampling of terrestrial vegetation, public use, and habitat use.
- Coordinate mitigation implementation activities associated with other members operating under the Project.
- Coordinate and develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.



- Coordinate and develop designs and plans to implement protection and restoration for Project Area deltas.
- Develop administrative work statement and budget and maintain site-specific operating budgets for individual mitigation parcels. Oversee and develop budget revisions as necessary.
- Prepare an Annual Report of Idaho Department of Fish and Game's Albeni Falls Wildlife Mitigation implementation activities.
- Monitoring and Evaluation: to monitor vegetative cover and habitats using scientific principals and techniques to ensure that project objectives are being met and to provide a basis for use of adaptive management when appropriate. To evaluate species and habitat responses to management activities for the benefit of fish and wildlife using mitigation lands.

Background for the Clark Fork River Delta Restoration Project

Nine areas identified in the Clark Fork River delta total about 2,496 acres before the construction and inundation of Lake Pend Oreille by the Albeni Falls Dam, and over 60 years later, the same areas total about 1,204 acres. This represents an estimated loss of about 1,292 acres of wildlife habitat (52 percent of the total area). The estimated wildlife habitat loss is due to the combined actions of the construction and inundation of the Albeni Falls dam, and each year that the dam operates. Erosion of shorelines and island areas as a result of Albeni Falls operations are still occurring, and some shoreline areas are experiencing annual erosion rates of up to eight feet.

Under the Council's Fish and Wildlife Program, IDFG contracted Ducks Unlimited (DU) to conduct an updated feasibility study on potential, cost-effective shoreline erosion control measures in the Clark Fork River delta. This is not the first time that a contractor has looked at solving the erosion issues in the delta. Avista Corporation contracted two companies in the past: Findlay Engineering, Inc. in 2000, and Paramatrix, Inc. in 1998. Both companies completed the studies in support of the Federal Energy Regulatory Commission (FERC) re-licensing of the Avista Corporation's Cabinet Gorge and Noxon Rapid Hydroelectric facilities. Ducks Unlimited was asked to review the past studies, and to also contact local experts with experience in controlling shoreline erosion including the local conservation districts, the Natural Resources Conservation Service, Montana Fish, Wildlife and Parks, Kalispel Tribe, and the U.S. Army Corps of Engineers (ACOE) to seek recommendations on successful shoreline erosion techniques. Then DU was asked to develop a conceptual plan, including feasible alternatives for treating shoreline erosion at each identified site.

DU engineers recommend that work in the Clark Fork River delta should consist of first protecting shorelines from further erosion and then conducting restoration activities behind the protection. Protection and restoration should be considered for all areas where possible. There are many areas where protection from further erosion may be considered the only activities needed at the sites. At present, the two ACOE's breakwaters appear to provide good wave protection, but provide limited wildlife habitat value, recreational uses, or aesthetics. A combination of materials such as riprap, anchored large wooded debris and vegetation could be used to construct breakwaters to protect the island shorelines, as well as providing wildlife habitat. Geotubes could also be considered in some areas, but lessons from the Pack River delta project have shown that this technology can be cost-prohibitive.

A June 1, 2012 letter from the State of Idaho's Office of Energy resources to Bonneville Power Administration (BPA) outlined a five-year agreement to monitor and evaluate the effects of operations at Albeni Falls dam. A major component of the agreement provides \$3 million in BPA funds over a three year period that would otherwise be considered for land acquisition, to initiate extensive river delta erosion mitigation projects where ongoing bank erosion is a concern. Both BPA and Idaho agreed to negotiate in good faith to reach a mutually agreed upon long-term settlement for mitigation of construction, inundation, and any operational impacts on fish and wildlife resources attributed to the Albeni Falls hydroelectric project.

On October 16, 2012, IDFG hosted a meeting with BPA, ACOE, U.S. Bureau of Land Management (BLM), federal and state regulators, as well as other interested stakeholders. The purpose of the meeting was to coordinate a restoration project in the Clark Fork River delta with a targeted construction start date of November/December 2013, and continuing until March/April 2014. Lands within the proposed delta restoration area are owned by ACOE, BLM and IDFG, and are all managed under a long-term management agreement with the State. Discussions revolved around which agency would be the lead federal agency, and how to complete the regulatory requirements within the tight time lines. The group also reviewed the draft project purpose and objectives. The project purpose will be to protect, improve and restore key riparian and wetland habitats and their ecological function in the Clark Fork River delta. To achieve this, the restoration project will involve creating barrier islands to project lands,



reinforcing and protecting eroding shorelines in the delta, raising portions of the delta islands that are currently submerged, increasing wetland diversity. The group supported the project purpose and formed a design team tasked with developing the restoration plan and time line.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Environmental Compliance

Description: Documentation will be completed to obtain environmental compliance prior to starting implementation of any Work Element that requires review or consultation. This work element is added to satisfy the requirements of PISCES. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene River WMA.

Deliverable Specification: This Work Element is to cover the gathering, compilation, and organization of information necessary for environmental compliance on activities that may require review or consultation from State, Tribal or federal agencies.

Planned Metrics:

- * Are herbicides used as part of work performed under this contract?: Yes
- * 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. Collect, Organize, Submit, and Maintain Environmental Compliance Documentation	7/1/2012	6/30/2013	Completed	Information pertaining to ESA species, historical sites, and state sensitive species will be collected and maintained. Environmental documentation will be completed as necessary for any activity requiring review or consultation. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene WMA.
B. Assist BPA's EC Lead to meet necessary environmental compliance requirements	7/1/2012	6/30/2013	Completed	IDFG Project Staff will ensure that copies of permits and other environmental compliance documentation is provided to the BPA EC Lead as necessary prior to any ground disturbing implementation.
C. Obtain BPA's EC Lead sign-off that EC requirements are complete prior to work at Pend Oreille WMA	7/1/2012	6/30/2013	Completed	This administrative contract will act as the funding vehicle for the obtainment of environmental clearance prior to the start of implementation activities planned to occur on the Pend Oreille Wildlife Management Areas. 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.
D. Obtain BPA's EC Lead sign-off that EC requirements are complete prior to work at Boundary/Sm...	7/1/2012	6/30/2013	Completed	This administrative contract will act as the funding vehicle for the obtainment of environmental clearance prior to the start of implementation activities planned to occur on the Boundary Creek/Smith Creek Wildlife Management Areas. 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.
E. Obtain BPA's EC Lead sign-off that EC requirements are complete prior to work on the CDA River WMA	7/1/2012	6/30/2013	Completed	This administrative contract will act as the funding vehicle for the obtainment of environmental clearance prior to the start of implementation activities planned to occur on the Coeur d'Alene River Wildlife Management Area. 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.
Deliverable: F. Completed Documentation Pertaining to Environmental Compliance		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

B: 172. Conduct Pre-Acquisition Activities

Title: Identify willing landowner participants

Description: Identify willing landowners with opportunities to permanently protect wildlife habitat and seek to establish good relationship(s). As directed by the Albeni Falls Wildlife Protection, Mitigation and Enhancement Plan, priority areas of interest are within the Pend Oreille and Clark Fork Subbasins. Out-of-basin projects include areas in the Coeur d'Alene and Kootenai Subbasins.

Deliverable Specification: List of willing landowner participants.

Locations: 1

Primary Focal Species: Wildlife

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed:

HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Actively drive areas of interest and areas adjacent to currently mitigation lands	7/1/2012	6/30/2013	Completed	Actively driving areas of interest and adjacent to current mitigation lands to identify willing landowners with opportunities to permanently protect wildlife habitat. Networking with the local community and seeking to establish good relationship(s) with landowners.
B. Ongoing searches and investigations for new projects	7/1/2012	6/30/2013	Completed	Throughout the year the project manager will attend public meetings and investigate possible real estate sales at local assessor offices. The project manager will also spend time driving and looking for land sales.
Deliverable: C. Identified Sellers of Lands		6/30/2013	Completed	See the Deliverable Specification above

C: 172. Conduct Pre-Acquisition Activities

Title: Pursue site information, title search & conservation ease

Description: Gather site information on potential habitat sites. Such information may include tax information, wetland delineation, aerial photos, title search, etc. Establish working relationship with landowner and write easement terms and conditions that are mutually agreeable. Verify maps, legal descriptions and fence boundaries of potential mitigation sites. Coordinate completion of property appraisals and review, including requesting bids of contractors.

Deliverable Specification: Information maintained in site files. Copy of easement terms and conditions and all legal descriptions will be included with appraisals. Information includes tax information, wetland delineations, aerial photos, and information pertaining to title searches.

Locations: 1

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Acquire appraisal	7/1/2012	6/30/2013	Completed	Acquire appraisal.
B. Acquire BPA review and approval of appraisal	7/1/2012	6/30/2013	Completed	Acquire BPA review and approval of appraisal.
C. Perform and obtain title searches and reports	7/1/2012	6/30/2013	Completed	Perform and obtain title searches and reports.
D. Review and clearance of title report encumbrances by BPA	7/1/2012	6/30/2013	Completed	Review and clearance of title report encumbrances by BPA.
E. Perform boundary surveys as needed	7/1/2012	6/30/2013	Completed	Perform boundary surveys as needed.
F. Provide legal descriptions	7/1/2012	6/30/2013	Completed	Provide legal descriptions.
G. Provide minimum habitat units	7/1/2012	6/30/2013	Completed	Provide minimum habitat units.
H. Attach a completed water survey form in Pisces	7/1/2012	6/30/2013	Completed	The water survey form is located at: http://www.efw.bpa.gov/IntegratedFWP/watersurveyform.doc . The form should be completed by the contract manager or BPA project manager and attached in Pisces.
I. Provide definition of easement terms and conditions (for easements)	7/1/2012	6/30/2013	Completed	Provide definition of easement terms and conditions (for easements).
Deliverable: J. Property Acquisition Information		6/30/2013	Completed	See the Deliverable Specification above

D: 172. Conduct Pre-Acquisition Activities

Title: Coordinate completion of Hazardous Waste Surveys

Description: Coordinate the completion of hazardous waste surveys on potential mitigation projects.

Deliverable Specification: Hazard waste surveys completed according to BPA KEP standards. Evaluation results will be maintained in site files.

Locations: 1

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**



County: BONNER

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contract BPA's environmental compliance group	7/1/2012	6/30/2013	Completed	Have a BPA inspector survey land for possible pollutants. If necessary utilize an outside contractor to inspect lands for pollution.
B. Begin clean-up work	7/1/2012	6/30/2013	Completed	If clean-up work is necessary, then bid a subcontractor for clean-up work required.
C. Provide status report to BPA	7/1/2012	6/30/2013	Completed	The findings of the Environmental Land Audit to be provided to BPA.
Deliverable: D. Completed Environmental Land Audit		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

E: 189. Coordination-Columbia Basinwide

Title: Coordinate with other members implementing Albeni Falls wildlife mitigation

Description: Coordinate when needed with other entities interested in implementing Albeni Falls wildlife mitigation, such as the U.S. Fish and Wildlife Service, the Army Corp of Engineers and any tribal or non-governmental entities. These activities may include meetings and open houses to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites.

Deliverable Specification: List of meetings and participants will be noted with meeting sign-in sheets, minutes or meeting summaries. Open house attendance and comments will be incorporated by reference into site-specific management plans.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with other interested members as needed	7/1/2012	6/30/2013	Completed	When appropriate, informing other members implementing under the Albeni Falls Wildlife Mitigation Project of pending projects and the landowners participating in the program.
B. Participate in meetings as needed	7/1/2012	6/30/2013	Completed	Participate in meetings, if required. Facilitate and provide meeting minutes as needed.
C. Hold public meetings as needed	7/1/2012	6/30/2013	Completed	Open houses will be held on an as-needed basis to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites. Other interested members implementing Albeni Falls wildlife mitigation will be invited to participate.
Deliverable: D. Completed project work identified in the Wildlife Management Plan		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

F: 189. Coordination-Columbia Basinwide

Title: Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus

Description: Coordinate and develop the materials necessary to represent the Albeni Falls Wildlife Mitigation Project to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.

Deliverable Specification: Meeting participants include all Columbia Basin Fish and Wildlife Authority (CBFWA) project managers and CBFWA managers. Often the purpose of the meetings are to improve basin-wide coordination efforts of project development. Usually there are 6-10 meetings planned annually. Spreadsheets, overheads, budgets, etc.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Prepare materials for meetings	7/1/2012	6/30/2013	Completed	Prepare PowerPoint presentations, overheads and other written materials on potential acquisition projects for the CBFWA wildlife advisory committee members.
B. Participate and attend wildlife caucus meetings	7/1/2012	6/30/2013	Completed	Participate and attend CBFWA wildlife advisory committee meetings as needed. Usually 6-10 meetings annually.
Deliverable: C. Regional Wildlife Meeting Attendance		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

G: 189. Coordination-Columbia Basinwide

Title: Build relationships with entities interested in wildlife mitigation

Description: Build effective working relationships with local governments, other agencies, non-profit organizations, members of the community, and the interested public. Primary focus will be to coordinate restoration efforts on mitigation parcels.



Deliverable Specification: Ongoing coordination to build community interest and inform the public about the Albeni Falls Wildlife Mitigation Project. Coordinate and involve agencies, other interested entities and the general public in restoration efforts on mitigation parcels.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with interested parties on restoration efforts on mitigation parcels	7/1/2012	6/30/2013	Completed	Coordinate with agency, tribe and other interested parties on planning and designing restoration projects on mitigation parcels.
B. Attend and participate in agency and community meetings	7/1/2012	6/30/2013	Completed	Attend and participate in land trust, land development and community group meetings as needed. Attend and participate in planning and scoping meetings for future restoration efforts on wildlife mitigation parcels.
C. Develop publications to advertise program	7/1/2012	6/30/2013	Completed	Develop informational pamphlets and/or poster or oral presentations on wildlife mitigation efforts including restoration on mitigation parcels.
Deliverable: D. Inform and Involve More Entities in the Mitigation Efforts		6/30/2013	Completed	See the Deliverable Specification above

H: 189. Coordination-Columbia Basinwide

Title: Meet with County Commissioners
Description: Meet with County Commissioners to inform and update them on Albeni Falls Wildlife Mitigation activities. Counties include Boundary County, Bonner County, Kootenai County, Shoshone County and Benewah County.
Deliverable Specification: Incorporation into annual report.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold or attend meetings as necessary	7/1/2012	6/30/2013	Completed	Meetings are to inform County commissioners of potential land sales and coordinate with wildlife management plan objectives.
Deliverable: B. Coordination with County Commissioners		6/30/2013	Completed	See the Deliverable Specification above

I: 189. Coordination-Columbia Basinwide

Title: Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans
Description: Coordinate enhancement activities defined in the individual site plans to ensure they follow the budget and attain the desired results.
Deliverable Specification: Verifying the completion of project work on mitigation properties for the Pend Oreille Wildlife Management Area (WMA), Boundary Creek and Smith Creek WMAs, and the Coeur d'Alene River WMA. Activities may include maintenance of fences, property and habitat improvements, access, water structures, information and education facilities, enforcement of easement terms and noxious weed control. Bidding out services to subcontractors and coordinating payment to subcontractors. Activities may include but are not limited to fencing, controlled burns, planting native vegetation, property clean-up and cultivating cropland.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold coordination meetings	7/1/2012	6/30/2013	Completed	Events that may trigger the organization of a meeting include the completion of a land acquisition or the beginning of a construction project on a Wildlife Management Area.
B. Coordinate activities on Boundary Creek/Smith Creek WMA	7/1/2012	6/30/2013	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Boundary Creek and Smith Creek Wildlife Management Areas.
C. Coordinate activities on Pend Oreille WMA	7/1/2012	6/30/2013	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Pend Oreille Wildlife Management Area (WMA).
D. Coordinate activities on the Coeur d'Alene River WMA	7/1/2012	6/30/2013	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Coeur d'Alene River Wildlife Management Area (WMA).
Deliverable: E. Completed project work identified in Wildlife Management Plans		6/30/2013	Completed	See the Deliverable Specification above

J: 114. Identify and Select Projects

Title: Identify cost-share partnerships and projects



Description: Wherever possible, identify partnerships with landowner participants, government agencies, watershed groups, or other entities so as to reduce costs, increase benefits, and/or eliminate duplicate activities. IDFG and the cost-share partner will negotiate a MOA to determine how habitat will be permanently protected and how management will proceed.

Deliverable Specification: List of cost-sharing partnerships to develop projects to protect, mitigate or enhance wildlife habitat. Cost-sharing role will be defined in Memorandum of Agreement (MOA). Possible partners could include The Nature Conservancy, Ducks Unlimited, Trout Unlimited, Inland Northwest Land Trust, the Rocky Mountain Elk Foundation, the Idaho Fish and Wildlife Foundation, the Idaho Department of Lands, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and the U.S. Forest Service and the Bureau of Land Management.

Primary Focal Species: Wildlife

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contact organizations via telephone or email or other methods applicable in pursuit of partner	7/1/2012	6/30/2013	Completed	Organizations and/or other agencies will be contacted to solicit cost-sharing partnerships.
B. Proposal Development	7/1/2012	6/30/2013	Completed	Proposal development will vary depending upon agency and/or organization requirements.
C. Land Committee Review and Approval	7/1/2012	6/30/2013	Completed	An internal process to review IDFG land acquisitions. The land committee meets at least four times a year and makes recommendations to the IDFG Director and the Idaho Fish and Game Commission.
D. Project Cost Share Information in Pisces	7/1/2012	6/30/2013	Completed	Funding obtained through cost share will be identified and entered into Pisces under the Project 1992-061-03
Deliverable: E. Cost Share Partners Identified		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

K: 99. Outreach and Education

Title: Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project

Description: Coordinate and implement information and education activities on the Albeni Falls Wildlife Mitigation Project. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours. Activities may also include developing a school curriculum. The goals are to educate members of the community on the mitigation program and to encourage their participation.

Deliverable Specification: Interpretive sites, audio-visual program, classroom syllabus, informational brochures and signs.

Planned Metrics: # of students reached: 200

Locations: 1
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Conduct classes, seminars, workshops, trainings, field tours, symposia and/or conferences	7/1/2012	6/30/2013	Completed	Includes outreach or education to the general public, fellow professionals and students (K-12 and college).
B. Set up web cam on WMA	7/1/2012	6/30/2013	Active	Set up a web cam on the Boundary Creek WMA so that the students as well as the general public can view the wildlife habitat and the wildlife live online.
C. Field studies with Habitat Biologists	5/1/2013	6/30/2013	Completed	Approximately 250 elementary, middle and/or high school students will observe habitat and wildlife biologists working in the field when collecting data.
D. Participant sign-in sheets	5/1/2013	6/30/2013	Completed	Participants will sign-in for any seminar, workshop or field study activity.
Deliverable: E. Education and Outreach for community affected by the Albeni Falls Hydroelectric facility.		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

L: 87. Prepare HEP Report

Title: Coordinate and conduct baseline and 5- and 10-year HEP surveys



Description: Coordinate completion of Habitat Evaluation Procedures (HEP).
Deliverable Specification: Coordinate completion of baseline and 5- and 10-year HEP surveys. HEP reports are included as appendices to the annual report.
Locations: 1
Primary Focal Species: Wildlife
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Collect HEP data from field studies	7/1/2012	6/30/2013	Completed	Collect field data using methods outlined in the USFWS HEP protocols.
B. Perform analysis on HEP data	7/1/2012	6/30/2013	Completed	Collected field data will be entered into databases and then applied to appropriate species models to calculate the project HUs.
C. Submit draft HEP report to BPA for review	7/1/2012	6/30/2013	Completed	HEP report will be produced and then submitted to BPA for review.
D. Upload final HEP report to BPA website	7/1/2012	6/30/2013	Completed	Final HEP report uploaded to BPA website.
Deliverable: E. Completed HEP Reports for Mitigation Properties		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

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

Title: Coordinate and conduct vegetative monitoring surveys
Description: Coordinate completion and/or conduct surveys to include: distribution and abundance plant communities, including native and rare species; noxious weeds; roads, trails, etc.; and recreational use, economics.
Deliverable Specification: For each of the wildlife management areas, coordinate with the Regional Habitat Biologists and technicians to analyze the vegetative monitoring field data for the annual report.
Planned Metrics: * Primary R, M, and E Focal Strategy : Tributary Habitat
 * Primary R, M, and E Type : Status and Trend Monitoring
Locations: 17
Primary Focal Species: Wildlife
Country: US **NPCC Subbasin:** Multiple
State: ID **HUC5 Watershed:** Multiple
County: BENEWAH | BONNER | BOUNDARY | KOOTENAI **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories: ID Conservation Data Center (<http://fishandgame.idaho.gov/cms/tech/CDC/>)
 Idaho Fish and Wildlife (<https://fishandgame.idaho.gov/ifwis/portal/>)
 Information System
 IDFG Fisheries Technical Reports (<https://collaboration.idfg.idaho.gov/FisheriesTechnicalReports/Forms/AllItems.aspx>)
Protocol: Monitoring and Evaluation Plan for Idaho Wildlife Mitigation Projects v1.0
Protocol Owner: Kathy Cousins **Protocol State:** Draft



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/4/2012	6/30/2013	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	7/1/2012	6/30/2013	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. Collect data from field studies	7/1/2012	6/30/2013	Completed	Data collected by the Habitat Biologists and Wildlife Technicians are submitted to the Project Manager.
D. Perform analyses on data set	7/1/2012	6/30/2013	Completed	Evaluations and assessments by Habitat Biologists and Biological Technicians are sent to the Project Manager. The Project Manager verifies the information and performs any additional analyses, if needed, and evaluates results in the annual report.
E. Collaborate with IBIS staff	7/1/2012	6/30/2013	Completed	Project Manager will collaborate with IBIS staff on the final analyses of data and generation of habitat value.
Deliverable: F. Summary of Findings in Annual Report		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

O: 174. Produce Plan

Title: Develop site-specific wildlife management plans

Description: Develop Wildlife Management Plans (WMP) that will include, but not be limited to, the following components: fish and wildlife habitat, recreation and access, fire protection noxious weeds, information and education, operation and maintenance, and monitoring and evaluation. The management plans will define the management program. These activities will be done on a need-by-need bases depending upon the acquisition activities.

Deliverable Specification: Site-specific management plans completed on a need-by-need basis. The time frame for the completion of a site-specific management plan is about one year after the completion of an acquisition. The wildlife management plan may include components on fish and wildlife habitat, recreation and access, fire protection, noxious weeds, information and education, operation and maintenance and monitoring and evaluation.

Primary Focal Species: Wildlife

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2012	6/30/2013	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. Hold scoping meetings	7/1/2012	6/30/2013	Completed	Meetings will be held on a need-by-need basis with local land owners, county commissioners and community members regarding any new Wildlife Management Plans.
C. Submit draft plan for IDFG review	7/1/2012	6/30/2013	Completed	Draft plan is submitted to IDFG for internal review, and review by the IDFG director and commission. This milestone will be completed after initial scoping meetings.
D. Submit draft plan for BPA review	7/1/2012	6/30/2013	Active	Draft management plan submitted to BPA for comments. This milestone will be completed after the IDFG review.
E. Hold a meeting for final review	7/1/2012	6/30/2013	Completed	The final draft Wildlife Management Plan will be presented to the county commissioners for comment. This milestone will be completed after the BPA review.
F. Submit final plan to BPA	7/1/2012	6/30/2013	Active	Final Wildlife Management Plan submitted to BPA. This milestone will be completed after it is presented to the County commissioners for comment.
Deliverable: G. Completed Wildlife Management Plans		6/30/2013	Active	<i>See the Deliverable Specification above</i>

P: 119. Manage and Administer Projects

Title: Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending



Description: Develop administrative work statement and budget, and maintain operating budgets for mitigation parcels. Oversee and develop budget revisions as necessary. Manage IDFG-BPA contract to maintain fiscal responsibility and oversight. Develop and manage subcontracts on an as-needed basis. Coordinate the purchase of equipment for the continued operation and maintenance of three Wildlife Management Areas (WMA). Maintain equipment inventory and documentation. Coordinate with administrative staff and maintain IDFG spending authority at appropriate levels.

Deliverable Specification: FY12 work statements, budgets and property inventories. Purchase of operating and maintenance equipment for three wildlife management areas (WMA). Copies of subcontracts and revised contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Create all FY12 and FY13 contracts using PISCES	10/1/2012	6/30/2013	Completed	FY12 and FY13 Statement of Work and Work Element budget to be developed on-line using PISCES.
B. Monitor periodic status reports on line	7/1/2012	6/30/2013	Completed	Status reports to be monitored on-line using PISCES.
C. Maintaining inventory documentation	7/1/2012	6/30/2013	Completed	Inventory maintained at site.
D. Land & Real Estate Training Seminars	8/2/2012	6/15/2013	Completed	The IDFG Project Manager to attend up to three instructional seminars on land appraising, real estate land transfers, and laws pertaining to conservation easements.
E. Solicit bids for equipment purchase	8/9/2012	6/30/2013	Completed	Coordinate the solicitation of bids for the purchase of equipment for the three Wildlife Management Areas (WMA). The equipment includes: - Seed Drill - CDA Tractor Land Pride 6 feet - Two Weed wiper booms - 15 foot Smucker @\$1,400 each - 3 - Bottom Plow - Arrow Equipment - ATV Sprayer Unit AgPro 2 tank/boomless sprayer.
F. Prepare paperwork for purchase of WMA equipment	8/9/2012	6/30/2013	Completed	Coordinate with Regional Biologists and Headquarter staff in the preparation and completion of the paperwork to purchase the O&M equipment.
G. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	7/1/2012	6/30/2013	Completed	If necessary, submit next year's Statement of Work and Work Element budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
H. Accrual - Submit September estimate to BPA	9/1/2012	9/15/2012	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. Generally, this should be done by September 10.
I. IDFG Project Manager to attend an Appraisal & Real Estate Course	9/14/2012	9/18/2012	Completed	The Project Manager to attend a course of instruction that covers the basics of Property Appraisals and the process of how they are completed.
Deliverable: J. Project Management and WMA Equipment Purchase		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

Q: 175. Produce Design and/or Specifications

Title: Prepare designs and plans to protect and restore delta area in the Project Area

Description: Extensive bank erosion has occurred to islands and shorelines in the Pack River, Clark Fork River and Priest River deltas in northern Idaho, resulting in significant losses of soil, native riparian and wetland vegetation, as well as the quantity and quality of fish and wildlife habitat. IDFG is working with Avista Corporation, Bureau of Land Management and Ducks Unlimited, as well as the Kalispel Tribe and other partners, to protect and restore wildlife habitats in the deltas. The Pack River delta is about 1,440 acres in size, and a small restoration project conducted in 2009, has shown that restoration is a viable wildlife mitigation opinion. The Priest River delta is now almost completely eroded. The Clark Fork River delta is about 6,000 acres in size, and is composed of complex wildlife habitats that are at risk of eroding into Lake Pend Oreille. Numerous studies have shown that over 80% of all fish and wildlife use riparian and wetland habitats during some stage of their life cycle—ranging from endangered bull trout, to recovered bald eagles, and big game, fur bearing mammals, reptiles, amphibians and hundreds of species of neo-tropical migrant birds. A coordinated effort is needed to prepare plans and designs to protect and restore the delta areas.

Deliverable Specification: A document proposing protection and restoration actions for the deltas in the Albeni Falls Dam Project Area.

Locations: 1

Primary Focal Species: Wildlife

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed:

HUC6 Name:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with partners and interested stakeholders	7/1/2012	6/30/2013	Completed	IDFG staff will meet with partners such as the U.S. Army Corps of Engineers, Kalispel Tribe, U.S. Bureau of Land Management, Avista Corporation, the Idaho Department of Lands, the Idaho Department of Environmental Quality, the U.S. Environmental Protection Agency, Ducks Unlimited and other interested parties to coordinate efforts in developing a plan and design to protect and restore wildlife habitat in the Project Area deltas.
B. Investigate all historical biological documents	7/1/2012	6/30/2013	Completed	IDFG staff will investigate and inventory past studies and surveys completed for the Project Area deltas.
C. Prepare a proposal for the protection and restoration of the Pack River and Clark Fork River deltas	7/1/2012	10/15/2012	Completed	IDFG Project Manager will coordinate with partners to prepare a proposal to protect and restore the Project Area deltas.
Deliverable: D. Engineered proposal for the protection and restoration of the deltas in the Project Area		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

R: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Jul-Sep 2012 (7/1/2012 - 9/30/2012)	10/1/2012	10/15/2012	Completed	
B. Oct-Dec 2012 (10/1/2012 - 12/31/2012)	1/1/2013	1/15/2013	Completed	
C. Jan-Mar 2013 (1/1/2013 - 3/31/2013)	4/1/2013	4/15/2013	Completed	
D. Final Apr-Jun 2013 (4/1/2013 - 6/30/2013)	6/16/2013	6/30/2013	Completed	

S: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (July 1, 2012) to (June 30, 2013)
Description: 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. Date range July 1, 2012 to June 30, 2013 will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics:
 * Start date of reporting period : 7/1/2012
 * End date of reporting period : 6/30/2013



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	7/1/2012	6/30/2013	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	7/1/2012	6/30/2013	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.
C. Submit annual progress report to COTR	7/1/2012	6/30/2013	Completed	Submit the completed annual report to the COTR.
D. Confirm BPA has posted the progress report	7/1/2012	6/30/2013	Completed	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: E. Attach Progress Report in Pisces		6/30/2013	Completed	<i>See the Deliverable Specification above</i>

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASSAGE
Contract #: 60779 [ISSUED] **Amendment #:** 1 [ISSUED]
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: Amd1
SOW Validation: Last validated 08/21/2013 with 0 problems, and 0 reviewable items
Contract Documents: Budget - Contract (08/21/2013) Revised Line Item Budget

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kjvleuven@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland, OR 97208-3621
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232
Jason Connor	Technical Contact	Kalispel Tribe	(509) 447-7285 / NA	jconnor@knrd.org	1981 N Leclerc Rd Usk WA 99180
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Joe Maroney	Supervisor	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Todd Andersen	Technical Contact	Kalispel Tribe	(509) 447-7245 / NA	tandersen@knrd.org	1981 N Leclerc Rd. Usk WA 99180
Brian Bellgraph	Technical Contact	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Jolene Seymour	Administrative Contact	Kalispel Tribe	(509) 445-1147 / NA	jseymour@kalispeltribe.com	
Ryan McNee	Technical Contact	Kalispel Tribe	(509) 447-7423 / NA	rmcnee@kalispeltribe.com	
Rossana Callejas	Interested Party	Bonneville Power Administration	(503) 230-7558 / NA	rxcallejas@bpa.gov	HQ-4
Jenna Peterson	Env. Compliance Lead	Bonneville Power Administration	(503) 230-3018 / NA	jepeterson@bpa.gov	905 NE 11th Avenue KEC-4 Portland OR 97232

Work Element Table of Contents:



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$5,086	(1 %)
B : 165. Produce Environmental Compliance Documentation - Obtain necessary permits and set up contract for genetic analysis		\$5,878	(1 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Electrofishing to collect bull trout below Albeni Falls Dam	*	\$61,154	(10 %)
D : 157. Collect/Generate/Validate Field and Lab Data - Angling for bull trout	*	\$6,303	(1 %)
E : 158. Mark/Tag Animals - Implant combination radio acoustic or radio transmitter into bull trout	*	\$32,525	(5 %)
F : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$10,185	(2 %)
G : 157. Collect/Generate/Validate Field and Lab Data - Rapid response genetic analysis of bull trout biopsy samples	*	\$6,628	(1 %)
H : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft, boat, and vehicle	*	\$35,625	(6 %)
I : 162. Analyze/Interpret Data - Analysis of bull trout radiotelemetry data		\$14,518	(2 %)
J : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$11,108	(2 %)
K : 157. Collect/Generate/Validate Field and Lab Data - Compile electronic spreadsheet database of electrofishing data	*	\$13,234	(2 %)
L : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving stations	*	\$28,451	(5 %)
M : 162. Analyze/Interpret Data - Data reduction and analysis		\$15,288	(2 %)
N : 189. Coordination-Columbia Basinwide - Project coordination among all stakeholders		\$13,237	(2 %)
O : 119. Manage and Administer Projects - Manage Project		\$57,335	(9 %)
P : 132. Produce (Annual) Progress Report - Submit Annual Report for the period (5/1/2012) to (4/30/2013)		\$13,516	(2 %)
Q : 184. Install Fish Passage Structure - Temporary upstream trap installed at Albeni Falls Dam, Idaho	*	\$300,000	(48 %)
Total:		\$630,071	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

Bull trout in the Columbia River Basin were listed as Threatened by the US Fish and Wildlife Service (USFWS) in 1998 (USFWS 2000). Bull trout populations are threatened by habitat degradation and fragmentation, past fisheries management practices, poor water quality, and blockage of migratory corridors. Pend Oreille River and Lake is a core area within the Northeast Washington Recovery Unit of the Columbia Basin bull trout population (USFWS 2002a, 2002b). Recovery of Pend Oreille bull trout is limited by the fact that dams on the mainstem Pend Oreille River (Albeni Falls and Box Canyon dams) have blocked migration of bull trout between Lake Pend Oreille and spawning/rearing areas (USFWS 2002a, 2002b). Albeni Falls Dam is a federal facility under the responsibility of the action agencies (US Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation). Albeni Falls Dam created two types of problems for bull trout in the Pend Oreille Basin. First, bull trout from natal tributaries above the dam, that either became entrained or had elected to voluntarily pass below the dam, were unable to return to spawn in their natal tributaries. (Source populations could include bull trout spawning in the Priest River, inlet tributaries of Pend Oreille Lake, or tributaries of the Clark Fork River below or above Cabinet Gorge Dam.) Second, adfluvial bull trout that formerly spawned in tributaries below the dam and migrated upstream to a cold water refuge in Lake Pend Oreille, Idaho were no longer able to do so.

The goal of this project is to provide temporary upstream passage, investigate long term fish passage, and fill data gaps for bull trout at Albeni Falls Dam on the Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing, angling, and snorkeling. All bull trout captured will be biopsied via hole punch and their DNA sent to the USFWS lab in Abernathy, Washington for rapid response genetic analysis. Each DNA sample will be compared to DNA from other bull trout populations in the Priest River drainage, Pend Oreille Lake tributaries, and Clark Fork drainage and an assignment will be made as to its probable region of origin. Prior to release each fish will be implanted with a combination radio-acoustic or radio transmitter to ascertain if the spawning tributary it selected was the same as its assigned tributary. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2013 (5/1/2013 - 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. Jan-Mar 2014 (1/1/2014 - 3/31/2014)	4/1/2014	4/15/2014	Active	
E. Final Apr 2014 (4/1/2014 - 4/30/2014)	4/16/2014	4/30/2014	Active	

B: 165. Produce Environmental Compliance Documentation

Title: Obtain necessary permits and set up contract for genetic analysis



Description: The Kalispel Natural Resource Department (KNRD) will obtain the necessary permits outlined in section D. PNNL and EWU will also obtain appropriate scientific collection permits. Additionally, the Kalispel Tribe will contract with the U.S. Fish and Wildlife Service Genetics Laboratory for conducting rapid response genetic analysis.

Deliverable Specification: Idaho state transport permit (Every 90 days)
Idaho scientific collection permit
Federal Section 10 fish and wildlife collection permit

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	5/1/2013	5/1/2013	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 (<i>Entosphenus tridentatus</i>) 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), macrophthalmia (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	5/1/2013	4/30/2014	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.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. Obtain BPA's EC Lead sign-off that EC requirements are complete	5/1/2013	5/1/2013	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.
D. Apply for 2014 Idaho collection permit	1/8/2014	2/5/2014	Active	Acquire Idaho Scientific collection permit
E. Apply for 2014 Transport Permit	1/8/2014	2/5/2014	Active	Acquire Idaho transport permit
F. Apply for 2014 federal fish and wildlife permit	1/8/2014	2/5/2014	Active	Acquire Fish and Wildlife permit
Deliverable: G. Idaho scientific collection, transportation, and federal permits		4/15/2014	Completed	<i>See the Deliverable Specification above</i>

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

Title: Electrofishing to collect bull trout below Albeni Falls Dam
Description: EWU and KNRD crews will conduct electrofishing surveys from Indian Creek (14 km below Albeni Falls Dam) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew. Most of the effort will be focused in the spring around the peak of the hydrograph before water temperatures reach the 16 degree Celsius threshold. In the previous three years this tends to be the period of time when the most bull trout have been captured and tagged.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by electrofishing that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about electrofishing operations.

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 : Uncertainty Research
 * Secondary R, M, and E Focal Strategy : Population Status

Locations: 6
Primary Focal Species: Trout, Bull
Country: US
State: Multiple
County: BONNER | PEND OREILLE
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name: EXPOSURE CREEK

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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	5/1/2013	4/30/2014	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. Spring electrofishing	5/1/2013	4/25/2014	Completed	EWU and KNRD crews will conduct electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew. The most effort will be expended in the spring before water temperatures rise above 16 degree Celsius. PNNL biologists will assist as needed.
D. Summer electrofishing	7/1/2013	9/15/2013	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, time will be expended in the summer at cold water refugia.
E. Fall electrofishing	9/16/2013	12/14/2013	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, effort will be expended in the fall once river temperatures fall below 16 C.
Deliverable: F. Electrofishing collection of bull trout below Albeni Falls Dam		4/30/2014	Completed	<i>See the Deliverable Specification above</i>

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

Title: Angling for bull trout



Description: KNRD crews will conduct angling surveys in the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 4 days of effort will be expended annually by the crew. Latitude and longitude coordinates at the start and end of each angling survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: WU will provide an annual summary of fish captured by angling that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about angling efforts.

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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 6

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER | PEND OREILLE **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
Oreille Subbasin Data
Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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	5/1/2013	4/30/2014	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. Spring angling	5/1/2013	4/29/2014	Completed	Angling for bull trout will be used when the water levels in the tailrace are too high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and or water velocity. A total of four days of angling will be conducted yearly.
D. Fall angling	9/15/2013	11/30/2013	Completed	Angling for bull trout will be used when the water levels in the tailrace are too high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and or water velocity. A total of four days of angling will be conducted yearly.
Deliverable: E. Angling for bull trout below Albeni Falls Dam		4/30/2014	Completed	<i>See the Deliverable Specification above</i>

E: 158. Mark/Tag Animals

Title: Implant combination radio acoustic or radio transmitter into bull trout



Description: Transmitter implantation will be accomplished by EWU, KNRD, and PNNL. Bull trout from electrofishing and angling will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for PIT tags. The PIT tag number along with data on TL (mm), FL (mm), weight (g) and results of the genetic assignment from the 'rapid response genetic analysis' (bull trout only) will be recorded on a data sheet.

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The fish will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exciting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently.

Deliverable Specification: 5-20 Bull trout will be captured and undergo surgery, depending on the size of the fish it will either be implanted with a combination radio acoustic or radio tag. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water), CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)], or Lotek radio tag SR-11-18, 449 day life. Surgical implantation of the transmitters will be accomplished by an experienced surgeon.

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 : Uncertainty Research

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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. Implant CART tags and radio tags in up to 5-20 bull trout	5/1/2013	4/18/2014	Active	The goal is 5-20 bull trout implanted with CART or radio tags.
Deliverable: C. Implanting of radio tags		4/30/2014	Active	See the Deliverable Specification above

F: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam

Description: All bull trout collected in the tailrace of Albeni Falls Dam in 2013-14 will be released primarily above Albeni Falls Dam, with the exception of any bull trout caught in a cold water refuge while the Pend Oreille River water temperature is above 16 degrees Celsius. Any bull trout captured in cold water refuge while the Pend Oreille River is above 16 degrees Celsius will be transported directly to Lake Pend Oreille. This will enable the fish to seek cold water with depth immediately.

Deliverable Specification: Bull trout captured in the tailrace of Albeni Falls Dam when water temperatures are below 16 degrees Celsius will be radio or CART tagged, transported, and released above the dam at the Priest River boat launch (below the confluence of Priest River and the Pend Oreille River).

Planned Metrics: # of fish transported: 20

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed:

HUC6 Name:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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. Capture bull trout	5/1/2013	4/25/2014	Active	Bull trout will be captured by boat electrofishing and angling between Indian Creek and the tailrace of Albeni Falls Dam. After capture bull trout will be implanted with a radio or CART tag and moved above Albeni Falls Dam and released at the Priest River boat launch.
C. Transport bull trout	5/1/2013	4/25/2014	Active	Bull trout will be transported in a water-filled cooler maintained at the proper temperature and DO level to the Priest River boat launch.
Deliverable: D. Bull trout transported above Albeni Falls Dam		4/30/2014	Active	<i>See the Deliverable Specification above</i>

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

Title: Rapid response genetic analysis of bull trout biopsy samples

Description: Tissue samples will be collected from bull trout captured by electrofishing and angling. The samples will be sent by express mail to the USFWS Genetics Laboratory in Abernathy Washington. Within 48 hours the USFWS genetics lab will assign individual bull trout to a particular tributary and will communicate this information to KNRD.

Deliverable Specification: Bull trout will be assigned to individual natal tributaries. Using the lab's "rapid response genetic analysis" protocol (The protocol that is being used at Cabinet Gorge Dam an Avista project)(Arden et al. 2005), the samples will be analyzed at 12 microsatellite DNA (msDNA) loci that are standard for Columbia Basin bull trout.

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 : Uncertainty Research

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** ELOCHOMAN

State: WA **HUC5 Watershed:** GERMANY/ABERNATHY

County: COWLITZ **HUC6 Name:**

Salmonid ESUs Present: Columbia River Chum Salmon ESU (Accessible) | Lower Columbia River Chinook Salmon ESU (Accessible) | Lower Columbia River Coho Salmon ESU (Accessible)

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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	5/1/2013	4/30/2014	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. Collect bull trout tissue samples	5/1/2013	4/25/2014	Active	Bull trout tissue samples will be collect by boat electrofishing and angling in the tailrace of Albeni Falls Dam. The samples will then be shipped to Abernathy Lab to under Rapid Response genetic assignments within 48 hours
D. Send bull trout tissue samples	5/1/2013	4/25/2014	Active	Send collected bull trout tissue samples to the Abernathy Lab for genetic analysis.
E. Abernathy Lab to process tissue samples and send results	5/1/2013	4/30/2014	Active	Abernathy Genetic Lab will process bull trout tissue samples. The sample will assign the particular bull trout to a region. The results will then be sent back to the Kalispel Tribe.
Deliverable: F. Genetic Analysis		4/30/2014	Active	<i>See the Deliverable Specification above</i>

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

Title: Mobile tracking surveys by fixed wing aircraft, boat, and vehicle

Description: Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. Air surveys will be made as needed. EWU will charter a Cessna C-182 aircraft from Felts Field Aviation in Spokane, Washington for making aerial surveys. A Yagi antenna will be mounted externally underneath the wing of the aircraft. Each flight will be approximately four hours in duration. A pilot accompanied by an EWU technician will fly a similar flight plan for each survey. Boat tracking will be conducted in the event that tributary flows are too low for bull trout to enter tributaries.

Deliverable Specification: Air surveys will be made as needed. The flight path will start just below Albeni Falls Dam, thence up the center of the Pend Oreille River to the outlet of Pend Oreille Lake, then around the perimeter of Pend Oreille Lake. Where known bull trout spawning tributaries enter they will be followed to their source or known upper limit of bull trout occupancy. Tributaries surveyed will include: (1) Priest River to Outlet Dam, including the East River and its Middle Fork; (2) Tributaries entering the north shore of Lake Pend Oreille (Pack River, Grouse Creek and Trestle Creek); (3) Tributaries entering the Clark Fork arm of Lake Pend Oreille (Lightning Creek and tributaries, Johnson Creek and Twin Creek) and (4) Tributaries entering the east shore of Lake Pend Oreille (Granite Creek, Sullivan Springs Creek, North Gold Creek, Gold Creek). Additionally, the Clark Fork River will be flown to Cabinet Gorge Dam. Vehicle surveys will be made once monthly from June to August and once weekly from September to November. Boat tracking will be conducted in the event that tributary flows are too low for bull trout to enter.

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 : Uncertainty Research

Locations: 15

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BONNER **HUC6 Name:** Multiple

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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	5/1/2013	4/30/2014	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. Aircraft tracking	5/15/2013	4/18/2014	Active	Aerial surveys will be conducted as needed from fixed wing aircraft.
D. Boat tracking	5/15/2013	4/18/2014	Active	Boat tracking will be conducted as needed in the event spawning tributary flows are too low for bull trout to enter.
E. Vehicle tracking	6/4/2013	12/3/2013	Completed	Vehicles surveys will be made along each of the tributaries streams once monthly from June to August and once weekly from September to November.
Deliverable: F. Tracking of radio tagged fish with aircraft, vehicle, and boat.		4/15/2014	Active	<i>See the Deliverable Specification above</i>

I: 162. Analyze/Interpret Data

Title: Analysis of bull trout radiotelemetry data

Description: Bull trout radiotelemetry data will be analyzed in ArcGIS to determine seasonal movement, habitat use and diel activity.

Deliverable Specification: Spatial analysis of bull trout movements, habitat use, and natal stream use will be conducted using ArcGIS.

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 : Uncertainty Research

Locations:

Primary Focal Species: Trout, Bull

Country: **NPCC Subbasin:**



State: HUC5 Watershed:
County: HUC6 Name:
Salmonid ESUs Present:
Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data
 Management Project
Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0
Protocol Owner: Jason Olson **Protocol State:** Proposed
Area of Inference:

Name	Value
Bull Trout Critical Habitat - Stream	Pend Oreille River

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Bull trout data will be entered into MS Excel spreadsheet	5/30/2013	4/18/2014	Active	Raw tracking data (GPS location, water temperature, habitat, fish code, depth, and substrate where possible) will be entered into MS Excel spreadsheet
B. GPS data will be spatially analyzed in Arc GIS	1/1/2014	4/18/2014	Active	GPS data will be entered into Arc GIS to be spatially analyzed and create maps of fish movement and habitat usage.
C. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	5/1/2013	4/30/2014	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.
Deliverable: D. Analyzed data for annual technical report.		4/30/2014	Active	See the Deliverable Specification above

J: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations
Description: Each spring PNNL and EWU will overhaul, refurbish and retest each of the twelve ground receiving stations..
Deliverable Specification: Functioning, tested (each station will be inspected for damage. Beacon tags and 12 volt batteries will be replaced if necessary) ground receiving stations. A trip log form and electronic version of the data will be maintained at PNNL and backed up at EWU. The annual reports will contain a description of annual overhaul and maintenance activities.
Locations: 11
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** Multiple
State: ID **HUC5 Watershed:** Multiple
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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. Overhaul, refurbish, and retest ground receiving stations	3/1/2014	4/30/2014	Active	Each spring PNNL and EWU will overhaul, refurbish and retest each of the twelve ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
Deliverable: C. Annual maintenance of monitoring equipment		4/30/2014	Active	See the Deliverable Specification above

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

Title: Compile electronic spreadsheet database of electrofishing data
Description: All electrofishing and angling data will be entered into an Excel spreadsheet and maintained as an electronic database of electrofishing records.
Deliverable Specification: All electrofishing and angling data will be entered into a excel workbook and maintained as a electronic database of all electrofishing.



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 : Uncertainty Research
 * Secondary R, M, and E Focal Strategy : Population Status

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: WA **HUC5 Watershed:** UPPER PEND OREILLE

County: PEND OREILLE **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data
 Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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	5/1/2013	4/30/2014	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. Electrofishing and angling data entry	5/10/2013	4/11/2014	Completed	All data collected while electrofishing and angling for bull trout will be input into a excel workbook and maintained as a electronic data base
Deliverable: D. Electrofishing and angling data entry		4/25/2014	Completed	<i>See the Deliverable Specification above</i>

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

Title: Download stationary ground radio receiving stations

Description: All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download. Each station will be inspected for damage and repaired if necessary.

Deliverable Specification: All fixed receiver stations will be inspected (Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.) and downloaded (Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise).

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 : Uncertainty Research

Locations: 11

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data
 Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2013	5/1/2013	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	5/1/2013	4/30/2014	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. Inspect and download receiver stations 26 times per year	5/14/2013	4/26/2014	Active	<p>All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.</p> <p>Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.</p> <p>Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.</p> <p>Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.</p>
Deliverable: D. Downloading stationary ground radio receiver		4/29/2014	Active	See the Deliverable Specification above

M: 162. Analyze/Interpret Data

Title: Data reduction and analysis

Description: EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked.

Deliverable Specification: GIS maps and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.

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 : Uncertainty Research

Locations:

Primary Focal Species: Trout, Bull

Country:

State:

County:

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
Oreille Subbasin Data Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson

Protocol State: Proposed

Area of Inference:

Name	Value
Bull Trout Critical Habitat - Stream	Pend Oreille River

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	5/1/2013	4/30/2014	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.
B. GIS generated tracking maps	11/9/2013	4/15/2014	Active	EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.
C. Statistical comparisons of run timing, genetic assignments, and spawning tributaries	11/9/2013	4/15/2014	Active	Statistical comparisons will be made to determine if fish randomly entered spawning tributaries or if they entered the tributary predicted by their genetic assignment. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
Deliverable: D. Data analysis of tracking data		4/15/2014	Active	<i>See the Deliverable Specification above</i>

N: 189. Coordination-Columbia Basinwide

Title: Project coordination among all stakeholders

Description: This project requires coordination with a number of agencies and organizations.

Deliverable Specification: Coordination activities (Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), private utilities (Avista), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies.) will be included in project reporting. Coordination will also be done via email, land mail, and telephone randomly as questions or findings arise. Because this project will be conducted in two states and involves a federal threaten species coordination and communication will be important to obtain permits, move fish, and distribute findings.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Ongoing coordination between stakeholders	5/1/2013	4/30/2014	Active	Coordination between PIs, USACE, WDFW, IDFG, USFWS, Avista Power, PNNL, EWU, bull trout recovery groups, and other researchers.
Deliverable: B. Project coordination among stakeholders		4/30/2014	Active	<i>See the Deliverable Specification above</i>

O: 119. Manage and Administer Projects

Title: Manage Project

Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.

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.

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	10/1/2013	11/29/2013	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.	1/1/2014	1/30/2014	Active	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.



Milestone Title	Start Date	End Date	Status	Milestone Description
C. #3 Funding Package - Attach budget and inventory documents then click Submit in SOW tab.	11/1/2013	1/31/2014	Active	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).	11/1/2013	1/31/2014	Active	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.)
E. #5 Funding Package - Respond to any Contracting Officer's requests for revisions within 7 days.	11/1/2013	4/30/2014	Active	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.	11/1/2013	4/30/2014	Active	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.	11/1/2013	4/30/2014	Active	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	9/1/2013	9/9/2013	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	5/1/2013	4/30/2014	Active	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.	5/1/2013	4/30/2014	Active	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.	5/1/2013	7/31/2013	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 un-invoiced work. This amount will be emailed to FWinvoices@bpa.gov and the COTR, Subject line: Kalispel Tribe, Un-invoiced balance for BPA contract # _____, BPA Project # _____ is \$ _____.
L. Inventory - Mark/Tag all equipment purchased during the contract.	5/1/2013	4/30/2014	Active	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.)

Milestone Title	Start Date	End Date	Status	Milestone Description
M. Facilitate inputting Cost Share information into Pisces at the Project level.	10/1/2013	11/15/2013	Completed	a) If you are the lone contractor under this contract, enter previous federal FY's Cost Share information on the Project's Cost Share tab by Nov 15. (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. (b2) Enter previous FY's Cost Share information on the Project Cost Share tab by Nov 15 for all project partners. (c) If there are multiple contractors under this project, and you are not the lead project Proponent, email federal FY Cost Share information for your contract to the lead contractor by Nov 1. (Milestone starts Oct 1 and ends on Nov 1 for option a, and Nov 15 for options b and c)
N. E-waste disposal in accordance with state and local jurisdiction, laws and policies	5/1/2013	4/30/2014	Active	Confirm that adequate waste identification and collection procedures are in place and proper disposal practices are followed according to your governmental policy. If you do not have a policy, please contact your CO and/or COTR for guidance. Purpose is to keep hazardous materials from entering the normal waste stream, becoming land-fill, or being boot-logged into unregulated reprocessing and/or metals extraction. E-Waste usually includes: batteries, light ballasts, fluorescent tubes and bulbs, modems, routers, computers and all equipment with electronic components. For current EPA guidance, please see: http://www.epa.gov/osw/conservation/materials/recycling/rules.htm
O. Project biologist to attend AFS conference and present project findings	9/8/2013	9/13/2013	Completed	Project Biologist to attend AFS conference and present project findings.
Deliverable: P. Fulfill all administrative tasks with quality products and in a timely manner.		4/30/2014	Active	<i>See the Deliverable Specification above</i>

P: 132. Produce (Annual) Progress Report

- Title:** Submit Annual Report for the period (5/1/2012) to (4/30/2013)
- Description:** Prepare and upload annual report.
- Deliverable Specification:** Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.
- Planned Metrics:**
- * Start date of reporting period : 5/1/2012
 - * End date of reporting period : 4/30/2013

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	11/30/2013	12/15/2013	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	1/1/2014	2/28/2014	Active	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.
C. Submit progress report for external review	3/3/2014	3/28/2014	Active	Use this milestone if the progress report requires external review.
D. Confirm BPA has posted the progress report (previous year's)	5/1/2013	8/30/2013	Completed	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: E. Attach Progress Report in Pisces		4/30/2014	Active	<i>See the Deliverable Specification above</i>

Q: 184. Install Fish Passage Structure

- Title:** Temporary upstream trap installed at Albeni Falls Dam, Idaho



Description: The USACE is currently assessing the feasibility of fish passage at AFD to comply with US Fish and Wildlife Service 2000 Biological Opinion on effects of operating the Federal Columbia River Power System on bull trout. Completion of the feasibility study, authorization for funding upstream fish passage, and construction of a facility is expected to take at least six (6) years.

The Kalispel Tribe and partners have been providing temporary upstream passage of bull trout at AFD since 2007 primarily by boat electrofishing, but also angling and snorkel-dip netting at cold water refuge downstream. Due to concern about personnel safety, electrofishing injury to bull trout and low capture efficiency, alternative methods of bull trout capture are being sought.

This temporary upstream fish trap will be operated by the Tribe as an interim fish passage measure in lieu of intensive electrofishing downstream of AFD. We expect to operate the facility annually from March-June/July until Pend Oreille River temperatures exceed 16-18 °C and again in fall once temperatures drop below that point.

Deliverable Specification: Temporary upstream fish trap will be designed, constructed, deployed, and operated by spring 2014.

Planned Metrics: * # of miles of habitat accessed to the next upstream barrier(s) or likely limit of habitable range: 25.00
* If installing a ladder, does the ladder meet NOAA specifications for attraction flow, pool dimensions, jump height, etc?: No
* # of weirs or fishway chutes or pools installed in the freshwater non-tidal zone: 1

Locations:

1

Primary Focal Species:

Trout, Bull

Country:

US

State:

ID

County:

BONNER

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/19/2013	9/30/2013	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. Discuss HIP3 ESA coverage with BPA EC lead; obtain risk determination	8/19/2013	9/30/2013	Completed	EC Lead will determine if work under this work element may be able to have full ESA-coverage (NMFS & USFWS) under the 2013 Habitat Improvement Program Biological Opinion (HIP3). The HIP3 programmatic BiOp has expanded coverage for projects that are moderate to high risk that would normally require a BA. For work that qualifies, HIP3 requires projects to undergo a review by an internal review team called the Restoration Review Team (RRT) in lieu of conducting a stand-alone ESA consultation. To begin this process, contact the EC lead for HIP3 Risk Determination and instruction on information needs and requirements to be eligible for coverage.
C. Negotiate on-call professional services agreement with selected contractor (task-orders)	8/19/2013	9/30/2013	Completed	The Kalispel Tribe solicited responses to an RFQ for engineering and technical services for design and construction oversight of the temporary upstream fish trap in July 2013. During August and September, a professional services agreement will be negotiated with the selected contractor to develop individual task-orders to include: data sharing and site visit, conceptual designs, 50% complete designs, 100% designs, construction oversight, and trap deployment.
D. Data sharing and site visit	8/30/2013	9/30/2013	Completed	In coordination with USACE NWS and Albeni Falls Dam staff, share biological, hydrologic, hydraulic, structural, access, etc. data specific to the proposed location of a temporary upstream fish trap at the project. Host a 1-day site visit at Albeni Falls Dam with key USACE NWS and Project staff, contractor(s), and KNRD to discuss project implementation, scope and scale of the project, limitations, and Project constraints regarding dam safety, personnel safety, and design requirements. All facilities must meet USACE standards and be reviewed and approved by USACE prior to installation and operation.
E. Conceptual design	8/30/2013	10/15/2013	Completed	Conceptual designs submitted to KNRD and USACE for review and approval. All facilities must meet USACE standards and be reviewed and approved by USACE prior to installation and operation.
F. 50% design drawings	10/15/2013	11/1/2013	Active	Fifty percent design drawings submitted to KNRD and USACE for review and approval. All facilities must meet USACE standards and be reviewed and approved by USACE prior to installation and operation.
G. 100% design drawings	11/15/2013	12/6/2013	Active	One hundred design drawings submitted to KNRD and USACE for review and approval. All facilities must meet USACE standards and be reviewed and approved by USACE prior to installation and operation.
H. Temporary trap construction	12/6/2013	3/31/2014	Active	Construction of temporary upstream fish trap.
I. Temporary trap deployment and testing	3/3/2014	4/30/2014	Active	Deployment of temporary upstream fish trap at Albeni Falls Dam, Idaho. Installation will include all personnel safety devices, access measures, water supply devices.
J. Operate temporary upstream fish trap	3/3/2014	4/30/2014	Active	Trap will be continuously operated until the Pend Oreille River temperatures rise above 16-18 C in June/July and again in fall once temperature drops below that point.
Deliverable: K. Temporary upstream trap installed and operated at Albeni Falls Dam, Idaho		4/30/2014	Active	<i>See the Deliverable Specification above</i>

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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Pend Oreille River Basin Initiative: Land Acquisitions, Watershed Restoration, Conservation Hatchery
Project #: 2011-018-00
Contract Title: 2011-018-00 EXP PEND OREILLE RIVER BASIN INITIATIVE
Contract #: 62378 [ISSUED]
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 298153 **Task ID:** 1
Perf. Period Budget: \$219,955 **Perf. Period:** 8/1/2013 - 7/31/2014
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: 62378
SOW Validation: Last validated 08/26/2013 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (07/23/2013) CR-234760 Property Inventory
Budget - Contract (07/23/2013) Pend Oreille Initiative 2014 Line Item Budget

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kjvleuven@bpa.gov	P.O Box 3621 Mailstop - NSSP-4 Portland, OR 97208-3621
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232
Matthew Berger	Technical Contact	Kalispel Tribe	(509) 447-7274 / NA	mberger@knrd.org	
Ray Entz	Supervisor	Kalispel Tribe	(509) 445-1147 / NA	rentz@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Joe Maroney	Supervisor	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Jason Connor	Interested Party	Kalispel Tribe	(509) 447-7285 / NA	jconnor@knrd.org	1981 N Leclerc Rd Usk WA 99180
Jason Olson	Contract Manager	Kalispel Tribe	(509) 447-7290 / NA	jolson@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Jolene Seymour	Administrative Contact	Kalispel Tribe	(509) 445-1147 / NA	jseymour@kalispeltribe.com	
Jenna Peterson	Env. Compliance Lead	Bonneville Power Administration	(503) 230-3018 / NA	jepeterson@bpa.gov	905 NE 11th Avenue KEC-4 Portland OR 97232

Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$6,900	(3 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
B : 165. Produce Environmental Compliance Documentation - Obtain Required Permits		\$8,100	(4 %)
C : 119. Manage and Administer Projects - Manage and fulfill all administrative tasks		\$65,280	(30 %)
D : 184. Install Fish Passage Structure - Replace East Branch LeClerc Creek culverts sites No. 1520386 and 1520387	*	\$28,700	(13 %)
E : 184. Install Fish Passage Structure - Replace West Branch LeClerc Creek Culvert site No. 1520372	*	\$14,350	(7 %)
F : 132. Produce (Annual) Progress Report - Submit Progress Report for the period Aug 1,2013 to July 31,2014		\$21,000	(10 %)
G : 34. Develop Alternative Water Source - Temperature model of the Priest River	*	\$28,275	(13 %)
H : 189. Coordination-Columbia Basinwide - Coordination with other entities on restoration efforts		\$37,500	(17 %)
I : 40. Install Fence - Install fence around Indian Creek Ponds	*	\$9,850	(4 %)
Total:		\$219,955	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

This project supports implementing larger-scale projects to improve local watershed health and ecosystem conditions and function within the Pend Oreille subbasin, consistent with the NPCC Sub-Basin Plan. The Kalispel Tribe has a history of matching & leveraging funds from various sources (e.g. SRFB, DOE, DOT, BIA, USFS) to implement large scale watershed projects. Land management and watershed restoration will be based upon the jointly-developed objectives and expected performance outcomes. There is an opportunity for cost share on culvert removal projects in the LeClerc Watershed. This is a cooperative project with the US Forest Service and Salmon Recovery Funding Board (SRFB). A total of 3 culverts that are blockages to fish passage will be replaced. Two of these culverts are on streams that are tributaries to East Branch LeClerc and the other culvert is on West Branch LeClerc. This project will also develop a CE-QUAL-W2 temperature model of the Priest River between Priest Lake and the Pend Oreille River to investigate the potential impact of cooler flows released from Priest Lake.

This project includes plans to design and implement a feasibility study for a westslope cutthroat and/or bull trout conservation aquaculture facility. The Tribe will obtain BPA concurrence about purpose and need, and project objectives to be served through conservation aquaculture – including agreement about appropriate cost-share (relative to the magnitude of the impacts attributable to the FCRPS and Albeni Falls Dam in particular) – before beginning the Northwest Power and Conservation Council’s Major Projects Review (3-STEP) process in about years 5 through 7.

- Target Habitats: Pend Oreille River and its tributaries both upstream and downstream of Albeni Falls Dam.
- Projected Benefits: Land acquisitions and conservations easements in core bull trout and westslope cutthroat watersheds. Large scale tributary fish passage projects. Improved ecosystem function through re-establishment of ecological conditions that foster abundance, diversity, and productivity of affected species. A better understanding of westslope cutthroat and bull trout rebuilding needs and objectives; greater definition of the purposes to be served through conservation aquaculture; and the possible construction of a production facility commencing after the ten-year term of this agreement.
- References: Intermountain Subbasin Plan (Pend Oreille Subbasin), Draft Bull Trout Recovery Plan (Chapter 23)



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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Aug-Sep 2013 (8/1/2013 - 9/30/2013)	10/1/2013	10/15/2013	Completed	
B. Oct-Dec 2013 (10/1/2013 - 12/31/2013)	1/1/2014	1/15/2014	Completed	
C. Jan-Mar 2014 (1/1/2014 - 3/31/2014)	4/1/2014	4/15/2014	Active	
D. Apr-Jun 2014 (4/1/2014 - 6/30/2014)	7/1/2014	7/15/2014	Active	
E. Final Jul 2014 (7/1/2014 - 7/31/2014)	7/17/2014	7/31/2014	Active	

B: 165. Produce Environmental Compliance Documentation

Title: Obtain Required Permits

Description: Obtain required environmental permits to implement habitat restoration activities.

Deliverable Specification: Specific permits necessary for work to proceed: Department of the Army Permit from the US Army of Corps of Engineers, USFS and WDFW JARPA permit.

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	8/1/2013	9/2/2013	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 (<i>Entosphenus tridentatus</i>) 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), macrophthalmia (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. Complete and document public involvement activities and provide to EC Lead	8/1/2013	7/14/2014	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.
C. HIP3 Risk Determination: Contact BPA EC Lead for risk determination	8/1/2013	8/30/2013	Completed	A project risk determination shall be made before the Sponsor begins preliminary design activities. Sponsor shall contact BPA EC lead to describe project scope for HIP3 Risk Determination. This is a decision point – EC Lead will determine risk (low, medium, or high) and define which milestones will apply. COTR or EC Lead will add the applicable milestones after the EC Lead has made the risk determination. The EC Lead will provide the Sponsor with the required list of conservation measures (Checklists) at this stage. The HIP3 activity categories and risk criteria are located in the "Note" section of the work element background page here: http://www.cbfish.org/WorkElement.mvc/Summary/175 . For additional specific guidance or questions, consult the BPA EC lead or the HIP3 BO.
D. Participate in ESA Consultation	8/1/2013	7/14/2014	Active	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.
E. Participate in Cultural/Historic Resource Consultation	8/1/2013	7/14/2014	Active	Examples include providing maps and detailed project descriptions, contracting for an archaeological survey, etc.
F. Obtain/Renew applicable local, state, federal and tribal environmental permits	8/1/2013	7/21/2014	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.
G. Obtain BPA's EC Lead sign-off that EC requirements are complete	8/1/2013	7/21/2014	Active	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.
H. Use Best Management Practices to stabilize soils and prevent spread of noxious weeds	6/30/2014	7/25/2014	Active	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.
Deliverable: I. Obtain Required Permits		7/21/2014	Active	<i>See the Deliverable Specification above</i>

C: 119. Manage and Administer Projects



Title: Manage and fulfill all administrative tasks

Description: Contract documents including SOW, budget, spending plan, and property inventory will be completed, reviewed and submitted to BPA for the following contract year. Financial estimates and administrative requests from BPA will be completed as needed during the entire contract period. Project management will include budgeting, purchasing, hiring, personnel management, and managing on the ground work to insure project implementation and completion.

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.

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	8/1/2013	5/1/2014	Active	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	4/1/2014	Active	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	4/14/2014	Active	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).	8/1/2013	6/16/2014	Active	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.)
E. #5 Funding Package - Respond to any Contracting Officer's requests for revisions within 7 days.	6/2/2014	6/23/2014	Active	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.	6/2/2014	7/31/2014	Active	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.	6/16/2014	7/31/2014	Active	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	8/1/2013	9/20/2013	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	8/1/2013	7/31/2014	Active	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.	8/1/2013	7/31/2014	Active	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).



Milestone Title	Start Date	End Date	Status	Milestone Description
K. Submit final invoice within 90 days of end of the previous contract to facilitate contract closeout.	5/5/2014	7/31/2014	Active	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. Subject line: Kalispel Tribe, un-invoiced balance for BPA contract _____, BPA Project 2011-018-00 is \$_____.
L. Inventory – Mark/Tag all equipment purchased during the contract.	8/1/2013	7/31/2014	Active	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.	8/1/2013	7/31/2014	Active	The Kalispel Tribe is the lone contractor under this contract. The Project lead will enter previous federal FY's Cost Share information on the Project's Cost Share tab by Nov 15.
N. E-waste disposal in accordance with state and local jurisdiction, laws and policies	8/1/2013	7/31/2014	Active	Confirm that adequate waste identification and collection procedures are in place and proper disposal practices are followed according to your governmental policy. If you do not have a policy, please contact your CO and/or COTR for guidance. Purpose is to keep hazardous materials from entering the normal waste stream, becoming land-fill, or being boot-legged into unregulated reprocessing and/or metals extraction. E-Waste usually includes: batteries, light ballasts, fluorescent tubes and bulbs, modems, routers, computers and all equipment with electronic components. For current EPA guidance, please see: http://www.epa.gov/osw/conservation/materials/recycling/rules.htm
Deliverable: O. Fulfill all administrative tasks with quality products and in a timely manner.		7/31/2014	Active	See the Deliverable Specification above

D: 184. Install Fish Passage Structure

Title: Replace East Branch LeClerc Creek culverts sites No. 1520386 and 1520387

Description: The project will replace three culverts with fish passable structures and reestablish natural stream channel conditions. The primary limiting factors are channel stability, instream and riparian habitat diversity, sediment load and connectivity. Two fish bearing tributaries to East Branch LeClerc Creek and one fish bearing tributary to West Branch LeClerc Creek are crossed by the 1934000 and 1935000 roads with culverts that prevent upstream fish passage and negatively affect water quality. Two of the tributaries are located in T36R44S14 and the third tributary is located in T37R44S28. The culverts are located 190, 290, and 4500 feet upstream of the main channel. About 1.7 miles of habitat would be opened by the culvert replacements on East Branch Leclerc Creek tributaries. About 0.5 miles of habitat would be opened by the culvert replacements on the West Branch Leclerc Creek tributary. Replacement of these three culverts are identified in the Colville National Forest East Branch LeClerc Creek Transition Watershed Restoration Action Plan and LeClerc Creek Watershed Action Plan as essential projects. WDFW has identified these culverts as fish barriers with 0-33% passability. Other sources of information include Draft Bull Trout recovery Plan (USFWS 2002), Final Designated Critical Habitat for Bull Trout Rule (USFWS 2005), and Proposed Critical Habitat for Bull Trout Rule (USFWS 2010). The work is to be implemented by Forest Service personnel, Tribal personnel, and sub-contractors hired by the Tribe and Forest Service. This will be a 15% cost share with the US Forest Service.

Deliverable Specification: Replace East Branch LeClerc Creek culverts sites No. 1520386 and 1520387 with a structural steel plate arch.

Planned Metrics: * # of miles of habitat accessed to the next upstream barrier(s) or likely limit of habitable range: 1.70
* # of culverts installed in the freshwater non-tidal zone: 2

Locations: 1

Primary Focal Species: Cutthroat Trout, Westslope | Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: WA **HUC5 Watershed:** MIDDLE PEND OREILLE

County: PEND OREILLE **HUC6 Name:**

Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/1/2013	4/7/2014	Active	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).
Deliverable: B. Replace East Branch LeClerc Creek culverts sites No. 1520386 and 1520387		7/31/2014	Active	See the Deliverable Specification above

*** This work element has potential for inadvertent discovery of cultural resources. See instructions at end of this document. ***

E: 184. Install Fish Passage Structure

Title: Replace West Branch LeClerc Creek Culvert site No. 1520372

Description: The project will replace three culverts with fish passable structures and reestablish natural stream channel conditions. The primary limiting factors are channel stability, instream and riparian habitat diversity, sediment load and connectivity. Two fish bearing tributaries to East Branch LeClerc Creek and one fish bearing tributary to West Branch LeClerc Creek are crossed by the 1934000 and 1935000 roads with culverts that prevent upstream fish passage and negatively affect water quality. Two of the tributaries are located in T36R44S14 and the third tributary is located in T37R44S28. The culverts are located 190, 290, and 4500 feet upstream of the main channel. About 1.7 miles of habitat would be opened by the culvert replacements on East Branch Leclerc Creek tributaries. About 0.5 miles of habitat would be opened by the culvert replacements on the West Branch Leclerc Creek tributary. Replacement of these three culverts are identified in the Colville National Forest East Branch LeClerc Creek Transition Watershed Restoration Action Plan and LeClerc Creek Watershed Action Plan as essential projects. WDFW has identified these culverts as fish barriers with 0-33% passability. Other sources of information include Draft Bull Trout recovery Plan (USFWS 2002), Final Designated Critical Habitat for Bull Trout Rule (USFWS 2005), and Proposed Critical Habitat for Bull Trout Rule (USFWS 2010). The work is to be implemented by Forest Service personnel, Tribal personnel, and sub-contractors hired by the Tribe and Forest Service. This will be a 15% cost share with the US Forest Service.

Deliverable Specification: Replace West Branch LeClerc Creek Culvert site No. 1520372 with a structural steel plate arch.

Planned Metrics: * # of miles of habitat accessed to the next upstream barrier(s) or likely limit of habitable range: 0.50
 * # of culverts installed in the freshwater non-tidal zone: 1

Locations: 1

Primary Focal Species: Cutthroat Trout, Westslope

Country: US

State: WA

County: PEND OREILLE

Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: MIDDLE PEND OREILLE

HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/1/2013	4/7/2014	Active	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).
Deliverable: B. Replace West Branch LeClerc Creek Culvert site No. 1520372		7/31/2014	Active	See the Deliverable Specification above

*** This work element has potential for inadvertent discovery of cultural resources. See instructions at end of this document. ***

F: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period Aug 1,2013 to July 31,2014

Description: 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. Date range August 1,2013 to July 31,2014 will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.



Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics:
 * Start date of reporting period : 8/1/2013
 * End date of reporting period : 7/31/2014

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	2/3/2014	2/27/2014	Active	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	3/1/2014	4/30/2014	Active	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.
C. Submit progress report for external review	4/1/2014	5/1/2014	Active	Use this milestone if the progress report requires external review.
D. Confirm BPA has posted the progress report	6/1/2014	7/31/2014	Active	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: E. Attach Progress Report in Pisces		7/31/2014	Active	<i>See the Deliverable Specification above</i>

G: 34. Develop Alternative Water Source

Title: Temperature model of the Priest River
Description: The objective of this project is to develop a CE-QUAL-W2 temperature model of the Priest River between Priest Lake and the Pend Oreille River to investigate the potential impact of cooler flows released from Priest Lake. CE-QUAL-W2 is a water quality and hydrodynamic model in 2D (longitudinal-vertical) for rivers, estuaries, lakes, reservoirs and river basin systems. W2 models basic eutrophication processes such as temperature-nutrient-algae-dissolved oxygen-organic matter and sediment relationships. The current model release enhancements have been developed under research contracts between the Corps and Portland State University under supervision of Dr. Scott Wells.

Deliverable Specification: Develop a CE-QUAL-W2 model of the Priest River using detailed bathymetry to determine the impact of management scenarios on Priest River temperatures.

Planned Metrics: # of alternate water sources installed in the riparian: 1

Locations: 4

Primary Focal Species: Trout, Bull | Cutthroat Trout, Westslope

Country: US

NPCC Subbasin: PEND OREILLE

State: ID

HUC5 Watershed: Multiple

County: BONNER

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/1/2013	1/30/2014	Active	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. Have PSU develop CE-Qual-W2 model for Priest River	8/1/2013	7/3/2014	Active	Development CE-Qual-W2 model for Priest River.
Deliverable: C. Temperature model of the Priest River		4/24/2014	Active	<i>See the Deliverable Specification above</i>

H: 189. Coordination-Columbia Basinwide

Title: Coordination with other entities on restoration efforts

Description: Coordination with other entities on restoration efforts to prevent duplication and enhance communication and cooperation within the watershed or subbasin. Work with landowners, interest groups, and agencies to research and identify funding and cost share opportunities.

Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP PNNL RESTORATION OF BULL TROUT PASS
Contract #: 56065 REL 1
 [ISSUED]
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Perf. Period Budget: \$63,785 **Perf. Period:** 4/5/2012 - 4/4/2013
Contract Type: Release **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Pacific Northwest National Laboratory (Prime - USDOERIC02)
BPA Internal Ref: 56065 REL 1
SOW Validation: Last validated 01/10/2012 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (12/07/2011) PNNL Property Inventory Project 2007-246-00
Budget - Contract (01/17/2012) 2012 LIB PNNL Bulltrout Passage

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Khanida Mote	Contracting Officer	Bonneville Power Administration	(503) 230-4599 / NA	kpmote@bpa.gov	P.O. Box 3621 Mailstop NSSP-4 Portland OR 97208
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232
Joe Maroney	Technical Contact	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Julie Hughes	Contract Manager	Pacific Northwest National Laboratory	(509) 371-7202 / (509) 371-7203	julie.hughes@pnl.gov	Pacific Northwest National Laboratory P.O. Box 999, MS K6-79 Richland WA 99352
Janie Vickerman	Administrative Contact	Pacific Northwest National Laboratory	(509) 371-7260 / (509) 371-7197	janie.vickerman@pnl.gov	
Brian Bellgraph	Supervisor	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Genice Madera	Administrative Contact	Pacific Northwest National Laboratory	(509) 372-4010 / (509) 372-4038	Genice.Madera@pnso.science.doe.gov	Science & Technology Programs Division, U.S. Department of Energy, Richland Field Office, P.O. Box 550 Richland WA 99352
Lisa Marko MacLellan	Interested Party	Bonneville Power Administration	(503) 230-4047 / NA	lmmarko@bpa.gov	



Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Complete environmental compliance requirements		\$542	(1 %)
B : 157. Collect/Generate/Validate Field and Lab Data - Maintain and download radio receiving stations	*	\$21,907	(34 %)
C : 162. Analyze/Interpret Data - Data reduction and analysis		\$12,115	(19 %)
D : 132. Produce (Annual) Progress Report - Submit Annual Report for the period 16 November 2011 to 15 November 2012		\$9,946	(16 %)
E : 119. Manage and Administer Projects - Manage Project		\$6,108	(10 %)
F : 70. Install Fish Monitoring Equipment - Test all stations prior to FY13/14 monitoring season, if applicable	*	\$10,998	(17 %)
G : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$2,169	(3 %)
Total:		\$63,785	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

The goal of this project is to provide temporary upstream passage for bull trout at Albeni Falls Dam, Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. The fish will then be transported above Albeni Falls Dam and released near Priest River, Idaho, or re-released below the dam depending on water temperature and number of fish captured. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to track the fish to potential spawning tributaries of Pend Oreille Lake. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Complete environmental compliance requirements

Description: Provide BPA with information necessary for environmental clearance for all contract activities during FY12/13. Submit FY13/14 SOW and supporting documents as needed for BPA's Environmental Compliance Group to determine environmental compliance status, dependent on project continuation into FY13/14.

Deliverable Specification: Environmental compliance requirements complete for FY12/13 work. Submit FY13/14 SOW package to begin Environmental Clearance review for subsequent contract, if project continues.

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 clearance for FY12/13 work	4/5/2012	4/15/2012	Completed	BPA provides environmental clearance to proceed with field work for FY12/13
B. Provide project information to BPA	11/1/2012	4/4/2013	Completed	Provide FY13/14 SOW and any other documentation needed for environmental review, only if project continues into FY13/14.
C. Obtain BPA clearance for FY13/14 work	3/1/2013	4/4/2013	Completed	BPA provides environmental clearance to proceed with field work for FY13/14, if project continues
D. Determine if contract work could adversely affect Pacific lamprey	4/5/2012	4/5/2012	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 (<i>Entosphenus tridentatus</i>) 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), macrophthalmia (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 water craft, waders, boots, etc. to be used in or near water for aquatic invasive species	4/5/2012	4/4/2013	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
F. Inspect and, if necessary, wash vehicles and equipment infested with terrestrial invasive species	4/5/2012	4/4/2013	Completed	Prevent spread of invasive species
G. Obtain/Renew applicable local, state, federal and tribal environmental permits	4/5/2012	4/4/2013	Completed	Any permits related to location of telemetry gear on lands will be coordinated during the project.
H. Obtain BPA's EC Lead sign-off that EC requirements are complete	4/5/2012	4/4/2013	Completed	Communicate with the BPA COTR to ensure all environmental compliance requirements are met before the start of project.
Deliverable: I. Ensure environmental compliance requirements are complete		4/4/2013	Completed	<i>See the Deliverable Specification above</i>

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

Title: Maintain and download radio receiving stations



Description: Method(s): All fixed receiver stations will be inspected and downloaded at least every other week during the sampling season by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems twice during the contract year.

Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.

Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within three working days after being collected.

Downloads will be performed primarily remotely via cellular modems, however, some stations require a person to physically download the data (because no cellular coverage). Downloading the data requires one person.

Deliverable Specification: Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU.

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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:

Primary Focal Species: Trout, Bull

Country: US

NPCC Subbasin: Multiple

State: ID

HUC5 Watershed: Multiple

County: BONNER

HUC6 Name:

Salmonid ESUs Present:

Data Repositories: PNAMP Monitoring Methods (<http://www.monitoringmethods.org/>)
Website

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2012	4/5/2012	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	4/5/2012	5/31/2012	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. Receiver stations inspected and downloaded	4/5/2012	4/4/2013	Completed	Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary. Data collection at some stations will continue through the end of the contract year if necessary.
Deliverable: D. Functioning radio monitoring stations		4/4/2013	Completed	<i>See the Deliverable Specification above</i>

C: 162. Analyze/Interpret Data

Title: Data reduction and analysis

Description: Method(s): EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked during the project year, which may overlap contract periods, e.g., data collected from 15 November through 30 April will be included in the following year's annual report. PNNL will lead the task of storing and performing QA/QC checks on telemetry data.

Deliverable Specification: Annual statistical reports, GIS maps, and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Data to determine detection histories will also be obtained from a database specifically designed to maintain fish detection data.



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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Tributary Habitat

Locations:

Primary Focal Species: Trout, Bull

Country:

NPCC Subbasin:

State:

HUC5 Watershed:

County:

HUC6 Name:

Salmonid ESUs Present:

Data Repositories: PNAMP Monitoring Methods (<http://www.monitoringmethods.org/>)
Website

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson

Protocol State: Proposed

Area of Inference:

Name	Value
Bull Trout Critical Habitat - Lake	Pend Oreille

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Data reduction and database compilation	4/5/2012	4/4/2013	Completed	Raw data will be checked for errors, organized, loaded into, and stored in a Microsoft SQL Server relational database after each download.
B. Fish positions (GPS coordinates) will be entered into GIS to generate track maps for each fish	10/1/2012	1/31/2013	Completed	Map and tabled-data showing fish migration patterns. Fish location data collected through the 15 November of each year will be used to produce a detection history of each fish.
C. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	10/1/2012	12/31/2012	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: D. Develop a profile of each fish tracked		1/31/2013	Completed	<i>See the Deliverable Specification above</i>

D: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period 16 November 2011 to 15 November 2012

Description: The annual 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. Note that any results included in the annual report will be restricted to those data collected before November 15 of the contract year. This means that data collected after November 15 will be included in the next year's report.

Deliverable Specification: Upload annual report for the period 16 November 2011 to 15 November 2012. This report will include all activities performed from during the above time period as well as projected activities through the end of the contract year on 4 April. The report will be uploaded in PISCES as an attachment to the contract.

Planned Metrics:

- * Start date of reporting period : 11/16/2011
- * End date of reporting period : 11/15/2012



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2012	11/15/2012	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Write final report	11/16/2012	1/15/2013	Completed	Write progress report for work done from 16 November 2011 to 15 November 2012.
C. Submit report for internal contractor review	1/15/2013	2/1/2013	Completed	Report will undergo PNNL technical and editorial review through PNNL's "ERICA" approval process.
D. Submit report for external review	2/1/2013	3/1/2013	Completed	Report will undergo review by collaborators (EWU and the Kalispel Tribe) and the BPA COTR.
E. Receive review comments	3/1/2013	3/1/2013	Completed	Collaborators and COTR will provide comments to PNNL within 30 days of receiving the draft progress report.
F. Finalize Annual Report	3/1/2013	3/4/2013	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format and upload to Pisces for "publication".
G. Confirm BPA has posted the report	3/4/2013	4/4/2013	Completed	It usually takes BPA no more than 30 days to get the report posted. This milestone should therefore have a duration of 30 days. To confirm posting of the report, search the BPA Publications database. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
Deliverable: H. Final report uploaded to the BPA website		4/4/2013	Completed	<i>See the Deliverable Specification above</i>

E: 119. Manage and Administer Projects

Title: Manage Project

Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.

Deliverable Specification: Work Products/Deliverables: Administrative products including accrual estimates, metric reporting, and annual statements of work.

Submit next year's SOW, Budget, and Property Inventory to the BPA COTR if work will continue. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Project coordination	4/5/2012	4/4/2013	Completed	This project will require coordination with a number of agencies and organizations. Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies). Coordination with landowners where equipment is located will also need to be managed accordingly.
B. Manage project	4/5/2012	4/4/2013	Completed	Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
C. Accrual - Submit September estimate to BPA	9/1/2012	9/10/2012	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. Generally, this should be done by September 10.
D. Funding Package - Write and conduct internal review (e.g., Supervisor or Interagency)	12/1/2012	1/3/2013	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
E. Submit funding package to BPA	1/3/2013	1/4/2013	Completed	If necessary, Submit SOW and budget estimate to BPA for the next contract year.
Deliverable: F. Complete all project management activities for FY12/13		4/4/2013	Completed	<i>See the Deliverable Specification above</i>

F: 70. Install Fish Monitoring Equipment

Title: Test all stations prior to FY13/14 monitoring season, if applicable
Description: In preparation the following contract year, if the project continues, we will test and calibrate all receiver stations in spring before the primary migration season.
Deliverable Specification: Testing and calibration of all monitoring stations
Locations: 9
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** Multiple
State: ID **HUC5 Watershed:** Multiple
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2012	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. Testing, calibration, modification of monitoring receivers	3/1/2013	4/4/2013	Completed	Test receivers
Deliverable: C. Testing and calibration of all monitoring stations		4/4/2013	Completed	<i>See the Deliverable Specification above</i>

G: 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:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Apr-Jun 2012 (4/5/2012 - 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-Apr 2013 (1/1/2013 - 4/4/2013)	3/21/2013	4/4/2013	Completed	

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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 37624
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: 37624

SOW Validation: Last validated 02/13/2008 with 0 problems, and 1 reviewable items

Contract Documents:	<u>Property Inventory (02/06/2008)</u>	2008 Property Inventory
	<u>Budget - Contract (05/09/2008)</u>	Line Item Budget CR
	<u>Budget - Contract (09/05/2008)</u>	Budget Update
	<u>Budget - Contract (02/18/2009)</u>	Line item budget3



Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Carlos Matthew	COTR	Bonneville Power Administration	(503) 230-3418 / (503) 230-4564	cjmatthew@bpa.gov	PO Box 3621 KEWL-4 Portland OR 97208-3621
Joe Maroney	Supervisor	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Jason Olson	Technical Contact	Kalispel Tribe	(509) 447-7290 / NA	jolson@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Jason Connor	Contract Manager	Kalispel Tribe	(509) 447-7285 / NA	jconnor@knrd.org	1981 N Leclerc Rd Usk WA 99180
Virgil Watts III	Interested Party	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Todd Andersen	Technical Contact	Kalispel Tribe	(509) 447-7245 / NA	tandersen@knrd.org	1981 N Leclerc Rd. Usk WA 99180
Mickey Carter	Interested Party	Bonneville Power Administration	(503) 230-5885 / NA	macarter@bpa.gov	905 NE 11th Ave. Portland OR 97232
Bruce Hollen	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5756 / NA	bahollen@bpa.gov	
Holly McLellan	Interested Party	Eastern Washington University	(509) 359-7498 / NA	hmclellan@mail.ewu.edu	Eastern Washington University 258 Science Building Cheney WA 99004
Allan Scholz	Interested Party	Eastern Washington University	(509) 359-6397 / NA		
Brian Bellgraph	Technical Contact	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Terry Holtcamp Jr	Contracting Officer	Bonneville Power Administration	(503) 230-3518 / NA	taholtcamp@bpa.gov	
Peter Lofy	F&W Approver	Bonneville Power Administration	(503) 230-4193 / (503) 230-4563	ptlofy@bpa.gov	905 NE 11th Ave. Portland OR 97232

Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Obtain necessary permits and set up contract for genetic analysis		\$3,975	(2 %)
B : 157. Collect/Generate/Validate Field and Lab Data - Angling for bull trout	*	\$11,868	(5 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Weekly electrofishing collecting a representative sample of bull trout below Albeni Falls Dam	*	\$52,789	(23 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
D : 158. Mark/Tag Animals - Implant combination radio acoustic transmitter into bull trout	*	\$28,692	(12 %)
E : 157. Collect/Generate/Validate Field and Lab Data - Rapid response genetic analysis of bull trout biopsy samples	*	\$6,462	(3 %)
F : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$9,529	(4 %)
G : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$9,318	(4 %)
H : 157. Collect/Generate/Validate Field and Lab Data - Compile electronic spread sheet data base of electrofishing data	*	\$10,003	(4 %)
I : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving station	*	\$20,117	(9 %)
J : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft, vehicle, and boat	*	\$36,733	(16 %)
K : 189. Coordination-Columbia Basinwide - Project coordination among all stakeholders		\$5,557	(2 %)
L : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$2,796	(1 %)
M : 119. Manage and Administer Projects - Manage Project		\$11,321	(5 %)
N : 132. Produce (Annual) Progress Report - Submit Annual Report for the period (5/1/2008) to (4/30/2009)		\$11,513	(5 %)
O : 162. Analyze/Interpret Data - Data reduction and analysis		\$13,275	(6 %)
Total:		\$233,948	

* Environmental Compliance (EC) needed before work begins.

Contract Description:



Bull trout in the Columbia River Basin were listed as Threatened by the US Fish and Wildlife Service (USFWS) in 1998 (USFWS 2000). Bull trout populations are threatened by habitat degradation and fragmentation, past fisheries management practices, poor water quality, and blockage of migratory corridors. Pend Oreille River and Lake is a core area within the Northeast Washington Recovery Unit of the Columbia Basin bull trout population (USFWS 2002a, 2002b). Recovery of Pend Oreille bull trout is limited by the fact that dams on the mainstem Pend Oreille River (Albeni Falls and Box Canyon dams) have blocked migration of bull trout between Lake Pend Oreille and spawning/rearing areas (USFWS 2002a, 2002b). Albeni Falls Dam is a federal facility under the responsibility of the action agencies (US Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation). Albeni Falls Dam created two types of problems for bull trout in the Pend Oreille Basin. First, bull trout from natal tributaries above the dam, that either became entrained or had elected to voluntarily pass below the dam, were unable to return to spawn in their natal tributaries. (Source populations could include bull trout spawning in the Priest River, inlet tributaries of Pend Oreille Lake, or tributaries of the Clark Fork River below or above Cabinet Gorge Dam.) Second, adfluvial bull trout that formerly spawned in tributaries below the dam and migrated upstream to a cold water refuge in Lake Pend Oreille, Idaho were no longer able to do so.

The goal of this project is to provide temporary upstream passage and data for bull trout at Albeni Falls Dam on the Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. Any bull trout captured will be biopsied via hole punch and their DNA sent to the USFWS lab in Abernathy, Washington for rapid analysis. Each DNA sample will be compared to DNA from other bull trout populations in the Priest River drainage, Pend Oreille Lake tributaries, and Clark Fork drainage and an assignment will be made as to its probable region of origin. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to ascertain if the spawning tributary it selected was the same as its assigned tributary. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Obtain necessary permits and set up contract for genetic analysis

Description: The Kalispel Natural Resource Department (KNRD) will obtain the necessary permits outlined in section D. PNNL and EWU will also obtain appropriate scientific collection permits. Additionally, the Kalispel Tribe will contract with the U.S. Fish and Wildlife Service Genetics Laboratory for conducting rapid response genetic analysis.

Deliverable Specification: Idaho state transport permit
Idaho scientific collection permit
Federal Section 10 fish and wildlife collection permit

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



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Federal fish and wildlife permit	5/1/2008	5/2/2008	Completed	Acquire Fish and Wildlife permit this will be done by the time contract is issued.
B. Idaho scientific collection permit	5/1/2008	5/2/2008	Completed	Acquire Idaho Scientific collection permit this will be completed before the contract is issued.
C. Idaho transport permit	5/1/2008	5/2/2008	Completed	Acquire Idaho transport permit this will be completed before the contract is issued.
D. Produce Idaho scientific collection permit annual report	12/3/2008	1/31/2009	Completed	Compile data (fish species, total length, weight, location, and effort) produce report and send to Idaho Department of Fish and Game.
E. Apply for 2009 Idaho collection permit	2/1/2009	2/28/2009	Completed	Acquire Idaho Scientific collection permit
F. Apply for 2009 transport permit	2/1/2009	2/28/2009	Completed	Acquire Idaho transport permit
G. Apply for 2009 federal fish and wildlife permit	2/1/2009	2/28/2009	Completed	Acquire Fish and Wildlife permit
Deliverable: H. Idaho scientific collection, transportation, and federal permits		2/28/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Angling for bull trout

Description: KNRD crews will conduct angling surveys in the tailrace of Albeni Falls Dam to collect bull trout. A total of 10 days of effort will be expended annually by the crew: seven days, during the spring (1 May– 30 June) and three days during the fall (15 September – 30 November).
Latitude and longitude coordinates at the start and end of each angling survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by angling that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about angling efforts.

Planned Metrics:
* Primary R, M, and E Focal Strategy : Hydrosystem
* Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Spring angling	5/1/2008	6/30/2008	Completed	Angling for bull trout will be used when the water levels in the tailrace are to high for electrofishing. Angling will also be used as an additional capture method in areas were electrofishing maybe ineffective due to depth and or water velocity. A total of seven days of angling will be conducted in the spring (5/1/08 - 6/30/08).
C. Fall angling	9/15/2008	11/30/2008	Completed	Angling for bull trout will be used when the water levels in the tailrace are to high for electrofishing. Angling will also be used as an additional capture method in areas were electrofishing maybe ineffective due to depth and or water velocity. A total of three days of angling will be conducted in the fall (9/15/08 - 11/30/08).
Deliverable: D. Angling for bull trout below Albeni Falls Dam		11/30/2008	Completed	<i>See the Deliverable Specification above</i>



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

Title: Weekly electrofishing collecting a representative sample of bull trout below Albeni Falls Dam

Description: EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew: six days, once each week, during the spring (2 May– 15 June), three days during the summer (July, August) and six days, once each week, during the fall (25 September – 15 November). PNNL biologists will assist on one survey in the spring, one in the summer and one in the fall. Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by electrofishing that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about electrofishing operations.

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

Locations: 2

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER | PEND OREILLE **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Spring electrofishing	5/2/2008	4/30/2009	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew: Six days, once each week, during the spring (2 May- 30 June 2008 and or 1 Mar- 30 April 2009). PNNL biologists will assist on one survey in the spring.
C. Summer electrofishing	7/1/2008	8/31/2008	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew: three days during the summer. PNNL biologists will assist on one survey in the summer.
D. Fall electrofishing	9/1/2008	11/15/2008	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew: Six days during the fall. PNNL biologists will assist on one survey in the fall.
Deliverable: E. Weekly electrofishing collection of bull trout below Albeni Falls Dam		4/30/2009	Completed	See the Deliverable Specification above

D: 158. Mark/Tag Animals

Title: Implant combination radio acoustic transmitter into bull trout



Description: Transmitter implantation will be accomplished by EWU, KNRD, and PNNL. Bull trout from electrofishing and angling will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for PIT tags. The PIT tag number along with data on TL (mm), FL (mm), weight (g) and results of the genetic assignment from the 'rapid response genetic analysis' will be recorded on a data sheet. [If the genetic assignment is unknown at the time transmitters are implanted that information will be added when it becomes available.]

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The bull trout will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exiting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently.

Deliverable Specification: 27-50 Bull trout will be captured and undergo surgery to implant the combination radio acoustic tag. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water) or CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)]. Surgical implantation of the transmitters will be accomplished by an experienced surgeon.

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

Locations:

Primary Focal Species: Trout, Bull

Country: US

State: Multiple

County: BONNER | PEND OREILLE

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Implant CART tags and PIT tags in up to 27-40 bull trout	5/2/2008	4/15/2009	Completed	27-40 bull trout will be implanted with CART and PIT tags.
Deliverable: C. Implanting of radio tags		4/30/2009	Completed	See the Deliverable Specification above

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

Title: Rapid response genetic analysis of bull trout biopsy samples
Description: Tissue samples will be collected from bull trout captured by electrofishing and angling. The samples will be sent by express mail to the USFWS Genetics Laboratory in Abernathy Washington. Within 48 hours the USFWS genetics lab will assign individual bull trout to a particular tributary and communicate this information to KNRD.

Deliverable Specification: Bull trout will be assigned to individual natal tributaries. Using the lab's "rapid response genetic analysis" protocol (The protocol that is being used at Cabinet Gorge Dam an Avista project)(Arden et al. 2005), the samples will be analyzed at 12 microsatellite DNA (msDNA) loci that are standard for Columbia Basin bull trout.

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

Locations:

Primary Focal Species: Trout, Bull

Country: US

State: Multiple

County: BONNER | PEND OREILLE

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Collect bull trout tissue samples	5/2/2008	4/15/2009	Completed	Bull trout tissue samples will be collect by boat electrofishing and angling in the tailrace of Albeni Falls Dam.
C. Send bull trout tissue samples	5/2/2008	4/15/2009	Completed	Send collected bull trout tissue samples to the Abernathy Lab for genetic analysis.
D. Abernathy Lab to process tissue samples and send results	5/2/2008	4/17/2009	Completed	Abernathy genetic lab will process bull trout tissue samples. The sample will assign the particular bull trout to a region. The results will then be sent back to the Kalispel Tribe.
Deliverable: E. Genetic Analysis		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

F: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam

Description: All bull trout collected in the tailrace of Albeni Falls Dam in 2008 will be released either above Albeni Falls Dam or below the dam, depending on the time of year, temperature and number of bull trout collected.

Deliverable Specification: Bull trout will be captured, radio tagged, and either transported above Albeni Falls Dam or released below the dam depending on water temperature and number of bull trout collected. Fish captured in the tailrace when the temperatures are less than 16 degrees Celsius will be moved above the dam and released in the town of Priest River below the confluence of Priest River.

Planned Metrics: # of fish transported: 30

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed:

HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Capture bull trout	5/2/2008	4/15/2009	Completed	Bull trout will be captured by boat electrofishing and angling between Indian Creek and the tailrace of Albeni Falls Dam.
C. Transport bull trout	5/2/2008	4/15/2009	Completed	Bull trout will be transported in a water-filled cooler maintained at the proper temperature and DO level.
Deliverable: D. Bull trout transported above Albeni Falls Dam		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

G: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations

Description: Each spring PNNL and EWU will overhaul, refurbish and retest each of the seven ground receiving stations.

Deliverable Specification: Functioning, tested (each station will be inspected for damage. Beacon tags and 12 volt batteries will be replaced if necessary) ground receiving stations. A trip log form and electronic version of the data will be maintained at PNNL and backed up at EWU. The annual reports will contain a description of annual overhaul and maintenance activities.

Locations: 10

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: Multiple

HUC5 Watershed: Multiple

HUC6 Name:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Overhaul, refurbish, and retest ground receiving stations	3/3/2009	3/28/2009	Completed	Each spring PNNL and EWU will overhaul, refurbish and retest each of the seven ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
Deliverable: C. Annual maintenance of monitoring equipment		3/28/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Compile electronic spread sheet data base of electrofishing data
Description: All electrofishing and angling data will be entered into an Excel spreadsheet and maintained as an electronic data base of electrofishing records.
Deliverable Specification: All electrofishing and angling data will be entered into a excel workbook and maintained as a electronic data base of all electrofishing.
Planned Metrics: * Primary R, M, and E Focal Strategy : Hydrosystem
* Primary R, M, and E Type : Action Effectiveness Monitoring
Locations: 2
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** PEND OREILLE
State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE
County: BONNER | PEND OREILLE **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Electrofishing data entry	5/2/2008	4/15/2009	Completed	All data collected while electrofishing and angling for bull trout will be input into a excel workbook and maintained as a electronic data base
Deliverable: C. Electrofishing data entry		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Download stationary ground radio receiving station
Description: All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download. Each station will be inspected for damage and repaired if necessary.
Deliverable Specification: All fixed receiver stations will be inspected (Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.) and downloaded (Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise).
Planned Metrics: * Primary R, M, and E Focal Strategy : Hydrosystem
* Primary R, M, and E Type : Action Effectiveness Monitoring
* Secondary R, M, and E Type : Status and Trend Monitoring
Locations: 10
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** Multiple
State: ID **HUC5 Watershed:** Multiple
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Inspect and download receiver stations 26 times per year	5/15/2008	4/30/2009	Completed	<p>All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.</p> <p>Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.</p> <p>Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.</p> <p>Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.</p>
Deliverable: C. Downloading stationary ground radio receiver		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Mobile tracking surveys by fixed wing aircraft, vehicle, and boat

Description: Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. Air surveys will be made 12 times per year. EWU will charter a Cessna C-182 aircraft from Felts Field Aviation in Spokane, Washington for making aerial surveys. A Yagi antenna will be mounted externally underneath the wing of the aircraft. Each flight will be approximately four hours in duration. A pilot accompanied by an EWU technician will fly a similar flight plan for each survey.

Deliverable Specification: Air surveys will be made 12 times a year. The flight path will start below Albeni Falls Dam, thence up the center of the Pend Oreille River to the outlet of Pend Oreille Lake, then around the perimeter of Pend Oreille Lake. Where known bull trout spawning tributaries enter they will be followed to their source or known upper limit of bull trout occupancy. Tributaries surveyed will include: (1) Priest River to Outlet Dam, including the East River and its Middle Fork; (2) Tributaries entering the north shore of Lake Pend Oreille (Pack River, Grouse Creek and Trestle Creek); (3) Tributaries entering the Clark Fork arm of Lake Pend Oreille (Lightning Creek and tributaries, Johnson Creek and Twin Creek) and (4) Tributaries entering the east shore of Lake Pend Oreille (Granite Creek, Sullivan Springs Creek, North Gold Creek, Gold Creek). Additionally, the Clark Fork River will be flown to Cabinet Gorge Dam. Boat tracking will occur 10 times each year. Vehicle surveys will be made once monthly from June to August and once weekly from September to November.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Tributaries
- * Primary R, M, and E Type : Action Effectiveness Monitoring
- * Secondary R, M, and E Type : Status and Trend Monitoring

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/2/2008	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. Aircraft tracking	5/15/2008	4/30/2009	Completed	Aerial surveys will be conducted 12 times a year from fixed wing aircraft.
C. Boat tracking	5/15/2008	4/30/2009	Completed	Boat tracking will be conducted 10 times a year using a directional hydrophone.
D. Vehicle tracking	5/15/2008	4/30/2009	Completed	Vehicles surveys will be made along each of the tributaries streams once monthly from June to August and once weekly from September to November.
Deliverable: E. Tracking of radio tagged fish with aircraft, vehicle, and boat.		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

K: 189. Coordination-Columbia Basinwide

Title: Project coordination among all stakeholders
Description: This project will require coordination with a number of agencies and organizations.
Deliverable Specification: Coordination activities (Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies.) will be included in project reporting. Coordination will also be done via email, land mail, and telephone randomly as questions or findings arise. Because this project will be conducted in two states and involves a federal threaten species coordination and communication will be important to obtain permits, move fish, and distribute findings.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Ongoing coordination between stakeholders	5/1/2008	4/30/2009	Completed	Coordination between PIs, USACE, WDFW, IDFG, USFWS, bull trout recovery groups, and other researchers.
Deliverable: B. Project coordination among stakeholders		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

L: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2008 (5/1/2008 - 6/30/2008)	7/1/2008	7/15/2008	Completed	
B. Jul-Sep 2008 (7/1/2008 - 9/30/2008)	10/1/2008	10/15/2008	Completed	
C. Oct-Dec 2008 (10/1/2008 - 12/31/2008)	1/1/2009	1/15/2009	Completed	
D. Jan-Mar 2009 (1/1/2009 - 3/31/2009)	4/1/2009	4/15/2009	Completed	
E. Final Apr 2009 (4/1/2009 - 4/30/2009)	4/16/2009	4/30/2009	Completed	

M: 119. Manage and Administer Projects

Title: Manage Project
Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.



Deliverable Specification: Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Accrual - Submit September estimate to BPA	9/1/2008	9/10/2008	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. Generally, this should be done by September 10.
B. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	1/30/2009	4/30/2009	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
Deliverable: C. Funding Package - Submit draft to COTR		2/1/2009	Completed	<i>See the Deliverable Specification above</i>

N: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period (5/1/2008) to (4/30/2009)
Description: Prepare and upload annual report.
Deliverable Specification: Annual report to BPA's COTR will be prepared by the EWU PI and PNNL CO-PI, with assistance from EWU's statistician and research associate, and PNNL's senior scientist. Report will summarize the results obtained that year. Reports will follow standard scientific format and include an executive summary, introduction, methods, results, discussion, recommendation, and literature cited section, as well as tables, figures, and data appendices. Reports will be reviewed by the KNRD CO-PI before submission. Upload annual report for the period (May 1, 2008 to April 30, 2009).
Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2008	12/15/2008	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Submit report for internal contractor review	2/25/2009	2/28/2009	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.
C. Submit report for external review	3/2/2009	3/2/2009	Completed	Use this milestone if the annual report requires external review. May be simultaneously reviewed by external parties and BPA COTR if desired.
D. Email draft of report to COTR for review	3/10/2009	3/10/2009	Completed	The draft annual report must be submitted to the BPA COTR in Microsoft Word format (any version of Word is fine).
E. Receive COTR review comments	3/11/2009	4/11/2009	Completed	The BPA COTR should provide review feedback and comments within 30 days of receiving the draft annual report. This milestone should therefore have a duration of 30 days.
F. Finalize Annual Report	4/30/2009	4/30/2009	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
Deliverable: G. Final report uploaded to the BPA website		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

O: 162. Analyze/Interpret Data

Title: Data reduction and analysis
Description: EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked.
Deliverable Specification: Annual statistical reports, GIS maps, and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Statistical comparisons will be made to determine if fish randomly entered spawning tributaries or if they entered the tributary predicted by their genetic assignment. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
Planned Metrics:
 * Primary R, M, and E Focal Strategy : Hydrosystem
 * Primary R, M, and E Type : Action Effectiveness Monitoring
 * Secondary R, M, and E Type : Status and Trend Monitoring



Locations:

Primary Focal Species: Trout, Bull

Country:

State:

County:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Area of Inference:

NPCC Subbasin:

HUC5 Watershed:

HUC6 Name:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. GIS generated tracking maps	11/10/2008	4/15/2009	Completed	EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.
B. Statistical comparisons of run timing, genetic assignments, and spawning tributaries	11/10/2008	4/30/2009	Completed	Statistical comparisons will be made to determine if fish randomly entered spawning tributaries or if they entered the tributary predicted by their genetic assignment. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
Deliverable: C. Data analysis of tracking data		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 52107
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: 52107
SOW Validation: Last validated 02/09/2011 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (02/10/2011) Property Inventory
Budget - Contract (02/14/2011) 2011 LIB Kalispel Bulltrout Passage



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Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$4,978	(2 %)

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
B : 165. Produce Environmental Compliance Documentation - Obtain necessary permits and set up contract for genetic analysis		\$5,763	(2 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Electrofishing to collect a representative sample of bull trout below Albeni Falls Dam	*	\$56,210	(21 %)
D : 157. Collect/Generate/Validate Field and Lab Data - Angling for bull trout	*	\$5,984	(2 %)
E : 158. Mark/Tag Animals - Implant combination radio acoustic or radio transmitter into bull trout	*	\$31,887	(12 %)
F : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$9,986	(4 %)
G : 157. Collect/Generate/Validate Field and Lab Data - Rapid response genetic analysis of bull trout biopsy samples	*	\$4,140	(2 %)
H : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft, boat, and vehicle	*	\$33,947	(12 %)
I : 162. Analyze/Interpret Data - Analysis of bull trout radiotelemetry data		\$14,234	(5 %)
J : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$10,891	(4 %)
K : 157. Collect/Generate/Validate Field and Lab Data - Compile electronic spreadsheet database of electrofishing data	*	\$12,975	(5 %)
L : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving stations	*	\$27,894	(10 %)
M : 162. Analyze/Interpret Data - Data reduction and analysis		\$14,989	(5 %)
N : 189. Coordination-Columbia Basinwide - Project coordination among all stakeholders		\$12,978	(5 %)
O : 119. Manage and Administer Projects - Manage Project		\$13,846	(5 %)
P : 132. Produce (Annual) Progress Report - Submit Annual Report for the period (5/1/2011) to (4/30/2012)		\$13,251	(5 %)
Total:		\$273,953	

* Environmental Compliance (EC) needed before work begins.

Contract Description:



Bull trout in the Columbia River Basin were listed as Threatened by the US Fish and Wildlife Service (USFWS) in 1998 (USFWS 2000). Bull trout populations are threatened by habitat degradation and fragmentation, past fisheries management practices, poor water quality, and blockage of migratory corridors. Pend Oreille River and Lake is a core area within the Northeast Washington Recovery Unit of the Columbia Basin bull trout population (USFWS 2002a, 2002b). Recovery of Pend Oreille bull trout is limited by the fact that dams on the mainstem Pend Oreille River (Albeni Falls and Box Canyon dams) have blocked migration of bull trout between Lake Pend Oreille and spawning/rearing areas (USFWS 2002a, 2002b). Albeni Falls Dam is a federal facility under the responsibility of the action agencies (US Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation). Albeni Falls Dam created two types of problems for bull trout in the Pend Oreille Basin. First, bull trout from natal tributaries above the dam, that either became entrained or had elected to volitionally pass below the dam, were unable to return to spawn in their natal tributaries. (Source populations could include bull trout spawning in the Priest River, inlet tributaries of Pend Oreille Lake, or tributaries of the Clark Fork River below or above Cabinet Gorge Dam.) Second, adfluvial bull trout that formerly spawned in tributaries below the dam and migrated upstream to a cold water refuge in Lake Pend Oreille, Idaho were no longer able to do so.

The goal of this project is to provide temporary upstream passage, investigate long term fish passage, and fill data gaps for bull trout at Albeni Falls Dam on the Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing, angling, and snorkeling. All bull trout captured will be biopsied via hole punch and their DNA sent to the USFWS lab in Abernathy, Washington for rapid response genetic analysis. Each DNA sample will be compared to DNA from other bull trout populations in the Priest River drainage, Pend Oreille Lake tributaries, and Clark Fork drainage and an assignment will be made as to its probable region of origin. Prior to release each fish will be implanted with a combination radio-acoustic or radio transmitter to ascertain if the spawning tributary it selected was the same as its assigned tributary. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2011 (5/1/2011 - 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. Jan-Mar 2012 (1/1/2012 - 3/31/2012)	4/1/2012	4/15/2012	Completed	
E. Final Apr 2012 (4/1/2012 - 4/30/2012)	4/16/2012	4/30/2012	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Obtain necessary permits and set up contract for genetic analysis

Description: The Kalispel Natural Resource Department (KNRD) will obtain the necessary permits outlined in section D. PNNL and EWU will also obtain appropriate scientific collection permits. Additionally, the Kalispel Tribe will contract with the U.S. Fish and Wildlife Service Genetics Laboratory for conducting rapid response genetic analysis.

Deliverable Specification: Idaho state transport permit (Every 90 days)
Idaho scientific collection permit
Federal Section 10 fish and wildlife collection permit

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. Federal fish and wildlife permit	5/1/2011	5/3/2011	Completed	Acquisition of Fish and Wildlife permit this will be done by the time contract is issued.
B. Idaho scientific collection permit	5/1/2011	5/3/2011	Completed	Acquisition of Idaho Scientific collection permit this will be completed before the contract is issued.
C. Idaho transport permit	5/1/2011	5/3/2011	Completed	Acquisition of Idaho transport permit this will be completed before the contract is issued.
D. Produce Idaho scientific collection permit annual report	12/1/2011	1/31/2012	Completed	Compile data (fish species, total length, weight, location, and effort) produce report and send to Idaho Department of Fish and Game.
E. Apply for 2012 Idaho collection permit	1/2/2012	2/2/2012	Completed	Acquire Idaho Scientific collection permit
F. Apply for 2012 transport permit	1/2/2012	2/2/2012	Completed	Acquire Idaho transport permit
G. Apply for 2012 federal fish and wildlife permit	1/2/2012	2/2/2012	Completed	Acquire Fish and Wildlife permit
Deliverable: H. Idaho scientific collection, transportation, and federal permits		6/15/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Electrofishing to collect a representative sample of bull trout below Albeni Falls Dam

Description: EWU and KNRD crews will conduct electrofishing surveys from Indian Creek (14 km below Albeni Falls Dam) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew. Most of the effort will be focused in the spring around the peak of the hydrograph before water temperatures reach the 16 degree Celsius threshold. In the previous three years this tends to be the period of time when the most bull trout have been captured and tagged.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by electrofishing that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about electrofishing operations.

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 : Uncertainty Research

Locations: 2

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER | PEND OREILLE **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/1/2011	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. Spring electrofishing	5/2/2011	4/29/2012	Completed	EWU and KNRD crews will conduct electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew. The most effort will be expended in the spring before water temperatures rise above 16 degree Celsius. PNNL biologists will assist on at least one survey in the spring.
C. Summer electrofishing	7/1/2011	9/15/2011	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, time will be expended in the summer at cold water refugia.
D. Fall electrofishing	9/16/2011	12/8/2011	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, effort will be expended in the fall.
Deliverable: E. Electrofishing collection of bull trout below Albeni Falls Dam		4/30/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Angling for bull trout

Description: KNRD crews will conduct angling surveys in the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 4 days of effort will be expended annually by the crew. Latitude and longitude coordinates at the start and end of each angling survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by angling that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about angling efforts.

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 : Uncertainty Research

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name: EXPOSURE CREEK

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/1/2011	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. Spring angling	5/3/2011	4/30/2012	Completed	Angling for bull trout will be used when the water levels in the tailrace are too high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and/or water velocity. A total of four days of angling will be conducted yearly.
C. Fall angling	9/15/2011	11/30/2011	Completed	Angling for bull trout will be used when the water levels in the tailrace are too high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and/or water velocity. A total of four days of angling will be conducted yearly.
Deliverable: D. Angling for bull trout below Albeni Falls Dam		4/30/2012	Completed	See the Deliverable Specification above

E: 158. Mark/Tag Animals

Title: Implant combination radio acoustic or radio transmitter into bull trout
Description: Transmitter implantation will be accomplished by EWU, KNRD, and PNNL. Bull trout from electrofishing and angling will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for PIT tags. The PIT tag number along with data on TL (mm), FL (mm), weight (g) and results of the genetic assignment from the 'rapid response genetic analysis' (bull trout only) will be recorded on a data sheet.

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The fish will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exciting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently.

Deliverable Specification: 5-20 Bull trout will be captured and undergo surgery, depending on the size of the fish it will either be implanted with a combination radio acoustic or radio tag. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water), CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weight 18.0 g (in water)], or Lotek radio tag SR-11-18, 449 day life. Surgical implantation of the transmitters will be accomplished by an experienced surgeon.

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 : Uncertainty Research

Locations: 1
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/1/2011	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. Implant CART tags and PIT tags in up to 5-20 bull trout	5/2/2011	4/15/2012	Completed	The goal is 5-20 bull trout implanted with CART or radio tags and PIT tags.
Deliverable: C. Implanting of radio tags		4/30/2012	Completed	See the Deliverable Specification above

F: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam



Description: All bull trout collected in the tailrace of Albeni Falls Dam in 2011-12 will be released primarily above Albeni Falls Dam, with the exception of any bull trout caught in a cool water refuge while the Pend Oreille River water temperature is above 16 degrees Celsius.

Deliverable Specification: Bull trout captured in the tailrace of Albeni Falls Dam when water temperatures are below 16 degrees Celsius will be radio or CART tagged, transported, and released above the dam at the Priest River boat launch (below the confluence of Priest River and the Pend Oreille River).

Planned Metrics: # of fish transported: 20

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/1/2011	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. Capture bull trout	5/2/2011	4/19/2012	Completed	Bull trout will be captured by boat electrofishing and angling between Indian Creek and the tailrace of Albeni Falls Dam. After capture bull trout will be implanted with a radio or CART tag and moved above Albeni Falls Dam and released at the Priest River boat launch.
C. Transport bull trout	5/2/2011	4/19/2012	Completed	Bull trout will be transported in a water-filled cooler maintained at the proper temperature and DO level to the Priest River boat launch.
Deliverable: D. Bull trout transported above Albeni Falls Dam		4/29/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Rapid response genetic analysis of bull trout biopsy samples

Description: Tissue samples will be collected from bull trout captured by electrofishing and angling. The samples will be sent by express mail to the USFWS Genetics Laboratory in Abernathy Washington. Within 48 hours the USFWS genetics lab will assign individual bull trout to a particular tributary and will communicate this information to KNRD.

Deliverable Specification: Bull trout will be assigned to individual natal tributaries. Using the lab's "rapid response genetic analysis" protocol (The protocol that is being used at Cabinet Gorge Dam an Avista project)(Arden et al. 2005), the samples will be analyzed at 12 microsatellite DNA (msDNA) loci that are standard for Columbia Basin bull trout.

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 : Uncertainty Research

Locations: 3

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: Multiple **HUC5 Watershed:** Multiple

County: BONNER | COWLITZ | PEND OREILLE **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present: Columbia River Chum Salmon ESU (Accessible) | Lower Columbia River Chinook Salmon ESU (Accessible) | Lower Columbia River Coho Salmon ESU (Accessible)

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/1/2011	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. Collect bull trout tissue samples	5/2/2011	4/19/2012	Completed	Bull trout tissue samples will be collect by boat electrofishing and angling in the tailrace of Albeni Falls Dam. The samples will then be shipped to Abernathy Lab to under Rapid Response genetic assignments within 48 hours
C. Send bull trout tissue samples	5/2/2011	4/19/2012	Completed	Send collected bull trout tissue samples to the Abernathy Lab for genetic analysis.
D. Abernathy Lab to process tissue samples and send results	5/5/2011	4/21/2012	Completed	Abernathy Genetic Lab will process bull trout tissue samples. The sample will assign the particular bull trout to a region. The results will then be sent back to the Kalispel Tribe.
Deliverable: E. Genetic Analysis		4/29/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Mobile tracking surveys by fixed wing aircraft, boat, and vehicle

Description: Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. Air surveys will be made 12 times per year. EWU will charter a Cessna C-182 aircraft from Felts Field Aviation in Spokane, Washington for making aerial surveys. A Yagi antenna will be mounted externally underneath the wing of the aircraft. Each flight will be approximately four hours in duration. A pilot accompanied by an EWU technician will fly a similar flight plan for each survey. Boat tracking will be conducted in the event that tributary flows are too low for bull trout to enter tributaries.

Deliverable Specification: Air surveys will be made 12 times a year. The flight path will start just below Albeni Falls Dam, thence up the center of the Pend Oreille River to the outlet of Pend Oreille Lake, then around the perimeter of Pend Oreille Lake. Where known bull trout spawning tributaries enter they will be followed to their source or known upper limit of bull trout occupancy. Tributaries surveyed will include: (1) Priest River to Outlet Dam, including the East River and its Middle Fork; (2) Tributaries entering the north shore of Lake Pend Oreille (Pack River, Grouse Creek and Trestle Creek); (3) Tributaries entering the Clark Fork arm of Lake Pend Oreille (Lightning Creek and tributaries, Johnson Creek and Twin Creek) and (4) Tributaries entering the east shore of Lake Pend Oreille (Granite Creek, Sullivan Springs Creek, North Gold Creek, Gold Creek). Additionally, the Clark Fork River will be flown to Cabinet Gorge Dam. Vehicle surveys will be made once monthly from June to August and once weekly from September to November. Boat tracking will be conducted in the event that tributary flows are to low for bull trout to enter.

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 : Uncertainty Research

Locations: 2

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/3/2011	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. Aircraft tracking	5/16/2011	4/13/2012	Completed	Aerial surveys will be conducted 12 times a year from fixed wing aircraft.
C. Boat tracking	5/16/2011	4/13/2012	Completed	Boat tracking will be conducted 2-4 times a year using a directional hydrophone.
D. Vehicle tracking	6/1/2011	4/13/2012	Completed	Vehicles surveys will be made along each of the tributaries streams once monthly from June to August and once weekly from September to November.
Deliverable: E. Tracking of radio tagged fish with aircraft, vehicle, and boat.		4/13/2012	Completed	<i>See the Deliverable Specification above</i>

I: 162. Analyze/Interpret Data



Title: Analysis of bull trout radiotelemetry data
Description: Bull trout radiotelemetry data will be analyzed in ArcGIS to determine seasonal movement, habitat use and diel activity.
Deliverable Specification: Spatial analysis of bull trout movements, habitat use, and natal stream use will be conducted using ArcGIS.
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 : Uncertainty Research
Locations:
Primary Focal Species: Trout, Bull
Country: **NPCC Subbasin:**
State: **HUC5 Watershed:**
County: **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner: **Protocol State:**
Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Bull trout data will be entered into MS Excel spreadsheet	5/30/2011	4/13/2012	Completed	Raw tracking data (GPS location, water temperature, habitat, fish code, depth, and substrate where possible) will be entered into MS Excel spreadsheet
B. GPS data will be spatially analyzed in Arc GIS	1/2/2012	4/16/2012	Completed	GPS data will be entered into Arc GIS to be spatially analyzed and create maps of fish movement and habitat usage.
Deliverable: C. Analyzed data for annual technical report.		4/26/2012	Completed	<i>See the Deliverable Specification above</i>

J: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations
Description: Each spring PNNL and EWU will overhaul, refurbish and retest each of the twelve ground receiving stations..
Deliverable Specification: Functioning, tested (each station will be inspected for damage. Beacon tags and 12 volt batteries will be replaced if necessary) ground receiving stations. A trip log form and electronic version of the data will be maintained at PNNL and backed up at EWU. The annual reports will contain a description of annual overhaul and maintenance activities.
Locations: 8
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** Multiple
State: ID **HUC5 Watershed:** Multiple
County: BONNER **HUC6 Name:** Multiple
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/3/2011	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. Overhaul, refurbish, and retest ground receiving stations	3/1/2012	3/30/2012	Completed	Each spring PNNL and EWU will overhaul, refurbish and retest each of the twelve ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
Deliverable: C. Annual maintenance of monitoring equipment		3/30/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Compile electronic spreadsheet database of electrofishing data
Description: All electrofishing and angling data will be entered into an Excel spreadsheet and maintained as an electronic database of electrofishing records.
Deliverable Specification: All electrofishing and angling data will be entered into a excel workbook and maintained as a electronic database of all electrofishing.

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 : Uncertainty Research

Locations: 1
Primary Focal Species: Trout, Bull
Country: US
State: WA
County: PEND OREILLE

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name:

Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/3/2011	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. Electrofishing data entry	5/10/2011	4/13/2012	Completed	All data collected while electrofishing and angling for bull trout will be input into a excel workbook and maintained as a electronic data base
Deliverable: C. Electrofishing data entry		4/27/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Download stationary ground radio receiving stations
Description: All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download. Each station will be inspected for damage and repaired if necessary.

Deliverable Specification: All fixed receiver stations will be inspected (Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.) and downloaded (Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise).

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 : Uncertainty Research

Locations: 8
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER

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

Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner:

Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2011	5/3/2011	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. Inspect and download receiver stations 26 times per year	5/13/2011	4/27/2012	Completed	<p>All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.</p> <p>Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.</p> <p>Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.</p> <p>Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.</p>
Deliverable: C. Downloading stationary ground radio receiver		4/30/2012	Completed	<i>See the Deliverable Specification above</i>

M: 162. Analyze/Interpret Data

Title: Data reduction and analysis

Description: EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked.

Deliverable Specification: GIS maps and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.

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 : Uncertainty Research

Locations:

Primary Focal Species: Trout, Bull

Country: **NPCC Subbasin:**

State: **HUC5 Watershed:**

County: **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. GIS generated tracking maps	11/10/2011	4/16/2012	Completed	EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.
B. Statistical comparisons of run timing, genetic assignments, and spawning tributaries	11/10/2011	4/16/2012	Completed	Statistical comparisons will be made to determine if fish randomly entered spawning tributaries or if they entered the tributary predicted by their genetic assignment. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
Deliverable: C. Data analysis of tracking data		4/16/2012	Completed	<i>See the Deliverable Specification above</i>



N: 189. Coordination-Columbia Basinwide

Title: Project coordination among all stakeholders
Description: This project will require coordination with a number of agencies and organizations.
Deliverable Specification: Coordination activities (Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), private utilities (Avista), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies.) will be included in project reporting. Coordination will also be done via email, land mail, and telephone randomly as questions or findings arise. Because this project will be conducted in two states and involves a federal threaten species coordination and communication will be important to obtain permits, move fish, and distribute findings.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Ongoing coordination between stakeholders	5/2/2011	4/27/2012	Completed	Coordination between PIs, USACE, WDFW, IDFG, USFWS, Avista Power, bull trout recovery groups, and other researchers.
Deliverable: B. Project coordination among stakeholders		4/30/2012	Completed	<i>See the Deliverable Specification above</i>

O: 119. Manage and Administer Projects

Title: Manage Project
Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
Deliverable Specification: Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Accrual - Submit September estimate to BPA	9/1/2011	9/9/2011	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. Generally, this should be done by September 10.
B. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	1/1/2012	1/30/2012	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
C. Attend Annual AFS Conference in Seattle Washington	9/4/2011	9/8/2011	Completed	The Project Biologist and two contract researchers from EWU will attend the Annual American Fisheries Society Conference held in Seattle WA. Sept 4-8.
Deliverable: D. Funding Package - Submit draft to COTR		2/1/2012	Completed	<i>See the Deliverable Specification above</i>

P: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period (5/1/2011) to (4/30/2012)
Description: Prepare and upload annual report.
Deliverable Specification: Annual report to BPA's COTR will be prepared by the EWU PI and PNNL CO-PI, with assistance from EWU's statistician and research associate, and PNNL's senior scientist. Report will summarize the results obtained that year. Reports will follow standard scientific format and include an executive summary, introduction, methods, results, discussion, recommendation, and literature cited section, as well as tables, figures, and data appendices. Reports will be reviewed by the KNRD CO-PI before submission. Upload annual report for the period (May 1, 2011 to April 30, 2012).
Planned Metrics: <None>



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2011	12/15/2011	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Submit report for internal contractor review	2/24/2012	2/28/2012	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.
C. Submit report for external review	3/2/2012	3/2/2012	Completed	Use this milestone if the annual report requires external review. May be simultaneously reviewed by external parties and BPA COTR if desired.
D. Email draft of report to COTR for review	3/9/2012	3/9/2012	Completed	he draft annual report must be submitted to the BPA COTR in Microsoft Word format (any version of Word is fine).
E. Receive COTR review comments	3/12/2012	4/11/2012	Completed	he BPA COTR should provide review feedback and comments within 30 days of receiving the draft annual report. This milestone should therefore have a duration of 30 days.
F. Finalize Annual Report	4/30/2012	4/30/2012	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
Deliverable: G. Final report uploaded to the BPA website		4/30/2012	Completed	<i>See the Deliverable Specification above</i>

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 26934 REL 34
 [ISSUED]
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Release **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Pacific Northwest National Laboratory (Prime - USDOERIC00)
BPA Internal Ref: 26934 REL 34
SOW Validation: Last validated 02/14/2011 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (02/14/2011) Property as of 1/10/11
Budget - Contract (02/14/2011) FY 2011 LIB PNNL Bulltrout Passage



Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
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Brian Bellgraph	Contract Manager	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
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Lisa Marko MacLellan	Interested Party	Bonneville Power Administration	(503) 230-4047 / NA	lmmarko@bpa.gov	
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Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Complete environmental compliance requirements		\$1,000	(1 %)
B : 157. Collect/Generate/Validate Field and Lab Data - Electrofish, tag, and transport bull trout	*	\$16,000	(12 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Lake mobile tracking surveys	*	\$18,000	(14 %)
D : 157. Collect/Generate/Validate Field and Lab Data - Maintain and download radio receiving stations	*	\$27,000	(21 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
E : 157. Collect/Generate/Validate Field and Lab Data - Professional hook/line fish, tag, transport fish	*	\$10,000	(8 %)
F : 119. Manage and Administer Projects - Manage Project		\$5,000	(4 %)
G : 162. Analyze/Interpret Data - Data reduction and analysis		\$14,000	(11 %)
H : 132. Produce (Annual) Progress Report - Submit Annual Report for the period April 2011 to November 2011		\$15,000	(12 %)
I : 183. Produce Journal Article - Submit journal article		\$5,746	(4 %)
J : 70. Install Fish Monitoring Equipment - Test all stations prior to FY12/13 monitoring season, if applicable	*	\$15,000	(12 %)
K : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$2,000	(2 %)
Total:		\$128,746	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

The goal of this project is to provide temporary upstream passage for bull trout at Albeni Falls Dam, Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. The fish will then be transported above Albeni Falls Dam and released near Priest River, Idaho, or re-released below the dam depending on water temperature and number of fish captured. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to track the fish to potential spawning tributaries of Pend Oreille Lake. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Complete environmental compliance requirements

Description: Provide BPA with information necessary for environmental clearance for all contract activities during FY11/12. Submit FY12/13 SOW and supporting documents as needed for BPA's Environmental Compliance Group to determine environmental compliance status, dependent on project continuation into FY12/13.

Deliverable Specification: Environmental compliance requirements complete for FY11/12 work. Submit FY12/13 SOW package to begin Environmental Clearance review for subsequent contract, if project continues.

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 clearance for FY11/12 work	4/5/2011	4/15/2011	Completed	BPA provides environmental clearance to proceed with field work for FY11/12
B. Provide project information to BPA	11/1/2011	4/4/2012	Completed	Provide FY12/13 SOW and any other documentation needed for environmental review, only if project continues into FY12/13.
C. Obtain BPA clearance for FY12/13 work	3/1/2012	4/4/2012	Completed	BPA provides environmental clearance to proceed with field work for FY12/13, if project continues
Deliverable: D. Ensure environmental compliance requirements are complete		4/4/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Electrofish, tag, and transport bull trout

Description: Method(s): Eastern Washington University and the Kalispel Tribe of Indians crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. One PNNL staff member will assist on up to 10 electrofishing trips in FY11/12, primarily concentrated during spring because this is when bull trout have been documented downstream of Albeni Falls Dam.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Fish collected during these surveys will be identified and total length (TL) measured (in mm). Bull trout will be weighed (to nearest g), measured (TL in mm and FL in mm), and tagged with PIT tag for permanent identification. All bull trout will be radio-tagged. Release sites will be dependent on water temperature (see work element above). Both EWU and the Kalispel Tribe own electrofishing boats that will be made available to the project.

Bull trout transmitter implantation will be accomplished by PNNL, KNRD, and EWU. Bull trout will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for the PIT tag injected by the electrofishing crews. The PIT tag number along with data on TL (mm), FL (mm), and weight (g) will be recorded on a data sheet. [If the genetic assignment is unknown at the time transmitters are implanted that information will be added when it becomes available.]

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The bull trout will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exiting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently to be put back in the live box on the floating barge.

All fish collected in the tailrace of Albeni Falls Dam in 2010 will be released either above Albeni Falls Dam or below the dam, depending on the time of year, water temperature, and number of bull trout captured. Fish captured in the tailrace when temperatures are less than 16 °C will be moved above the dam and released in the town of Priest River below the confluence of Priest River.

Deliverable Specification: Work Products/Deliverables: Up to 40 CART-tagged bull trout released in 2011 upstream of Albeni Falls Dam. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water) or CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)]. Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train project personnel to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured. The annual reports and project completion report will contain a description of tagging bull trout.

Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam. This is a change in plans from the proposal because without a fish trap, there is no way to hold the fish and conduct genetic analyses prior to release.

Fish will be transported in a water-filled cooler maintained at the proper temperature and DO level. If necessary, the bull trout will be acclimated to the temperature of the release site. This will be accomplished by slowly adding release site water into the cooler until the temperature difference between the transport water and release site water is =1.0°C. Oxygen will be bubbled into the cooler until the fish is released.



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: 2

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name: EXPOSURE CREEK

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2011	4/14/2011	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. Assist on 10 electrofishing trips in FY11/12	4/15/2011	10/30/2011	Completed	Electrofishing surveys will be concentrated during spring because bull trout are most catchable during this period. Fall electrofishing and transport of bull trout may also occur if trips are not all completed in spring. Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
C. Implant bull trout with CART transmitters	4/15/2011	10/30/2011	Completed	Implant bulltrout with acoustic/radio telemetry transmitters
D. Transport bull trout upstream of Albeni Falls Dam	4/15/2011	10/30/2011	Completed	Following capture of bulltrout they will be transported above the Albeni Falls Dam
Deliverable: E. Bull trout tagged and transported upstream of Albeni Falls Dam		10/30/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Lake mobile tracking surveys

Description: During summer and early fall of 2011, acoustic and radio tracking will be used to locate bull trout in Lake Pend Oreille prior to spawning. These surveys will occur approximately once a month for a total of 3 surveys from June through November. Bull trout positions will be geo-referenced. Our primary goal is to understand more about where bull trout go during the summer and to more precisely track fish into their spawning tributaries.

Deliverable Specification: Locations of bull trout in Lake Pend Oreille will be included in the final report including summer locations and pre-spawn staging locations, if we are able to determine this level of detail.

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: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed:

HUC6 Name:

Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2011	4/5/2011	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. Re-install stations at Gold and Granite creeks	5/1/2011	6/30/2011	Completed	Re-install stations that were uninstalled in fall 2010 (because it was thought that the project was over)
C. Receiver stations inspected and downloaded	4/5/2011	4/4/2012	Completed	Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary. Data collection at some stations will continue through the end of the contract year if necessary.
Deliverable: D. Functioning radio monitoring stations		4/4/2012	Completed	See the Deliverable Specification above

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

Title: Professional hook/line fish, tag, transport fish

Description: We plan to hire a professional fisherman in FY11/12 to assist with capture of bull trout downstream of Albeni Falls Dam because of the low capture efficiency of electrofishing. One PNNL staff member will attend the professional fisherman during each capture outing and all sampling permits with the states of Idaho to capture bull trout will be obtained prior. Any bull trout captured will be treated exactly as fish under Work Element B that are captured, implanted with a transmitter, and released upstream of Albeni Falls Dam.

Deliverable Specification: We hop to capture, tag, and transport up to 5 bull trout using the services of a professional fisherman.

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: Trout, Bull

Country: US

State: ID

County: BONNER

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name: EXPOSURE CREEK

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2011	4/29/2011	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. Hire professional fisherman to assist in bull trout capture	5/1/2011	6/24/2011	Completed	Hire professional fisherman to help increase catch rates of bull trout below Albeni Falls Dam.
Deliverable: C. Bull trout tagged and transported using professional		6/24/2011	Completed	See the Deliverable Specification above

F: 119. Manage and Administer Projects

Title: Manage Project

Description: Method(s): Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.



Deliverable Specification: Work Products/Deliverables: Administrative products including accrual estimates, metric reporting, and annual statements of work.

Submit next year's SOW, Budget, and Property Inventory to the BPA COTR if work will continue beyond FY11/12. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Project coordination	4/5/2011	4/4/2012	Completed	This project will require coordination with a number of agencies and organizations. Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies). Coordination with landowners where equipment is located will also need to be managed accordingly.
B. Manage project	4/5/2011	4/4/2012	Completed	Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
C. Accrual - Submit September estimate to BPA	9/1/2011	9/10/2011	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. Generally, this should be done by September 10.
D. Funding Package - Write and conduct internal review (e.g., Supervisor or Interagency)	12/1/2011	1/3/2012	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
E. Submit FY12/13 funding package to BPA	1/3/2012	1/4/2012	Completed	If necessary, Submit SOW and budget estimate to BPA for FY12/13 work
Deliverable: F. Complete all project management activities for FY11/12		4/4/2012	Completed	<i>See the Deliverable Specification above</i>

G: 162. Analyze/Interpret Data

Title: Data reduction and analysis

Description: Method(s): EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked during the project year, which may overlap contract periods, e.g., data collected from 15 November through 30 April will be included in the following year's annual report. PNNL will lead the task of analyzing fish tracking data.

Deliverable Specification: Annual statistical reports, GIS maps, and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Data to determine detection histories will also be obtained from a database specifically designed to maintain fish detection data.

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: Trout, Bull

Country:

NPCC Subbasin:

State:

HUC5 Watershed:

County:

HUC6 Name:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:

Area of Inference:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Data reduction and database compilation	4/5/2011	4/4/2012	Completed	Raw data will be checked for errors, organized and loaded into a database after each download.
B. Fish positions (GPS coordinates) will be entered into GIS to generate track maps for each fish	11/1/2011	12/31/2011	Completed	Map and tabled-data showing fish migration patterns. Fish location data collected through the 15 November of each year will be used to produce a detection history of each fish.
Deliverable: C. Develop a profile of each fish tracked		12/31/2011	Completed	<i>See the Deliverable Specification above</i>

H: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period April 2011 to November 2011

Description: The annual 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. Note that any results included in the annual report will be restricted to those data collected before November 15 of the contract year. This means that data collected after November 15 will be included in the next year's report. In 2011, this work element also covers work towards submitting a peer-reviewed journal article.

Deliverable Specification: Upload annual report for the period April 2011 to November 2011, with the caveat that any data or activities completed after November 15 will be included in the following year's annual report. Thus, the report will include all activities performed from 15 November 2010 to 15 November 2011, as well as projected activities through the end of the contract year on 4 April 2012. The report will be uploaded in PISCES as an attachment to the contract.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2011	11/15/2011	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Write final report	11/16/2011	1/8/2012	Completed	Write progress report for work done from 15 November 2010 to 15 November 2011.
C. Submit report for internal contractor review	1/9/2012	1/23/2012	Completed	Report will undergo PNNL technical and editorial review.
D. Submit report for external review	1/24/2012	2/24/2012	Completed	Report will undergo review by BPA COTR.
E. Receive COTR review comments	1/24/2012	2/24/2012	Completed	COTR will provide comments to PNNL within 30 days of receiving the draft progress report.
F. Finalize Annual Report	2/24/2012	3/4/2012	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
G. Confirm BPA has posted the report	3/4/2012	4/4/2012	Completed	It usually takes BPA no more than 30 days to get the report posted. This milestone should therefore have a duration of 30 days. To confirm posting of the report, search the BPA Publications database. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
Deliverable: H. Final report uploaded to the BPA website		4/4/2012	Completed	<i>See the Deliverable Specification above</i>

I: 183. Produce Journal Article

Title: Submit journal article

Description: Formulate results from this 4-year project into results specific to the peer-reviewed literature. We plan to submit this publication to a peer-reviewed journal in FY11/12.

Deliverable Specification: We will prepare a manuscript to Transactions of the American Fisheries Society, the North American Journal of Fisheries Management, or another fisheries-related research journal describing the main findings of this project.

Planned Metrics: # of draft manuscripts and draft final reports of research findings submitted for publication: 2

Primary Focal Species: Trout, Bull



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Manuscript review	4/5/2011	6/30/2011	Active	Final review before submittance to journal.
Deliverable: B. Manuscript submitted to peer-reviewed journal		6/30/2011	Active	<i>See the Deliverable Specification above</i>

J: 70. Install Fish Monitoring Equipment

Title: Test all stations prior to FY12/13 monitoring season, if applicable

Description: In preparation for tracking during FY12/13, if the project continues, we will test and calibrate all receiver stations in spring 2012.

Deliverable Specification: Testing and calibration of all monitoring stations

Locations: 9

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BONNER **HUC6 Name:** Multiple

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	4/5/2011	5/15/2011	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. Testing, calibration, modification of monitoring receivers	3/1/2012	4/4/2012	Completed	Test receivers
Deliverable: C. Testing and calibration of all monitoring stations		4/4/2012	Completed	<i>See the Deliverable Specification above</i>

K: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Apr-Jun 2011 (4/5/2011 - 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-Apr 2012 (1/1/2012 - 4/4/2012)	3/21/2012	4/4/2012	Completed	

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 26934 REL 16
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Release **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Pacific Northwest National Laboratory (Prime - USDOERIC00)
BPA Internal Ref: 26934 REL 16
SOW Validation: Last validated 02/05/2008 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (02/04/2008) Property Inventory
Budget - Contract (03/12/2008) Line Item Budget CR



Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Carlos Matthew	COTR	Bonneville Power Administration	(503) 230-3418 / (503) 230-4564	cjmatthew@bpa.gov	PO Box 3621 KEWL-4 Portland OR 97208-3621
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Virgil Watts III	Interested Party	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Brian Bellgraph	Contract Manager	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Terri Stewart	Interested Party	Pacific Northwest National Laboratory	(509) 375-4423 / (509) 371-7150	terri.stewart@pnl.gov	Pacific Northwest National Laboratory Energy and Environment Directorate PO Box 999, MS K6-84 Richland WA 99352
Genice Madera	Administrative Contact	Pacific Northwest National Laboratory	(509) 372-4010 / (509) 372-4038	Genice.Madera@pnso.science.doe.gov	Science & Technology Programs Division, U.S. Department of Energy, Richland Field Office, P.O. Box 550 Richland WA 99352
Khanida Mote	Contracting Officer	Bonneville Power Administration	(503) 230-4599 / NA	kpote@bpa.gov	P.O. Box 3621 Mailstop NSSP-4 Portland OR 97208
Bruce Hollen	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5756 / NA	bahollen@bpa.gov	
Mickey Carter	Interested Party	Bonneville Power Administration	(503) 230-5885 / NA	macarter@bpa.gov	905 NE 11th Ave. Portland OR 97232
Joe Maroney	Technical Contact	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
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Work Element Table of Contents:



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Complete environmental compliance requirements		\$523	(0 %)
B : 157. Collect/Generate/Validate Field and Lab Data - Weekly electrofishing	*	\$15,153	(12 %)
C : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$2,089	(2 %)
D : 158. Mark/Tag Animals - Implant combination radio acoustic transmitter (CART) into bull trout	*	\$9,238	(7 %)
E : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft, vehicle and boat	*	\$15,922	(13 %)
F : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving station	*	\$25,912	(21 %)
G : 119. Manage and Administer Projects - Manage Project		\$7,737	(6 %)
H : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$25,165	(20 %)
I : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$2,088	(2 %)
J : 162. Analyze/Interpret Data - Data reduction and analysis		\$8,348	(7 %)
K : 132. Produce (Annual) Progress Report - Submit Annual Report for the period May 2008 to April 2009		\$12,870	(10 %)
Total:		\$125,045	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

The goal of this project is to provide temporary upstream passage for bull trout at Albeni Falls Dam, Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. The fish will then be transported above Albeni Falls Dam and released near Priest River, Idaho, or re-released below the dam depending on water temperature and number of fish captured. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to track the fish to potential spawning tributaries of Pend Oreille Lake. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Complete environmental compliance requirements
Description: Provide BPA with information necessary for environmental clearance for all contract activities during FY08. Submit FY09 SOW and supporting documents as needed for BPA's Environmental Compliance Group to determine environmental compliance status.
Deliverable Specification: Environmental compliance requirements complete for FY08 work. Submit FY09 SOW package to begin Environmental Clearance review for subsequent contract.
Planned Metrics: Are herbicides used as part of work performed under this contract?: No



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Obtain BPA clearance for FY08 work	5/1/2008	5/1/2008	Completed	BPA provides environmental clearance to proceed with field work for FY08
B. Provide project information to BPA	11/1/2008	2/1/2009	Completed	Provide FY09 SOW and any other documentation needed for environmental review.
C. Obtain BPA clearance for FY09 work	4/15/2009	4/30/2009	Completed	BPA provides environmental clearance to proceed with field work for FY09
Deliverable: D. Ensure environmental compliance requirements are complete		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Weekly electrofishing

Description: Method(s): EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 24 days of effort will be expended annually (during the contract year May 1 through April 30) by each crew: 15 days, once each week, during the spring (1 May–15 June, or March 1 through April 30), three days during the summer (July, August) and six days, once each week, during the fall (25 September – 10 November). PNNL biologists will assist on one survey in the spring, one in the summer and one in the fall.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Fish collected during these surveys will be identified and total length (TL) measured (in mm). Bull trout will be weighed (to nearest g), measured (TL in mm and FL in mm), and tagged with PIT tag for permanent identification. All bull trout will be radio-tagged (up to maximum of 40 in 2008). Release sites will be dependent on water temperature (see work element above). Both EWU and the Kalispel Tribe own electrofishing boats that will be made available to the project.

Deliverable Specification: Work Products/Deliverables: EWU will provide an annual summary of fish captured by electrofishing; note that since electrofishing in the early spring occurs each year prior to the contract renewal data, these data from the early spring period will be included in the following year's report, e.g., data collected in March and April 2008 will be included in the FY 2009 report. This summary will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g); and (3) A written summary about electrofishing operations. PNNL will provide comment to EWU on report.

Planned Metrics: * Primary R, M, and E Focal Strategy : Tributaries
* Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Total of 15 days of effort will be expended annually by ea crew: 6 days in spring	5/1/2008	4/30/2009	Completed	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
C. Three days during the summer July and August	7/1/2008	8/31/2008	Active	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
D. Six days, once ea wk during the fall Sept -Nov	9/1/2008	11/15/2008	Completed	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
Deliverable: E. Weekly electrofishing surveys		4/30/2009	Completed	See the Deliverable Specification above

C: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam

Description: All fish collected in the tailrace of Albeni Falls Dam in 2008 will be released either above Albeni Falls Dam or below the dam, depending on the time of year, water temperature, and number of bull trout captured. Fish captured in the tailrace when temperatures are less than 16 °C will be moved above the dam and released in the town of Priest River below the confluence of Priest River.

Deliverable Specification: Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam. This is a change in plans from the proposal because without a fish trap, there is no way to hold the fish and conduct genetic analyses prior to release.

Fish will be transported in a water-filled cooler maintained at the proper temperature and DO level. If necessary, the bull trout will be acclimated to the temperature of the release site. This will be accomplished by slowly adding release site water into the cooler until the temperature difference between the transport water and release site water is =1.0°C. Oxygen will be bubbled into the cooler until the fish is released.

Planned Metrics: # of fish transported: 40

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Fish releases	5/1/2008	4/30/2009	Completed	Fish captured in the tailrace when temperature are less than 16c will be moved above the dam and released in the town of Priest River below the confluence of Priest River. Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam.
Deliverable: C. bull trout released		4/30/2009	Completed	See the Deliverable Specification above

D: 158. Mark/Tag Animals

Title: Implant combination radio acoustic transmitter (CART) into bull trout



Description:

Method(s): Transmitter implantation will be accomplished by PNNL, KNRD, and EWU. Bull trout will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for the PIT tag injected by the electrofishing crews. The PIT tag number along with data on TL (mm), FL (mm), and weight (g) will be recorded on a data sheet. [If the genetic assignment is unknown at the time transmitters are implanted that information will be added when it becomes available.]

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The bull trout will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exciting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently to be put back in the live box on the floating barge.

Deliverable Specification:

Work Products/Deliverables: Up to 40 CART-tagged bull trout released in 2008 above and below Albeni Falls Dam. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water) or CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)]. Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train project personnel to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured. The annual reports and project completion report will contain a description of tagging bull trout.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Tributaries
- * Primary R, M, and E Type : Action Effectiveness Monitoring

Locations:

1

Primary Focal Species:

Trout, Bull

Country:

US

NPCC Subbasin: PEND OREILLE

State:

ID

HUC5 Watershed: UPPER PEND OREILLE

County:

BONNER

HUC6 Name: EXPOSURE CREEK

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Fish will be implanted with Lotek combination acoustic/radio telemetry (CART) tag	5/1/2008	4/30/2009	Completed	Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train the EWU research associate to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured.
Deliverable: C. Transmitter implantation will be accomplished by PNNL and EWU.		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title:

Mobile tracking surveys by fixed wing aircraft, vehicle and boat

Description:

Method(s): Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. EWU will make vehicle surveys along each of the above noted tributary streams once monthly on about June 15, July 15, and August 15; once weekly from September 1 to October 15, and on about November 1 each year for the purpose of locating bull trout in spawning tributaries. One survey may also be done during the first quarter of CY2009 to identify locations of bull trout. A 4-element Yagi antenna will be mounted in a motorized assembly that will allow the operator to rotate the antenna while operating a 4WD truck. EWU and PNNL will conduct acoustic tracking surveys from boat to locate CART tagged bull trout after they enter Lake Pend Oreille. A Lotek directional hydrophone connected to a digital interface on the Lotek SRX 400 receiver will be used to follow the acoustic signal emanating from the CART tag. The acoustic signal from the CART tag will enable us to locate bull trout after they move into Lake Pend Oreille where radio signals are lost due to attenuation due to depth.

Deliverable Specification:

Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU. Boat tracking will occur on 10 dates that will be dependent on when fish are captured/tagged/released. Positions (latitude and longitude coordinates) of bull trout found during mobile tracking surveys will be determined using a GPS. A trip log will be maintained that will include information about dates and time of activities performed, equipment performance and locations and identification of any bull trout found. These data will be entered into an electronic database at the end of each trip.



Planned Metrics: * Primary R, M, and E Focal Strategy : Tributaries
 * Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 4

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. EWU and PNNL will conduct surveys by aircraft, vehicle and boat	5/1/2008	4/30/2009	Completed	To locate CART tagged bull trout after they enter Lake Pend Oreille. A Lotek directional hydrophone connected to a digital interface on the Lotek SRX 400 receiver will be used to follow the acoustic signal emanating from the CART tag. The acoustic signal from the CART tag will enable us to locate bull trout after they move into Lake Pend Oreille where radio signals are lost due to attenuation due to depth. Boat racking will occur on 10 dates that will be dependent on when fish are captured/tagged/released.
Deliverable: C. Track movement of tagged bull trout		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Download stationary ground radio receiving station

Description: Method(s): All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.

Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.

Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.

Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.

Deliverable Specification: Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU.

Planned Metrics: * Primary R, M, and E Focal Strategy : Tributaries
 * Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 10

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Receiver stations inspected and downloaded	5/1/2008	4/30/2009	Completed	Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.
Deliverable: C. All fixed receiver stations will be inspected and downloaded every other wk (26 times per yr)		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

G: 119. Manage and Administer Projects

Title: Manage Project
Description: Method(s): Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
Deliverable Specification: Work Products/Deliverables: Administrative products including accrual estimates, metric reporting, and annual statements of work.

Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Project coordination	5/1/2008	4/30/2009	Completed	This project will require coordination with a number of agencies and organizations. Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies). Coordination with landowners where equipment is located will also need to be managed accordingly.
B. Manage project	5/1/2008	4/30/2009	Completed	Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
C. Accrual - Submit September estimate to BPA	9/1/2008	9/12/2008	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. Generally, this should be done by September 10.
D. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	12/1/2008	12/31/2008	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
Deliverable: E. Funding Package - Submit draft to COTR		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

H: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations
Description: Method(s): Each spring PNNL and EWU will overhaul, refurbish and retest each of the eleven ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
 Start date: 1 February (annually, 2008-2010)
 Completion date: 30 April (annually, 2008-2010)



Deliverable Specification: Functioning, tested ground receiving stations. The annual reports will contain a description of annual overhaul and maintenance activities.

Locations: 10

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

NPCC Subbasin: Multiple

HUC5 Watershed: Multiple

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	1/31/2009	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. Permanent stationary ground stations will be tested	2/1/2009	4/30/2009	Completed	All permanent stationary ground stations will be calibrated and tested before electrofishing begins in 2009. The receiver stations at the dam will be calibrated by making transects across the river at 100 meter intervals from the concrete of the dam structure to the points upstream and downstream where radio signals can no longer be detected. Along each transect, GPS coordinates will be obtained at intervals of 50 meters and a radio transmitter will be lowered on a metered line to a depth of 5 meters (at 1 m depth intervals). Simultaneously, the receivers on the dam will detect and decode the radio signals. Signal strength (horizontal and vertical) at each transmitter position and depth will be translated into Geographic Information System (GIS) map coverage. Maximum distance (upstream and downstream) from the dam at which receivers can decode the radio signal (at power level >100) from a tag at a depth of 1 m will be determined. Our coverage will be designed to provide assurance that any radio-tagged fish moving below the dam will first be detected by one of the receivers monitoring the forebay and then be detected by one of the receivers monitoring the tailrace.
Deliverable: C. Testing of radio receivers		4/30/2009	Completed	See the Deliverable Specification above

I: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2008 (5/1/2008 - 6/30/2008)	7/1/2008	7/15/2008	Completed	
B. Jul-Sep 2008 (7/1/2008 - 9/30/2008)	10/1/2008	10/15/2008	Completed	
C. Oct-Dec 2008 (10/1/2008 - 12/31/2008)	1/1/2009	1/15/2009	Completed	
D. Jan-Mar 2009 (1/1/2009 - 3/31/2009)	4/1/2009	4/15/2009	Completed	
E. Final Apr 2009 (4/1/2009 - 4/30/2009)	4/16/2009	4/30/2009	Completed	

J: 162. Analyze/Interpret Data

Title: Data reduction and analysis

Description: Method(s): EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked during the CY which may overlap contract periods, e.g., data collected in March and April 2009 will not be included in the FY 2008 but will be included in the FY 2009 report. PNNL will lead the task of analyzing fish tracking data.

Deliverable Specification: Work Products/Deliverables: Annual statistical reports, GIS maps, and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.

Planned Metrics:
 * Primary R, M, and E Focal Strategy : Tributaries
 * Primary R, M, and E Type : Action Effectiveness Monitoring



Locations:

Primary Focal Species: Trout, Bull

Country:

NPCC Subbasin:

State:

HUC5 Watershed:

County:

HUC6 Name:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:

Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Fish positions (GPS coordinates) will be entered into GIS to generate track maps for each fish	11/1/2008	11/30/2008	Completed	Map and tabled-data showing fish migration patterns.
Deliverable: B. Develop a profile of each fish tracked		11/30/2008	Completed	<i>See the Deliverable Specification above</i>

K: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period May 2008 to April 2009

Description: The annual 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. Note that any results included in the annual report will be restricted to those data collected before November 15 of the contract year. This means that data collected after November 15 will be included in the next year's report.

Deliverable Specification: Upload annual report for the period May 2008 to April 2009, with the caveat that any data or activities completed after November 15 won't be included in the report. The report will be uploaded in PISCES as an attachment to the contract.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2008	11/7/2008	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Write progress report	11/1/2008	12/31/2008	Completed	Write progress report for work done from May 2008 to December 2008
C. Submit report for internal contractor review	1/1/2009	1/31/2009	Completed	Report will undergo PNNL technical and editorial review.
D. Submit report for external review	2/1/2009	2/28/2009	Completed	Report will undergo simultaneous COTR and peer review.
E. Email draft of report to COTR for review	2/1/2009	2/28/2009	Completed	Report will undergo simultaneous COTR and peer review.
F. Receive COTR review comments	3/1/2009	3/1/2009	Completed	COTR will provide comments to PNNL within 30 days.
G. Finalize Annual Report	3/1/2009	4/28/2009	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
H. Confirm BPA has posted the report	4/28/2009	4/28/2009	Completed	It usually takes BPA no more than 30 days to get the report posted. This milestone should therefore have a duration of 30 days. To confirm posting of the report, search the BPA Publications database. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
Deliverable: I. Final report uploaded to the BPA website		4/28/2009	Completed	<i>See the Deliverable Specification above</i>



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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 26934 REL 16
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Release **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Pacific Northwest National Laboratory (Prime - USDOERIC00)
BPA Internal Ref: 26934 REL 16
SOW Validation: Last validated 02/05/2008 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (02/04/2008) Property Inventory
Budget - Contract (03/12/2008) Line Item Budget CR

**Contacts:**

Name	Role	Organization	Phone/Fax	Email	Address
Carlos Matthew	COTR	Bonneville Power Administration	(503) 230-3418 / (503) 230-4564	cjmatthew@bpa.gov	PO Box 3621 KEWL-4 Portland OR 97208-3621
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Virgil Watts III	Interested Party	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Brian Bellgraph	Contract Manager	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Terri Stewart	Interested Party	Pacific Northwest National Laboratory	(509) 375-4423 / (509) 371-7150	terri.stewart@pnl.gov	Pacific Northwest National Laboratory Energy and Environment Directorate PO Box 999, MS K6-84 Richland WA 99352
Genice Madera	Administrative Contact	Pacific Northwest National Laboratory	(509) 372-4010 / (509) 372-4038	Genice.Madera@pnso.science.doe.gov	Science & Technology Programs Division, U.S. Department of Energy, Richland Field Office, P.O. Box 550 Richland WA 99352
Khanida Mote	Contracting Officer	Bonneville Power Administration	(503) 230-4599 / NA	kpote@bpa.gov	P.O. Box 3621 Mailstop Nssp-4 Portland OR 97208
Bruce Hollen	Env. Compliance Lead	Bonneville Power Administration	(503) 230-5756 / NA	bahollen@bpa.gov	
Mickey Carter	Interested Party	Bonneville Power Administration	(503) 230-5885 / NA	macarter@bpa.gov	905 NE 11th Ave. Portland OR 97232
Joe Maroney	Technical Contact	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Peter Lofy	F&W Approver	Bonneville Power Administration	(503) 230-4193 / (503) 230-4563	ptlofy@bpa.gov	905 NE 11th Ave. Portland OR 97232

Work Element Table of Contents:



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Complete environmental compliance requirements		\$523	(0 %)
B : 157. Collect/Generate/Validate Field and Lab Data - Weekly electrofishing	*	\$15,153	(12 %)
C : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$2,089	(2 %)
D : 158. Mark/Tag Animals - Implant combination radio acoustic transmitter (CART) into bull trout	*	\$9,238	(7 %)
E : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft, vehicle and boat	*	\$15,922	(13 %)
F : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving station	*	\$25,912	(21 %)
G : 119. Manage and Administer Projects - Manage Project		\$7,737	(6 %)
H : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$25,165	(20 %)
I : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$2,088	(2 %)
J : 162. Analyze/Interpret Data - Data reduction and analysis		\$8,348	(7 %)
K : 132. Produce (Annual) Progress Report - Submit Annual Report for the period May 2008 to April 2009		\$12,870	(10 %)
Total:		\$125,045	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

The goal of this project is to provide temporary upstream passage for bull trout at Albeni Falls Dam, Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. The fish will then be transported above Albeni Falls Dam and released near Priest River, Idaho, or re-released below the dam depending on water temperature and number of fish captured. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to track the fish to potential spawning tributaries of Pend Oreille Lake. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Complete environmental compliance requirements

Description: Provide BPA with information necessary for environmental clearance for all contract activities during FY08. Submit FY09 SOW and supporting documents as needed for BPA's Environmental Compliance Group to determine environmental compliance status.

Deliverable Specification: Environmental compliance requirements complete for FY08 work. Submit FY09 SOW package to begin Environmental Clearance review for subsequent contract.

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



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Obtain BPA clearance for FY08 work	5/1/2008	5/1/2008	Completed	BPA provides environmental clearance to proceed with field work for FY08
B. Provide project information to BPA	11/1/2008	2/1/2009	Completed	Provide FY09 SOW and any other documentation needed for environmental review.
C. Obtain BPA clearance for FY09 work	4/15/2009	4/30/2009	Completed	BPA provides environmental clearance to proceed with field work for FY09
Deliverable: D. Ensure environmental compliance requirements are complete		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Weekly electrofishing

Description: Method(s): EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 24 days of effort will be expended annually (during the contract year May 1 through April 30) by each crew: 15 days, once each week, during the spring (1 May–15 June, or March 1 through April 30), three days during the summer (July, August) and six days, once each week, during the fall (25 September – 10 November). PNNL biologists will assist on one survey in the spring, one in the summer and one in the fall.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Fish collected during these surveys will be identified and total length (TL) measured (in mm). Bull trout will be weighed (to nearest g), measured (TL in mm and FL in mm), and tagged with PIT tag for permanent identification. All bull trout will be radio-tagged (up to maximum of 40 in 2008). Release sites will be dependent on water temperature (see work element above). Both EWU and the Kalispel Tribe own electrofishing boats that will be made available to the project.

Deliverable Specification: Work Products/Deliverables: EWU will provide an annual summary of fish captured by electrofishing; note that since electrofishing in the early spring occurs each year prior to the contract renewal data, these data from the early spring period will be included in the following year's report, e.g., data collected in March and April 2008 will be included in the FY 2009 report. This summary will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g); and (3) A written summary about electrofishing operations. PNNL will provide comment to EWU on report.

Planned Metrics: * Primary R, M, and E Focal Strategy : Tributaries
* Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Total of 15 days of effort will be expended annually by ea crew: 6 days in spring	5/1/2008	4/30/2009	Completed	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
C. Three days during the summer July and August	7/1/2008	8/31/2008	Active	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
D. Six days, once ea wk during the fall Sept -Nov	9/1/2008	11/15/2008	Completed	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
Deliverable: E. Weekly electrofishing surveys		4/30/2009	Completed	See the Deliverable Specification above

C: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam

Description: All fish collected in the tailrace of Albeni Falls Dam in 2008 will be released either above Albeni Falls Dam or below the dam, depending on the time of year, water temperature, and number of bull trout captured. Fish captured in the tailrace when temperatures are less than 16 °C will be moved above the dam and released in the town of Priest River below the confluence of Priest River.

Deliverable Specification: Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam. This is a change in plans from the proposal because without a fish trap, there is no way to hold the fish and conduct genetic analyses prior to release.

Fish will be transported in a water-filled cooler maintained at the proper temperature and DO level. If necessary, the bull trout will be acclimated to the temperature of the release site. This will be accomplished by slowly adding release site water into the cooler until the temperature difference between the transport water and release site water is =1.0°C. Oxygen will be bubbled into the cooler until the fish is released.

Planned Metrics: # of fish transported: 40

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Fish releases	5/1/2008	4/30/2009	Completed	Fish captured in the tailrace when temperature are less than 16c will be moved above the dam and released in the town of Priest River below the confluence of Priest River. Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam.
Deliverable: C. bull trout released		4/30/2009	Completed	See the Deliverable Specification above

D: 158. Mark/Tag Animals

Title: Implant combination radio acoustic transmitter (CART) into bull trout



Description:

Method(s): Transmitter implantation will be accomplished by PNNL, KNRD, and EWU. Bull trout will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for the PIT tag injected by the electrofishing crews. The PIT tag number along with data on TL (mm), FL (mm), and weight (g) will be recorded on a data sheet. [If the genetic assignment is unknown at the time transmitters are implanted that information will be added when it becomes available.]

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The bull trout will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exciting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently to be put back in the live box on the floating barge.

Deliverable Specification:

Work Products/Deliverables: Up to 40 CART-tagged bull trout released in 2008 above and below Albeni Falls Dam. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water) or CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)]. Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train project personnel to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured. The annual reports and project completion report will contain a description of tagging bull trout.

Planned Metrics:

* Primary R, M, and E Focal Strategy : Tributaries
 * Primary R, M, and E Type : Action Effectiveness Monitoring

Locations:

1

Primary Focal Species:

Trout, Bull

Country:

US

NPCC Subbasin:

PEND OREILLE

State:

ID

HUC5 Watershed:

UPPER PEND OREILLE

County:

BONNER

HUC6 Name:

EXPOSURE CREEK

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Fish will be implanted with Lotek combination acoustic/radio telemetry (CART) tag	5/1/2008	4/30/2009	Completed	Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train the EWU research associate to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured.
Deliverable: C. Transmitter implantation will be accomplished by PNNL and EWU.		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title:

Mobile tracking surveys by fixed wing aircraft, vehicle and boat

Description:

Method(s): Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. EWU will make vehicle surveys along each of the above noted tributary streams once monthly on about June 15, July 15, and August 15; once weekly from September 1 to October 15, and on about November 1 each year for the purpose of locating bull trout in spawning tributaries. One survey may also be done during the first quarter of CY2009 to identify locations of bull trout. A 4-element Yagi antenna will be mounted in a motorized assembly that will allow the operator to rotate the antenna while operating a 4WD truck. EWU and PNNL will conduct acoustic tracking surveys from boat to locate CART tagged bull trout after they enter Lake Pend Oreille. A Lotek directional hydrophone connected to a digital interface on the Lotek SRX 400 receiver will be used to follow the acoustic signal emanating from the CART tag. The acoustic signal from the CART tag will enable us to locate bull trout after they move into Lake Pend Oreille where radio signals are lost due to attenuation due to depth.

Deliverable Specification:

Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU. Boat tracking will occur on 10 dates that will be dependent on when fish are captured/tagged/released. Positions (latitude and longitude coordinates) of bull trout found during mobile tracking surveys will be determined using a GPS. A trip log will be maintained that will include information about dates and time of activities performed, equipment performance and locations and identification of any bull trout found. These data will be entered into an electronic database at the end of each trip.



Planned Metrics: * Primary R, M, and E Focal Strategy : Tributaries
 * Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 4

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. EWU and PNNL will conduct surveys by aircraft, vehicle and boat	5/1/2008	4/30/2009	Completed	To locate CART tagged bull trout after they enter Lake Pend Oreille. A Lotek directional hydrophone connected to a digital interface on the Lotek SRX 400 receiver will be used to follow the acoustic signal emanating from the CART tag. The acoustic signal from the CART tag will enable us to locate bull trout after they move into Lake Pend Oreille where radio signals are lost due to attenuation due to depth. Boat racking will occur on 10 dates that will be dependent on when fish are captured/tagged/released.
Deliverable: C. Track movement of tagged bull trout		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

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

Title: Download stationary ground radio receiving station

Description: Method(s): All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.

Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.

Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.

Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.

Deliverable Specification: Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU.

Planned Metrics: * Primary R, M, and E Focal Strategy : Tributaries
 * Primary R, M, and E Type : Action Effectiveness Monitoring

Locations: 10

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	5/1/2008	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. Receiver stations inspected and downloaded	5/1/2008	4/30/2009	Completed	Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.
Deliverable: C. All fixed receiver stations will be inspected and downloaded every other wk (26 times per yr)		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

G: 119. Manage and Administer Projects

Title: Manage Project
Description: Method(s): Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
Deliverable Specification: Work Products/Deliverables: Administrative products including accrual estimates, metric reporting, and annual statements of work.

Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Project coordination	5/1/2008	4/30/2009	Completed	This project will require coordination with a number of agencies and organizations. Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies). Coordination with landowners where equipment is located will also need to be managed accordingly.
B. Manage project	5/1/2008	4/30/2009	Completed	Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
C. Accrual - Submit September estimate to BPA	9/1/2008	9/12/2008	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. Generally, this should be done by September 10.
D. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	12/1/2008	12/31/2008	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
Deliverable: E. Funding Package - Submit draft to COTR		4/30/2009	Completed	<i>See the Deliverable Specification above</i>

H: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations
Description: Method(s): Each spring PNNL and EWU will overhaul, refurbish and retest each of the eleven ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
 Start date: 1 February (annually, 2008-2010)
 Completion date: 30 April (annually, 2008-2010)



Deliverable Specification: Functioning, tested ground receiving stations. The annual reports will contain a description of annual overhaul and maintenance activities.

Locations: 10
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: Multiple
HUC5 Watershed: Multiple
HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2008	1/31/2009	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. Permanent stationary ground stations will be tested	2/1/2009	4/30/2009	Completed	All permanent stationary ground stations will be calibrated and tested before electrofishing begins in 2009. The receiver stations at the dam will be calibrated by making transects across the river at 100 meter intervals from the concrete of the dam structure to the points upstream and downstream where radio signals can no longer be detected. Along each transect, GPS coordinates will be obtained at intervals of 50 meters and a radio transmitter will be lowered on a metered line to a depth of 5 meters (at 1 m depth intervals). Simultaneously, the receivers on the dam will detect and decode the radio signals. Signal strength (horizontal and vertical) at each transmitter position and depth will be translated into Geographic Information System (GIS) map coverage. Maximum distance (upstream and downstream) from the dam at which receivers can decode the radio signal (at power level >100) from a tag at a depth of 1 m will be determined. Our coverage will be designed to provide assurance that any radio-tagged fish moving below the dam will first be detected by one of the receivers monitoring the forebay and then be detected by one of the receivers monitoring the tailrace.
Deliverable: C. Testing of radio receivers		4/30/2009	Completed	See the Deliverable Specification above

I: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2008 (5/1/2008 - 6/30/2008)	7/1/2008	7/15/2008	Completed	
B. Jul-Sep 2008 (7/1/2008 - 9/30/2008)	10/1/2008	10/15/2008	Completed	
C. Oct-Dec 2008 (10/1/2008 - 12/31/2008)	1/1/2009	1/15/2009	Completed	
D. Jan-Mar 2009 (1/1/2009 - 3/31/2009)	4/1/2009	4/15/2009	Completed	
E. Final Apr 2009 (4/1/2009 - 4/30/2009)	4/16/2009	4/30/2009	Completed	

J: 162. Analyze/Interpret Data

Title: Data reduction and analysis
Description: Method(s): EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked during the CY which may overlap contract periods, e.g., data collected in March and April 2009 will not be included in the FY 2008 but will be included in the FY 2009 report. PNNL will lead the task of analyzing fish tracking data.

Deliverable Specification: Work Products/Deliverables: Annual statistical reports, GIS maps, and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.

Planned Metrics:
 * Primary R, M, and E Focal Strategy : Tributaries
 * Primary R, M, and E Type : Action Effectiveness Monitoring



Locations:

Primary Focal Species: Trout, Bull

Country:

NPCC Subbasin:

State:

HUC5 Watershed:

County:

HUC6 Name:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:

Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Fish positions (GPS coordinates) will be entered into GIS to generate track maps for each fish	11/1/2008	11/30/2008	Completed	Map and tabled-data showing fish migration patterns.
Deliverable: B. Develop a profile of each fish tracked		11/30/2008	Completed	<i>See the Deliverable Specification above</i>

K: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period May 2008 to April 2009

Description: The annual 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. Note that any results included in the annual report will be restricted to those data collected before November 15 of the contract year. This means that data collected after November 15 will be included in the next year's report.

Deliverable Specification: Upload annual report for the period May 2008 to April 2009, with the caveat that any data or activities completed after November 15 won't be included in the report. The report will be uploaded in PISCES as an attachment to the contract.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2008	11/7/2008	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Write progress report	11/1/2008	12/31/2008	Completed	Write progress report for work done from May 2008 to December 2008
C. Submit report for internal contractor review	1/1/2009	1/31/2009	Completed	Report will undergo PNNL technical and editorial review.
D. Submit report for external review	2/1/2009	2/28/2009	Completed	Report will undergo simultaneous COTR and peer review.
E. Email draft of report to COTR for review	2/1/2009	2/28/2009	Completed	Report will undergo simultaneous COTR and peer review.
F. Receive COTR review comments	3/1/2009	3/1/2009	Completed	COTR will provide comments to PNNL within 30 days.
G. Finalize Annual Report	3/1/2009	4/28/2009	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
H. Confirm BPA has posted the report	4/28/2009	4/28/2009	Completed	It usually takes BPA no more than 30 days to get the report posted. This milestone should therefore have a duration of 30 days. To confirm posting of the report, search the BPA Publications database. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
Deliverable: I. Final report uploaded to the BPA website		4/28/2009	Completed	<i>See the Deliverable Specification above</i>



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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 56905
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: 56905
SOW Validation: Last validated 03/15/2012 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (02/09/2012) 2012 Prop Inv Bulltrout Pass Kalispel
Budget - Contract (03/15/2012) 2012 LIB Bulltrout Pass Kalispel



Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Work Element Table of Contents:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$5,086	(1 %)
B : 165. Produce Environmental Compliance Documentation - Obtain necessary permits and set up contract for genetic analysis		\$5,878	(2 %)

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
C : 157. Collect/Generate/Validate Field and Lab Data - Electrofishing to collect a representative sample of bull trout below Albeni Falls Dam	*	\$57,335	(16 %)
D : 157. Collect/Generate/Validate Field and Lab Data - Angling for bull trout	*	\$6,103	(2 %)
E : 158. Mark/Tag Animals - Implant combination radio acoustic or radio transmitter into bull trout	*	\$32,525	(9 %)
F : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$10,185	(3 %)
G : 157. Collect/Generate/Validate Field and Lab Data - Rapid response genetic analysis of bull trout biopsy samples	*	\$4,222	(1 %)
H : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft, boat, and vehicle	*	\$34,625	(10 %)
I : 162. Analyze/Interpret Data - Analysis of bull trout radiotelemetry data		\$14,518	(4 %)
J : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$11,108	(3 %)
K : 157. Collect/Generate/Validate Field and Lab Data - Compile electronic spreadsheet database of electrofishing data	*	\$13,234	(4 %)
L : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving stations	*	\$28,451	(8 %)
M : 162. Analyze/Interpret Data - Data reduction and analysis		\$15,288	(4 %)
N : 189. Coordination-Columbia Basinwide - Project coordination among all stakeholders		\$13,237	(4 %)
O : 119. Manage and Administer Projects - Manage Project		\$91,154	(26 %)
P : 132. Produce (Annual) Progress Report - Submit Annual Report for the period (5/1/2012) to (4/30/2013)		\$13,516	(4 %)
	Total:	\$356,465	

* Environmental Compliance (EC) needed before work begins.

Contract Description:



Bull trout in the Columbia River Basin were listed as Threatened by the US Fish and Wildlife Service (USFWS) in 1998 (USFWS 2000). Bull trout populations are threatened by habitat degradation and fragmentation, past fisheries management practices, poor water quality, and blockage of migratory corridors. Pend Oreille River and Lake is a core area within the Northeast Washington Recovery Unit of the Columbia Basin bull trout population (USFWS 2002a, 2002b). Recovery of Pend Oreille bull trout is limited by the fact that dams on the mainstem Pend Oreille River (Albeni Falls and Box Canyon dams) have blocked migration of bull trout between Lake Pend Oreille and spawning/rearing areas (USFWS 2002a, 2002b). Albeni Falls Dam is a federal facility under the responsibility of the action agencies (US Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation). Albeni Falls Dam created two types of problems for bull trout in the Pend Oreille Basin. First, bull trout from natal tributaries above the dam, that either became entrained or had elected to voluntarily pass below the dam, were unable to return to spawn in their natal tributaries. (Source populations could include bull trout spawning in the Priest River, inlet tributaries of Pend Oreille Lake, or tributaries of the Clark Fork River below or above Cabinet Gorge Dam.) Second, adfluvial bull trout that formerly spawned in tributaries below the dam and migrated upstream to a cold water refuge in Lake Pend Oreille, Idaho were no longer able to do so.

The goal of this project is to provide temporary upstream passage, investigate long term fish passage, and fill data gaps for bull trout at Albeni Falls Dam on the Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing, angling, and snorkeling. All bull trout captured will be biopsied via hole punch and their DNA sent to the USFWS lab in Abernathy, Washington for rapid response genetic analysis. Each DNA sample will be compared to DNA from other bull trout populations in the Priest River drainage, Pend Oreille Lake tributaries, and Clark Fork drainage and an assignment will be made as to its probable region of origin. Prior to release each fish will be implanted with a combination radio-acoustic or radio transmitter to ascertain if the spawning tributary it selected was the same as its assigned tributary. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2012 (5/1/2012 - 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. Jan-Mar 2013 (1/1/2013 - 3/31/2013)	4/1/2013	4/15/2013	Completed	
E. Final Apr 2013 (4/1/2013 - 4/30/2013)	4/16/2013	4/30/2013	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Obtain necessary permits and set up contract for genetic analysis

Description: The Kalispel Natural Resource Department (KNRD) will obtain the necessary permits outlined in section D. PNNL and EWU will also obtain appropriate scientific collection permits. Additionally, the Kalispel Tribe will contract with the U.S. Fish and Wildlife Service Genetics Laboratory for conducting rapid response genetic analysis.

Deliverable Specification: Idaho state transport permit (Every 90 days)
Idaho scientific collection permit
Federal Section 10 fish and wildlife collection permit

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	5/1/2012	5/1/2012	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. Determine if contract work could adversely affect Pacific lamprey	5/1/2012	5/1/2012	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 (<i>Entosphenus tridentatus</i>) 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), macrophthalmia (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.
C. Apply for 2012 Idaho collection permit	1/8/2013	2/5/2013	Completed	Acquire Idaho Scientific collection permit
D. Apply for 2012 transport permit	1/8/2013	2/5/2013	Completed	Acquire Idaho transport permit
E. Apply for 2012 federal fish and wildlife permit	1/8/2013	2/5/2013	Completed	Acquire Fish and Wildlife permit
Deliverable: F. Idaho scientific collection, transportation, and federal permits		4/15/2013	Completed	<i>See the Deliverable Specification above</i>

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

Title: Electrofishing to collect a representative sample of bull trout below Albeni Falls Dam

Description: EWU and KNRD crews will conduct electrofishing surveys from Indian Creek (14 km below Albeni Falls Dam) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 15 days of effort will be expended annually by each crew. Most of the effort will be focused in the spring around the peak of the hydrograph before water temperatures reach the 16 degree Celsius threshold. In the previous three years this tends to be the period of time when the most bull trout have been captured and tagged.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by electrofishing that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about electrofishing operations.



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 : Uncertainty Research

Locations: 6

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER | PEND OREILLE **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data
 Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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	5/1/2012	4/30/2013	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. Spring electrofishing	5/1/2012	4/26/2013	Completed	EWU and KNRD crews will conduct electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew. The most effort will be expended in the spring before water temperatures rise above 16 degree Celsius. PNNL biologists will assist if needed.
D. Summer electrofishing	7/1/2012	9/15/2012	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, time will be expended in the summer at cold water refugia.
E. Fall electrofishing	9/16/2012	12/14/2012	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, effort will be expended in the fall.
Deliverable: F. Electrofishing collection of bull trout below Albeni Falls Dam		4/30/2013	Completed	<i>See the Deliverable Specification above</i>

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

Title: Angling for bull trout

Description: KNRD crews will conduct angling surveys in the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 4 days of effort will be expended annually by the crew. Latitude and longitude coordinates at the start and end of each angling survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: WU will provide an annual summary of fish captured by angling that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about angling efforts.

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 : Uncertainty Research

Locations: 6

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE



County: BONNER | PEND OREILLE **HUC6 Name:** EXPOSURE CREEK
Salmonid ESUs Present:
Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data
 Management Project
Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0
Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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	5/1/2012	4/30/2013	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. Spring angling	5/1/2012	4/29/2013	Completed	Angling for bull trout will be used when the water levels in the tailrace are too high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and or water velocity. A total of four days of angling will be conducted yearly.
D. Fall angling	9/15/2012	11/30/2012	Completed	Angling for bull trout will be used when the water levels in the tailrace are high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and or water velocity. A total of four days of angling will be conducted yearly.
Deliverable: E. Angling for bull trout below Albeni Falls Dam		4/30/2013	Completed	<i>See the Deliverable Specification above</i>

E: 158. Mark/Tag Animals

Title: Implant combination radio acoustic or radio transmitter into bull trout
Description: Transmitter implantation will be accomplished by EWU, KNRD, and PNNL. Bull trout from electrofishing and angling will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for PIT tags. The PIT tag number along with data on TL (mm), FL (mm), weight (g) and results of the genetic assignment from the 'rapid response genetic analysis' (bull trout only) will be recorded on a data sheet.

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The fish will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exciting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently.

Deliverable Specification: 5-20 Bull trout will be captured and undergo surgery, depending on the size of the fish it will either be implanted with a combination radio acoustic or radio tag. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water), CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weight 18.0 g (in water)], or Lotek radio tag SR-11-18, 449 day life. Surgical implantation of the transmitters will be accomplished by an experienced surgeon.

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 : Uncertainty Research

Locations: 1
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:** UPPER PEND OREILLE
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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. Implant CART tags and radio tags in up to 5-20 bull trout	5/1/2012	4/18/2013	Completed	The goal is 5-20 bull trout implanted with CART or radio tags.
Deliverable: C. Implanting of radio tags		4/30/2013	Completed	See the Deliverable Specification above

F: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam

Description: All bull trout collected in the tailrace of Albeni Falls Dam in 2012-13 will be released primarily above Albeni Falls Dam, with the exception of any bull trout caught in a cold water refuge while the Pend Oreille River water temperature is above 16 degrees Celsius. Any bull trout captured in cold water refuge while the Pend Oreille River is above 16 degrees Celsius will be transported directly to Lake Pend Oreille. This will enable the fish to seek cold water with depth immediately.

Deliverable Specification: Bull trout captured in the tailrace of Albeni Falls Dam when water temperatures are below 16 degrees Celsius will be radio or CART tagged, transported, and released above the dam at the Priest River boat launch (below the confluence of Priest River and the Pend Oreille River).

Planned Metrics: # of fish transported: 20

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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. Capture bull trout	5/1/2012	4/25/2013	Completed	Bull trout will be captured by boat electrofishing and angling between Indian Creek and the tailrace of Albeni Falls Dam. After capture bull trout will be implanted with a radio or CART tag and moved above Albeni Falls Dam and released at the Priest River boat launch.
C. Transport bull trout	5/1/2012	4/25/2013	Completed	Bull trout will be transported in a water-filled cooler maintained at the proper temperature and DO level to the Priest River boat launch.
Deliverable: D. Bull trout transported above Albeni Falls Dam		4/30/2013	Completed	See the Deliverable Specification above

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

Title: Rapid response genetic analysis of bull trout biopsy samples

Description: Tissue samples will be collected from bull trout captured by electrofishing and angling. The samples will be sent by express mail to the USFWS Genetics Laboratory in Abernathy Washington. Within 48 hours the USFWS genetics lab will assign individual bull trout to a particular tributary and will communicate this information to KNRD.

Deliverable Specification: Bull trout will be assigned to individual natal tributaries. Using the lab's "rapid response genetic analysis" protocol (The protocol that is being used at Cabinet Gorge Dam an Avista project)(Arden et al. 2005), the samples will be analyzed at 12 microsatellite DNA (msDNA) loci that are standard for Columbia Basin bull trout.

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 : Uncertainty Research

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** ELOCHOMAN

State: WA **HUC5 Watershed:** GERMANY/ABERNATHY

County: COWLITZ **HUC6 Name:**

Salmonid ESUs Present: Columbia River Chum Salmon ESU (Accessible) | Lower Columbia River Chinook Salmon ESU (Accessible) | Lower Columbia River Coho Salmon ESU (Accessible)



Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
Oreille Subbasin Data
Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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	5/1/2012	4/30/2013	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. Collect bull trout tissue samples	5/1/2012	4/25/2013	Completed	Bull trout tissue samples will be collect by boat electrofishing and angling in the tailrace of Albeni Falls Dam. The samples will then be shipped to Abernathy Lab to under Rapid Response genetic assignments within 48 hours
D. Send bull trout tissue samples	5/1/2012	4/25/2013	Completed	Send collected bull trout tissue samples to the Abernathy Lab for genetic analysis.
E. Abernathy Lab to process tissue samples and send results	5/1/2012	4/30/2013	Completed	Abernathy Genetic Lab will process bull trout tissue samples. The sample will assign the particular bull trout to a region. The results will then be sent back to the Kalispel Tribe.
Deliverable: F. Genetic Analysis		4/30/2013	Completed	<i>See the Deliverable Specification above</i>

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

Title: Mobile tracking surveys by fixed wing aircraft, boat, and vehicle

Description: Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. Air surveys will be made as needed. EWU will charter a Cessna C-182 aircraft from Felts Field Aviation in Spokane, Washington for making aerial surveys. A Yagi antenna will be mounted externally underneath the wing of the aircraft. Each flight will be approximately four hours in duration. A pilot accompanied by an EWU technician will fly a similar flight plan for each survey. Boat tracking will be conducted in the event that tributary flows are too low for bull trout to enter tributaries.

Deliverable Specification: Air surveys will be made as needed. The flight path will start just below Albeni Falls Dam, thence up the center of the Pend Oreille River to the outlet of Pend Oreille Lake, then around the perimeter of Pend Oreille Lake. Where known bull trout spawning tributaries enter they will be followed to their source or known upper limit of bull trout occupancy. Tributaries surveyed will include: (1) Priest River to Outlet Dam, including the East River and its Middle Fork; (2) Tributaries entering the north shore of Lake Pend Oreille (Pack River, Grouse Creek and Trestle Creek); (3) Tributaries entering the Clark Fork arm of Lake Pend Oreille (Lightning Creek and tributaries, Johnson Creek and Twin Creek) and (4) Tributaries entering the east shore of Lake Pend Oreille (Granite Creek, Sullivan Springs Creek, North Gold Creek, Gold Creek). Additionally, the Clark Fork River will be flown to Cabinet Gorge Dam. Vehicle surveys will be made once monthly from June to August and once weekly from September to November. Boat tracking will be conducted in the event that tributary flows are to low for bull trout to enter.

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 : Uncertainty Research

Locations: 15

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

NPCC Subbasin: Multiple

HUC5 Watershed: Multiple

HUC6 Name: Multiple

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
Oreille Subbasin Data
Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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	5/1/2012	4/30/2013	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. Aircraft tracking	5/15/2012	4/18/2013	Completed	Aerial surveys will be conducted as needed from fixed wing aircraft.
D. Boat tracking	5/15/2012	4/18/2013	Completed	Boat tracking will be conducted as needed in the event spawning tributary flows are to low for bull trout to enter.
E. Vehicle tracking	6/4/2012	12/3/2012	Completed	Vehicles surveys will be made along each of the tributaries streams once monthly from June to August and once weekly from September to November.
Deliverable: F. Tracking of radio tagged fish with aircraft, vehicle, and boat.		4/15/2013	Completed	<i>See the Deliverable Specification above</i>

I: 162. Analyze/Interpret Data

Title: Analysis of bull trout radiotelemetry data

Description: Bull trout radiotelemetry data will be analyzed in ArcGIS to determine seasonal movement, habitat use and diel activity.

Deliverable Specification: Spatial analysis of bull trout movements, habitat use, and natal stream use will be conducted using ArcGIS.

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 : Uncertainty Research

Locations:

Primary Focal Species: Trout, Bull

Country: **NPCC Subbasin:**

State: **HUC5 Watershed:**

County: **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
Oreille Subbasin Data
Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Area of Inference:	Name	Value
	Bull Trout Critical Habitat - Stream	Pend Oreille River
	Bull Trout Critical Habitat - Stream	Gold Creek
	Bull Trout Critical Habitat - Stream	Trestle Creek
	Bull Trout Critical Habitat - Stream	Pack River
	Bull Trout Critical Habitat - Stream	Priest River
	HUC5 - Watershed	Pack River
	HUC5 - Watershed	Lower Priest River
	HUC6 - Sub Watershed	Trestle Creek
	HUC6 - Sub Watershed	Gold Creek
	HUC6 - Sub Watershed	Albeni Falls Dam-Pend Oreille River
	HUC6 - Sub Watershed	Lake Pend Oreille
	Mainstem Reaches and Dams	Box Canyon Dam to Albeni Falls Dam
	Mainstem Reaches and Dams	Albeni Falls Dam into Lake Pend Oreille
	NPPC Provinces	INTERMOUNTAIN
	NPPC Subbasins	PEND OREILLE
	Rivers - Streams 24k	17010216005718
	Rivers 100k	Pend Oreille River

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Bull trout data will be entered into MS Excel spreadsheet	5/30/2012	4/18/2013	Completed	Raw tracking data (GPS location, water temperature, habitat, fish code, depth, and substrate where possible) will be entered into MS Excel spreadsheet
B. GPS data will be spatially analyzed in Arc GIS	1/1/2013	4/18/2013	Completed	GPS data will be entered into Arc GIS to be spatially analyzed and create maps of fish movement and habitat usage.
C. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	5/1/2012	4/30/2013	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.
Deliverable: D. Analyzed data for annual technical report.		4/30/2013	Completed	<i>See the Deliverable Specification above</i>

J: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations

Description: Each spring PNNL and EWU will overhaul, refurbish and retest each of the twelve ground receiving stations..

Deliverable Specification: Functioning, tested (each station will be inspected for damage. Beacon tags and 12 volt batteries will be replaced if necessary) ground receiving stations. A trip log form and electronic version of the data will be maintained at PNNL and backed up at EWU. The annual reports will contain a description of annual overhaul and maintenance activities.

Locations: 11

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPPC Subbasin: Multiple

HUC5 Watershed: Multiple

HUC6 Name:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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. Overhaul, refurbish, and retest ground receiving stations	3/1/2013	4/30/2013	Completed	Each spring PNNL and EWU will overhaul, refurbish and retest each of the twelve ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
Deliverable: C. Annual maintenance of monitoring equipment		4/30/2013	Completed	See the Deliverable Specification above

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

Title: Compile electronic spreadsheet database of electrofishing data

Description: All electrofishing and angling data will be entered into an Excel spreadsheet and maintained as an electronic database of electrofishing records.

Deliverable Specification: All electrofishing and angling data will be entered into a excel workbook and maintained as a electronic database of all electrofishing.

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 : Uncertainty Research

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: WA **HUC5 Watershed:** UPPER PEND OREILLE

County: PEND OREILLE **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data
 Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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	5/1/2012	4/30/2013	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. Electrofishing and angling data entry	5/10/2012	4/11/2013	Completed	All data collected while electrofishing and angling for bull trout will be input into a excel workbook and maintained as a electronic data base
Deliverable: D. Electrofishing and angling data entry		4/25/2013	Completed	See the Deliverable Specification above

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

Title: Download stationary ground radio receiving stations

Description: All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download. Each station will be inspected for damage and repaired if necessary.

Deliverable Specification: All fixed receiver stations will be inspected (Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.) and downloaded (Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise).

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 : Uncertainty Research

Locations: 11
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** Multiple
State: ID **HUC5 Watershed:** Multiple
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
 Oreille Subbasin Data
 Management Project
Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0
Protocol Owner: Jason Olson **Protocol State:** Proposed

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2012	5/1/2012	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	5/1/2012	4/30/2013	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. Inspect and download receiver stations 26 times per year	5/14/2012	4/26/2013	Completed	<p>All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.</p> <p>Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.</p> <p>Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.</p> <p>Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.</p>
Deliverable: D. Downloading stationary ground radio receiver		4/29/2013	Completed	See the Deliverable Specification above

M: 162. Analyze/Interpret Data

Title: Data reduction and analysis
Description: EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked.
Deliverable Specification: GIS maps and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
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 : Uncertainty Research

Locations:
Primary Focal Species: Trout, Bull
Country: **NPCC Subbasin:**
State: **HUC5 Watershed:**
County: **HUC6 Name:**
Salmonid ESUs Present:



Data Repositories: Intermountain Province/Pend (<http://gis.knrd.org/knrdgisviewer/>)
Oreille Subbasin Data
Management Project

Protocol: Temporary Fish Passage at Albeni Falls Dam (2007-246-00) v1.0

Protocol Owner: Jason Olson **Protocol State:** Proposed

Area of Inference:

Name	Value
Bull Trout Critical Habitat - Lake	Lake Pend Oreille
Bull Trout Critical Habitat - Stream	Priest River
Bull Trout Critical Habitat - Stream	Gold Creek
Bull Trout Critical Habitat - Stream	Trestle Creek
Bull Trout Critical Habitat - Stream	Pack River
HUC4 - Sub Basin	PEND OREILLE LAKE
HUC5 - Watershed	Lower Priest River
HUC6 - Sub Watershed	Lower Pack River
HUC6 - Sub Watershed	Trestle Creek
HUC6 - Sub Watershed	Gold Creek
HUC6 - Sub Watershed	Granite Creek
Mainstem Reaches and Dams	Albeni Falls Dam into Lake Pend Oreille
Mainstem Reaches and Dams	Box Canyon Dam to Albeni Falls Dam
NPPC Provinces	INTERMOUNTAIN
NPPC Subbasins	PEND OREILLE
Rivers - Streams 24k	17010216000239
Rivers - Streams 24k	17010214130110

Milestone Title	Start Date	End Date	Status	Milestone Description
A. GIS generated tracking maps	11/9/2012	4/15/2013	Completed	EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.
B. Statistical comparisons of run timing, genetic assignments, and spawning tributaries	11/9/2012	4/15/2013	Completed	Statistical comparisons will be made to determine if fish randomly entered spawning tributaries or if they entered the tributary predicted by their genetic assignment. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
C. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	5/1/2012	4/30/2013	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.
Deliverable: D. Data analysis of tracking data		4/15/2013	Completed	<i>See the Deliverable Specification above</i>

N: 189. Coordination-Columbia Basinwide

Title: Project coordination among all stakeholders

Description: This project requires coordination with a number of agencies and organizations.

Deliverable Specification: Coordination activities (Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), private utilities (Avista), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies.) will be included in project reporting. Coordination will also be done via email, land mail, and telephone randomly as questions or findings arise. Because this project will be conducted in two states and involves a federal threaten species coordination and communication will be important to obtain permits, move fish, and distribute findings.



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Ongoing coordination between stakeholders	5/1/2012	4/30/2013	Completed	Coordination between PIs, USACE, WDFW, IDFG, USFWS, Avista Power, PNNL, EWU, bull trout recovery groups, and other researchers.
Deliverable: B. Project coordination among stakeholders		4/30/2013	Completed	<i>See the Deliverable Specification above</i>

O: 119. Manage and Administer Projects

Title: Manage Project

Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.

Deliverable Specification: Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Project Biologist to Attend Annual National AFS Conference	8/18/2012	8/23/2012	Completed	Project Biologist to Attend Annual National AFS Conference held in Minneapolis MN
B. Accrual - Submit September estimate to BPA	9/1/2012	9/9/2012	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. Generally, this should be done by September 10.
C. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	1/1/2013	1/30/2013	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
Deliverable: D. Funding Package - Submit draft to COTR		2/1/2013	Completed	<i>See the Deliverable Specification above</i>

P: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period (5/1/2012) to (4/30/2013)

Description: Prepare and upload annual report.

Deliverable Specification: Annual report to BPA's COTR will be prepared by the EWU PI and PNNL CO-PI, with assistance from EWU's statistician and research associate, and PNNL's senior scientist. Report will summarize the results obtained that year. Reports will follow standard scientific format and include an executive summary, introduction, methods, results, discussion, recommendation, and literature cited section, as well as tables, figures, and data appendices. Reports will be reviewed by the KNRD CO-PI before submission. Upload annual report for the period (May 1, 2012 to April 30, 2013).

Planned Metrics:

- * Start date of reporting period : 5/1/2012
- * End date of reporting period : 4/30/2013



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/30/2012	12/15/2012	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Submit report for internal contractor review	2/24/2013	2/28/2013	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.
C. Submit report for external review	3/2/2013	3/2/2013	Completed	Use this milestone if the annual report requires external review. May be simultaneously reviewed by external parties and BPA COTR if desired.
D. Email draft of report to COTR for review	3/9/2013	3/9/2013	Completed	The draft annual report must be submitted to the BPA COTR in Microsoft Word format (any version of Word is fine).
E. Receive COTR review comments	3/12/2013	4/11/2013	Completed	The BPA COTR should provide review feedback and comments within 30 days of receiving the draft annual report. This milestone should therefore have a duration of 30 days.
F. Finalize Annual Report	4/30/2013	4/30/2013	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
Deliverable: G. Final report uploaded to the BPA website		4/30/2013	Completed	<i>See the Deliverable Specification above</i>

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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Pend Oreille River Basin Initiative: Land Acquisitions, Watershed Restoration, Conservation Hatchery
Project #: 2011-018-00
Contract Title: 2011-018-00 EXP PEND OREILLE RIVER BASIN INITIATIVE
Contract #: 58411
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 298153 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: 58411
SOW Validation: Last validated 07/30/2012 with 0 problems, and 0 reviewable items
Contract Documents: Budget - Contract (07/27/2012) final revised Kalispel Tribe 2012 LIB PO init

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kjvleuven@bpa.gov	P.O Box 3621 Mailstop - NSSP-4 Portland, OR 97208-3621
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232
Matthew Berger	Technical Contact	Kalispel Tribe	(509) 447-7274 / NA	mberger@knrd.org	
Ray Entz	Administrative Contact	Kalispel Tribe	(509) 445-1147 / NA	rentz@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Joe Maroney	Supervisor	Kalispel Tribe	(509) 447-7272 / NA	jmaroney@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Jason Connor	Interested Party	Kalispel Tribe	(509) 447-7285 / NA	jconnor@knrd.org	1981 N Leclerc Rd Usk WA 99180
Donald Rose	Env. Compliance Lead	Bonneville Power Administration	(503) 230-3796 / NA	dlrose@bpa.gov	PO Box 3621 Mailstop - KEC Portland OR 97208-3621
Jason Olson	Interested Party	Kalispel Tribe	(509) 447-7290 / NA	jolson@knrd.org	1981 N. Leclerc Rd. Usk WA 99180
Jolene Seymour	Administrative Contact	Kalispel Tribe	(509) 445-1147 / NA	jseymour@kalispeltribe.com	

Work Element Table of Contents:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$4,500	(2 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
B : 165. Produce Environmental Compliance Documentation - Obtain Required Permits		\$6,900	(3 %)
C : 119. Manage and Administer Projects - Manage and fulfill all administrative tasks		\$56,631	(26 %)
D : 184. Install Fish Passage Structure - Replace Cee Cee Ah Creek Culvert Site #1	*	\$30,208	(14 %)
E : 184. Install Fish Passage Structure - Replace Cee Cee Ah Creek Culvert Site #2	*	\$19,431	(9 %)
F : 184. Install Fish Passage Structure - Replace Cee Cee Ah Creek Culvert Site #3	*	\$26,166	(12 %)
G : 132. Produce (Annual) Progress Report - Submit Progress Report for the period Aug 1,2012 to July 31,2013		\$21,000	(10 %)
H : 189. Coordination-Columbia Basinwide - Coordination with other entities on restoration efforts		\$27,500	(13 %)
I : 174. Produce Plan - Investigate needs for conservation hatchery	*	\$27,619	(13 %)
Total:		\$219,955	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

This project supports implementing larger-scale projects to improve local watershed health and ecosystem conditions and function within the Pend Oreille subbasin, consistent with the NPCC Sub-Basin Plan. The Kalispel Tribe has a history of matching & leveraging funds from various sources (e.g. SRFB, DOE, DOT, BIA, USFS) to implement large scale watershed projects. Land management and watershed restoration will be based upon the jointly-developed objectives and expected performance outcomes. There is an opportunity to begin implementation of this project in 2012 with a cost share on Cee Cee Ah Culvert with the US Forest Service. A total of 3 culverts that are blockages to fish passage will be replaced. Two of these culverts are in areas where brook trout were removed through another BPA funded project (Non-Native Fish Suppression Project). The design for these culvert replacements were funded through the Salmon Recovery Funding Board (SRFB).

This project includes plans to design and implement a feasibility study for a westslope cutthroat and/or bull trout conservation aquaculture facility. The Tribe will obtain BPA concurrence about purpose and need, and project objectives to be served through conservation aquaculture – including agreement about appropriate cost-share (relative to the magnitude of the impacts attributable to the FCRPS and Albeni Falls Dam in particular) – before beginning the Northwest Power and Conservation Council’s Major Projects Review (3-STEP) process in about years 5 through 7.

- Target Habitats: Pend Oreille River and its tributaries both upstream and downstream of Albeni Falls Dam.
- Projected Benefits: Land acquisitions and conservations easements in core bull trout and westslope cutthroat watersheds. Large scale tributary fish passage projects. Improved ecosystem function through re-establishment of ecological conditions that foster abundance, diversity, and productivity of affected species. A better understanding of westslope cutthroat and bull trout rebuilding needs and objectives; greater definition of the purposes to be served through conservation aquaculture; and the possible construction of a production facility commencing after the ten-year term of this agreement.
- References: Intermountain Subbasin Plan (Pend Oreille Subbasin), Draft Bull Trout Recovery Plan (Chapter 23)



Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

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

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Aug-Sep 2012 (8/1/2012 - 9/30/2012)	10/1/2012	10/15/2012	Completed	
B. Oct-Dec 2012 (10/1/2012 - 12/31/2012)	1/1/2013	1/15/2013	Completed	
C. Jan-Mar 2013 (1/1/2013 - 3/31/2013)	4/1/2013	4/15/2013	Completed	
D. Apr-Jun 2013 (4/1/2013 - 6/30/2013)	7/1/2013	7/15/2013	Completed	
E. Final Jul 2013 (7/1/2013 - 7/31/2013)	7/17/2013	7/31/2013	Completed	

B: 165. Produce Environmental Compliance Documentation

Title: Obtain Required Permits
Description: Obtain required environmental permits to implement habitat restoration activities.
Deliverable Specification: Specific permits necessary for work to proceed: Department of the Army Permit from the US Army of Corps of Engineers, USFS and WDFW JARPA permit.
Planned Metrics: <None>



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Determine if contract work could adversely affect Pacific lamprey	8/15/2012	8/15/2012	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 (<i>Entosphenus tridentatus</i>) 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), macrophthalmia (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. Obtain BPA's EC Lead sign-off that EC requirements are complete	8/15/2012	8/15/2012	Completed	The EC column on the contract SOW tab in Pisces must have a complete dot 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.
C. Participate in ESA Consultation	8/15/2012	7/30/2013	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.
D. Participate in Cultural/Historic Resource Consultation	8/15/2012	7/30/2013	Completed	Examples include providing maps and detailed project descriptions, contracting for an archaeological survey, etc.
E. Obtain/Renew applicable local, state, federal and tribal environmental permits	8/15/2012	7/30/2013	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.
F. Complete and document public involvement activities and provide to EC Lead	8/15/2012	7/30/2013	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.
G. Use Best Management Practices to stabilize soils and prevent spread of noxious weeds	8/15/2012	7/30/2013	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.
Deliverable: H. Obtain Required Permits		7/30/2013	Completed	<i>See the Deliverable Specification above</i>

C: 119. Manage and Administer Projects

- Title:** Manage and fulfill all administrative tasks
- Description:** Contract documents including SOW, budget, spending plan, and property inventory will be completed, reviewed and submitted to BPA for the following contract year. Financial estimates and administrative requests from BPA will be completed as needed during the entire contract period. Project management will include budgeting, purchasing, hiring, personnel management, and managing on the ground work to insure project implementation and completion.
- 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.



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	8/15/2012	5/30/2013	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.	8/15/2012	4/30/2013	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.	8/15/2012	5/17/2013	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).	8/15/2012	6/28/2013	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.)
E. #5 Funding Package - Respond to any Contracting Officer's requests for revisions within 7 days.	8/15/2012	6/28/2013	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.	8/15/2012	6/14/2013	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.	8/15/2012	4/30/2013	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	8/15/2012	9/20/2012	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. Submit monthly invoices electronically within 45 days.	8/15/2012	6/6/2013	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).
J. Submit final invoice within 90 days of contract end to facilitate contract closeout.	8/15/2012	5/1/2013	Completed	Within 90 days of the last day of the 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 (Subject line: (Contractor Kalispel Tribe) Uninvoiced balance for BPA contract TBD, BPA Project 2011-018 -00 is \$TBD.
K. Inventory - Mark/Tag all equipment purchased during the contract.	8/15/2012	7/30/2013	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.)
L. Facilitate inputting Cost Share information into Pisces at the Project level.	8/15/2012	9/14/2012	Completed	This is the first contract under a new MOA project, at this time this project has only a single contract. All Cost Share information will be entered into Pisces at the appropriate date.



Milestone Title	Start Date	End Date	Status	Milestone Description
Deliverable: M. Fulfill all administrative tasks with quality products and in a timely manner.		7/30/2013	Completed	See the Deliverable Specification above

D: 184. Install Fish Passage Structure

Title: Replace Cee Cee Ah Creek Culvert Site #1
Description: This project will replace 3 fish passage barrier culverts in the Cee Cee Ah (CCA) subbasin with fish friendly crossings. The two lowest culverts are on US Forest Service roads and the upper most culvert is on a cost-share road managed jointly by the Colville National Forest and Stimson Lumber Company. Cost-share roads are not covered under the Forest and Fish Agreement. Implementation of this project will restore fish passage to approximately 0.4 miles of bull trout habitat and 4.0 miles of westslope cutthroat trout habitat. The work is to be implemented by Forest Service personnel, Tribal personnel, and sub-contractors hired by the Tribe and Forest Service.

Restoration of fish passage in the CCA subbasin has been identified as a high priority action for the improvement of bull trout and westslope cutthroat trout habitat by the Pend Oreille Salmonid Recovery Team (Lead Entity Strategy, 2007). While CCA is a medium priority subbasin in the Lead Entity Strategy, considerable efforts have been made over the last 14 years to restore habitat in the watershed and remove non-native brook trout above a natural barrier. Funding for these watershed wide projects have come from BIA, SRFB and BPA. The two upper most culverts are in the project area where brook trout were successfully removed in 2008-2010 with rotenone. Westslope cutthroat trout have been translocated from a nearby watershed that is genetically pure beginning in 2010 and will continue for the next several years. This will be a 25% cost share with the US Forest Service.

Deliverable Specification: Replace Cee Cee Ah Creek Culvert site #1 with a structural steel plate arch.

Planned Metrics: * # of miles of habitat accessed to the next upstream barrier(s) or likely limit of habitable range: 4.40
 * # of culverts installed in the freshwater non-tidal zone: 1

Locations: 1

Primary Focal Species: Cutthroat Trout, Westslope | Trout, Bull

Country: US

NPCC Subbasin: PEND OREILLE

State: WA

HUC5 Watershed: UPPER PEND OREILLE

County: PEND OREILLE

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/15/2012	8/15/2012	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).
Deliverable: B. Replace Cee Cee Ah Creek culvert site #1.		11/1/2012	Completed	See the Deliverable Specification above

*** This work element has potential for inadvertent discovery of cultural resources. See instructions at end of this document. ***

E: 184. Install Fish Passage Structure

Title: Replace Cee Cee Ah Creek Culvert Site #2
Description: This project will replace 3 fish passage barrier culverts in the Cee Cee Ah (CCA) subbasin with fish friendly crossings. The two lowest culverts are on US Forest Service roads and the upper most culvert is on a cost-share road managed jointly by the Colville National Forest and Stimson Lumber Company. Cost-share roads are not covered under the Forest and Fish Agreement. Implementation of this project will restore fish passage to approximately 0.4 miles of bull trout habitat and 4.0 miles of westslope cutthroat trout habitat. The work is to be implemented by Forest Service personnel, Tribal personnel, and sub-contractors hired by the Tribe and Forest Service.

Restoration of fish passage in the CCA subbasin has been identified as a high priority action for the improvement of bull trout and westslope cutthroat trout habitat by the Pend Oreille Salmonid Recovery Team (Lead Entity Strategy, 2007). While CCA is a medium priority subbasin in the Lead Entity Strategy, considerable efforts have been made over the last 14 years to restore habitat in the watershed and remove non-native brook trout above a natural barrier. Funding for these watershed wide projects have come from BIA, SRFB and BPA. The two upper most culverts are in the project area where brook trout were successfully removed in 2008-2010 with rotenone. Westslope cutthroat trout have been translocated from a nearby watershed that is genetically pure beginning in 2010 and will continue for the next several years. This will be a 25% cost share with the US Forest Service.

Deliverable Specification: Replace Cee Cee Ah Creek Culvert #2 with a structural steel plate arch.

Planned Metrics: <None>



Locations: 1
Primary Focal Species: Cutthroat Trout, Westslope
Country: US
State: WA
County: PEND OREILLE
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/15/2012	9/28/2012	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).
Deliverable: B. Replace Cee Cee Ah Culvert Site #2		11/1/2012	Completed	See the Deliverable Specification above

F: 184. Install Fish Passage Structure

Title: Replace Cee Cee Ah Creek Culvert Site #3
Description: This project will replace 3 fish passage barrier culverts in the Cee Cee Ah (CCA) subbasin with fish friendly crossings. The two lowest culverts are on US Forest Service roads and the upper most culvert is on a cost-share road managed jointly by the Colville National Forest and Stimson Lumber Company. Cost-share roads are not covered under the Forest and Fish Agreement. Implementation of this project will restore fish passage to approximately 0.4 miles of bull trout habitat and 4.0 miles of westslope cutthroat trout habitat. The work is to be implemented by Forest Service personnel, Tribal personnel, and sub-contractors hired by the Tribe and Forest Service.

Restoration of fish passage in the CCA subbasin has been identified as a high priority action for the improvement of bull trout and westslope cutthroat trout habitat by the Pend Oreille Salmonid Recovery Team (Lead Entity Strategy, 2007). While CCA is a medium priority subbasin in the Lead Entity Strategy, considerable efforts have been made over the last 14 years to restore habitat in the watershed and remove non-native brook trout above a natural barrier. Funding for these watershed wide projects have come from BIA, SRFB and BPA. The two upper most culverts are in the project area where brook trout were successfully removed in 2008-2010 with rotenone. Westslope cutthroat trout have been translocated from a nearby watershed that is genetically pure beginning in 2010 and will continue for the next several years. This will be a 25% cost share with the US Forest Service.

Deliverable Specification: Replace Cee Cee Ah Creek Culvert Site #3 with a structural steel plate arch.

Planned Metrics: <None>

Locations: 1
Primary Focal Species: Cutthroat Trout, Westslope
Country: US
State: WA
County: PEND OREILLE
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/15/2012	9/14/2012	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).
Deliverable: B. Replace Cee Cee Ah Culvert Site #3		11/1/2012	Completed	See the Deliverable Specification above

*** This work element has potential for inadvertent discovery of cultural resources. See instructions at end of this document. ***

G: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period Aug 1,2012 to July 31,2013



Description: 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. Date range August 1,2012 to July 31,2013 will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	2/1/2013	2/28/2013	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	3/4/2013	4/8/2013	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.
C. Submit progress report for external review	4/15/2013	5/13/2013	Completed	Use this milestone if the progress report requires external review.
D. Confirm BPA has posted the progress report	6/3/2013	7/31/2013	Completed	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: E. Attach Progress Report in Pisces		7/31/2013	Completed	<i>See the Deliverable Specification above</i>

H: 189. Coordination-Columbia Basinwide

Title: Coordination with other entities on restoration efforts
Description: Coordination with other entities on restoration efforts to prevent duplication and enhance communication and cooperation within the watershed or subbasin. Work with landowners, interest groups, and agencies to research and identify funding and cost share opportunities.
Deliverable Specification: Project coordination for work that helps support the identification and selection of projects. Coordination with other entities on restoration efforts to prevent duplication and enhance communication and cooperation within the watershed or subbasin. Work with landowners, interest groups, and agencies to research and identify funding and cost share opportunities.

Milestone Title	Start Date	End Date	Status	Milestone Description
Deliverable: A. Project coordination among all stakeholders		7/30/2013	Completed	<i>See the Deliverable Specification above</i>

I: 174. Produce Plan

Title: Investigate needs for conservation hatchery
Description: Begin preliminary investigation into needs for a conservation hatchery.
Deliverable Specification: Begin preliminary investigation into needs for a conservation hatchery.

Primary Focal Species: Cutthroat Trout, Westslope | Trout, Bull



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	8/15/2012	7/1/2013	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).
Deliverable: B. Investigate needs for conservation hatchery		7/30/2013	Active	<i>See the Deliverable Specification above</i>

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:

<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Albeni Falls Wildlife Mitigation-Idaho Department of Fish and Game (IDFG)
Project #: 1992-061-03
Contract Title: 1992-061-03 EXP ALBENI FALLS ADMIN WL IDF&G
Contract #: 53816
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 205740 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Idaho Department of Fish and Game (IDFG) (Prime - IDFISGAM00)
BPA Internal Ref: 53816
SOW Validation: Last validated 06/02/2011 with 0 problems, and 1 reviewable items
Contract Documents: Property Inventory (06/02/2011) Property Inventory for the Albeni Falls Wildl...
Budget - Contract (06/10/2011) 2011 LIB Admin IDFG Albeni Falls Final

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kjvleuven@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland, OR 97208-3621
Gregg Servheen	Supervisor	Idaho Department of Fish and Game (IDFG)	(208) 287-2713 / NA	gregg.servheen@idfg.idaho.gov	600 W Walnut Street Boise ID 83707
Katherine Cousins	Contract Manager	Idaho Department of Fish and Game (IDFG)	(208) 769-1414 / (208) 769-1418	kathy.cousins@idfg.idaho.gov	2885 W. Kathleen Aveue Coeur D'Alene ID 83815-
Conan Chiu	Administrative Contact	Idaho Department of Fish and Game (IDFG)	(208) 287-2813 / (208) 334-2148	conan.chiu@idfg.idaho.gov	Bureau of Administration P.O. Box 25 Boise ID 83707-
Jenna Peterson	Interested Party	Bonneville Power Administration	(503) 230-3018 / NA	jepeterson@bpa.gov	905 NE 11th Avenue KEC-4 Portland OR 97232
Rosemary Mazaika	Interested Party	Bonneville Power Administration	(503) 230-5869 / (503) 230-5699	rxmazaika@bpa.gov	P.O. Box 3621 Mailstop - KEWL-4 Portland OR 97208-3621
Nicole Rutherford	Interested Party	Bonneville Power Administration	(503) 230-4320 / NA	narutherford@bpa.gov	P.O. Box 3621 Mailstop - NSSP-4 Portland OR 97208-3621
Katey Grange	Env. Compliance Lead	Bonneville Power Administration	(503) 230-4047 / NA	kcgrange@bpa.gov	PO Box 3621, KEC-4 Portland OR 97208
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232



Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Environmental Compliance		\$2,970	(1 %)
B : 172. Conduct Pre-Acquisition Activities - Conduct Pre-Acquisition Activities - Coordinate completion of Hazardous Waste Surveys		\$2,970	(1 %)
C : 172. Conduct Pre-Acquisition Activities - Conduct Pre-Acquisition Activities - Pursue site information, title search & conservation ease		\$40,000	(15 %)
D : 172. Conduct Pre-Acquisition Activities - Conduct Pre-Acquisition Activities - Identify willing landowner participants		\$5,000	(2 %)
E : 189. Coordination-Columbia Basinwide - Coordinate with other members implementing Albeni Falls wildlife mitigation		\$970	(0 %)
F : 189. Coordination-Columbia Basinwide - Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Cauc		\$9,000	(3 %)
G : 189. Coordination-Columbia Basinwide - Build relationships with entities interested in wildlife mitigation		\$12,790	(5 %)
H : 189. Coordination-Columbia Basinwide - Meet with County Commissioners		\$4,970	(2 %)
I : 189. Coordination-Columbia Basinwide - Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans		\$12,970	(5 %)
J : 114. Identify and Select Projects - Identify cost-share partnerships and projects		\$12,970	(5 %)
K : 99. Outreach and Education - Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project		\$15,000	(6 %)
L : 87. Prepare HEP Report - Coordinate and conduct baseline and 5- and 10-year HEP surveys		\$40,100	(15 %)
M : 157. Collect/Generate/Validate Field and Lab Data - Coordinate and conduct vegetative monitoring surveys	*	\$16,970	(6 %)
N : 157. Collect/Generate/Validate Field and Lab Data - Coordinate, collect and generate field data to assist IBIS	*	\$9,970	(4 %)
O : 174. Produce Plan - Develop site-specific wildlife management plans	*	\$10,970	(4 %)
P : 119. Manage and Administer Projects - Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending		\$38,070	(14 %)
Q : 175. Produce Design and/or Specifications - Design access roads to restoration area in the Clark Fork River delta	*	\$5,500	(2 %)
R : 175. Produce Design and/or Specifications - Surveying and Monitoring bank pins and Lake Pend Oreille deltas	*	\$15,000	(6 %)
S : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$771	(0 %)



Work Element - Work Element Title	EC Needed*	Estimate	(%)
T : 132. Produce (Annual) Progress Report - Submit Progress Report for the period (July 1, 2011) to (June 30, 2012)		\$8,000	(3 %)
Total:		\$264,961	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

Background

The Pacific Northwest Electric Power Planning and Conservation Act (Act) of 1980 (Public Law 96-501) directed that measures be implemented by Bonneville Power Administration (BPA) to protect, mitigate, and enhance fish and wildlife to the extent affected by development and operation of hydropower projects on the Columbia River system (Martin et al. 1988). The Act created the Northwest Power Planning and Conservation Council (Council), which in turn developed the Columbia River Basin Fish and Wildlife Program (Program). Under the Act, BPA has the authority and obligation to fund fish and wildlife mitigation activities that are consistent with the Council's Fish and Wildlife Program (USDE 1996). Part of the Program was the development of wildlife protection, mitigation and enhancement plans for each of the hydropower facilities on the Columbia River system and ultimately, implementation of the plans to mitigate wildlife habitat losses. The Idaho Department of Fish and Game (IDFG) developed a mitigation plan in 1987, for the Albeni Falls hydroelectric facility that was constructed by the U.S. Army Corps of Engineers (ACOE) on the Pend Oreille River in Bonner County, Idaho between 1951 and 1955 (Martin et al. 1988). Mitigation plans for wildlife habitat losses at each of the Columbia River Basin dams were submitted by BPA to the Council in 1989, including the mitigation plan for Albeni Falls Dam in Idaho (USDE 1996). The Council reviewed and approved the Albeni Falls plan in 1990 (USDE 1996).

The Albeni Falls Wildlife Management Plan Final Environmental Assessment (BPA 1996) addressed the potential environmental effects of a proposed wildlife habitat protection and enhancement program. Based on the analysis in the environmental assessment, the Bonneville Power Administration (BPA) concluded that funding the development and implementation of the Project would enable the IDFG, as well as other federal agencies and sovereign nations to protect and enhance a variety of wetland and riparian habitats, restore 28,587 Habitat Units (HU) lost as a result of construction of the Albeni Falls Dam, and implement long-term wildlife management activities. The Project also complies with the Wildlife Mitigation Program Final Environmental Impact Statement (BPA 1997) and the standardized planning and implementation process prescriptions set forth in the Record of Decision. In-lieu of annualizing habitat unit losses the Council decided to mitigate losses at a 2:1 ratio. That is, for every two HU protected the HU ledger would be reduced by one HU. In 2002, however, BPA decided to maintain a 1:1 crediting policy. The issue of how to address the annualized wildlife habitat losses remains unresolved.

The Northern Idaho Wildlife Mitigation Agreement was jointly prepared and approved by the IDFG and BPA in June 1997 (BPA and IDFG 1997). This contract is one of two IDFG contracts for protection, mitigation and enhancement of wildlife habitats in Northern Idaho. This contract covers all management and administrative responsibilities for implementing mitigation projects. The second contract under this Project number covers all operational and maintenance of wildlife mitigation parcels. Thus, the Project goals are twofold and are: 1) to continue the administration and ongoing implementation of the Albeni Falls Wildlife Mitigation Project; and, 2) to protect, restore, maintain, and manage wetland, riparian and upland coniferous forest habitats on three wildlife management areas in Northern Idaho.

This contract has been developed to cover personnel, mitigation implementation and monitoring costs for a 16-month contract period (March 1, 2009 - June 30, 2010) with the following objectives:

- Identify potential mitigation actions by identifying willing landowner participants and cost-sharing partnerships, building relationships with entities interested in wildlife mitigation and meeting with County Commissioners.
- Secure conservation easements, fee-title, and lease agreements by pursuing site information and title search, writing easement terms and conditions with landowners, verifying maps, fence boundaries, and legal descriptions, coordinating completion of property appraisal and review, and developing option/purchase agreements.
- Fulfill NEPA and BPA funding requirements by coordinating completion of cultural resource surveys, hazardous waste surveys and providing information for NEPA assessment.
- Provide cost-share funding to other project entities by determining cost-share entity's role in the proposed project.



- Coordinate completion of biological baseline surveys of specific habitat areas to determine starting point for monitoring and evaluation of biological objectives.
- Coordinate and implement information and education program. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours.
- Provide assistance with monitoring and evaluation activities on mitigation lands. Activities may include continuing HEP analysis to determine changes in habitat quality, site-specific monitoring and/or sampling of terrestrial vegetation, public use, and habitat use.
- Coordinate mitigation implementation activities associated with other members operating under the Project.
- Coordinate and develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.
- Develop administrative work statement and budget and maintain site-specific operating budgets for individual mitigation parcels. Oversee and develop budget revisions as necessary.
- Prepare an Annual Report of Idaho Department of Fish and Game's Albeni Falls Wildlife Mitigation implementation activities.
- Monitoring and Evaluation: to monitor vegetative cover and habitats using scientific principals and techniques to ensure that project objectives are being met and to provide a basis for use of adaptive management when appropriate. To evaluate species and habitat responses to management activities for the benefit of fish and wildlife using mitigation lands.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title:	Environmental Compliance
Description:	Documentation will be completed to obtain environmental compliance prior to starting implementation of any Work Element that requires review or consultation. This work element is added to satisfy the requirements of PISCES. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene River WMA.
Deliverable Specification:	This Work Element is to cover the gathering, compilation, and organization of information necessary for environmental compliance on activities that may require review or consultation from State, Tribal or federal agencies.
Planned Metrics:	* Are herbicides used as part of work performed under this contract?: Yes * 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. Collect, Organize, Submit, and Maintain Environmental Compliance Documentation	7/1/2011	6/30/2012	Completed	Information pertaining to ESA species, historical sites, and state sensitive species will be collected and maintained. Environmental documentation will be completed as necessary for any activity requiring review or consultation. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene WMA.
B. Receive NEPA clearance to begin implementation work on the Pend Oreille WMA	7/1/2011	6/30/2012	Completed	This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation activities planned to occur on the Pend Oreille Wildlife Management Area.
C. Receive NEPA clearance to begin implementation work on the Boundary Creek/Smith Creek WMA	7/1/2011	6/30/2012	Completed	This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation activities planned to occur on the Boundary Creek/Smith Creek Wildlife Management Areas.
D. Receive NEPA clearance to begin implementation work on the Coeur d'Alene River WMA	7/1/2011	6/30/2012	Completed	This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation activities planned to occur on the Coeur d'Alene River Wildlife Management Area.
E. Provide BPA EC Lead with calendar year FY11 proposed herbicide use	7/1/2011	6/30/2012	Completed	Contractor submits any proposed herbicide use on an approved form to the BPA Environmental Compliance Lead
F. Provide BPA EC Lead with calendar year FY11 actual herbicide use	7/1/2011	6/30/2012	Completed	Contractor submits any actual herbicide use on an approved form to the BPA Environmental Compliance Lead
Deliverable: G. Completed Documentation Pertaining to Environmental Compliance		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

B: 172. Conduct Pre-Acquisition Activities

Title: Conduct Pre-Acquisition Activities - Coordinate completion of Hazardous Waste Surveys
Description: Coordinate the completion of hazardous waste surveys on potential mitigation projects.
Deliverable Specification: Hazard waste surveys completed according to BPA KEC standards. Evaluation results will be maintained in site files.

Locations: 1
Primary Focal Species: Wildlife
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed:
HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contract BPA's environmental compliance group	7/1/2011	6/30/2012	Completed	Have a BPA inspector survey land for possible pollutants. If necessary utilize an outside contractor to inspect lands for pollution.
B. Begin clean-up work	7/1/2011	6/30/2012	Completed	If clean-up work is necessary, then bid a subcontractor for clean-up work required.
C. Provide status report to BPA	7/1/2011	6/30/2012	Completed	The findings of the Environmental Land Audit to be provided to BPA.
Deliverable: D. Completed Environmental Land Audit		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

C: 172. Conduct Pre-Acquisition Activities

Title: Conduct Pre-Acquisition Activities - Pursue site information, title search & conservation easement



Description: Gather site information on potential habitat sites. Such information may include tax information, wetland delineation, aerial photos, title search, etc. Establish working relationship with landowner and write easement terms and conditions that are mutually agreeable. Verify maps, legal descriptions and fence boundaries of potential mitigation sites. Coordinate completion of property appraisals and review, including requesting bids of contractors.

Deliverable Specification: Information maintained in site files. Copy of easement terms and conditions and all legal descriptions will be included with appraisals. Information includes tax information, wetland delineations, aerial photos, and information pertaining to title searches.

Locations: 1
Primary Focal Species: Wildlife
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Acquire appraisal	7/1/2011	6/30/2012	Completed	Acquire appraisal.
B. Acquire BPA review and approval of appraisal	7/1/2011	6/30/2012	Completed	Acquire BPA review and approval of appraisal.
C. Perform and obtain title searches and reports	7/1/2011	6/30/2012	Completed	Perform and obtain title searches and reports.
D. Review and clearance of title report encumbrances by BPA	7/1/2011	6/30/2012	Completed	Review and clearance of title report encumbrances by BPA.
E. Perform boundary surveys as needed	7/1/2011	6/30/2012	Completed	Perform boundary surveys as needed.
F. Provide legal descriptions	7/1/2011	6/30/2012	Completed	Provide legal descriptions.
G. Provide minimum habitat units	7/1/2011	6/30/2012	Completed	Provide minimum habitat units.
H. Provide definition of easement terms and conditions (for easements)	7/1/2011	6/30/2012	Completed	Provide definition of easement terms and conditions (for easements).
I. Attach a completed water survey form in Pisces	7/1/2011	6/30/2012	Completed	The water survey form is located at: http://www.efw.bpa.gov/IntegratedFWP/watersurveyform.doc . The form should be completed by the contract manager or BPA project manager and attached in Pisces.
Deliverable: J. Property Acquisition Information		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

D: 172. Conduct Pre-Acquisition Activities

Title: Conduct Pre-Acquisition Activities - Identify willing landowner participants
Description: Identify willing landowners with opportunities to permanently protect wildlife habitat and seek to establish good relationship(s). As directed by the Albeni Falls Wildlife Protection, Mitigation and Enhancement Plan, priority areas of interest are within the Pend Oreille and Clark Fork Subbasins. Out-of-basin projects include areas in the Coeur d'Alene and Kootenai Subbasins.

Deliverable Specification: List of willing landowner participants.

Locations: 1
Primary Focal Species: Wildlife
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Actively drive areas of interest and areas adjacent to currently mitigation lands	7/1/2011	6/30/2012	Completed	Actively driving areas of interest and adjacent to current mitigation lands to identify willing landowners with opportunities to permanently protect wildlife habitat. Networking with the local community and seeking to establish good relationship(s) with landowners.
B. Ongoing searches and investigations for new projects	7/1/2011	6/30/2012	Completed	Throughout the year the project manager will attend public meetings and investigate possible real estate sales at local assessor offices. The project manager will also spend time driving and looking for land sales.
Deliverable: C. Identified Sellers of Lands		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

E: 189. Coordination-Columbia Basinwide

Title: Coordinate with other members implementing Albeni Falls wildlife mitigation

Description: Coordinate when needed with other entities interested in implementing Albeni Falls wildlife mitigation, such as the U.S. Fish and Wildlife Service, the Army Corp of Engineers and any tribal or non-governmental entities. These activities may include meetings and open houses to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites.

Deliverable Specification: List of meetings and participants will be noted with meeting sign-in sheets, minutes or meeting summaries. Open house attendance and comments will be incorporated by reference into site-specific management plans.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with other interested members as needed	7/1/2011	6/30/2012	Completed	When appropriate, informing other members implementing under the Albeni Falls Wildlife Mitigation Project of pending projects and the landowners participating in the program.
B. Participate in meetings as needed	7/1/2011	6/30/2012	Completed	Participate in meetings, if required. Facilitate and provide meeting minutes as needed.
C. Hold public meetings as needed	7/1/2011	6/30/2012	Completed	Open houses will be held on an as-needed basis to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites. Other interested members implementing Albeni Falls wildlife mitigation will be invited to participate.
Deliverable: D. Completed project work identified in the Wildlife Management Plan		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

F: 189. Coordination-Columbia Basinwide

Title: Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus

Description: Coordinate and develop the materials necessary to represent the Albeni Falls Wildlife Mitigation Project to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.

Deliverable Specification: Meeting participants include all Columbia Basin Fish and Wildlife Authority (CBFWA) project managers and CBFWA managers. Often the purpose of the meetings are to improve basin-wide coordination efforts of project development. Usually there are 6-10 meetings planned annually. Spreadsheets, overheads, budgets, etc.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Participate and attend wildlife caucus meetings	7/1/2011	6/30/2012	Completed	Participate and attend CBFWA wildlife advisory committee meetings as needed. Usually 6-10 meetings annually.
B. Prepare materials for meetings	7/1/2011	6/30/2012	Completed	Prepare PowerPoint presentations, overheads and other written materials on potential acquisition projects for the CBFWA wildlife advisory committee members.
Deliverable: C. Regional Wildlife Meeting Attendance		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

G: 189. Coordination-Columbia Basinwide

Title: Build relationships with entities interested in wildlife mitigation

Description: Build effective working relationships with local governments, other agencies, non-profit organizations, members of the community, and the interested public.

Deliverable Specification: Ongoing coordination to build community interest and inform the public about the Albeni Falls Wildlife Mitigation Project.



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Attend meetings	7/1/2011	6/30/2012	Completed	Attend land trust, land development and community group meetings as needed.
B. Develop publications to advertise program	7/1/2011	6/30/2012	Completed	Develop informational pamphlets for mail outs to interested parties.
Deliverable: C. Inform and Involve More Entities in the Mitigation Efforts		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

H: 189. Coordination-Columbia Basinwide

Title: Meet with County Commissioners
Description: Meet with County Commissioners to inform and update them on Albeni Falls Wildlife Mitigation activities. Counties include Boundary County, Bonner County, Kootenai County, Shoshone County and Benewah County.
Deliverable Specification: Incorporation into annual report.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold or attend meetings as necessary	7/1/2011	6/30/2012	Completed	Meetings are to inform County commissioners of potential land sales and coordinate with wildlife management plan objectives.
Deliverable: B. Coordination with County Commissioners		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

I: 189. Coordination-Columbia Basinwide

Title: Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans
Description: Coordinate enhancement activities defined in the individual site plans to ensure they follow the budget and attain the desired results.
Deliverable Specification: Verifying the completion of project work on mitigation properties for the Pend Oreille Wildlife Management Area (WMA), Boundary Creek and Smith Creek WMAs, and the Coeur d'Alene River WMA. Activities may include maintenance of fences, property and habitat improvements, access, water structures, information and education facilities, enforcement of easement terms and noxious weed control. Bidding out services to subcontractors and coordinating payment to subcontractors. Activities may include but are not limited to fencing, controlled burns, planting native vegetation, property clean-up and cultivating cropland.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold coordination meetings	7/1/2011	6/30/2012	Completed	Events that may trigger the organization of a meeting include the completion of a land acquisition or the beginning of a construction project on a Wildlife Management Area.
B. Coordinate activities on Boundary Creek/Smith Creek WMA	7/1/2011	6/30/2012	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Boundary Creek and Smith Creek Wildlife Management Areas.
C. Coordinate activities on Pend Oreille WMA	7/1/2011	6/30/2012	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Pend Oreille Wildlife Management Area (WMA).
D. Coordinate activities on the Coeur d'Alene River WMA	7/1/2011	6/30/2012	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Coeur d'Alene River Wildlife Management Area (WMA).
Deliverable: E. Completed project work identified in Wildlife Management Plans		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

J: 114. Identify and Select Projects

Title: Identify cost-share partnerships and projects
Description: Wherever possible, identify partnerships with landowner participants, government agencies, watershed groups, or other entities so as to reduce costs, increase benefits, and/or eliminate duplicate activities. IDFG and the cost-share partner will negotiate a MOA to determine how habitat will be permanently protected and how management will proceed.
Deliverable Specification: List of cost-sharing partnerships to develop projects to protect, mitigate or enhance wildlife habitat. Cost-sharing role will be defined in Memorandum of Agreement (MOA). Possible partners could include The Nature Conservancy, Ducks Unlimited, Trout Unlimited, Inland Northwest Land Trust, the Rocky Mountain Elk Foundation, the Idaho Fish and Wildlife Foundation, the Idaho Department of Lands, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and the U.S. Forest Service and the Bureau of Land Management.

Primary Focal Species: Wildlife

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contact organizations via telephone or email or other methods applicable in pursuit of partner	7/1/2011	6/30/2012	Completed	Organizations and/or other agencies will be contacted to solicit cost-sharing partnerships.
B. Proposal Development	7/1/2011	6/30/2012	Completed	Proposal development will vary depending upon agency and/or organization requirements.
C. Land Committee Review and Approval	7/1/2011	6/30/2012	Completed	An internal process to review IDFG land acquisitions. The land committee meets at least four times a year and makes recommendations to the IDFG Director and the Idaho Fish and Game Commission.
D. Project Cost Share Information in Pisces	7/1/2011	6/30/2012	Completed	Funding obtained through cost share will be identified and entered into Pisces under the Project 1992-061-03
Deliverable: E. Cost Share Partners Identified		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

K: 99. Outreach and Education

Title: Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project

Description: Coordinate and implement information and education activities on the Albeni Falls Wildlife Mitigation Project. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours. Activities may also include developing a school curriculum. The goals are to educate members of the community on the mitigation program and to encourage their participation.

Deliverable Specification: Interpretive sites, audio-visual program, classroom syllabus, informational brochures and signs.

Planned Metrics:
 * # of students reached: 250
 * # of general public reached: 200
 * # of teachers reached: 10

Locations: 4

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:**

County: BONNER | BOUNDARY | KOOTENAI **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Conduct classes, seminars, workshops, trainings, field tours, symposia and/or conferences	7/1/2011	6/30/2012	Completed	Includes outreach or education to the general public, fellow professionals and students (K-12 and college).
B. Set up web cam on WMA	7/1/2011	6/30/2012	Completed	Set up a web cam on the Boundary Creek WMA so that the students as well as the general public can view the wildlife habitat and the wildlife live online.
C. Field studies with Habitat Biologists	5/1/2012	6/30/2012	Completed	Approximately 250 elementary, middle and/or high school students will observe habitat and wildlife biologists working in the field when collecting data.
D. Participant sign-in sheets	5/1/2012	6/30/2012	Completed	Participants will sign-in for any seminar, workshop or field study activity.
Deliverable: E. Education and Outreach for community affected by the Albeni Falls Hydroelectric facility.		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

L: 87. Prepare HEP Report

Title: Coordinate and conduct baseline and 5- and 10-year HEP surveys

Description: Coordinate completion of Habitat Evaluation Procedures (HEP).

Deliverable Specification: Coordinate completion of baseline and 5- and 10-year HEP surveys. HEP reports are included as appendices to the annual report.

Locations: 7

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BONNER | BOUNDARY | KOOTENAI **HUC6 Name:**



Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Collect HEP data from field studies	7/1/2011	6/30/2012	Completed	Collect field data using methods outlined in the USFWS HEP protocols.
B. Perform analysis on HEP data	7/1/2011	6/30/2012	Completed	Collected field data will be entered into databases and then applied to appropriate species models to calculate the project HUs.
C. Submit draft HEP report to BPA for review	7/1/2011	6/30/2012	Completed	HEP report will be produced and then submitted to BPA for review.
D. Upload final HEP report to BPA website	7/1/2011	6/30/2012	Completed	Final HEP report uploaded to BPA website.
Deliverable: E. Completed HEP Reports for Mitigation Properties		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Coordinate and conduct vegetative monitoring surveys

Description: Coordinate completion and/or conduct surveys to include: distribution and abundance plant communities, including native and rare species; noxious weeds; roads, trails, etc.; and recreational use, economics.

Deliverable Specification: For each of the wildlife management areas, coordinate with the Regional Habitat Biologists and technicians to analyze the vegetative monitoring field data for the annual report.

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 : Tributary Habitat

Locations: 4

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2011	6/30/2012	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. Collect data from field studies	7/1/2011	6/30/2012	Completed	Data collected by the Habitat Biologists and Wildlife Technicians are submitted to the Project Manager.
C. Perform analyses on data sets	7/1/2011	6/30/2012	Completed	Evaluations and assessments by Habitat Biologists and Biological Technicians are sent to the Project Manager. The Project Manager verifies the information and performs any additional analyses, if needed, and evaluates results in the annual report.
Deliverable: D. Annual Summary Report of Vegetative Monitoring		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

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

Title: Coordinate, collect and generate field data to assist IBIS

Description: Coordinate, collect and generate field data to assist the Northwest Habitat Institute, Interactive Biodiversity Information System (IBIS) in the development of tools that assist land managers in conserving native species and habitats, developing and implementing inventorying and monitoring programs, and coordinating and facilitating activities (e.g., habitat restoration, land-use planning and management objectives) that promote the conservation and management of natural resources.

Deliverable Specification: Coordinate with the Northwest Habitat Institute, Interactive Biodiversity Information System (IBIS) to develop extensive information about the vegetative habitat cover types and wildlife present on mitigation lands and analyze the relationships among these species and their habitats to determine a wildlife habitat value.



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 : Tributary Habitat

Locations: 13

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BONNER | BOUNDARY | KOOTENAI **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2011	6/30/2012	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. Collect data from field studies	7/1/2011	6/30/2012	Completed	Data collected by the Habitat Biologists and Wildlife Technicians are submitted to the Project Manager.
C. Perform analyses on data set	7/1/2011	6/30/2012	Completed	Evaluations and assessments by Habitat Biologists and Biological Technicians are sent to the Project Manager. The Project Manager verifies the information and performs any additional analyses, if needed, and evaluates results in the annual report.
D. Collaborate with IBIS staff	7/1/2011	6/30/2012	Completed	Project Manager will collaborate with IBIS staff on the final analyses of data and generation of habitat value.
Deliverable: E. Summary of Findings in Annual Report		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

O: 174. Produce Plan

Title: Develop site-specific wildlife management plans

Description: Develop Wildlife Management Plans (WMP) that will include, but not be limited to, the following components: fish and wildlife habitat, recreation and access, fire protection noxious weeds, information and education, operation and maintenance, and monitoring and evaluation. The management plans will define the management program. These activities will be done on a need-by-need bases depending upon the acquisition activities.

Deliverable Specification: Site-specific management plans completed on a need-by-need basis. The time frame for the completion of a site-specific management plan is about one year after the completion of an acquisition. The wildlife management plan may include components on fish and wildlife habitat, recreation and access, fire protection, noxious weeds, information and education, operation and maintenance and monitoring and evaluation.

Primary Focal Species: Wildlife

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold scoping meetings	7/1/2011	6/30/2012	Completed	Meetings will be held on a need-by-need basis with local land owners, county commissioners and community members regarding any new Wildlife Management Plans.
B. Submit draft plan for IDFG review	7/1/2011	6/30/2012	Completed	Draft plan is submitted to IDFG for internal review, and review by the IDFG director and commission. This milestone will be completed after initial scoping meetings.
C. Submit draft plan for BPA review	7/1/2011	6/30/2012	Completed	Draft management plan submitted to BPA for comments. This milestone will be completed after the IDFG review.
D. Hold a meeting for final review	7/1/2011	6/30/2012	Completed	The final draft Wildlife Management Plan will be presented to the county commissioners for comment. This milestone will be completed after the BPA review.
E. Submit final plan to BPA	7/1/2011	6/30/2012	Completed	Final Wildlife Management Plan submitted to BPA. This milestone will be completed after it is presented to the County commissioners for comment.
Deliverable: F. Completed Wildlife Management Plans		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

P: 119. Manage and Administer Projects



Title: Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending

Description: Develop administrative work statement and budget, and maintain operating budgets for mitigation parcels. Oversee and develop budget revisions as necessary. Manage IDFG-BPA contract to maintain fiscal responsibility and oversight. Develop and manage subcontracts on an as-needed basis. Coordinate the purchase of equipment for the continued operation and maintenance of three Wildlife Management Areas (WMA). Maintain equipment inventory and documentation. Coordinate with administrative staff and maintain IDFG spending authority at appropriate levels

Deliverable Specification: FY11 work statements, budgets and property inventories. Purchase of operating and maintenance equipment for three wildlife management areas (WMA). Copies of subcontracts and revised contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Create all FY11 and FY12 contracts using PISCES	10/1/2011	6/30/2012	Completed	FY11 and FY12 Statement of Work and Work Element budget to be developed on-line using PISCES.
B. Monitor periodic status reports on line	7/1/2011	6/30/2012	Completed	Status reports to be monitored on-line using PISCES.
C. Maintaining inventory documentation	7/1/2011	6/30/2012	Completed	Inventory maintained at site.
D. IDFG Project Manager to attend an Appraisal & Real Estate Course	9/14/2011	9/18/2011	Completed	The Project Manager to attend a course of instruction that covers the basics of Property Appraisals and the process of how they are completed.
E. Land & Real Estate Training Seminars	8/2/2011	6/15/2012	Completed	The IDFG Project Manager to attend up to three instructional seminars on land appraising, real estate land transfers, and laws pertaining to conservation easements.
F. Solicit bids for equipment purchase	8/9/2011	6/30/2012	Completed	Coordinate the solicitation of bids for the purchase of equipment for the Pend Oreille Wildlife Management Area (WMA). The WMA requires an off-road vehicle (Yamaha Big Bear 400 4x4 IRS) to complete O&M activities.
G. Prepare paperwork for purchase of WMA equipment	8/9/2011	6/30/2012	Completed	Coordinate with Headquarter staff in the preparation and completion of the paperwork to purchase the O&M equipment.
H. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	7/1/2011	6/30/2012	Completed	If necessary, submit next year's Statement of Work and Work Element budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
I. Accrual - Submit September estimate to BPA	9/1/2011	9/15/2011	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. Generally, this should be done by September 10.
Deliverable: J. Project Management and WMA Equipment Purchase		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

Q: 175. Produce Design and/or Specifications

Title: Design access roads to restoration area in the Clark Fork River delta

Description: Extensive bank erosion has occurred to islands and shorelines in the Clark Fork River delta in northern Idaho, resulting in significant losses of soil, native riparian and wetland vegetation, as well as the quantity and quality of fish and wildlife habitat. IDFG is working with Avista and DU, as well as other partners, to propose a restoration project in the delta. Prior to any restoration activity, a biological assessment of the action is needed. The delta is about 6,000 acres, and is composed of complex wildlife habitats. Numerous studies have shown that over 80% of all fish and wildlife use riparian and wetland habitats during some stage of their life cycle—ranging from endangered bull trout, to recovered bald eagles, and big game, fur bearing mammals, reptiles, amphibians and hundreds of species of neo-tropical migrant birds. A plan and design outline on how to complete a comprehensive biological assessment for the delta is needed.

Deliverable Specification: A framework document outlining the structure of the biological assessment will be completed. A GPS inventory of the vegetative cover types and any ecological structural habitat features will be completed.

Locations: 1

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** CLARK FORK

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with IDFG Staff at the CDC	7/1/2011	6/30/2012	Completed	IDFG staff will meet to coordinate efforts in developing a framework to assess the biological resources in the Clark Fork River delta.
B. Investigate all historical biological documents	7/1/2011	6/30/2012	Completed	IDFG staff will investigate and inventory past studies and surveys completed for the Clark Fork River delta.
C. Conduct a inventory of wildlife habitat covers	7/1/2011	10/15/2011	Completed	IDFG Project Manager and biological technician will survey the Clark Fork River delta to GPS different wildlife habitat cover types and habitat structural features.
Deliverable: D. Framework document outlining a Biological Assessment for the Clark Fork River Delta		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

R: 175. Produce Design and/or Specifications

Title: Surveying and Monitoring bank pins and Lake Pend Oreille deltas

Description: Surveying and monitoring restoration at the Pack River delta, as well as surveying and monitoring bank pin sites at the Clark Fork and Priest River deltas. If Pend Oreille Lake is held at 2,051 feet, then the bank pins on Kokanne spawning sites will also be surveyed and monitored.

Deliverable Specification: Included in a report from the contractor will be information on the surveying and monitoring of bank pin sites at the Clark Fork, Pack River and Priest River deltas. If Pend Oreille Lake is held at 2,051 feet, then the bank pins on Kokanne spawning sites will also be surveyed and monitored. Also included in the report from the contractor will be surveying and monitoring information from the Pack River delta restoration project.

Locations: 2

Primary Focal Species: Wildlife

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: Multiple

HUC5 Watershed:

HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contract engineer and surveyor	7/1/2011	6/30/2012	Completed	Project lead will work with Headquarters staff to develop a Scope of Work for a subcontractor.
B. Engineer and surveyor conduct the work	12/1/2011	3/15/2012	Completed	The subcontractor will perform the work outlined in the SOW. This will include monitoring and surveying bank pin sites located along the Pend Orielle River, and Lake Pend Oreille. The subcontractor will also monitor and survey the restoration work completed in the Pack River delta.
C. Project Lead and Habitat Biologists review report	3/30/2012	4/30/2012	Completed	The Project Lead and area Habitat Biologists will review the draft report from the Subcontractor to ensure that the work meets the SOW, and if necessary, provide comments.
Deliverable: D. Final Report included in Annual Report to BPA		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

S: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Jul-Sep 2011 (7/1/2011 - 9/30/2011)	10/1/2011	10/15/2011	Completed	
B. Oct-Dec 2011 (10/1/2011 - 12/31/2011)	1/1/2012	1/15/2012	Completed	
C. Jan-Mar 2012 (1/1/2012 - 3/31/2012)	4/1/2012	4/15/2012	Completed	
D. Final Apr-Jun 2012 (4/1/2012 - 6/30/2012)	6/16/2012	6/30/2012	Completed	



T: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (July 1, 2011) to (June 30, 2012)

Description: 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. Date range July 1, 2011 to June 30, 2012 will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	7/1/2011	6/30/2012	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	7/1/2011	6/30/2012	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.
C. Submit annual progress report to COTR	7/1/2011	6/30/2012	Completed	Submit the completed annual report to the COTR.
D. Confirm BPA has posted the progress report	7/1/2011	6/30/2012	Completed	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: E. Attach Progress Report in Pisces		6/30/2012	Completed	<i>See the Deliverable Specification above</i>

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 26934 REL 22
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Release **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Pacific Northwest National Laboratory (Prime - USDOERIC00)
BPA Internal Ref: 26934 REL 22
SOW Validation: Last validated 03/04/2009 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (03/11/2009) PNNL Property Inventory through 2/2/09
Budget - Contract (03/11/2009) Line Item Budget CR



Contacts:

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Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Complete environmental compliance requirements		\$867	(1 %)

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
B : 157. Collect/Generate/Validate Field and Lab Data - Weekly electrofishing	*	\$8,343	(6 %)
C : 158. Mark/Tag Animals - Implant combination radio acoustic transmitter (CART) into bull trout	*	\$2,473	(2 %)
D : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$2,465	(2 %)
E : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft, vehicle and boat	*	\$44,478	(31 %)
F : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving station	*	\$25,660	(18 %)
G : 119. Manage and Administer Projects - Manage Project		\$6,038	(4 %)
H : 162. Analyze/Interpret Data - Data reduction and analysis		\$13,479	(9 %)
I : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$20,719	(14 %)
J : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$1,626	(1 %)
K : 132. Produce (Annual) Progress Report - Submit Annual Report for the period May 2008 to April 2009		\$19,123	(13 %)
Total:		\$145,271	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

The goal of this project is to provide temporary upstream passage for bull trout at Albeni Falls Dam, Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. The fish will then be transported above Albeni Falls Dam and released near Priest River, Idaho, or re-released below the dam depending on water temperature and number of fish captured. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to track the fish to potential spawning tributaries of Pend Oreille Lake. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Complete environmental compliance requirements

Description: Provide BPA with information necessary for environmental clearance for all contract activities during FY09. Submit FY10 SOW and supporting documents as needed for BPA's Environmental Compliance Group to determine environmental compliance status.

Deliverable Specification: Environmental compliance requirements complete for FY09 work. Submit FY10 SOW package to begin Environmental Clearance review for subsequent contract.

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



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Obtain BPA clearance for FY09 work	5/1/2009	5/1/2009	Completed	BPA provides environmental clearance to proceed with field work for FY08
B. Provide project information to BPA	11/1/2009	2/1/2010	Completed	Provide FY09 SOW and any other documentation needed for environmental review.
C. Obtain BPA clearance for FY10 work	4/15/2010	4/30/2010	Completed	BPA provides environmental clearance to proceed with field work for FY09
Deliverable: D. Ensure environmental compliance requirements are complete		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Weekly electrofishing

Description: Method(s): EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 24 days of effort will be expended annually (during the contract year May 1 through April 30) by each crew: 15 days, once each week, during the spring (1 May–15 June, or March 1 through April 30), three days during the summer (July, August) and six days, once each week, during the fall (25 September – 10 November). PNNL biologists will assist on one survey in the spring, one in the summer and one in the fall.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Fish collected during these surveys will be identified and total length (TL) measured (in mm). Bull trout will be weighed (to nearest g), measured (TL in mm and FL in mm), and tagged with PIT tag for permanent identification. All bull trout will be radio-tagged (up to maximum of 40 in 2008). Release sites will be dependent on water temperature (see work element above). Both EWU and the Kalispel Tribe own electrofishing boats that will be made available to the project.

Deliverable Specification: Work Products/Deliverables: EWU will provide an annual summary of fish captured by electrofishing; note that since electrofishing in the early spring occurs each year prior to the contract renewal data, these data from the early spring period will be included in the following year's report, e.g., data collected in March and April 2008 will be included in the FY 2009 report. This summary will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g); and (3) A written summary about electrofishing operations. PNNL will provide comment to EWU on report.

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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 1

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Total of 15 days of effort will be expended annually by ea crew: 6 days in spring	5/2/2009	4/30/2010	Completed	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
C. Three days during the summer July and August	7/1/2009	8/31/2009	Completed	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
D. Six days, once ea wk during the fall Sept -Nov	9/1/2009	11/15/2009	Completed	Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
Deliverable: E. Weekly electrofishing surveys		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

C: 158. Mark/Tag Animals

Title: Implant combination radio acoustic transmitter (CART) into bull trout
Description: Method(s): Transmitter implantation will be accomplished by PNNL, KNRD, and EWU. Bull trout will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for the PIT tag injected by the electrofishing crews. The PIT tag number along with data on TL (mm), FL (mm), and weight (g) will be recorded on a data sheet. [If the genetic assignment is unknown at the time transmitters are implanted that information will be added when it becomes available.]

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The bull trout will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exciting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently to be put back in the live box on the floating barge.

Deliverable Specification: Work Products/Deliverables: Up to 40 CART-tagged bull trout released in 2009 above and below Albeni Falls Dam. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water) or CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)]. Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train project personnel to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured. The annual reports and project completion report will contain a description of tagging bull trout.

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 : Uncertainty Research
 * Secondary R, M, and E Focal Strategy : Population Status

Locations:
1

Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name: EXPOSURE CREEK



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Fish will be implanted with Lotek combination acoustic/radio telemetry (CART) tag	5/2/2009	4/30/2010	Completed	Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train the EWU research associate to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured.
Deliverable: C. Transmitter implantation will be accomplished by EWU, the Kalispel Tribe, and PNNL.		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

D: 28. Trap and Haul

Title: Transport bull trout above Albeni Falls Dam

Description: All fish collected in the tailrace of Albeni Falls Dam in 2009 will be released either above Albeni Falls Dam or below the dam, depending on the time of year, water temperature, and number of bull trout captured. Fish captured in the tailrace when temperatures are less than 16 °C will be moved above the dam and released in the town of Priest River below the confluence of Priest River.

Deliverable Specification: Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam. This is a change in plans from the proposal because without a fish trap, there is no way to hold the fish and conduct genetic analyses prior to release.

Fish will be transported in a water-filled cooler maintained at the proper temperature and DO level. If necessary, the bull trout will be acclimated to the temperature of the release site. This will be accomplished by slowly adding release site water into the cooler until the temperature difference between the transport water and release site water is =1.0°C. Oxygen will be bubbled into the cooler until the fish is released.

Planned Metrics: # of fish transported: 10

Locations: 1

Primary Focal Species: Trout, Bull

Country: US

State: ID

County: BONNER

Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: LOWER PRIEST RIVER

HUC6 Name: QUARTZ CREEK

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Transport bull trout upstream of Albeni Falls Dam	5/2/2009	4/30/2010	Completed	Fish captured in the tailrace when temperature are less than 16c will be moved above the dam and released in the town of Priest River below the confluence of Priest River. Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam.
Deliverable: C. Bull trout released above Albeni Falls Dam		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Mobile tracking surveys by fixed wing aircraft, vehicle and boat

Description: Method(s): Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. EWU will make vehicle surveys along each of the above noted tributary streams once monthly on about June 15, July 15, and August 15; once weekly from September 1 to October 15, and on about November 1 each year for the purpose of locating bull trout in spawning tributaries. One survey may also be done during the first quarter of 2010 to identify locations of bull trout after the winter. A 4-element Yagi antenna will be mounted in a motorized assembly that will allow the operator to rotate the antenna while operating a 4WD truck.

EWU and PNNL will conduct acoustic tracking surveys from boat to locate CART tagged bull trout after they enter Lake Pend Oreille. A Lotek directional hydrophone connected to a digital interface on the Lotek SRX 400 receiver will be used to follow the acoustic signal emanating from the CART tag. The acoustic signal from the CART tag will enable us to locate bull trout after they move into Lake Pend Oreille where radio signals are lost due to attenuation due to depth.



Deliverable Specification: Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU. Boat tracking will occur on 10 dates that will be dependent on when fish are captured/tagged/released. Positions (latitude and longitude coordinates) of bull trout found during mobile tracking surveys will be determined using a GPS. A trip log will be maintained that will include information about dates and time of activities performed, equipment performance and locations and identification of any bull trout found. These data will be entered into an electronic database at the end of each trip.

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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 1
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed:
HUC6 Name:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. EWU and PNNL will conduct surveys by aircraft, vehicle and boat	5/2/2009	4/30/2010	Completed	To locate CART tagged bull trout after they enter Lake Pend Oreille. A Lotek directional hydrophone connected to a digital interface on the Lotek SRX 400 receiver will be used to follow the acoustic signal emanating from the CART tag. The acoustic signal from the CART tag will enable us to locate bull trout after they move into Lake Pend Oreille where radio signals are lost due to attenuation due to depth. Boat racking will occur on 10 dates that will be dependent on when fish are captured/tagged/released.
Deliverable: C. Track movement of tagged bull trout		4/30/2010	Completed	<i>See the Deliverable Specification above.</i>

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

Title: Download stationary ground radio receiving station
Description: Method(s): All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.

Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.

Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within two working days after being collected.

Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.

Deliverable Specification: Work Products/Deliverables: Trip log forms and electronic version of the data will be maintained at PNNL and backed up at EWU.

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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 8
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER

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



Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Receiver stations inspected and downloaded	5/2/2009	4/30/2010	Completed	Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.
Deliverable: C. All fixed receiver stations will be inspected and downloaded every other wk (26 times per yr)		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

G: 119. Manage and Administer Projects

Title: Manage Project

Description: Method(s): Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.

Deliverable Specification: Work Products/Deliverables: Administrative products including accrual estimates, metric reporting, and annual statements of work.

Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Project coordination	5/1/2009	4/30/2010	Completed	This project will require coordination with a number of agencies and organizations. Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies). Coordination with landowners where equipment is located will also need to be managed accordingly.
B. Manage project	5/1/2009	4/30/2010	Completed	Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
C. Accrual - Submit September estimate to BPA	9/1/2009	9/12/2009	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. Generally, this should be done by September 10.
D. Funding Package - Write and conduct internal review (e.g., Supervisor or Interagency)	11/1/2009	12/31/2009	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
E. Submit FY10 funding package to BPA	1/2/2010	1/2/2010	Completed	Submit SOW and budget estimate to BPA for FY10 work
Deliverable: F. Contract awarded prior to start of FY10 work		4/30/2010	Completed	<i>See the Deliverable Specification above</i>



H: 162. Analyze/Interpret Data

Title: Data reduction and analysis

Description: Method(s): EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked during the project year, which may overlap contract periods, e.g., data collected from 15 November through 30 April will be included in the following year's annual report. PNNL will lead the task of analyzing fish tracking data.

Deliverable Specification: Work Products/Deliverables: Annual statistical reports, GIS maps, and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Data to determine detection histories will also be obtained from a database specifically designed to maintain fish detection data.

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 : Uncertainty Research
- * Secondary R, M, and E Focal Strategy : Population Status

Locations:

Primary Focal Species: Trout, Bull

Country: NPCC Subbasin:

State: HUC5 Watershed:

County: HUC6 Name:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: Protocol State:

Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
B. Fish positions (GPS coordinates) will be entered into GIS to generate track maps for each fish	11/1/2009	11/30/2009	Completed	Map and tabled-data showing fish migration patterns. Fish location data collected through the 15 November of each year will be used to produce a detection history of each fish.
B. Data reduction and database compilation	5/1/2009	4/30/2010	Completed	Raw data will be checked for errors, organized and loaded into a database after each download.
Deliverable: C. Develop a profile of each fish tracked		11/30/2009	Completed	<i>See the Deliverable Specification above</i>

I: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations

Description: Method(s): Each spring PNNL and EWU will overhaul, refurbish and retest each of the eleven ground receiving stations. If inclement weather precludes installation (e.g., snow in mountains), receivers will be re-installed and tested as soon as conditions are safe, which may be in the following contract year.
Start date: 1 February (annually, 2008-2010)
Completion date: 30 April (annually, 2008-2010) or later if inclement weather precludes installation (especially of Pend Oreille Lake tributary stations)

Deliverable Specification: Functioning, tested ground receiving stations. The annual reports will contain a description of annual overhaul and maintenance activities.

Locations: 8

Primary Focal Species: Trout, Bull

Country: US NPCC Subbasin: Multiple

State: ID HUC5 Watershed: Multiple

County: BONNER HUC6 Name: Multiple

Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2009	5/1/2009	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. Permanent stationary ground stations will be tested	5/2/2009	4/30/2010	Completed	All permanent stationary ground stations will be calibrated and tested as soon as possible in the spring of each year. The receiver stations at the dam, Priest River mouth, and stations on the Pend Oreille River near Dover, ID will be tested and calibrated by dragging a test transmitter at various water depths up to 5 m while the receivers simultaneously detect signals. These data will then be post-processed in GIS software to determine the detection range of each receiver. Each receiver will then be calibrated to attain the desired detection range and re-tested to verify that calibrations were sufficient. Detection range maps will be produced that represent the areas where receivers can hear a transmitter with a signal strength (i.e., "Power") > 100 at 0.5 m and 3 m depth. Our detection ranges at Albeni Falls Dam will be designed to provide assurance that radio-tagged fish moving from upstream to downstream of the dam will first be detected by one of the receivers monitoring the forebay and then be detected by one of the receivers monitoring the tailrace. All other receivers will be configured to differentiate upstream and downstream movements of migrating bull trout.
Deliverable: C. Testing of radio receivers		4/30/2010	Completed	See the Deliverable Specification above

J: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2009 (5/1/2009 - 6/30/2009)	7/1/2009	7/15/2009	Completed	
B. Jul-Sep 2009 (7/1/2009 - 9/30/2009)	10/1/2009	10/15/2009	Completed	
C. Oct-Dec 2009 (10/1/2009 - 12/31/2009)	1/1/2010	1/15/2010	Completed	
D. Jan-Mar 2010 (1/1/2010 - 3/31/2010)	4/1/2010	4/15/2010	Completed	
E. Final Apr 2010 (4/1/2010 - 4/30/2010)	4/16/2010	4/30/2010	Completed	

K: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period May 2008 to April 2009

Description: The annual 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. Note that any results included in the annual report will be restricted to those data collected before November 15 of the contract year. This means that data collected after November 15 will be included in the next year's report. In 2010, this work element also covers work towards producing a peer-reviewed journal article. This article will be submitted in the final year of the contract.

Deliverable Specification: Upload annual report for the period May 2009 to April 2010, with the caveat that any data or activities completed after November 15 will be included in the following year's annual report. Thus, the report will include all activities performed from 15 November 2008 to 15 November 2009, as well as projected activities through the end of the contract year on 30 April 2010. The report will be uploaded in PISCES as an attachment to the contract.

Planned Metrics: <None>



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2009	11/7/2009	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Write progress report	11/1/2009	12/31/2009	Completed	Write progress report for work done from 15 November 2008 to 15 November 2009.
C. Submit report for internal contractor review	1/1/2010	1/31/2010	Completed	Report will undergo PNNL technical and editorial review.
D. Submit report for external review	2/1/2010	2/28/2010	Completed	Report will undergo simultaneous COTR and peer review.
E. Email draft of report to COTR for review	2/1/2010	2/1/2010	Completed	Report will undergo simultaneous COTR and peer review.
F. Receive COTR review comments	3/1/2010	3/1/2010	Completed	COTR will provide comments to PNNL within 30 days.
G. Finalize Annual Report	3/1/2010	3/31/2010	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
H. Confirm BPA has posted the report	4/1/2010	4/30/2010	Completed	It usually takes BPA no more than 30 days to get the report posted. This milestone should therefore have a duration of 30 days. To confirm posting of the report, search the BPA Publications database. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
Deliverable: I. Final report uploaded to the BPA website		4/30/2010	Completed	<i>See the Deliverable Specification above</i>

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS KALISPEL
Contract #: 47330
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Kalispel Tribe (Prime - KALISPEL00)
BPA Internal Ref: 47330
SOW Validation: Last validated 03/31/2010 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (03/31/2010) 2010 Property Inventory
Budget - Contract (03/31/2010) 2010 Line Item Budget



Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
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Todd Andersen	Technical Contact	Kalispel Tribe	(509) 447-7245 / NA	tandersen@knrd.org	1981 N Leclerc Rd. Usk WA 99180
Holly McLellan	Interested Party	Eastern Washington University	(509) 359-7498 / NA	hmclellan@mail.ewu.edu	Eastern Washington University 258 Science Building Cheney WA 99004
Brian Bellgraph	Technical Contact	Pacific Northwest National Laboratory	(509) 371-7185 / (509) 371-7160	brian.bellgraph@pnnl.gov	Pacific Northwest National Laboratory Ecology Group PO Box 999, MS K6-85 Richland WA 99352
Allan Scholz	Interested Party	Eastern Washington University	(509) 359-6397 / NA		
Lisa Marko MacLellan	Interested Party	Bonneville Power Administration	(503) 230-4047 / NA	lmmarko@bpa.gov	
Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kivleuven@bpa.gov	P.O Box 3621 Mailstop - NSSP-4 Portland, OR 97208-3621
Jolene Seymour	Administrative Contact	Kalispel Tribe	(509) 445-1147 / NA	jseymour@kalispeltribe.com	
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Hannah Dondy-Kaplan	Env. Compliance Lead	Bonneville Power Administration	(503) 230-4071 / (503) 230-5699	hadondy-kaplan@bpa.gov	P.O. Box 3621 Mailstop - KEC-4 Portland OR 97208-3621
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232

Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Obtain necessary permits and set up contract for genetic analysis		\$4,215	(2 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
B : 157. Collect/Generate/Validate Field and Lab Data - Weekly electrofishing to collect a representative sample of bull trout below Albeni Falls Dam	*	\$52,122	(20 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Angling for bull trout and westslope cutthroat trout	*	\$4,852	(2 %)
D : 158. Mark/Tag Animals - Implant combination radio acoustic transmitter into bull trout and westslope cutthroat trout	*	\$28,486	(11 %)
E : 28. Trap and Haul - Transport bull trout above Albeni Falls Dam	*	\$9,487	(4 %)
F : 157. Collect/Generate/Validate Field and Lab Data - Rapid response genetic analysis of bull trout biopsy samples	*	\$6,189	(2 %)
G : 157. Collect/Generate/Validate Field and Lab Data - Manually track Bull trout and westslope cutthroat trout in the Pend Oreille River	*	\$19,986	(8 %)
H : 157. Collect/Generate/Validate Field and Lab Data - Mobile tracking surveys by fixed wing aircraft and vehicle	*	\$32,896	(12 %)
I : 162. Analyze/Interpret Data - Analysis of bull trout and westslope cutthroat trout radio telemetry data		\$12,657	(5 %)
J : 70. Install Fish Monitoring Equipment - Annual overhaul and recalibration of ground receiver stations	*	\$9,897	(4 %)
K : 157. Collect/Generate/Validate Field and Lab Data - Compile electronic spread sheet data base of electrofishing data	*	\$11,654	(4 %)
L : 157. Collect/Generate/Validate Field and Lab Data - Download stationary ground radio receiving station	*	\$20,906	(8 %)
M : 162. Analyze/Interpret Data - Data reduction and analysis		\$13,578	(5 %)
N : 189. Coordination-Columbia Basinwide - Project coordination among all stakeholders		\$5,679	(2 %)
O : 119. Manage and Administer Projects - Manage Project		\$12,586	(5 %)
P : 132. Produce (Annual) Progress Report - Submit Annual Report for the period (5/1/2010) to (4/30/2011)		\$12,195	(5 %)
Q : 132. Produce (Annual) Progress Report - Submit Progress Report for the period (5/1/10) to (4/30/11)		\$2,888	(1 %)
R : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$4,727	(2 %)
Total:		\$265,000	

* Environmental Compliance (EC) needed before work begins.

Contract Description:



Bull trout in the Columbia River Basin were listed as Threatened by the US Fish and Wildlife Service (USFWS) in 1998 (USFWS 2000). Bull trout populations are threatened by habitat degradation and fragmentation, past fisheries management practices, poor water quality, and blockage of migratory corridors. Pend Oreille River and Lake is a core area within the Northeast Washington Recovery Unit of the Columbia Basin bull trout population (USFWS 2002a, 2002b). Recovery of Pend Oreille bull trout is limited by the fact that dams on the mainstem Pend Oreille River (Albeni Falls and Box Canyon dams) have blocked migration of bull trout between Lake Pend Oreille and spawning/rearing areas (USFWS 2002a, 2002b). Albeni Falls Dam is a federal facility under the responsibility of the action agencies (US Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation). Albeni Falls Dam created two types of problems for bull trout in the Pend Oreille Basin. First, bull trout from natal tributaries above the dam, that either became entrained or had elected to voluntarily pass below the dam, were unable to return to spawn in their natal tributaries. (Source populations could include bull trout spawning in the Priest River, inlet tributaries of Pend Oreille Lake, or tributaries of the Clark Fork River below or above Cabinet Gorge Dam.) Second, adfluvial bull trout that formerly spawned in tributaries below the dam and migrated upstream to a cold water refuge in Lake Pend Oreille, Idaho were no longer able to do so.

The goal of this project is to provide temporary upstream passage, investigate long term fish passage, and fill data gaps for bull trout at Albeni Falls Dam on the Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing, angling, and snorkeling. All bull trout captured will be biopsied via hole punch and their DNA sent to the USFWS lab in Abernathy, Washington for rapid response genetic analysis. Each DNA sample will be compared to DNA from other bull trout populations in the Priest River drainage, Pend Oreille Lake tributaries, and Clark Fork drainage and an assignment will be made as to its probable region of origin. Prior to release each fish will be implanted with a combination radio-acoustic or radio transmitter to ascertain if the spawning tributary it selected was the same as its assigned tributary. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title:	Obtain necessary permits and set up contract for genetic analysis
Description:	The Kalispel Natural Resource Department (KNRD) will obtain the necessary permits outlined in section D. PNNL and EWU will also obtain appropriate scientific collection permits. Additionally, the Kalispel Tribe will contract with the U.S. Fish and Wildlife Service Genetics Laboratory for conducting rapid response genetic analysis.
Deliverable Specification:	Idaho state transport permit Idaho scientific collection permit Federal Section 10 fish and wildlife collection permit
Planned Metrics:	Are herbicides used as part of work performed under this contract?: No



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Federal fish and wildlife permit	5/1/2010	5/3/2010	Completed	Acquisition of Fish and Wildlife permit this will be done by the time contract is issued.
B. Idaho scientific collection permit	5/1/2010	5/3/2010	Completed	Acquisition of Idaho Scientific collection permit this will be completed before the contract is issued.
C. Idaho transport permit	5/1/2010	5/3/2010	Completed	Acquisition of Idaho transport permit this will be completed before the contract is issued.
D. Produce Idaho scientific collection permit annual report	12/1/2010	1/31/2011	Completed	Compile data (fish species, total length, weight, location, and effort) produce report and send to Idaho Department of Fish and Game.
E. Apply for 2011 Idaho collection permit	2/1/2011	2/28/2011	Completed	Acquire Idaho Scientific collection permit
F. Apply for 2011 transport permit	2/1/2011	2/28/2011	Completed	Acquire Idaho transport permit
G. Apply for 2011 federal fish and wildlife permit	2/1/2011	2/28/2011	Completed	Acquire Fish and Wildlife permit
Deliverable: H. Idaho scientific collection, transportation, and federal permits		6/15/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Weekly electrofishing to collect a representative sample of bull trout below Albeni Falls Dam

Description: EWU and KNRD crews will conduct electrofishing surveys from Indian Creek (14 km below Albeni Falls Dam) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew. Most of the effort will be focused in the spring around the peak of the hydrograph before water temperatures reach the 16 degree Celsius threshold. In the previous three years this tends to be the period of time when the most bull trout have been captured and tagged.

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by electrofishing that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about electrofishing operations.

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

Locations: 3

Primary Focal Species: Trout, Bull

Country: US

State: Multiple

County: BONNER | PEND OREILLE

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name: EXPOSURE CREEK

Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Spring electrofishing	5/3/2010	4/30/2011	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew. The most effort will be expended in the spring before water temperatures rise above 16 degree Celsius. PNNL biologists will assist on at least one survey in the spring.
C. Summer electrofishing	7/1/2010	9/15/2010	Active	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, 2-3 days will be expended in the summer at cold water refugia.
D. Fall electrofishing	9/16/2010	11/15/2010	Completed	EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 15 days of effort will be expended annually by each crew, 2-4 days of effort will be expended in the fall.
Deliverable: E. Weekly electrofishing collection of bull trout below Albeni Falls Dam		4/28/2011	Completed	See the Deliverable Specification above

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

Title: Angling for bull trout and westslope cutthroat trout

Description: KNRD crews will conduct angling surveys in the tailrace of Albeni Falls Dam to collect bull trout and westslope cutthroat trout. A total of 4 days of effort will be expended annually by the crew. Latitude and longitude coordinates at the start and end of each angling survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout or westslope cutthroat trout collected.

Deliverable Specification: EWU will provide an annual summary of fish captured by angling that will be included as an appendix in the annual report to BPA. The report will contain: (1) A table of fish captured; (2) A table that provides statistics for bull trout [Date captured, PIT tag number, TL (mm), FL (mm), weight (g), result of genetic assignment]; and (3) A written summary about angling efforts.

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

Locations: 2

Primary Focal Species: Cutthroat Trout, Westslope | Trout, Bull

Country: US **NPCC Subbasin:** PEND OREILLE

State: Multiple **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER | PEND OREILLE **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Spring angling	5/3/2010	4/30/2011	Completed	Angling for bull trout and westslope cutthroat trout will be used when the water levels in the tailrace are too high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and or water velocity. A total of four days of angling will be conducted in the spring.
C. Fall angling	9/15/2010	11/30/2010	Completed	Angling for bull trout will be used when the water levels in the tailrace are too high for electrofishing. Angling will also be used as an additional capture method in areas where electrofishing may be ineffective due to depth and or water velocity. A total of two days of angling will be conducted in the fall (9/15/10 - 11/30/10).
Deliverable: D. Angling for bull trout below Albeni Falls Dam		4/30/2011	Completed	See the Deliverable Specification above

D: 158. Mark/Tag Animals

Title: Implant combination radio acoustic transmitter into bull trout and westslope cutthroat trout

Description: Transmitter implantation will be accomplished by EWU, KNRD, and PNNL. Bull trout and westslope cutthroat trout from electrofishing and angling will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for PIT tags. The PIT tag number along with data on TL (mm), FL (mm), weight (g) and results of the genetic assignment from the 'rapid response genetic analysis' (bull trout only) will be recorded on a data sheet.

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The fish will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exiting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently.

Deliverable Specification: 5-10 Bull trout and 10-20 westslope cutthroat trout will be captured and undergo surgery to implant the combination radio acoustic or radio tag or depending on the weight of the fish may be implanted with just a radio tag. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water), CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weight 18.0 g (in water)], or Lotek radio tag SR-11-18, 449 day life. Surgical implantation of the transmitters will be accomplished by an experienced surgeon.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Hydrosystem
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 1

Primary Focal Species: Trout, Bull | Cutthroat Trout, Westslope

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:** UPPER PEND OREILLE

County: BONNER **HUC6 Name:** EXPOSURE CREEK

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Implant CART tags and PIT tags in up to 10-50 bull trout and 10-30 westslope cutthroat trout	5/2/2010	4/15/2011	Completed	10-50 bull trout will be implanted with CART, or radio tags and PIT tags. 10-30 westslope cutthroat trout will be implanted with radio tags.
Deliverable: C. Implanting of radio tags		4/30/2011	Completed	See the Deliverable Specification above

E: 28. Trap and Haul



Title: Transport bull trout above Albeni Falls Dam
Description: All bull trout collected in the tailrace of Albeni Falls Dam in 2010-11 will be released primarily above Albeni Falls Dam, with the exception of any bull trout caught in a cool water refuge while the Pend Oreille River water temperature is above 16 degrees Celsius.
Deliverable Specification: Bull trout captured in the tailrace of Albeni Falls Dam when water temperatures are below 16 degrees Celsius will be radio tagged, transported, and released above the dam at the Priest River boat launch (below the confluence of Priest River and the Pend Oreille River).
Planned Metrics: # of fish transported: 5
Locations: 1
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Capture bull trout	5/3/2010	4/14/2011	Completed	Bull trout will be captured by boat electrofishing and angling between Indian Creek and the tailrace of Albeni Falls Dam.
C. Transport bull trout	5/3/2010	4/14/2011	Completed	Bull trout will be transported in a water-filled cooler maintained at the proper temperature and DO level.
Deliverable: D. Bull trout transported above Albeni Falls Dam		4/29/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Rapid response genetic analysis of bull trout biopsy samples
Description: Tissue samples will be collected from bull trout captured by electrofishing and angling. The samples will be sent by express mail to the USFWS Genetics Laboratory in Abernathy Washington. Within 48 hours the USFWS genetics lab will assign individual bull trout to a particular tributary and will communicate this information to KNRD.
Deliverable Specification: Bull trout will be assigned to individual natal tributaries. Using the lab's "rapid response genetic analysis" protocol (The protocol that is being used at Cabinet Gorge Dam an Avista project)(Arden et al. 2005), the samples will be analyzed at 12 microsatellite DNA (msDNA) loci that are standard for Columbia Basin bull trout.
Planned Metrics:
 * Primary R, M, and E Focal Strategy : Hydrosystem
 * Primary R, M, and E Type : Status and Trend Monitoring
 * Secondary R, M, and E Focal Strategy : Population Status
Locations: 1
Primary Focal Species: Trout, Bull
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:** UPPER PEND OREILLE
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Collect bull trout tissue samples	5/3/2010	4/14/2011	Completed	Bull trout tissue samples will be collect by boat electrofishing and angling in the tailrace of Albeni Falls Dam.
C. Send bull trout tissue samples	5/3/2010	4/15/2011	Completed	Send collected bull trout tissue samples to the Abernathy Lab for genetic analysis.
D. Abernathy Lab to process tissue samples and send results	5/3/2010	4/18/2011	Completed	Abernathy genetic lab will process bull trout tissue samples. The sample will assign the particular bull trout to a region. The results will then be sent back to the Kalispel Tribe.
Deliverable: E. Genetic Analysis		4/29/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Manually track Bull trout and westslope cutthroat trout in the Pend Oreille River

Description: Recovery of Pend Oreille bull trout and westslope cutthroat trout are limited by the fact that dams on the mainstem Pend Oreille River (Albeni Falls and Box Canyon dams) have blocked migration of bull trout and westslope cutthroat trout between Lake Pend Oreille and spawning/rearing areas (USFWS 2002a, 2002b). Albeni Falls Dam creates two types of problems for bull trout and westslope cutthroat trout in the Pend Oreille Basin. First, bull trout and westslope cutthroat trout from natal tributaries above the dam, that either become entrained or elect to volitionally pass below the dam, are unable to return to spawn in their natal tributaries. Second, adfluvial bull trout and westslope cutthroat trout that formerly spawned in tributaries below the dam and migrated upstream to a cold water refuge in Lake Pend Oreille, Idaho are no longer able to do so.

Another project presently under way are addressing fish passage at Albeni Falls Dam, Army Corps of Engineers - Albeni Falls Dam Fish Passage Feasibility Study). An extensive antenna arrays on the dam and spillway to determine possible passage facility locations. In the lower Pend Oreille River, stationary receivers are located at Usk (Corp project), Box Canyon Dam (Pend Oreille PUD telemetry project), and Boundary Dam (Seattle City Light telemetry project) and set to scan our transmitter frequencies.

Between this project and the Army Corp of Engineers project, large-scale bull trout and westslope cutthroat trout movement throughout the upper and lower Pend Oreille, as well as fine-scale movement in close proximity to Albeni Falls Dam is possible. The goal of this project is to collect fine-scale movement data within Box Canyon Reservoir, and the lower Pend Oreille River to identify seasonal movement patterns and timing, diel movement, habitat use, and identify potential cold water refugia in the reservoir and it's tributaries. Very little information about native salmonid movement, habitat use, and survival in the mainstem Pend Oreille River below Albeni Falls Dam is presently available. This project will fill this important data gap while capitalizing on cost-share and cooperation with other ongoing radiotelemetry projects in the watershed.

Manual tracking of radio tagged bull trout and westslope cutthroat trout will be conducted with a Lotek SRX-400 receiver and 3 and 5 element handheld yagi antennas, as well as a 4 element fixed yagi antenna affixed to a mast primarily by boat, but also automobile, fixed wing aircraft, and on foot.

Deliverable Specification: Geographic data will be recorded on a Garmin GPS unit and stored in MS Excel spreadsheets prior to importing to ArcGIS for analysis. Biological and physical data will be recorded on Rite-N-Rain data sheets and entered into MS Excel spreadsheets. Data to be recorded will include: species, date, time, location, temperature, substrate, and habitat type.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Hydrosystem
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Focal Strategy : Population Status

Locations: 1

Primary Focal Species: Cutthroat Trout, Westslope

Country: US

State: WA

County: PEND OREILLE

NPCC Subbasin: PEND OREILLE

HUC5 Watershed: UPPER PEND OREILLE

HUC6 Name: CALISPELL CREEK

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	4/30/2011	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. Manually track radio tagged bull trout and westslope cutthroat trout in Box Canyon Reservoir	5/15/2010	4/15/2011	Completed	Bull trout and westslope cutthroat trout will be manually tracked in the Box Canyon Reservoir 2-4 times a month depending on fish activity and movement during each month.
Deliverable: C. Location and habitat data prepared for analysis		4/15/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Mobile tracking surveys by fixed wing aircraft and vehicle

Description: Movement of tagged bull trout will also be monitored using a Lotek SRX radio receiver connected to a four element Yagi antenna. Air surveys will be made 12 times per year. EWU will charter a Cessna C-182 aircraft from Felts Field Aviation in Spokane, Washington for making aerial surveys. A Yagi antenna will be mounted externally underneath the wing of the aircraft. Each flight will be approximately four hours in duration. A pilot accompanied by an EWU technician will fly a similar flight plan for each survey.

Deliverable Specification: Air surveys will be made 12 times a year. The flight path will start below Albeni Falls Dam, thence up the center of the Pend Oreille River to the outlet of Pend Oreille Lake, then around the perimeter of Pend Oreille Lake. Where known bull trout spawning tributaries enter they will be followed to their source or known upper limit of bull trout occupancy. Tributaries surveyed will include: (1) Priest River to Outlet Dam, including the East River and its Middle Fork; (2) Tributaries entering the north shore of Lake Pend Oreille (Pack River, Grouse Creek and Trestle Creek); (3) Tributaries entering the Clark Fork arm of Lake Pend Oreille (Lightning Creek and tributaries, Johnson Creek and Twin Creek) and (4) Tributaries entering the east shore of Lake Pend Oreille (Granite Creek, Sullivan Springs Creek, North Gold Creek, Gold Creek). Additionally, the Clark Fork River will be flown to Cabinet Gorge Dam. Vehicle surveys will be made once monthly from June to August and once weekly from September to November.

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

Locations: 11

Primary Focal Species: Trout, Bull

Country: US **NPCC Subbasin:** Multiple

State: Multiple **HUC5 Watershed:** Multiple

County: BONNER | PEND OREILLE **HUC6 Name:** Multiple

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Aircraft tracking	5/14/2010	4/14/2011	Completed	Aerial surveys will be conducted 12 times a year from fixed wing aircraft.
C. Boat tracking	5/14/2010	4/14/2011	Completed	Boat tracking will be conducted 2-6 times a year using a directional hydrophone.
D. Vehicle tracking	6/1/2010	4/14/2011	Completed	Vehicles surveys will be made along each of the tributaries streams once monthly from June to August and once weekly from September to November.
Deliverable: E. Tracking of radio tagged fish with aircraft, vehicle, and boat.		4/14/2011	Completed	<i>See the Deliverable Specification above</i>

I: 162. Analyze/Interpret Data

Title: Analysis of bull trout and westslope cutthroat trout radio telemetry data

Description: Bull trout and westslope cutthroat trout radiotelemetry data will be analyzed in ArcGIS to determine seasonal movement, habitat use and diel activity.

Deliverable Specification: Spatial analysis of westslope cutthroat trout movements, habitat use, diel activity, and locations of cool water refugia will be reported using ArcGIS.



Planned Metrics:
 * Primary R, M, and E Focal Strategy : Hydrosystem
 * Primary R, M, and E Type : Uncertainty Research
 * Secondary R, M, and E Focal Strategy : Population Status

Locations:
Primary Focal Species: Cutthroat Trout, Westslope

Country:
State:
County:
Salmonid ESUs Present:
Data Repositories:
Protocol:
Protocol Owner:
Area of Inference:

NPCC Subbasin:
HUC5 Watershed:
HUC6 Name:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Bull trout and westslope cutthroat data will be entered into MS Excel spreadsheet	5/30/2010	4/15/2011	Completed	Raw tracking data (GPS location, water temperature, habitat, fish code, depth, and substrate where possible) will be entered into MS Excel spreadsheet
B. GPS data will be spatially analyzed in Arc GIS	1/3/2011	4/15/2011	Completed	GPS data will be entered into Arc GIS to be spatially analyzed and create maps of fish movement and habitat usage.
Deliverable: C. Analyzed data for annual technical report.		4/29/2011	Completed	<i>See the Deliverable Specification above</i>

J: 70. Install Fish Monitoring Equipment

Title: Annual overhaul and recalibration of ground receiver stations
Description: Each spring PNNL and EWU will overhaul, refurbish and retest each of the eleven ground receiving stations..
Deliverable Specification: Functioning, tested (each station will be inspected for damage. Beacon tags and 12 volt batteries will be replaced if necessary) ground receiving stations. A trip log form and electronic version of the data will be maintained at PNNL and backed up at EWU. The annual reports will contain a description of annual overhaul and maintenance activities.
Locations: 10
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: Multiple
HUC5 Watershed: Multiple
HUC6 Name:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Overhaul, refurbish, and retest ground receiving stations	3/1/2011	3/31/2011	Completed	Each spring PNNL and EWU will overhaul, refurbish and retest each of the eleven ground receiving stations. Two people from each lab working five 10-hour days will be required for this effort.
Deliverable: C. Annual maintenance of monitoring equipment		3/31/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Compile electronic spread sheet data base of electrofishing data
Description: All electrofishing and angling data will be entered into an Excel spreadsheet and maintained as an electronic data base of electrofishing records.
Deliverable Specification: All electrofishing and angling data will be entered into a excel workbook and maintained as a electronic data base of all electrofishing.
Planned Metrics:
 * Primary R, M, and E Focal Strategy : Hydrosystem
 * Primary R, M, and E Type : Status and Trend Monitoring
 * Secondary R, M, and E Focal Strategy : Population Status
Locations: 1
Primary Focal Species: Trout, Bull



Country: US NPCC Subbasin: PEND OREILLE
 State: ID HUC5 Watershed: UPPER PEND OREILLE
 County: BONNER HUC6 Name:
 Salmonid ESUs Present:
 Data Repositories:
 Protocol:
 Protocol Owner: Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Electrofishing data entry	5/3/2010	4/14/2011	Completed	All data collected while electrofishing and angling for bull trout will be input into a excel workbook and maintained as a electronic data base
Deliverable: C. Electrofishing data entry		4/29/2011	Completed	See the Deliverable Specification above

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

Title: Download stationary ground radio receiving station
Description: All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download. Each station will be inspected for damage and repaired if necessary.
Deliverable Specification: All fixed receiver stations will be inspected (Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.) and downloaded (Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise).
Planned Metrics:
 * Primary R, M, and E Focal Strategy : Hydrosystem
 * Primary R, M, and E Type : Status and Trend Monitoring
 * Secondary R, M, and E Focal Strategy : Population Status
Locations: 10
Primary Focal Species: Trout, Bull
 Country: US NPCC Subbasin: Multiple
 State: ID HUC5 Watershed: Multiple
 County: BONNER HUC6 Name:
 Salmonid ESUs Present:
 Data Repositories:
 Protocol:
 Protocol Owner: Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Inspect and download receiver stations 26 times per year	5/13/2010	4/29/2011	Completed	<p>All fixed receiver stations will be inspected and downloaded every other week (26 times per year) by EWU and/or PNNL crews. It is anticipated that this task will usually be accomplished by EWU to save travel and staff costs. However, funds have been budgeted for a PNNL crew to trouble shoot problems on every 6th download.</p> <p>Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary.</p> <p>Trip log forms will be developed by PNNL and filled out by EWU and PNNL personnel during station inspection and downloads. Logs will include information about the dates and times of activities performed, problems encountered, and a description of what was done to correct the problem. Copies of the logs and an electronic copy of data retrieved from ground receiver stations will be sent to PNNL and EWU within to working days after being collected.</p> <p>Downloads will require a two person crew, working two days to inspect, repair and download stationary receivers.</p>
Deliverable: C. Downloading stationary ground radio receiver		4/29/2011	Completed	See the Deliverable Specification above

M: 162. Analyze/Interpret Data

Title: Data reduction and analysis

Description: EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked.

Deliverable Specification: GIS maps and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Hydrosystem
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Focal Strategy : Population Status

Locations:

Primary Focal Species: Trout, Bull | Cutthroat Trout, Westslope

Country:

State:

County:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Area of Inference:

NPCC Subbasin:

HUC5 Watershed:

HUC6 Name:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. GIS generated tracking maps	11/10/2010	4/15/2011	Completed	EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish.
B. Statistical comparisons of run timing, genetic assignments, and spawning tributaries	11/10/2010	4/14/2011	Completed	Statistical comparisons will be made to determine if fish randomly entered spawning tributaries or if they entered the tributary predicted by their genetic assignment. Time of entry (spring or late summer/fall) of individual fish into spawning tributaries will be compared to the genetic analysis of the fish in an attempt to evaluate if run timing can be related to genetics.
Deliverable: C. Data analysis of tracking data		4/14/2011	Completed	See the Deliverable Specification above



N: 189. Coordination-Columbia Basinwide

Title: Project coordination among all stakeholders
Description: This project will require coordination with a number of agencies and organizations.
Deliverable Specification: Coordination activities (Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies.) will be included in project reporting. Coordination will also be done via email, land mail, and telephone randomly as questions or findings arise. Because this project will be conducted in two states and involves a federal threaten species coordination and communication will be important to obtain permits, move fish, and distribute findings.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Ongoing coordination between stakeholders	5/3/2010	4/29/2011	Completed	Coordination between Pls, USACE, WDFW, IDFG, USFWS, bull trout recovery groups, and other researchers.
Deliverable: B. Project coordination among stakeholders		4/29/2011	Completed	<i>See the Deliverable Specification above</i>

O: 119. Manage and Administer Projects

Title: Manage Project
Description: Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
Deliverable Specification: Submit next year's SOW, Budget, and Property Inventory to the BPA COTR. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Accrual - Submit September estimate to BPA	9/1/2010	9/10/2010	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. Generally, this should be done by September 10.
B. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	1/15/2011	1/28/2011	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
Deliverable: C. Funding Package - Submit draft to COTR		2/1/2011	Completed	<i>See the Deliverable Specification above</i>

P: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period (5/1/2010) to (4/30/2011)
Description: Prepare and upload annual report.
Deliverable Specification: Annual report to BPA's COTR will be prepared by the EWU PI and PNNL CO-PI, with assistance from EWU's statistician and research associate, and PNNL's senior scientist. Report will summarize the results obtained that year. Reports will follow standard scientific format and include an executive summary, introduction, methods, results, discussion, recommendation, and literature cited section, as well as tables, figures, and data appendices. Reports will be reviewed by the KNRD CO-PI before submission. Upload annual report for the period (May 1, 2010 to April 30, 2011).
Planned Metrics: <None>



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2010	12/15/2010	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Submit report for internal contractor review	2/25/2011	2/28/2011	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.
C. Submit report for external review	3/2/2011	3/2/2011	Completed	Use this milestone if the annual report requires external review. May be simultaneously reviewed by external parties and BPA COTR if desired.
D. Email draft of report to COTR for review	3/10/2011	3/10/2011	Completed	The draft annual report must be submitted to the BPA COTR in Microsoft Word format (any version of Word is fine).
E. Receive COTR review comments	3/11/2011	4/11/2011	Completed	The BPA COTR should provide review feedback and comments within 30 days of receiving the draft annual report. This milestone should therefore have a duration of 30 days.
F. Finalize Annual Report	4/30/2011	4/30/2011	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
Deliverable: G. Final report uploaded to the BPA website		4/30/2011	Completed	<i>See the Deliverable Specification above</i>

Q: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (5/1/10) to (4/30/11)

Description: 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. Date range May 09 to Apr 10 (e.g. Apr 2001 to Mar 2002) will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	5/1/2010	5/8/2010	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	5/25/2010	6/8/2010	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.
C. Submit progress report for external review	6/8/2010	6/19/2010	Completed	Use this milestone if the progress report requires external review.
D. Confirm BPA has posted the progress report	7/27/2010	7/27/2010	Completed	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: E. Attach Progress Report in Pisces		6/22/2010	Completed	<i>See the Deliverable Specification above</i>

R: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2010 (5/1/2010 - 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. Jan-Mar 2011 (1/1/2011 - 3/31/2011)	4/1/2011	4/15/2011	Completed	
E. Final Apr 2011 (4/1/2011 - 4/30/2011)	4/16/2011	4/30/2011	Completed	

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Restoration of Bull Trout Passage at Albeni Falls Dam
Project #: 2007-246-00
Contract Title: 2007-246-00 EXP RESTORATION OF BULL TROUT PASS
Contract #: 26934 REL 29
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 196899 **Task ID:** 1
Contract Type: Release **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Pacific Northwest National Laboratory (Prime - USDOERIC00)
BPA Internal Ref: 26934 REL 29
SOW Validation: Last validated 07/06/2010 with 15 problems, and 0 reviewable items
Contract Documents:

<u>Property Inventory (03/01/2010)</u>	2010 Property Inventory PNNL Bulltrout Pass A...
<u>Budget - Contract (03/01/2010)</u>	2010 LIB PNNL Bulltrout Pass Albeni



Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Genice Madera	Administrative Contact	Pacific Northwest National Laboratory	(509) 372-4010 / (509) 372-4038	Genice.Madera@pnso.science.doe.gov	Science & Technology Programs Division, U.S. Department of Energy, Richland Field Office, P.O. Box 550 Richland WA 99352
Lisa Marko MacLellan	Interested Party	Bonneville Power Administration	(503) 230-4047 / NA	lmmarko@bpa.gov	
Julie Hughes	Administrative Contact	Pacific Northwest National Laboratory	(509) 371-7202 / (509) 371-7203	julie.hughes@pnl.gov	Pacific Northwest National Laboratory P.O. Box 999, MS K6-79 Richland WA 99352
Hannah Dondy-Kaplan	Env. Compliance Lead	Bonneville Power Administration	(503) 230-4071 / (503) 230-5699	hadondy-kaplan@bpa.gov	P.O. Box 3621 Mailstop - KEC-4 Portland OR 97208-3621
Paul Krueger	F&W Approver	Bonneville Power Administration	(503) 230-5723 / NA	pqkrueger@bpa.gov	905 NE 11th Ave. Portland OR 97232

Work Element Table of Contents:

<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Complete environmental compliance requirements		\$1,000	(1 %)
B : 157. Collect/Generate/Validate Field and Lab Data - Electrofish, tag, and transport bull trout	*	\$13,125	(10 %)
C : 157. Collect/Generate/Validate Field and Lab Data - Lake tracking surveys	*	\$25,000	(20 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
D : 157. Collect/Generate/Validate Field and Lab Data - Download and maintain stationary radio receiving stations	*	\$16,000	(12 %)
E : 119. Manage and Administer Projects - Manage Project		\$6,000	(5 %)
F : 162. Analyze/Interpret Data - Data reduction and analysis		\$15,000	(12 %)
G : 132. Produce (Annual) Progress Report - Submit Annual Report for the period May 2009 to April 2010		\$16,000	(12 %)
H : 183. Produce Journal Article - Write journal article		\$14,000	(11 %)
I : 70. Install Fish Monitoring Equipment - Uninstall all radio monitoring stations	*	\$20,000	(16 %)
J : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$2,000	(2 %)
Total:		\$128,125	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

The goal of this project is to provide temporary upstream passage for bull trout at Albeni Falls Dam, Pend Oreille River. We propose to collect bull trout below the dam using boat electrofishing. The fish will then be transported above Albeni Falls Dam and released near Priest River, Idaho, or re-released below the dam depending on water temperature and number of fish captured. Prior to release each fish will be implanted with a combination radio-acoustic transmitter to track the fish to potential spawning tributaries of Pend Oreille Lake. A system of stationary radio receiving stations and airplane/truck/boat surveys will be used to monitor the movement of the tagged fish. This project provides direct on-the-ground benefits for endangered bull trout in the Pend Oreille Basin because it will allow fish, whose migration corridor has been blocked by a dam without fish passage, to return to their natal streams and contribute their genes (which would otherwise have been lost) to the spawning population.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

- Title:** Complete environmental compliance requirements
- Description:** Provide BPA with information necessary for environmental clearance for all contract activities during FY10/11. Submit FY11/12 SOW and supporting documents as needed for BPA's Environmental Compliance Group to determine environmental compliance status, if project continues into 2011/12.
- Deliverable Specification:** Environmental compliance requirements complete for FY10/11 work. Submit FY11 SOW package to begin Environmental Clearance review for subsequent contract, if project continues.
- Planned Metrics:** Are herbicides used as part of work performed under this contract?: No



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Obtain BPA clearance for FY10/11 work	5/3/2010	5/14/2010	Completed	BPA provides environmental clearance to proceed with field work for FY10/11
B. Provide project information to BPA	11/1/2010	2/1/2011	Completed	Provide FY10/11 SOW and any other documentation needed for environmental review, only if project continues into FY11/12.
C. Obtain BPA clearance for FY11/12 work	5/3/2010	8/30/2010	Completed	BPA provides environmental clearance to proceed with field work for FY11/12, if project continues
Deliverable: D. Ensure environmental compliance requirements are complete		4/15/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Electrofish, tag, and transport bull trout

Description: Method(s): EWU and KNRD crews will conduct weekly electrofishing surveys from Indian Creek (14 km below Albeni Falls) to the tailrace of Albeni Falls Dam to collect bull trout. A total of 12 days of effort will be expended in FY10/11, primarily concentrated during spring because this is when bull trout have been documented downstream of Albeni Falls Dam. One PNNL biologist will assist with electrofishing during each trip

Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.

Fish collected during these surveys will be identified and total length (TL) measured (in mm). Bull trout will be weighed (to nearest g), measured (TL in mm and FL in mm), and tagged with PIT tag for permanent identification. All bull trout will be radio-tagged. Release sites will be dependent on water temperature (see work element above). Both EWU and the Kalispel Tribe own electrofishing boats that will be made available to the project.

Bull trout transmitter implantation will be accomplished by PNNL, KNRD, and EWU. Bull trout will be placed in a 143 L cooler aerated with oxygen. The fish will be anesthetized with 70-100 mg/L MS 222. Once the anesthesia takes effect the fish will be examined for fin clips and scanned for the PIT tag injected by the electrofishing crews. The PIT tag number along with data on TL (mm), FL (mm), and weight (g) will be recorded on a data sheet. [If the genetic assignment is unknown at the time transmitters are implanted that information will be added when it becomes available.]

Surgical procedures were described by McLeod and Clayton (1997) and Brown et al. (1999). The bull trout will be placed in a water soaked foam block that has the middle cut out. The fish will be placed dorsal side down and water will be flushed through the gills using an underwater pump connected to a piece of tubing placed in the mouth of the fish. Water will be periodically poured over the fish's body to keep it hydrated. A 2-3 cm long longitudinal incision will be made 3 cm anterior to the pelvic fins. A 16 gauge hypodermic needle will be injected through the body wall to the side and posterior to the incision. The transmitter antenna will be inserted through the hollow needle and the needle removed, leaving the antenna exiting the body wall of the fish. The incision will be closed using 3-4 individual sutures (Ethicon absorbable 5-0 vicryl violet braided sutures with taper SH needle) spaced at 0.5-1 cm intervals and fungicide/bactericide will be topically applied to the wound. The fish will be placed in an oxygenated tank until it recovers sufficiently to be put back in the live box on the floating barge.

All fish collected in the tailrace of Albeni Falls Dam in 2010 will be released either above Albeni Falls Dam or below the dam, depending on the time of year, water temperature, and number of bull trout captured. Fish captured in the tailrace when temperatures are less than 16 °C will be moved above the dam and released in the town of Priest River below the confluence of Priest River.

Deliverable Specification: Work Products/Deliverables: Up to 40 CART-tagged bull trout released in 2010 above and below Albeni Falls Dam. Fish will be implanted with a Lotek combination acoustic/radio telemetry (CART) tag [either CART 16_1, 661 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 mm x 60 mm, weight 13.5 g (in water) or CART 16_2s, 967 day life, AF 65.5/76.8 KHz, RF 148.52 MHz 16 x 68 mm, weigh 18.0 g (in water)]. Surgical implantation of the transmitters will be accomplished by an experienced surgeon. PNNL will train project personnel to accomplish surgery, so that additional staff can perform surgeries in the event that PNNL personnel are unavailable when a bull trout is captured. The annual reports and project completion report will contain a description of tagging bull trout.

Fish captured at temperatures above 16 °C will be released back into the tailrace of Albeni Falls Dam. This is a change in plans from the proposal because without a fish trap, there is no way to hold the fish and conduct genetic analyses prior to release.

Fish will be transported in a water-filled cooler maintained at the proper temperature and DO level. If necessary, the bull trout will be acclimated to the temperature of the release site. This will be accomplished by slowly adding release site water into the cooler until the temperature difference between the transport water and release site water is =1.0°C. Oxygen will be bubbled into the cooler until the fish is released.



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 : Uncertainty Research
 * Secondary R, M, and E Focal Strategy : Hydrosystem

Locations: 2
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER

NPCC Subbasin: PEND OREILLE
HUC5 Watershed: Multiple
HUC6 Name: Multiple

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Total of 12 electrofishing trips in FY10/11	5/1/2010	10/30/2010	Completed	Electrofishing surveys will be concentrated during spring because bull trout are most catchable during this period. Electrofishing surveys will be conducted using standardized 10 minute transects that survey approximately 0.4 km of shoreline. This will allow for comparisons to previous surveys. Latitude and longitude coordinates at the start and end of each survey will be determined using a GPS. Water temperature will be recorded for each survey. Latitude and longitude coordinates and water temperature will be recorded at the location of each bull trout collected.
C. Implant bull trout with CART transmitters	5/1/2010	10/30/2010	Completed	Implant bulltrout with acoustic/radio telemetry transmitters
D. Transport bull trout upstream of Albeni Falls Dam	5/1/2010	10/30/2010	Completed	Following capture of bulltrout they will be transported above the Albeni Falls Dam
Deliverable: E. Bull trout tagged and transported upstream of Albeni Falls Dam		10/30/2010	Completed	<i>See the Deliverable Specification above</i>

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

Title: Lake tracking surveys
Description: During summer and early fall of 2010, acoustic and radio tracking will be used to locate bull trout in Lake Pend Oreille prior to spawning. These surveys will occur approximately every other week for a total of 4 surveys from June through November. Bull trout positions will be geo-referenced. Our primary goal is to understand more about where bull trout go during the summer and to more precisely track fish into their spawning tributaries.

Deliverable Specification: Locations of bull trout in Lake Pend Oreille will be included in the final report including summer locations and pre-spawn staging locations, if we are able to determine this level of detail.

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 : Uncertainty Research
 * Secondary R, M, and E Focal Strategy : Hydrosystem

Locations: 8
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER

NPCC Subbasin: PEND OREILLE
HUC5 Watershed:
HUC6 Name:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Install cell modems at remaining stations	5/1/2010	5/31/2010	Completed	Cellular modems will be installed at the North Dover, Mudhole, Forebay, Tailrace, and Logchute receiving stations in order to increase download frequency and reduce associated travel costs.
C. Receiver stations inspected and downloaded	5/1/2010	4/30/2011	Completed	Each station will be inspected for damage and repaired if necessary. Data will be downloaded using a Lotek data-dump program. Data will be saved to the hard drive of a laptop computer and then backed up on a removable thumb drive. After each download, data will be examined for active tags, beacon tag, signals and noise. Proper adjustments to gain will be made when necessary. Beacon tags and 12 volt batteries will be replaced when necessary. Data collection at some stations will continue through the end of the contract year if necessary.
Deliverable: D. Functioning radio monitoring stations		4/30/2011	Completed	<i>See the Deliverable Specification above</i>

E: 119. Manage and Administer Projects

Title: Manage Project

Description: Method(s): Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.

Deliverable Specification: Work Products/Deliverables: Administrative products including accrual estimates, metric reporting, and annual statements of work.

Submit next year's SOW, Budget, and Property Inventory to the BPA COTR if work will continue beyond FY10/11. The SOW should include location information (latitude and longitude) 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 90 days before the end of the current contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Project coordination	5/1/2010	4/30/2011	Completed	This project will require coordination with a number of agencies and organizations. Principal investigators will be responsible for coordination among themselves, and also with US Army Corps of Engineers (Albeni Falls Project staff and Seattle District), state and federal fisheries management agencies (WDFW, IDFG, USFWS), regional bull trout coordination groups (Lake Pend Oreille, Intermountain Province bull trout recovery groups), and other researchers (consultants working on Box Canyon Dam bull trout study, agency and tribal biologists working on Pend Oreille River and lake bull trout studies). Coordination with landowners where equipment is located will also need to be managed accordingly.
B. Manage project	5/1/2010	4/30/2011	Completed	Each of the principal investigators will be responsible for management of the overall project, as well as their organizational responsibilities. Management activities will include administrative responsibilities required for compliance with BPA program requirements such as metric reporting, financial reporting (accruals), and development of annual statements of work.
C. Accrual - Submit September estimate to BPA	9/1/2010	9/12/2010	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. Generally, this should be done by September 10.
D. Funding Package - Write and conduct internal review (e.g., Supervisor or Interagency)	12/1/2010	1/31/2011	Completed	If necessary, submit next year's SOW and Budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
E. Submit FY11/12 funding package to BPA	2/1/2011	2/1/2011	Completed	If necessary, Submit SOW and budget estimate to BPA for FY11/12 work
Deliverable: F. Complete all project management activities for FY10/11		4/30/2011	Completed	<i>See the Deliverable Specification above</i>

F: 162. Analyze/Interpret Data

Title: Data reduction and analysis



Description: Method(s): EWU and PNNL will combine the results of ground receiver station downloads and mobile tracking surveys to develop a profile of each fish tracked during the project year, which may overlap contract periods, e.g., data collected from 15 November through 30 April will be included in the following year's annual report. PNNL will lead the task of analyzing fish tracking data.

Deliverable Specification: Work Products/Deliverables: Annual statistical reports, GIS maps, and explanatory text that will be incorporated into the annual reports. Fish positions (GPS coordinates) will be entered into a GIS to generate track maps for each fish. Data to determine detection histories will also be obtained from a database specifically designed to maintain fish detection data.

Planned Metrics: * Primary R, M, and E Focal Strategy : Population Status
* Primary R, M, and E Type : Uncertainty Research

Locations:

Primary Focal Species: Trout, Bull

Country: **NPCC Subbasin:**

State: **HUC5 Watershed:**

County: **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Area of Inference:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Data reduction and database compilation	5/1/2010	12/31/2010	Completed	Raw data will be checked for errors, organized and loaded into a database after each download.
B. Fish positions (GPS coordinates) will be entered into GIS to generate track maps for each fish	11/1/2010	12/31/2010	Completed	Map and tabled-data showing fish migration patterns. Fish location data collected through the 15 November of each year will be used to produce a detection history of each fish.
Deliverable: C. Develop a profile of each fish tracked		12/31/2010	Completed	<i>See the Deliverable Specification above</i>

G: 132. Produce (Annual) Progress Report

Title: Submit Annual Report for the period May 2009 to April 2010

Description: The annual 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. Note that any results included in the annual report will be restricted to those data collected before November 15 of the contract year. This means that data collected after November 15 will be included in the next year's report. In 2010, this work element also covers work towards producing a peer-reviewed journal article. This article will be submitted in the final year of the contract.

Deliverable Specification: Upload annual report for the period May 2009 to April 2010, with the caveat that any data or activities completed after November 15 will be included in the following year's annual report. Thus, the report will include all activities performed from 15 November 2008 to 15 November 2009, as well as projected activities through the end of the contract year on 30 April 2010. The report will be uploaded in PISCES as an attachment to the contract.

Planned Metrics: <None>



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review annual report format requirements	11/1/2010	11/7/2010	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
B. Write final report	11/1/2010	2/1/2011	Completed	Write progress report for work done from 15 November 2008 to 15 November 2009.
C. Submit report for internal contractor review	2/1/2011	2/15/2011	Completed	Report will undergo PNNL technical and editorial review.
D. Submit report for external review	2/15/2011	3/15/2011	Completed	Report will undergo simultaneous COTR and peer review.
E. Email draft of report to COTR for review	2/15/2011	2/15/2011	Completed	Report will undergo simultaneous COTR and peer review.
F. Receive COTR review comments	2/15/2011	3/15/2011	Completed	COTR will provide comments to PNNL within 30 days.
G. Finalize Annual Report	3/15/2011	3/31/2011	Completed	Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format.
H. Confirm BPA has posted the report	4/1/2011	4/30/2011	Completed	It usually takes BPA no more than 30 days to get the report posted. This milestone should therefore have a duration of 30 days. To confirm posting of the report, search the BPA Publications database. http://www.efw.bpa.gov/Integrated_Fish_and_Wildlife_Program/technicalreports.aspx
Deliverable: I. Final report uploaded to the BPA website		4/30/2011	Completed	<i>See the Deliverable Specification above</i>

H: 183. Produce Journal Article

Title: Write journal article
Description: Formulate results from this 4-year project into results specific to the peer-reviewed literature.
Deliverable Specification: We will prepare a manuscript to Transactions of the American Fisheries Society, the North American Journal of Fisheries Management, or another fisheries-related research journal describing the main findings of this project.
Planned Metrics: * # of draft scientific reports submitted: 1
 * # of draft manuscripts and draft final reports of research findings submitted for publication: 1
Primary Focal Species: Trout, Bull

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Prepare draft manuscript - draft preparation before significant intra-contractor technical review.	5/1/2010	3/31/2011	Completed	Coordinate with EWU and Kalispel Tribe collaborators to produce a journal article describing the main finds of this 4-year project.
B. Internal technical review of manuscript	4/1/2011	4/30/2011	Completed	submission of the manuscript for in-house, internal technical review.
Deliverable: C. Manuscript prepared for peer-reviewed journal		4/30/2011	Completed	<i>See the Deliverable Specification above</i>

I: 70. Install Fish Monitoring Equipment

Title: Uninstall all radio monitoring stations
Description: Break down, organize, and store all equipment used for radio telemetry monitoring stations.
Deliverable Specification: We will remove all monitoring equipment following cessation of data collection and store equipment at PNNL.
Locations: 1
Primary Focal Species: Trout, Bull
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:
NPCC Subbasin: PEND OREILLE
HUC5 Watershed: UPPER PEND OREILLE
HUC6 Name: EXPOSURE CREEK



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	5/1/2010	5/1/2010	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. Remove Lake Pend Oreille tributary stations	10/1/2010	11/30/2010	Completed	Stations on tributaries of Lake Pend Oreille will be removed following the bull trout spawning season and equipment stored at PNNL.
C. Remove remaining stations at dam, etc.	3/1/2011	4/30/2011	Completed	Stations at Albeni Falls Dam, mouth of the Priest River, and the stations at Dover, Idaho will remain throughout the winter of 2010/11 to document movement of bull trout into the Pend Oreille River. These stations will be removed in spring 2011 before the end of the contract period.
Deliverable: D. Monitoring equipment removed and stored		4/30/2011	Completed	<i>See the Deliverable Specification above</i>

J: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. May-Jun 2010 (5/1/2010 - 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. Jan-Mar 2011 (1/1/2011 - 3/31/2011)	4/1/2011	4/15/2011	Completed	
E. Final Apr 2011 (4/1/2011 - 4/30/2011)	4/16/2011	4/30/2011	Completed	

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>



Statement of Work Report

Project Title: Albeni Falls Wildlife Mitigation-Idaho Department of Fish and Game (IDFG)
Project #: 1992-061-03
Contract Title: 1992-061-03 EXP IDFG ALBENI FALLS ADMIN & IMP WL
Contract #: 48187
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 205740 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Idaho Department of Fish and Game (IDFG) (Prime - IDFISGAM00)
BPA Internal Ref: 48187
SOW Validation: Last validated 05/24/2010 with 0 problems, and 0 reviewable items
Contract Documents: Property Inventory (05/25/2010) Property Inventory
Budget - Contract (05/24/2010) 2010 LIB IDFG ADMIN CONTRACT ALBENI FALLS

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
Virgil Watts III	COTR	Bonneville Power Administration	(503) 230-4625 / (503) 230-4567	vlwatts@bpa.gov	P.O. Box 3621 KEWU-4 Portland OR 97208-3621
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Jenna Peterson	Env. Compliance Lead	Bonneville Power Administration	(503) 230-3018 / NA	jepeterson@bpa.gov	905 NE 11th Avenue KEC-4 Portland OR 97232
Rosemary Mazaika	Interested Party	Bonneville Power Administration	(503) 230-5869 / (503) 230-5699	rxmazaika@bpa.gov	P.O. Box 3621 Mailstop - KEWL-4 Portland OR 97208-3621
Kristi Van Leuven	Contracting Officer	Bonneville Power Administration	(503) 230-3605 / NA	kjvleuven@bpa.gov	P.O Box 3621 Mailstop - Nssp-4 Portland, OR 97208-3621
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Work Element Table of Contents:



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
A : 165. Produce Environmental Compliance Documentation - Environmental Compliance		\$1,000	(0 %)
B : 172. Conduct Pre-Acquisition Activities - Conduct Pre-Acquisition Activities - Coordinate completion of Hazardous Waste Surveys		\$2,000	(1 %)
C : 172. Conduct Pre-Acquisition Activities - Conduct Pre-Acquisition Activities - Pursue site information, title search & conservation ease		\$25,000	(9 %)
D : 172. Conduct Pre-Acquisition Activities - Conduct Pre-Acquisition Activities - Identify willing landowner participants		\$5,000	(2 %)
E : 189. Coordination-Columbia Basinwide - Coordinate with other members implementing Albeni Falls wildlife mitigation		\$500	(0 %)
F : 189. Coordination-Columbia Basinwide - Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Cauc		\$4,000	(2 %)
G : 189. Coordination-Columbia Basinwide - Build relationships with entities interested in wildlife mitigation		\$10,000	(4 %)
H : 189. Coordination-Columbia Basinwide - Meet with County Commissioners		\$5,000	(2 %)
I : 189. Coordination-Columbia Basinwide - Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans		\$19,000	(7 %)
J : 114. Identify and Select Projects - Identify cost-share partnerships and projects		\$12,000	(5 %)
K : 99. Outreach and Education - Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project		\$18,000	(7 %)
L : 87. Prepare HEP Report - Coordinate and conduct baseline and 5-year HEP surveys		\$34,000	(13 %)
M : 157. Collect/Generate/Validate Field and Lab Data - Coordinate and conduct vegetative monitoring surveys	*	\$36,000	(14 %)
N : 157. Collect/Generate/Validate Field and Lab Data - Coordinate, collect and generate field data to assist IBIS	*	\$25,000	(9 %)
O : 174. Produce Plan - Develop site-specific wildlife management plans	*	\$14,280	(5 %)
P : 119. Manage and Administer Projects - Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending		\$12,000	(5 %)
Q : 174. Produce Plan - Erosion control proposal for the Clark Fork River delta	*	\$16,145	(6 %)
R : 175. Produce Design and/or Specifications - Design or framework for the completion of a Biological Assessment for the Clark Fork River Delta	*	\$12,557	(5 %)
S : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$1,000	(0 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
T : 132. Produce (Annual) Progress Report - Submit Progress Report for the period (July 1 2009) to (June 2010)		\$14,130	(5 %)
Total:		\$266,612	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

Background

The Pacific Northwest Electric Power Planning and Conservation Act (Act) of 1980 (Public Law 96-501) directed that measures be implemented by Bonneville Power Administration (BPA) to protect, mitigate, and enhance fish and wildlife to the extent affected by development and operation of hydropower projects on the Columbia River system (Martin et al. 1988). The Act created the Northwest Power Planning and Conservation Council (Council), which in turn developed the Columbia River Basin Fish and Wildlife Program (Program). Under the Act, BPA has the authority and obligation to fund fish and wildlife mitigation activities that are consistent with the Council's Fish and Wildlife Program (USDE 1996). Part of the Program was the development of wildlife protection, mitigation and enhancement plans for each of the hydropower facilities on the Columbia River system and ultimately, implementation of the plans to mitigate wildlife habitat losses. The Idaho Department of Fish and Game (IDFG) developed a mitigation plan in 1987, for the Albeni Falls hydroelectric facility that was constructed by the U.S. Army Corps of Engineers (ACOE) on the Pend Oreille River in Bonner County, Idaho between 1951 and 1955 (Martin et al. 1988). Mitigation plans for wildlife habitat losses at each of the Columbia River Basin dams were submitted by BPA to the Council in 1989, including the mitigation plan for Albeni Falls Dam in Idaho (USDE 1996). The Council reviewed and approved the Albeni Falls plan in 1990 (USDE 1996).

The Albeni Falls Wildlife Management Plan Final Environmental Assessment (BPA 1996) addressed the potential environmental effects of a proposed wildlife habitat protection and enhancement program. Based on the analysis in the environmental assessment, the Bonneville Power Administration (BPA) concluded that funding the development and implementation of the Project would enable the IDFG, as well as other federal agencies and sovereign nations to protect and enhance a variety of wetland and riparian habitats, restore 28,587 Habitat Units (HU) lost as a result of construction of the Albeni Falls Dam, and implement long-term wildlife management activities. The Project also complies with the Wildlife Mitigation Program Final Environmental Impact Statement (BPA 1997) and the standardized planning and implementation process prescriptions set forth in the Record of Decision. In-lieu of annualizing habitat unit losses the Council decided to mitigate losses at a 2:1 ratio. That is, for every two HU protected the HU ledger would be reduced by one HU. In 2002, however, BPA decided to maintain a 1:1 crediting policy. The issue of how to address the annualized wildlife habitat losses remains unresolved.

The Northern Idaho Wildlife Mitigation Agreement was jointly prepared and approved by the IDFG and BPA in June 1997 (BPA and IDFG 1997). This contract is one of two IDFG contracts for protection, mitigation and enhancement of wildlife habitats in Northern Idaho. This contract covers all management and administrative responsibilities for implementing mitigation projects. The second contract under this Project number covers all operational and maintenance of wildlife mitigation parcels. Thus, the Project goals are twofold and are: 1) to continue the administration and ongoing implementation of the Albeni Falls Wildlife Mitigation Project; and, 2) to protect, restore, maintain, and manage wetland, riparian and upland coniferous forest habitats on three wildlife management areas in Northern Idaho.

This contract has been developed to cover personnel, mitigation implementation and monitoring costs for a 16-month contract period (March 1, 2009 - June 30, 2010) with the following objectives:

- Identify potential mitigation actions by identifying willing landowner participants and cost-sharing partnerships, building relationships with entities interested in wildlife mitigation and meeting with County Commissioners.
- Secure conservation easements, fee-title, and lease agreements by pursuing site information and title search, writing easement terms and conditions with landowners, verifying maps, fence boundaries, and legal descriptions, coordinating completion of property appraisal and review, and developing option/purchase agreements.
- Fulfill NEPA and BPA funding requirements by coordinating completion of cultural resource surveys, hazardous waste surveys and providing information for NEPA assessment.
- Provide cost-share funding to other project entities by determining cost-share entity's role in the proposed project.



- Coordinate completion of biological baseline surveys of specific habitat areas to determine starting point for monitoring and evaluation of biological objectives.
- Coordinate and implement information and education program. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours.
- Provide assistance with monitoring and evaluation activities on mitigation lands. Activities may include continuing HEP analysis to determine changes in habitat quality, site-specific monitoring and/or sampling of terrestrial vegetation, public use, and habitat use.
- Coordinate mitigation implementation activities associated with other members operating under the Project.
- Coordinate and develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.
- Develop administrative work statement and budget and maintain site-specific operating budgets for individual mitigation parcels. Oversee and develop budget revisions as necessary.
- Prepare an Annual Report of Idaho Department of Fish and Game's Albeni Falls Wildlife Mitigation implementation activities.
- Monitoring and Evaluation: to monitor vegetative cover and habitats using scientific principals and techniques to ensure that project objectives are being met and to provide a basis for use of adaptive management when appropriate. To evaluate species and habitat responses to management activities for the benefit of fish and wildlife using mitigation lands.

Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title:	Environmental Compliance
Description:	Documentation will be completed to obtain environmental compliance prior to starting implementation of any Work Element that requires review or consultation. This work element is added to satisfy the requirements of PISCES. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene WMA.
Deliverable Specification:	This Work Element is to cover the gathering, compilation, and organization of information necessary for environmental compliance on activities that may require review or consultation from State, Tribal or federal agencies.
Planned Metrics:	Are herbicides used as part of work performed under this contract?: Yes



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Collect, Organize, Submit, and Maintain Environmental Compliance Documentation	7/1/2010	6/30/2011	Completed	Information pertaining to ESA species, historical sites, and state sensitive species will be collected and maintained. Environmental documentation will be completed as necessary for any activity requiring review or consultation. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene WMA.
B. Receive NEPA clearance to begin implementation work on the Pend Oreille WMA	7/1/2010	6/30/2011	Completed	This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation activities planned to occur on the Pend Oreille Wildlife Management Area.
C. Receive NEPA clearance to begin implementation work on the Boundary Creek/Smith Creek WMA	7/1/2010	6/30/2011	Completed	This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation activities planned to occur on the Boundary Creek/Smith Creek Wildlife Management Areas.
D. Receive NEPA clearance to begin implementation work on the Coeur d'Alene WMA	7/1/2010	6/30/2011	Completed	This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation activities planned to occur on the Coeur d'Alene Wildlife Management Area.
E. Provide BPA EC Lead with calendar year FY10 proposed herbicide use	7/1/2010	6/30/2011	Completed	Contractor submits any proposed herbicide use on an approved form to the BPA Environmental Compliance Lead
F. Provide BPA EC Lead with calendar year FY10 actual herbicide use	7/1/2010	6/30/2011	Completed	Contractor submits any actual herbicide use on an approved form to the BPA Environmental Compliance Lead
Deliverable: G. Completed Documentation Pertaining to Environmental Compliance		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

B: 172. Conduct Pre-Acquisition Activities

Title: Conduct Pre-Acquisition Activities - Coordinate completion of Hazardous Waste Surveys
Description: Coordinate the completion of hazardous waste surveys on potential mitigation projects.
Deliverable Specification: Hazard waste surveys completed according to BPA KEC standards. Evaluation results will be maintained in site files.

Locations: 1
Primary Focal Species:
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contract BPA's environmental compliance group	7/1/2010	6/30/2011	Completed	Have a BPA inspector survey land for possible pollutants. If necessary utilize an outside contractor to inspect lands for pollution.
B. Begin clean-up work	7/1/2010	6/30/2011	Completed	If clean-up work is necessary, then bid a subcontractor for clean-up work required.
C. Provide status report to BPA	7/1/2010	6/30/2011	Completed	The findings of the Environmental Land Audit to be provided to BPA.
Deliverable: D. Completed Environmental Land Audit		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

C: 172. Conduct Pre-Acquisition Activities

Title: Conduct Pre-Acquisition Activities - Pursue site information, title search & conservation ease



Description: Gather site information on potential habitat sites. Such information may include tax information, wetland delineation, aerial photos, title search, etc. Establish working relationship with landowner and write easement terms and conditions that are mutually agreeable. Verify maps, legal descriptions and fence boundaries of potential mitigation sites. Coordinate completion of property appraisals and review, including requesting bids of contractors.

Deliverable Specification: Information maintained in site files. Copy of easement terms and conditions and all legal descriptions will be included with appraisals. Information includes tax information, wetland delineations, aerial photos, and information pertaining to title searches.

Locations: 1

Primary Focal Species:

Country: US

NPCC Subbasin: PEND OREILLE

State: ID

HUC5 Watershed:

County: BONNER

HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Acquire appraisal	7/1/2010	6/30/2011	Completed	Acquire appraisal.
B. Acquire BPA review and approval of appraisal	7/1/2010	6/30/2011	Completed	Acquire BPA review and approval of appraisal.
C. Perform and obtain title searches and reports	7/1/2010	6/30/2011	Completed	Perform and obtain title searches and reports.
D. Review and clearance of title report encumbrances by BPA	7/1/2010	6/30/2011	Completed	Review and clearance of title report encumbrances by BPA.
E. Perform boundary surveys as needed	7/1/2010	6/30/2011	Completed	Perform boundary surveys as needed.
F. Provide legal descriptions	7/1/2010	6/30/2011	Completed	Provide legal descriptions.
G. Provide minimum habitat units	7/1/2010	6/30/2011	Completed	Provide minimum habitat units.
H. Provide definition of easement terms and conditions (for easements)	7/1/2010	6/30/2011	Completed	Provide definition of easement terms and conditions (for easements).
I. Attach a completed water survey form in Pisces	7/1/2010	6/30/2011	Completed	The water survey form is located at: http://www.efw.bpa.gov/IntegratedFWP/watersurveyform.doc . The form should be completed by the contract manager or BPA project manager and attached in Pisces.
Deliverable: J. Property Acquisition Information		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

D: 172. Conduct Pre-Acquisition Activities

Title: Conduct Pre-Acquisition Activities - Identify willing landowner participants

Description: Identify willing landowners with opportunities to permanently protect wildlife habitat and seek to establish good relationship(s). As directed by the Albeni Falls Wildlife Protection, Mitigation and Enhancement Plan, priority areas of interest are within the Pend Oreille Subbasin. Out-of-basin projects include areas in the Coeur d'Alene and Kootenai Subbasins.

Deliverable Specification: List of willing landowner participants.

Locations: 1

Primary Focal Species:

Country: US

NPCC Subbasin: PEND OREILLE

State: ID

HUC5 Watershed:

County: BONNER

HUC6 Name:

Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Actively drive areas of interest and areas adjacent to currently mitigation lands	7/1/2010	6/30/2011	Completed	Actively driving areas of interest and adjacent to current mitigation lands to identify willing landowners with opportunities to permanently protect wildlife habitat. Networking with the local community and seeking to establish good relationship(s) with landowners.
B. Ongoing searches and investigations for new projects	7/1/2010	6/30/2011	Completed	Throughout the year the project manager will attend public meetings and investigate possible real estate sales at local assessor offices. The project manager will also spend time driving and looking for land sales.
Deliverable: C. Identified Sellers of Lands		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

E: 189. Coordination-Columbia Basinwide

Title: Coordinate with other members implementing Albeni Falls wildlife mitigation

Description: Coordinate when needed with other entities interested in implementing Albeni Falls wildlife mitigation, such as the U.S. Fish and Wildlife Service, the Army Corp of Engineers and any tribal or non-governmental entities. These activities may include meetings and open houses to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites.

Deliverable Specification: List of meetings and participants will be noted with meeting sign-in sheets, minutes or meeting summaries. Open house attendance and comments will be incorporated by reference into site-specific management plans.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with other interested members as needed	7/1/2010	6/30/2011	Completed	When appropriate, informing other members implementing under the Albeni Falls Wildlife Mitigation Project of pending projects and the landowners participating in the program.
B. Participate in meetings as needed	7/1/2010	6/30/2011	Completed	Participate in meetings, if required. Facilitate and provide meeting minutes as needed.
C. Hold public meetings as needed	7/1/2010	6/30/2011	Completed	Open houses will be held on an as-needed basis to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites. Other interested members implementing Albeni Falls wildlife mitigation will be invited to participate.
Deliverable: D. Completed project work identified in the Wildlife Management Plan		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

F: 189. Coordination-Columbia Basinwide

Title: Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus

Description: Coordinate and develop the materials necessary to represent the Albeni Falls Wildlife Mitigation Project to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.

Deliverable Specification: Meeting participants include all Columbia Basin Fish and Wildlife Authority (CBFWA) project managers and CBFWA managers. Often the purpose of the meetings are to improve basin-wide coordination efforts of project development. Usually there are 6-10 meetings planned annually. Spreadsheets, overheads, budgets, etc.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Prepare materials for meetings	7/1/2010	6/30/2011	Completed	Prepare PowerPoint presentations, overheads and other written materials on potential acquisition projects for the CBFWA wildlife advisory committee members.
B. Participate and attend wildlife caucus meetings	7/1/2010	6/30/2011	Completed	Participate and attend CBFWA wildlife advisory committee meetings as needed. Usually 6-10 meetings annually.
Deliverable: C. Regional Wildlife Meeting Attendance		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

G: 189. Coordination-Columbia Basinwide

Title: Build relationships with entities interested in wildlife mitigation

Description: Build effective working relationships with local governments, other agencies, non-profit organizations, members of the community, and the interested public.

Deliverable Specification: Ongoing coordination to build community interest and inform the public about the Albeni Falls Wildlife Mitigation Project.



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Attend meetings	7/1/2010	6/30/2011	Completed	Attend land trust, land development and community group meetings as needed.
B. Develop publications to advertise program	7/1/2010	6/30/2011	Completed	Develop informational pamphlets for mail outs to interested parties.
Deliverable: C. Inform and Involve More Entities in the Mitigation Efforts		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

H: 189. Coordination-Columbia Basinwide

Title: Meet with County Commissioners
Description: Meet with County Commissioners to inform and update them on Albeni Falls Wildlife Mitigation activities. Counties include Boundary County, Bonner County, Kootenai County and Benewah County.
Deliverable Specification: Incorporation into annual report.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold or attend meetings as necessary	7/1/2010	6/30/2011	Completed	Meetings are to inform County commissioners of potential land sales and coordinate with wildlife management plan objectives.
Deliverable: B. Coordination with County Commissioners		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

I: 189. Coordination-Columbia Basinwide

Title: Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans
Description: Coordinate enhancement activities defined in the individual site plans to ensure they follow the budget and attain the desired results.
Deliverable Specification: Verifying the completion of project work on mitigation properties for the Pend Oreille Wildlife Management Area (WMA), Boundary Creek and Smith Creek WMAs, and the Coeur d'Alene WMA. Activities may include maintenance of fences, property and habitat improvements, access, water structures, information and education facilities, enforcement of easement terms and noxious weed control. Bidding out services to subcontractors and coordinating payment to subcontractors. Activities may include but are not limited to fencing, controlled burns, planting native vegetation, property clean-up and cultivating cropland.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold coordination meetings	7/1/2010	6/30/2011	Completed	Events that may trigger the organization of a meeting include the completion of a land acquisition or the beginning of a construction project on a Wildlife Management Area.
B. Coordinate activities on Boundary Creek/Smith Creek WMA	7/1/2010	6/30/2011	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Boundary Creek and Smith Creek Wildlife Management Areas.
C. Coordinate activities on Pend Oreille WMA	7/1/2010	6/30/2011	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Pend Oreille Wildlife Management Area (WMA).
D. Coordinate activities on the Coeur d'Alene WMA	7/1/2010	6/30/2011	Completed	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Coeur d'Alene Wildlife Management Area (WMA).
Deliverable: E. Completed project work identified in Wildlife Management Plans		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

J: 114. Identify and Select Projects

Title: Identify cost-share partnerships and projects
Description: Wherever possible, identify partnerships with landowner participants, government agencies, watershed groups, or other entities so as to reduce costs, increase benefits, and/or eliminate duplicate activities. IDFG and the cost-share partner will negotiate a MOA to determine how habitat will be permanently protected and how management will proceed.
Deliverable Specification: List of cost-sharing partnerships to develop projects to protect, mitigate or enhance wildlife habitat. Cost-sharing role will be defined in Memorandum of Agreement (MOA). Possible partners could include The Nature Conservancy, Ducks Unlimited, Trout Unlimited, Inland Northwest Land Trust, the Rocky Mountain Elk Foundation, the Idaho Fish and Wildlife Foundation, the Idaho Department of Lands, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and the U.S. Forest Service.

Primary Focal Species:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contact organizations via telephone or email or other methods applicable in pursuit of partner	7/1/2010	6/30/2011	Completed	Organizations and/or other agencies will be contacted to solicit cost-sharing partnerships.
B. Proposal Development	7/1/2010	6/30/2011	Completed	Proposal development will vary depending upon agency and/or organization requirements.
C. Technical Review	7/1/2010	6/30/2011	Completed	Technical review of potential properties. For instance, IDFG partners with land trust organizations such as The Nature Conservancy, Rocky Mountain Elk Foundation, Idaho Fish and Wildlife Foundation, Ducks Unlimited and Trout Unlimited, as well as partnering with the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers. The project proposals need to complement the missions and goals of these organizations as well as meet the requirements of the Council's Program and State.
D. Land Committee Approval	7/1/2010	6/30/2011	Completed	An internal process to review IDFG land acquisitions. The land committee meets at least four times a year and makes recommendations to the IDFG Director and the Idaho Fish and Game Commission.
E. Project Cost Share Information in Pisces	7/1/2010	6/30/2011	Completed	Funding obtained through cost share will be identified and entered into Pisces under the Project 1992-061-03
Deliverable: F. Cost Share Partners Identified		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

K: 99. Outreach and Education

Title: Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project
Description: Coordinate and implement information and education activities on the Albeni Falls Wildlife Mitigation Project. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours. Activities may also include developing a school curriculum. The goals are to educate members of the community on the mitigation program and to encourage their participation.

Deliverable Specification: Interpretive sites, audio-visual program, classroom syllabus, informational brochures and signs.

Planned Metrics: * # of students reached: 200
 * # of general public reached: 100
 * # of teachers reached: 3

Locations: 3
Country: US
State: ID
County: BONNER

NPCC Subbasin: PEND OREILLE
HUC5 Watershed:
HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Conduct classes, seminars, workshops, trainings, field tours, symposia and/or conferences	7/1/2010	6/30/2011	Completed	Includes outreach or education to the general public, fellow professionals and students (K-12 and college).
B. Set up web cam on WMA	7/1/2010	6/30/2011	Active	Set up a web cam on the Boundary Creek WMA so that the students as well as the general public can view the wildlife habitat and the wildlife live online.
C. Field studies with Habitat Biologists	5/1/2011	6/30/2011	Completed	Approximately 100 middle or high school students will observe habitat and wildlife biologists working in the field when collecting data.
D. Participant sign-in sheets	5/1/2011	6/30/2011	Completed	Participants will sign-in for any seminar, workshop or field study activity.
Deliverable: E. Education and Outreach for community affected by the Albeni Falls Hydroelectric facility.		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

L: 87. Prepare HEP Report

Title: Coordinate and conduct baseline and 5-year HEP surveys
Description: Coordinate completion of Habitat Evaluation Procedures (HEP).



Deliverable Specification: Coordinate completion of baseline and 5-year HEP surveys. HEP reports are included as appendices to the annual report.

Locations: 3

Primary Focal Species:

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Collect HEP data from field studies	7/1/2010	6/30/2011	Completed	Collect field data using methods outlined in the USFWS HEP protocols.
B. Perform analysis on HEP data	7/1/2010	6/30/2011	Completed	Collected field data will be entered into databases and then applied to appropriate species models to calculate the project HUs.
C. Submit draft HEP report to BPA for review	7/1/2010	6/30/2011	Completed	HEP report will be produced and then submitted to BPA for review.
D. Upload final HEP report to BPA website	7/1/2010	6/30/2011	Completed	Final HEP report uploaded to BPA website.
Deliverable: E. Completed HEP Reports for Mitigation Properties		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Coordinate and conduct vegetative monitoring surveys

Description: Coordinate completion and/or conduct surveys to include: distribution and abundance plant communities, including native and rare species; noxious weeds; roads, trails, etc.; and recreational use, economics.

Deliverable Specification: For each of the wildlife management areas, coordinate with the Regional Habitat Biologists and technicians to analyze the vegetative monitoring field data for the annual report.

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 : Tributary Habitat

Locations: 4

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:**

County: BONNER | SHOSHONE **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner: **Protocol State:**

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2010	6/2/2011	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. Collect data from field studies	7/1/2010	6/30/2011	Completed	Data collected by the Habitat Biologists and Wildlife Technicians are submitted to the Project Manager.
C. Perform analyses on data sets	7/1/2010	6/30/2011	Completed	Evaluations and assessments by Habitat Biologists and Biological Technicians are sent to the Project Manager. The Project Manager verifies the information and performs any additional analyses, if needed, and evaluates results in the annual report.
Deliverable: D. Annual Summary Report of Vegetative Monitoring		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

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

Title: Coordinate, collect and generate field data to assist IBIS



Description: Coordinate, collect and generate field data to assist the Northwest Habitat Institute, Interactive Biodiversity Information System (IBIS) in the development of tools that assist land managers in conserving native species and habitats, developing and implementing inventorying and monitoring programs, and coordinating and facilitating activities (e.g., habitat restoration, land-use planning and management objectives) that promote the conservation and management of natural resources.

Deliverable Specification: Coordinate with the Northwest Habitat Institute, Interactive Biodiversity Information System (IBIS) to develop extensive information about the vegetative habitat cover types and wildlife present on mitigation lands and analyze the relationships among these species and their habitats to determine a wildlife habitat value.

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 : Tributary Habitat

Locations: 13

Primary Focal Species: Wildlife

Country: US

NPCC Subbasin: Multiple

State: ID

HUC5 Watershed: Multiple

County: BONNER | BOUNDARY | SHOSHONE

HUC6 Name:

Salmonid ESUs Present:

Data Repositories:

Protocol:

Protocol Owner:

Protocol State:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2010	6/30/2011	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. Collect data from field studies	7/1/2010	6/30/2011	Completed	Data collected by the Habitat Biologists and Wildlife Technicians are submitted to the Project Manager.
C. Perform analyses on data set	7/1/2010	6/30/2011	Completed	Evaluations and assessments by Habitat Biologists and Biological Technicians are sent to the Project Manager. The Project Manager verifies the information and performs any additional analyses, if needed, and evaluates results in the annual report.
D. Collaborate with IBIS staff	7/1/2010	6/30/2011	Completed	Project Manager will collaborate with IBIS staff on the final analyses of data and generation of habitat value.
Deliverable: E. Summary of Findings in Annual Report		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

O: 174. Produce Plan

Title: Develop site-specific wildlife management plans

Description: Develop Wildlife Management Plans (WMP) that will include, but not be limited to, the following components: fish and wildlife habitat, recreation and access, fire protection noxious weeds, information and education, operation and maintenance, and monitoring and evaluation. The management plans will define the management program. These activities will be done on a need-by-need bases depending upon the acquisition activities.

Deliverable Specification: Site-specific management plans completed on a need-by-need basis. The time frame for the completion of a site-specific management plan is about one year after the completion of an acquisition. The wildlife management plan may include components on fish and wildlife habitat, recreation and access, fire protection, noxious weeds, information and education, operation and maintenance and monitoring and evaluation.

Primary Focal Species: Wildlife



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold scoping meetings	7/1/2010	6/30/2011	Completed	Meetings will be held on a need-by-need basis with local land owners, county commissioners and community members regarding any new Wildlife Management Plans.
B. Submit draft plan for IDFG review	7/1/2010	6/30/2011	Completed	Draft plan is submitted to IDFG for internal review, and review by the IDFG director and commission. This milestone will be completed after initial scoping meetings.
C. Submit draft plan for BPA review	7/1/2010	6/30/2011	Completed	Draft management plan submitted to BPA for comments. This milestone will be completed after the IDFG review.
D. Hold a meeting for final review	7/1/2010	6/30/2011	Completed	The final draft Wildlife Management Plan will be presented to the county commissioners for comment. This milestone will be completed after the BPA review.
E. Submit final plan to BPA	7/1/2010	6/30/2011	Completed	Final Wildlife Management Plan submitted to BPA. This milestone will be completed after it is presented to the County commissioners for comment.
Deliverable: F. Completed Wildlife Management Plans		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

P: 119. Manage and Administer Projects

Title: Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending

Description: Develop administrative work statement and budget, and maintain operating budgets for mitigation parcels. Oversee and develop budget revisions as necessary. Manage IDFG-BPA contract to maintain fiscal responsibility and oversight. Develop and manage subcontracts on an as-needed basis. Maintain equipment inventory and documentation. Coordinate with administrative staff and maintain IDFG spending authority at appropriate levels

Deliverable Specification: FY10 work statements, budgets and property inventories. Copies of subcontracts and revised contract.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Create all FY10 and FY11 contracts using PISCES	10/1/2010	6/30/2011	Completed	FY10 and FY11 Statement of Work and Work Element budget to be developed on-line using Pisces.
B. Monitor periodic status reports on line	7/1/2010	6/30/2011	Completed	Status reports to be monitored on-line using Pisces.
C. Maintaining inventory documentation	7/1/2010	6/30/2011	Completed	Inventory maintained at site.
D. Land & Real Estate Training Seminars	8/2/2010	6/15/2011	Completed	The IDFG Project Manager will attend up to three instructional seminars on land appraising, real estate land transfers, and laws pertaining to conservation easements.
E. Funding Package - Conduct internal review (e.g., Supervisor or Interagency)	7/1/2010	6/30/2011	Completed	If necessary, submit next year's Statement of Work and Work Element budget for internal contractor review before submitting to BPA. Assuming this review takes 30 days, start this milestone 120 days before the end of the current contract.
F. Accrual - Submit September estimate to BPA	9/1/2010	9/15/2010	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. Generally, this should be done by September 10.
G. IDFG Project Manager to attend an Appraisal & Real Estate Course	9/14/2010	9/25/2010	Completed	The Project Manager will attend a single course of instruction that covers the basics of Property Appraisals and the process of how they are completed.
Deliverable: H. Project Management		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

Q: 174. Produce Plan

Title: Erosion control proposal for the Clark Fork River delta

Description: Extensive bank erosion has occurred to islands and shorelines in the Clark Fork River Delta in northern Idaho, resulting in significant losses of soil, native riparian and wetland vegetation as well as the quantity and quality of fish and wildlife habitat. This erosion is the result of wave action from Lake Pend Oreille and the erosive action of flowing water in the Clark Fork River. IDFG staff and the contractor will survey eroded sites to determine the current extent of the problem and determine possible solutions. Verify locations with survey grade global positioning system (GPS) location. This will be done on foot and from a boat during the late summer of 2010. Vertical datum will be NGVD29 to allow correlation to lake operations and horizontal datum will be Idaho State Plane, NAD83, west zone. In addition, Watershed Sciences will be subcontracted to process LiDAR data collected by the U.S. Army Corps of Engineers during winter 2009-2010.



Deliverable Specification: Based on measurements collected in the past and during this FY and the FY09 field season, and LiDAR information collected by the U.S. Army Corps of Engineers, the Project Manager and contractor will prepare an erosion control proposal for areas impacted by the construction and operation of the Albeni Falls dam in the Clark Fork River delta.

Primary Focal Species: Wildlife

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Collect measurements in the field	7/1/2010	6/30/2011	Completed	IDFG staff and the contractor will survey eroded sites to determine the current extent of the problem and identify possible solutions. Verify locations with survey grade global positioning system (GPS) location. This will be done on foot and from a boat during the late summer of 2010. Vertical datum will be NGVD29 to allow correlation to lake operations and horizontal datum will be Idaho State Plane, NAD83, west zone.
C. Prepare draft plan	7/1/2010	6/30/2011	Completed	Using measurements collected in the field and data from past surveying efforts and reports, the IDFG Project lead will prepare an erosion control proposal in coordination with the contractor and other professional staff.
C. Attain LiDAR information on Clark Fork River Delta	7/1/2010	6/30/2011	Completed	LiDAR data were collected for the Clark Fork River delta during the winter of 2009-2010, by Watershed Sciences under a contract to the U.S. Army Corps of Engineers. Watershed Sciences will process the LiDAR information and provide 8 pulse/meter squared one foot contours for the delta area (5,697 acres).
Deliverable: D. Completed erosion control proposal for the Clark Fork River delta		6/30/2011	Completed	See the Deliverable Specification above

R: 175. Produce Design and/or Specifications

Title: Design or framework for the completion of a Biological Assessment for the Clark Fork River Delta

Description: Extensive bank erosion has occurred to islands and shorelines in the Clark Fork River delta in northern Idaho, resulting in significant losses of soil, native riparian and wetland vegetation, as well as the quantity and quality of fish and wildlife habitat. IDFG is working with Avista and DU, as well as other partners, to propose a restoration project in the delta. Prior to any restoration activity, a biological assessment of the action is needed. The delta is about 6,000 acres, and is composed of complex wildlife habitats. Numerous studies have shown that over 80% of all fish and wildlife use riparian and wetland habitats during some stage of their life cycle—ranging from endangered bull trout, to recovered bald eagles, and big game, fur bearing mammals, reptiles, amphibians and hundreds of species of neo-tropical migrant birds. A plan and design outline on how to complete a comprehensive biological assessment for the delta is needed.

Deliverable Specification: A framework document outlining the structure of the biological assessment will be completed. A GPS inventory of the vegetative cover types and any ecological structural habitat features will be completed.

Locations: 1

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with IDFG Staff at the CDC	7/1/2010	6/30/2011	Completed	IDFG staff will meet to coordinate efforts in developing a framework to assess the biological resources in the Clark Fork River delta.
B. Investigate all historical biological documents	7/1/2010	6/30/2011	Completed	IDFG staff will investigate and inventory past studies and surveys completed for the Clark Fork River delta.
C. Conduct a inventory of wildlife habitat covers	7/1/2010	10/15/2010	Completed	IDFG Project Manager and biological technician will survey the Clark Fork River delta to GPS different wildlife habitat cover types and habitat structural features.
Deliverable: D. Framework document outlining a Biological Assessment for the Clark Fork River Delta		6/30/2011	Completed	See the Deliverable Specification above

S: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Jul-Sep 2010 (7/1/2010 - 9/30/2010)	10/1/2010	10/15/2010	Completed	
B. Oct-Dec 2010 (10/1/2010 - 12/31/2010)	1/1/2011	1/15/2011	Completed	
C. Jan-Mar 2011 (1/1/2011 - 3/31/2011)	4/1/2011	4/15/2011	Completed	
D. Final Apr-Jun 2011 (4/1/2011 - 6/30/2011)	6/16/2011	6/30/2011	Completed	

T: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (July 1 2009) to (June 2010)
Description: 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. Date range July 1, 2009 to June 30, 2010 will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics: <None>

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Review progress report format requirements	7/1/2010	6/30/2011	Completed	Contractor must review formatting requirements before starting the first draft of their report. Please follow the BPA-required format. http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx
B. Submit progress report for internal contractor review	7/1/2010	6/30/2011	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.
C. Submit annual progress report to COTR	7/1/2010	6/30/2011	Completed	Submit the completed annual report to the COTR.
D. Confirm BPA has posted the progress report	7/1/2010	6/30/2011	Completed	It usually takes BPA 30-45 days to post the final version of a report. This milestone's end date should therefore be 45 days after the Deliverable milestone. You will receive an email from BPA confirming that your report has been finalized and posted to the web.
Deliverable: E. Attach Progress Report in Pisces		6/30/2011	Completed	<i>See the Deliverable Specification above</i>

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Statement of Work Report

Project Title: Albeni Falls Wildlife Mitigation-Idaho Department of Fish and Game (IDFG)
Project #: 1992-061-03
Contract Title: 1992-061-03 EXP ALBENI FALLS WL IDF&G ADMIN
Contract #: 62561 [ISSUED] **Amendment #:** 1 [ISSUED]
Province: Intermountain **Subbasin:** Pend Oreille
Workorder ID: 205740 **Task ID:** 1
Contract Type: Contract (IGC) **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Idaho Department of Fish and Game (IDFG) (Prime - IDFIGAM00)
BPA Internal Ref: Amd1
SOW Validation: Last validated 10/31/2013 with 0 problems, and 0 reviewable items
Contract Documents: Budget - Contract (10/31/2013) Line Item Budget - Albeni Falls Wildlife Miti...

Contacts:

Name	Role	Organization	Phone/Fax	Email	Address
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Jenna Peterson	Env. Compliance Lead	Bonneville Power Administration	(503) 230-3018 / NA	jepeterson@bpa.gov	905 NE 11th Avenue KEC-4 Portland OR 97232
Rosemary Mazaika	Interested Party	Bonneville Power Administration	(503) 230-5869 / (503) 230-5699	rxmazaika@bpa.gov	P.O. Box 3621 Mailstop - KEWL-4 Portland OR 97208-3621
Katherine Cousins	Contract Manager	Idaho Department of Fish and Game (IDFG)	(208) 769-1414 / (208) 769-1418	kathy.cousins@idfg.idaho.gov	2885 W. Kathleen Avenue Coeur D'Alene ID 83815-

Work Element Table of Contents:

Work Element - Work Element Title	EC Needed*	Estimate	(%)
A : 165. Produce Environmental Compliance Documentation - Environmental Compliance		\$2,000	(0 %)
B : 172. Conduct Pre-Acquisition Activities - Identify willing landowner participants		\$200	(0 %)
C : 172. Conduct Pre-Acquisition Activities - Pursue site information, title search & easement terms		\$200	(0 %)



<u>Work Element - Work Element Title</u>	<u>EC Needed*</u>	<u>Estimate</u>	<u>(%)</u>
D : 172. Conduct Pre-Acquisition Activities - Coordinate completion of Hazardous Waste Surveys		\$200	(0 %)
E : 189. Coordination-Columbia Basinwide - Coordinate with other members implementing Albeni Falls wildlife mitigation		\$3,200	(1 %)
F : 189. Coordination-Columbia Basinwide - Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Cauc		\$12,200	(2 %)
G : 189. Coordination-Columbia Basinwide - Build relationships with entities interested in wildlife mitigation		\$24,590	(4 %)
H : 189. Coordination-Columbia Basinwide - Meet with County Commissioners		\$6,000	(1 %)
I : 189. Coordination-Columbia Basinwide - Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans		\$11,150	(2 %)
J : 114. Identify and Select Projects - Identify cost-share partnerships and projects		\$12,200	(2 %)
K : 99. Outreach and Education - Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project		\$10,200	(2 %)
L : 87. Prepare HEP Report - Coordinate and conduct baseline and 5- and 10-year HEP surveys		\$26,200	(4 %)
M : 157. Collect/Generate/Validate Field and Lab Data - Coordinate and conduct vegetative monitoring surveys	*	\$26,200	(4 %)
N : 157. Collect/Generate/Validate Field and Lab Data - Coordinate, collect and generate field data for Wildlife Habitat Reference Sites - EWU	*	\$11,265	(2 %)
O : 174. Produce Plan - Develop site-specific wildlife management plans	*	\$10,200	(2 %)
P : 119. Manage and Administer Projects - Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending		\$35,900	(6 %)
Q : 175. Produce Design and/or Specifications - Prepare designs and plans to protect and restore delta area in the Project Area	*	\$349,600	(59 %)
R : 185. Produce Pisces Status Report - Periodic Status Reports for BPA		\$1,200	(0 %)
S : 132. Produce (Annual) Progress Report - Submit Progress Report for the period (July 1, 2013) to (June 30, 2014)		\$20,000	(3 %)
T : 157. Collect/Generate/Validate Field and Lab Data - Coordinate, collect & generate field data for Monitoring of Bank Retreat and Vegetation Development	*	\$27,350	(5 %)
Total:		\$590,055	

* Environmental Compliance (EC) needed before work begins.

Contract Description:

Background

The Pacific Northwest Electric Power Planning and Conservation Act (Act) of 1980 (Public Law 96-501) directed

that measures be implemented by Bonneville Power Administration (BPA) to protect, mitigate, and enhance fish and wildlife to the extent affected by development and operation of hydropower projects on the Columbia River system (Martin et al. 1988). The Act created the Northwest Power Planning and Conservation Council (Council), which in turn developed the Columbia River Basin Fish and Wildlife Program (Program). Under the Act, BPA has the authority and obligation to fund fish and wildlife mitigation activities that are consistent with the Council's Fish and Wildlife Program (USDE 1996). Part of the Program was the development of wildlife protection, mitigation and enhancement plans for each of the hydropower facilities on the Columbia River system and ultimately, implementation of the plans to mitigate wildlife habitat losses. The Idaho Department of Fish and Game (IDFG) developed a mitigation plan in 1987, for the Albeni Falls hydroelectric facility that was constructed by the U.S. Army Corps of Engineers (ACOE) on the Pend Oreille River in Bonner County, Idaho between 1951 and 1955 (Martin et al. 1988). Mitigation plans for wildlife habitat losses at each of the Columbia River Basin dams were submitted by BPA to the Council in 1989, including the mitigation plan for Albeni Falls Dam in Idaho (USDE 1996). The Council reviewed and approved the Albeni Falls plan in 1990 (USDE 1996). The Northern Idaho Wildlife Mitigation Agreement was jointly prepared and approved by the IDFG and BPA in June 1997 (BPA and IDFG 1997).

The Albeni Falls Wildlife Management Plan Final Environmental Assessment (BPA 1996) addressed the potential environmental effects of a proposed wildlife habitat protection and enhancement program. Based on the analysis in the environmental assessment, the Bonneville Power Administration (BPA) concluded that funding the development and implementation of the Project would enable the IDFG, as well as other federal agencies and sovereign nations to protect and enhance a variety of wetland and riparian habitats, restore 28,587 Habitat Units (HU) lost as a result of construction of the Albeni Falls Dam, and implement long-term wildlife management activities. The Project also complies with the Wildlife Mitigation Program Final Environmental Impact Statement (BPA 1997) and the standardized planning and implementation process prescriptions set forth in the Record of Decision. In-lieu of annualizing habitat unit losses the Council decided to mitigate losses at a 2:1 ratio. That is, for every two HU protected the HU ledger would be reduced by one HU. In 2002, however, BPA decided to maintain a 1:1 crediting policy. The issue of how to address the annualized wildlife habitat losses remains unresolved.

This contract is one of two IDFG contracts for protection, mitigation and enhancement of wildlife habitats in Northern Idaho. This contract covers all management and administrative responsibilities for implementing mitigation projects.

The second contract under this Project number covers all operational and maintenance of wildlife mitigation parcels. Thus, the Project goals are twofold and are: 1) to continue the administration and ongoing implementation of the Albeni Falls Wildlife Mitigation Project; and, 2) to protect, restore, maintain, and manage wetland, riparian and upland coniferous forest habitats on three wildlife management areas in Northern Idaho.

This contract has been developed to cover personnel, mitigation implementation and monitoring costs for a 12-month contract period (July 1, 2012 - June 30, 2013) with the following objectives:

- Identify potential mitigation actions by identifying willing landowner participants and cost-sharing partnerships, building relationships with entities interested in wildlife mitigation and meeting with County Commissioners.
- Secure conservation easements, fee-title, and lease agreements by pursuing site information and title search, writing easement terms and conditions with landowners, verifying maps, fence boundaries, and legal descriptions, coordinating completion of property appraisal and review, and developing option/purchase agreements.
- Fulfill NEPA and BPA funding requirements by coordinating completion of cultural resource surveys, hazardous waste surveys and providing information for NEPA assessment.
- Provide cost-share funding to other project entities by determining cost-share entity's role in the proposed project.
- Coordinate completion of biological baseline surveys of specific habitat areas to determine starting point for monitoring and evaluation of biological objectives.
- Coordinate and implement information and education program. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours.
- Provide assistance with monitoring and evaluation activities on mitigation lands. Activities may include continuing HEP analysis to determine changes in habitat quality, site-specific monitoring and/or sampling of terrestrial vegetation, public use, and habitat use.
- Coordinate mitigation implementation activities associated with other members operating under the Project.
- Coordinate and develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.
- Coordinate and develop designs and plans to implement protection and restoration for Project Area deltas.
- Develop administrative work statement and budget and maintain site-specific operating budgets for individual mitigation parcels. Oversee and develop budget revisions as necessary.



- Prepare an Annual Report of Idaho Department of Fish and Game's Albeni Falls Wildlife Mitigation implementation activities.
- Monitoring and Evaluation: to monitor vegetative cover and habitats using scientific principals and techniques to ensure that project objectives are being met and to provide a basis for use of adaptive management when appropriate. To evaluate species and habitat responses to management activities for the benefit of fish and wildlife using mitigation lands.

Background for the Clark Fork River Delta Restoration Project

Nine areas identified in the Clark Fork River delta total about 2,496 acres before the construction and inundation of Lake Pend Oreille by the Albeni Falls Dam, and over 60 years later, the same areas total about 1,204 acres. This represents an estimated loss of about 1,292 acres of wildlife habitat (52 percent of the total area). The estimated wildlife habitat loss is due to the combined actions of the construction and inundation of the Albeni Falls dam, and each year that the dam operates. Erosion of shorelines and island areas as a result of Albeni Falls operations are still occurring, and some shoreline areas are experiencing annual erosion rates of up to eight feet.

Under the Council's Fish and Wildlife Program, IDFG contracted Ducks Unlimited (DU) to conduct an updated feasibility study on potential, cost-effective shoreline erosion control measures in the Clark Fork River delta. This is not the first time that a contractor has looked at solving the erosion issues in the delta. Avista Corporation contracted two companies in the past: Findlay Engineering, Inc. in 2000, and Paramatrix, Inc. in 1998. Both companies completed the studies in support of the Federal Energy Regulatory Commission (FERC) re-licensing of the Avista Corporation's Cabinet Gorge and Noxon Rapid Hydroelectric facilities. Ducks Unlimited was asked to review the past studies, and to also contact local experts with experience in controlling shoreline erosion including the local conservation districts, the Natural Resources Conservation Service, Montana Fish, Wildlife and Parks, Kalispel Tribe, and the U.S. Army Corps of Engineers (ACOE) to seek recommendations on successful shoreline erosion techniques. Then DU was asked to develop a conceptual plan, including feasible alternatives for treating shoreline erosion at each identified site.

DU engineers recommend that work in the Clark Fork River delta should consist of first protecting shorelines from further erosion and then conducting restoration activities behind the protection. Protection and restoration should be considered for all areas where possible. There are many areas where protection from further erosion may be considered the only activities needed at the sites. At present, the two ACOE's breakwaters appear to provide good wave protection, but provide limited wildlife habitat value, recreational uses, or aesthetics. A combination of materials such as riprap, anchored large wooded debris and vegetation could be used to construct breakwaters to protect the island shorelines, as well as providing wildlife habitat. Geotubes could also be considered in some areas, but lessons from the Pack River delta project have shown that this technology can be cost-prohibitive.

A June 1, 2012 letter from the State of Idaho's Office of Energy resources to Bonneville Power Administration (BPA) outlined a five-year agreement to monitor and evaluate the effects of operations at Albeni Falls dam. A major component of the agreement provides \$3 million in BPA funds over a three year period that would otherwise be considered for land acquisition, to initiate extensive river delta erosion mitigation projects where ongoing bank erosion is a concern. Both BPA and Idaho agreed to negotiate in good faith to reach a mutually agreed upon long-term settlement for mitigation of construction, inundation, and any operational impacts on fish and wildlife resources attributed to the Albeni Falls hydroelectric project.

On October 16, 2012, IDFG hosted a meeting with BPA, ACOE, U.S. Bureau of Land Management (BLM), federal and state regulators, as well as other interested stakeholders. The purpose of the meeting was to coordinate a restoration project in the Clark Fork River delta with a targeted construction start date of November/December 2013, and continuing until March/April 2014. Lands within the proposed delta restoration area are owned by ACOE, BLM and IDFG, and are all managed under a long-term management agreement with the State. Discussions revolved around which agency would be the lead federal agency, and how to complete the regulatory requirements within the tight time lines. The group also reviewed the draft project purpose and objectives. The project purpose will be to protect, improve and restore key riparian and wetland habitats and their ecological function in the Clark Fork River delta. To achieve this, the restoration project will involve creating barrier islands to project lands, reinforcing and protecting eroding shorelines in the delta, raising portions of the delta islands that are currently submerged, increasing wetland diversity. The group supported the project purpose and formed a design team tasked with developing the restoration plan and time line.



Statement of Work Report

Work Element Details

A: 165. Produce Environmental Compliance Documentation

Title: Environmental Compliance

Description: Documentation will be completed to obtain environmental compliance prior to starting implementation of any Work Element that requires review or consultation. This work element is added to satisfy the requirements of PISCES. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene River WMA.

Deliverable Specification: This Work Element is to cover the gathering, compilation, and organization of information necessary for environmental compliance on activities that may require review or consultation from State, Tribal or federal agencies.

Planned Metrics:

- * Are herbicides used as part of work performed under this contract?: Yes
- * 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. Provide BPA EC Lead with calendar year 2014 proposed herbicide use form	7/1/2013	6/30/2014	Active	Contractor submits any proposed herbicide use on an approved form to the BPA EC Lead. The BPA EC Lead will send the form out in December of each year; it will be due January 31. Use this milestone only when you are using BPA funding to apply herbicides as part of your work.
B. Provide BPA EC Lead with calendar year 2013 actual herbicide use form.	7/1/2013	6/30/2014	Active	Contractor submits any actual herbicide use on an approved form to the BPA Environmental Compliance Lead. The BPA EC Lead will send the form out in December of each year; it will be due January 31. Use this milestone only when you are using BPA funding to apply herbicides as part of your work.
C. Determine if contract work could adversely affect Pacific lamprey	7/1/2013	6/30/2014	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 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 (<i>Entosphenus tridentatus</i>) 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), macrophthalmia (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.



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	7/1/2013	6/30/2014	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.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	7/1/2013	6/30/2014	Active	Prevent spread of invasive species
F. Complete and document public involvement activities and provide to EC Lead	7/1/2013	6/30/2014	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.
G. Participate in ESA Consultation	7/1/2013	6/30/2014	Active	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.
H. Participate in Cultural/Historic Resource Consultation	7/1/2013	6/30/2014	Active	Examples include providing maps and detailed project descriptions, contracting for an archaeological survey, etc.
I. Obtain/Renew applicable local, state, federal and tribal environmental permits	7/1/2013	6/30/2014	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.
J. Obtain BPA's EC Lead sign-off that EC requirements are complete	7/1/2013	6/30/2014	Active	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.
K. Use Best Management Practices to stabilize soils and prevent spread of noxious weeds	7/1/2013	6/30/2014	Active	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.
L. Collect, Organize, Submit, and Maintain Environmental Compliance Documentation	7/1/2013	6/30/2014	Active	Information pertaining to ESA species, historical sites, and state sensitive species will be collected and maintained. Environmental documentation will be completed as necessary for any activity requiring review or consultation. This administrative contract will act as the funding vehicle for the obtainment of NEPA clearance/compliance measures prior to the start of implementation and enhancement activities planned to occur on Boundary Creek/Smith Creek Wildlife Management Areas, the Pend Oreille Wildlife Management Area (WMA), and the Coeur d'Alene WMA.
M. Obtain BPA's EC Lead sign-off that EC requirements are complete prior to work at Boundary/Sm...	7/1/2013	6/30/2014	Active	This administrative contract will act as the funding vehicle for the obtainment of environmental clearance prior to the start of implementation activities planned to occur on the Boundary Creek/Smith Creek Wildlife Management Areas. 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.



Milestone Title	Start Date	End Date	Status	Milestone Description
N. Obtain BPA's EC Lead sign-off that EC requirements are complete prior to work on the CDA River	7/1/2013	6/30/2014	Active	This administrative contract will act as the funding vehicle for the obtainment of environmental clearance prior to the start of implementation activities planned to occur on the Coeur d'Alene River Wildlife Management Area. 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.
Deliverable: O. Completed Documentation Pertaining to Environmental Compliance		6/30/2014	Active	See the Deliverable Specification above

B: 172. Conduct Pre-Acquisition Activities

Title: Identify willing landowner participants
Description: Identify willing landowners with opportunities to permanently protect wildlife habitat and seek to establish good relationship(s). As directed by the Albeni Falls Wildlife Protection, Mitigation and Enhancement Plan, priority areas of interest are within the Pend Oreille and Clark Fork Subbasins. Out-of-basin projects include areas in the Coeur d'Alene and Kootenai Subbasins.
Deliverable Specification: List of willing landowner participants.
Locations: 1
Primary Focal Species: Wildlife
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Actively drive areas of interest and areas adjacent to currently mitigation lands	7/1/2013	6/30/2014	Active	Actively driving areas of interest and adjacent to current mitigation lands to identify willing landowners with opportunities to permanently protect wildlife habitat. Networking with the local community and seeking to establish good relationship(s) with landowners.
B. Ongoing searches and investigations for new projects	7/1/2013	6/30/2014	Active	Throughout the year the project manager will attend public meetings and investigate possible real estate sales at local assessor offices. The project manager will also spend time driving and looking for land sales.
Deliverable: C. Identified Sellers of Lands		6/30/2014	Active	See the Deliverable Specification above

C: 172. Conduct Pre-Acquisition Activities

Title: Pursue site information, title search & easement terms
Description: Gather site information on potential habitat sites. Such information may include tax information, wetland delineation, aerial photos, title search, etc. Establish working relationship with landowner and write easement terms and conditions that are mutually agreeable. Verify maps, legal descriptions and fence boundaries of potential mitigation sites. Coordinate completion of property appraisals and review, including requesting bids of contractors.
Deliverable Specification: Information maintained in site files. Copy of easement terms and conditions and all legal descriptions will be included with appraisals. Information includes tax information, wetland delineations, aerial photos, and information pertaining to title searches.
Locations: 1
Primary Focal Species: Wildlife
Country: US **NPCC Subbasin:** PEND OREILLE
State: ID **HUC5 Watershed:**
County: BONNER **HUC6 Name:**
Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Perform boundary surveys as needed	7/1/2013	6/30/2014	Active	Perform boundary surveys as needed
B. Provide legal descriptions	7/1/2013	6/30/2014	Active	Provide legal descriptions
C. Provide minimum habitat units	7/1/2013	6/30/2014	Active	Provide minimum habitat units
D. Provide definition of easement terms and conditions (for easements)	7/1/2013	6/30/2014	Active	Provide definition of easement terms and conditions
E. Acquire appraisal and submit to BPA for review	7/1/2013	6/30/2014	Active	If the appraisal will be conducted by a non-BPA appraiser, please contact your BPA COTR for the most recent version of BPA's F&W Appraisal Requirements.
F. E-mail completed water survey form to BPA COTR	7/1/2013	6/30/2014	Active	The water survey form is located at: http://www.efw.bpa.gov/IntegratedFWP/watersurveyform.doc . The form should be completed by the project sponsor/contractor and emailed to the BPA COTR. The BPA COTR will attach the form in Pisces.
Deliverable: G. Property Acquisition Information		6/30/2014	Active	<i>See the Deliverable Specification above</i>

D: 172. Conduct Pre-Acquisition Activities

Title: Coordinate completion of Hazardous Waste Surveys
Description: Coordinate the completion of hazardous waste surveys on potential mitigation projects.
Deliverable Specification: Hazard waste surveys completed according to BPA KEP standards. Evaluation results will be maintained in site files.

Locations: 1
Primary Focal Species: Wildlife
Country: US
State: ID
County: BONNER

NPCC Subbasin: PEND OREILLE
HUC5 Watershed:
HUC6 Name:

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contract BPA's environmental compliance group	7/1/2013	6/30/2014	Active	Have a BPA inspector survey land for possible pollutants. If necessary utilize an outside contractor to inspect lands for pollution.
B. Begin clean-up work	7/1/2013	6/30/2014	Active	If clean-up work is necessary, then bid a subcontractor for clean-up work required.
C. Provide status report to BPA	7/1/2013	6/30/2014	Active	The findings of the Environmental Land Audit to be provided to BPA.
Deliverable: D. Completed Environmental Land Audit		6/30/2014	Active	<i>See the Deliverable Specification above</i>

E: 189. Coordination-Columbia Basinwide

Title: Coordinate with other members implementing Albeni Falls wildlife mitigation
Description: Coordinate when needed with other entities interested in implementing Albeni Falls wildlife mitigation, such as the U.S. Fish and Wildlife Service, the Army Corp of Engineers and any tribal or non-governmental entities. These activities may include meetings and open houses to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites.
Deliverable Specification: List of meetings and participants will be noted with meeting sign-in sheets, minutes or meeting summaries. Open house attendance and comments will be incorporated by reference into site-specific management plans.



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with other interested members as needed	7/1/2013	6/30/2014	Active	When appropriate, informing other members implementing under the Albeni Falls Wildlife Mitigation Project of pending projects and the landowners participating in the program.
B. Participate in meetings as needed	7/1/2013	6/30/2014	Active	Participate in meetings, if required. Facilitate and provide meeting minutes as needed.
C. Hold public meetings as needed	7/1/2013	6/30/2014	Active	Open houses will be held on an as-needed basis to provide the public the opportunity to provide feedback on proposed management plans for mitigation sites. Other interested members implementing Albeni Falls wildlife mitigation will be invited to participate.
Deliverable: D. Completed project work identified in the Wildlife Management Plan		6/30/2014	Active	<i>See the Deliverable Specification above</i>

F: 189. Coordination-Columbia Basinwide

Title: Coordinate/develop Albeni Falls Wildlife Mitigation Project presentations to the Wildlife Caucus
Description: Coordinate and develop the materials necessary to represent the Albeni Falls Wildlife Mitigation Project to the Wildlife Caucus. Such materials may include slides, overheads, budgets, spreadsheets, site-specific information, etc.
Deliverable Specification: Meeting participants include all Columbia Basin Fish and Wildlife Authority (CBFWA) project managers and CBFWA managers. Often the purpose of the meetings are to improve basin-wide coordination efforts of project development. Usually there are 6-10 meetings planned annually. Spreadsheets, overheads, budgets, etc.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Prepare materials for meetings	7/1/2013	6/30/2014	Active	Prepare PowerPoint presentations, overheads and other written materials on potential acquisition projects for the CBFWA wildlife advisory committee members.
B. Participate and attend wildlife caucus meetings	7/1/2013	6/30/2014	Active	Participate and attend CBFWA wildlife advisory committee meetings as needed. Usually 6-10 meetings annually.
Deliverable: C. Regional Wildlife Meeting Attendance		6/30/2014	Active	<i>See the Deliverable Specification above</i>

G: 189. Coordination-Columbia Basinwide

Title: Build relationships with entities interested in wildlife mitigation
Description: Build effective working relationships with local governments, other agencies, non-profit organizations, members of the community, and the interested public. Primary focus will be to coordinate restoration efforts on mitigation parcels.
Deliverable Specification: Ongoing coordination to build community interest and inform the public about the Albeni Falls Wildlife Mitigation Project. Coordinate and involve agencies, other interested entities and the general public in restoration efforts on mitigation parcels.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Attend and participate in agency and community meetings	7/1/2013	6/30/2014	Active	Attend and participate in land trust, land development and community group meetings as needed. Attend and participate in planning and scoping meetings for future restoration efforts on wildlife mitigation parcels.
B. Coordinate with interested parties on restoration efforts on mitigation parcels	7/1/2013	6/30/2014	Active	Coordinate with agency, tribe and other interested parties on planning and designing restoration projects on mitigation parcels.
C. Develop publications to advertise program	7/1/2013	6/30/2014	Active	Develop informational pamphlets and/or poster or oral presentations on wildlife mitigation efforts including restoration on mitigation parcels.
D. Contract a professional webdesigner	10/29/2013	11/30/2013	Completed	Contract a professional website designer to develop a web page for the Clark Fork River Delta Restoration Project.
E. Coordinate and update information on restoration project website	12/1/2013	6/30/2014	Active	Coordinate information to be posted on the Clark Fork River Delta Restoration website by ensuring that all information is approved by Federal partners and IDFG Headquarters.
Deliverable: F. Inform and Involve More Entities in the Mitigation Efforts		6/30/2014	Active	<i>See the Deliverable Specification above</i>

H: 189. Coordination-Columbia Basinwide



Title: Meet with County Commissioners
Description: Meet with County Commissioners to inform and update them on Albeni Falls Wildlife Mitigation activities. Counties include Boundary County, Bonner County, Kootenai County, Shoshone County and Benewah County.
Deliverable Specification: Incorporation into annual report.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold or attend meetings as necessary	7/1/2013	6/30/2014	Active	Meetings are to inform County commissioners of potential land sales and coordinate with wildlife management plan objectives.
Deliverable: B. Coordination with County Commissioners		6/30/2014	Active	<i>See the Deliverable Specification above</i>

I: 189. Coordination-Columbia Basinwide

Title: Coordinate enhancement and O&M activities defined in site-specific Wildlife Management Plans
Description: Coordinate enhancement activities defined in the individual site plans to ensure they follow the budget and attain the desired results.
Deliverable Specification: Verifying the completion of project work on mitigation properties for the Pend Oreille Wildlife Management Area (WMA), Boundary Creek and Smith Creek WMAs, and the Coeur d'Alene River WMA. Activities may include maintenance of fences, property and habitat improvements, access, water structures, information and education facilities, enforcement of easement terms and noxious weed control. Bidding out services to subcontractors and coordinating payment to subcontractors. Activities may include but are not limited to fencing, controlled burns, planting native vegetation, property clean-up and cultivating cropland.

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Hold coordination meetings	7/1/2013	6/30/2014	Active	Events that may trigger the organization of a meeting include the completion of a land acquisition or the beginning of a construction project on a Wildlife Management Area.
B. Coordinate activities on Boundary Creek/Smith Creek WMA	7/1/2013	6/30/2014	Active	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Boundary Creek and Smith Creek Wildlife Management Areas.
C. Coordinate activities on Pend Oreille WMA	7/1/2013	6/30/2014	Active	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Pend Oreille Wildlife Management Area (WMA).
D. Coordinate activities on the Coeur d'Alene River WMA	7/1/2013	6/30/2014	Active	Coordinate with IDFG Habitat and Wildlife biologists regarding the O&M activities for Coeur d'Alene River Wildlife Management Area (WMA).
Deliverable: E. Completed project work identified in Wildlife Management Plans		6/30/2014	Active	<i>See the Deliverable Specification above</i>

J: 114. Identify and Select Projects

Title: Identify cost-share partnerships and projects
Description: Wherever possible, identify partnerships with landowner participants, government agencies, watershed groups, or other entities so as to reduce costs, increase benefits, and/or eliminate duplicate activities. IDFG and the cost-share partner will negotiate a MOA to determine how habitat will be permanently protected and how management will proceed.
Deliverable Specification: List of cost-sharing partnerships to develop projects to protect, mitigate or enhance wildlife habitat. Cost-sharing role will be defined in Memorandum of Agreement (MOA). Possible partners could include The Nature Conservancy, Ducks Unlimited, Trout Unlimited, Inland Northwest Land Trust, the Rocky Mountain Elk Foundation, the Idaho Fish and Wildlife Foundation, the Idaho Department of Lands, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and the U.S. Forest Service and the Bureau of Land Management.
Primary Focal Species: Wildlife



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Contact organizations via telephone or email or other methods applicable in pursuit of partner	7/1/2013	6/30/2014	Active	Organizations and/or other agencies will be contacted to solicit cost-sharing partnerships.
B. Proposal Development	7/1/2013	6/30/2014	Active	Proposal development will vary depending upon agency and/or organization requirements.
C. Land Committee Review and Approval	7/1/2013	6/30/2014	Active	An internal process to review IDFG land acquisitions. The land committee meets at least four times a year and makes recommendations to the IDFG Director and the Idaho Fish and Game Commission.
D. Project Cost Share Information in Pisces	7/1/2013	6/30/2014	Active	Funding obtained through cost share will be identified and entered into Pisces under the Project 1992-061-03
Deliverable: E. Cost Share Partners Identified		6/30/2014	Active	<i>See the Deliverable Specification above</i>

K: 99. Outreach and Education

Title: Coordinate/implement info education program for Albeni Falls Wildlife Mitigation Project

Description: Coordinate and implement information and education activities on the Albeni Falls Wildlife Mitigation Project. Activities may include development of information and regulation signs and interpretive sites, production of audio-visual programs and informational brochures, and educational site tours. Activities may also include developing a school curriculum. The goals are to educate members of the community on the mitigation program and to encourage their participation.

Deliverable Specification: Interpretive sites, audio-visual program, classroom syllabus, informational brochures and signs.

Planned Metrics:
 * # of students reached: 200
 * # of general public reached: 200
 * # of teachers reached: 4

Locations: 1

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Field studies with Habitat Biologists	7/1/2013	6/30/2014	Active	Approximately 250 elementary, middle and/or high school students will observe habitat and wildlife biologists working in the field when collecting data.
B. Participant sign-in sheets	7/1/2013	6/30/2014	Active	Participants will sign-in for any seminar, workshop or field study activity.
Deliverable: C. Education and Outreach for community affected by the Albeni Falls Hydroelectric facility.		6/30/2014	Active	<i>See the Deliverable Specification above</i>

L: 87. Prepare HEP Report

Title: Coordinate and conduct baseline and 5- and 10-year HEP surveys

Description: Coordinate completion of Habitat Evaluation Procedures (HEP).

Deliverable Specification: Coordinate completion of baseline and 5- and 10-year HEP surveys. HEP reports are included as appendices to the annual report.

Locations: 1

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** PEND OREILLE

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Collect HEP data from field studies	7/1/2013	6/30/2014	Active	Collect field data using methods outlined in the USFWS HEP protocols.
B. Perform analysis on HEP data	7/1/2013	6/30/2014	Active	Collected field data will be entered into databases and then applied to appropriate species models to calculate the project HUs.
C. Submit draft HEP report to BPA for review	7/1/2013	6/30/2014	Active	HEP report will be produced and then submitted to BPA for review.
D. Upload final HEP report to BPA website	7/1/2013	6/30/2014	Active	Final HEP report uploaded to BPA website.
Deliverable: E. Completed HEP Reports for Mitigation Properties		6/30/2014	Active	<i>See the Deliverable Specification above</i>

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

Title: Coordinate and conduct vegetative monitoring surveys

Description: Coordinate completion and/or conduct surveys to include: distribution and abundance plant communities, including native and rare species; noxious weeds; roads, trails, etc.; and recreational use, economics.

Deliverable Specification: For each of the wildlife management areas, coordinate with the Regional Habitat Biologists and technicians to analyze the vegetative monitoring field data for the annual report.

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

Locations: 17

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** Multiple

State: ID **HUC5 Watershed:** Multiple

County: BENEWAH | BONNER | BOUNDARY | KOOTENAI **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories: ID Conservation Data Center (<http://fishandgame.idaho.gov/cms/tech/CDC/>)
 Idaho Fish and Wildlife (<https://fishandgame.idaho.gov/ifwis/portal/>)
 Information System

Protocol: Monitoring and Evaluation Plan for Idaho Wildlife Mitigation Projects v1.0

Protocol Owner: Kathy Cousins **Protocol State:** Draft

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2013	6/30/2014	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. Collect data from field studies	7/1/2013	6/30/2014	Active	Data collected by the Habitat Biologists and Wildlife Technicians are submitted to the Project Manager.
C. Perform analyses on data sets	7/1/2013	6/30/2014	Active	Evaluations and assessments by Habitat Biologists and Biological Technicians are sent to the Project Manager. The Project Manager verifies the information and performs any additional analyses, if needed, and evaluates results in the annual report.
D. Review, revise, and Publish protocol, study design, and methods in monitoringmethods.org	7/1/2013	6/30/2014	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.
Deliverable: E. Annual Summary Report of Vegetative Monitoring		6/30/2014	Active	<i>See the Deliverable Specification above</i>

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

Title: Coordinate, collect and generate field data for Wildlife Habitat Reference Sites - EWU

Description: Sampling protocols developed by James Hallett and Margaret O'Connell at Eastern Washington University (EWU) in concert with the Albeni Falls Interagency Work Group. The Idaho Department of Fish and Game (IDFG) is contracting the EWU researchers to investigate the possibility of using these protocols to monitor wildlife habitat on mitigation parcels managed by the Idaho Department of Fish and Game (IDFG). The EWU investigators will work with IDFG Project Lead to identify potential reference sites to be used to assess the progression of a restoration project in the Clark Fork River delta. It is hoped that this information might be used to adaptively manage the restoration project.



Deliverable Specification: The EWU Principal Investigators will provide all survey data and analyses of potential wildlife habitat reference sites to IDFG.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Multiple Strategies
- * 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 : Multiple Strategies

Locations: 1
Primary Focal Species: Wildlife
Country: US
State: ID
County: BONNER

NPCC Subbasin: CLARK FORK
HUC5 Watershed:
HUC6 Name:

Salmonid ESUs Present:
Data Repositories: Idaho Fish and Wildlife (<https://fishandgame.idaho.gov/ifwis/portal/>)
 Information System
 ID Conservation Data Center (<http://fishandgame.idaho.gov/cms/tech/CDC/>)

Protocol: Wildlife and habitat monitoring to assess ecological restoration projects v1.0
Protocol Owner: Kristi Kimmet **Protocol State:** Draft

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2013	6/30/2014	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	7/1/2013	6/30/2014	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. Contract EWU Principal Investigators	7/15/2013	6/30/2014	Active	Contract EWU Principal Investigators
D. Coordinate with IDFG Project Lead on identifying reference sites	7/20/2013	6/30/2014	Active	Coordinate with IDFG Project Lead to identify potential wildlife habitat reference sites.
E. Conduct wildlife habitat surveys	7/25/2013	6/30/2014	Active	Conduct wildlife habitat surveys.
F. Provide all data to Project Lead	7/30/2013	6/30/2014	Active	Contractors from Eastern Washington University will provide all data collected and any analyses and briefs to the IDFG Project Lead.
Deliverable: G. Wildlife Habitat Reference Site Data and Analyses		6/30/2014	Active	<i>See the Deliverable Specification above</i>

O: 174. Produce Plan

Title: Develop site-specific wildlife management plans
Description: Develop Wildlife Management Plans (WMP) that will include, but not be limited to, the following components: fish and wildlife habitat, recreation and access, fire protection noxious weeds, information and education, operation and maintenance, and monitoring and evaluation. The management plans will define the management program. These activities will be done on a need-by-need bases depending upon the acquisition activities.
Deliverable Specification: Site-specific management plans completed on a need-by-need basis. The time frame for the completion of a site-specific management plan is about one year after the completion of an acquisition. The wildlife management plan may include components on fish and wildlife habitat, recreation and access, fire protection, noxious weeds, information and education, operation and maintenance and monitoring and evaluation.
Primary Focal Species: Wildlife



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	7/1/2013	6/30/2014	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. Hold scoping meetings	7/1/2013	6/30/2014	Active	Meetings will be held on a need-by-need basis with local land owners, county commissioners and community members regarding any new Wildlife Management Plans.
C. Submit draft plan for IDFG review	7/1/2013	6/30/2014	Active	Draft plan is submitted to IDFG for internal review, and review by the IDFG director and commission. This milestone will be completed after initial scoping meetings.
D. Submit draft plan for BPA review	7/1/2013	6/30/2014	Active	Draft management plan submitted to BPA for comments. This milestone will be completed after the IDFG review.
E. Hold a meeting for final review	7/1/2013	6/30/2014	Active	The final draft Wildlife Management Plan will be presented to the county commissioners for comment. This milestone will be completed after the BPA review.
F. Submit final plan to BPA	7/1/2013	6/30/2014	Active	Final Wildlife Management Plan submitted to BPA. This milestone will be completed after it is presented to the County commissioners for comment.
Deliverable: G. Completed Wildlife Management Plans		6/30/2014	Active	<i>See the Deliverable Specification above</i>

P: 119. Manage and Administer Projects

Title: Develop/maintain IDFG budgets, manage/maintain contracts & inventory records & IDFG spending

Description: Develop administrative work statement and budget, and maintain operating budgets for mitigation parcels. Oversee and develop budget revisions as necessary. Manage IDFG-BPA contract to maintain fiscal responsibility and oversight. Develop and manage subcontracts on an as-needed basis. Coordinate the purchase of equipment for the continued operation and maintenance of three Wildlife Management Areas (WMA). Maintain equipment inventory and documentation. Coordinate with administrative staff and maintain IDFG spending authority at appropriate levels.

Deliverable Specification: FY14 work statements, budgets and property inventories. Purchase of operating and maintenance equipment for three wildlife management areas (WMA). Copies of subcontracts and revised contract.



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Accrual - Submit September estimate to BPA	7/1/2013	6/30/2014	Active	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).
B. Submit monthly invoices electronically within 45 days.	7/1/2013	6/30/2014	Active	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).
C. Facilitate inputting Cost Share information into Pisces at the Project level.	7/1/2013	6/30/2014	Active	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. (b2) Enter previous FY's Cost Share information on the Project Cost Share tab by Nov 15 for all project partners.
D. Create all FY13 and FY14 contracts using PISCES	7/1/2013	6/30/2014	Active	FY13 and FY14 Statement of Work and Work Element budget to be developed on-line using Pisces.
E. Monitor periodic status reports on line	7/1/2013	6/30/2014	Active	Status reports to be monitored on-line using Pisces.
F. Maintaining inventory documentation	7/1/2013	6/30/2014	Active	Inventory maintained at site.
G. Land & Real Estate Training Seminars	7/1/2013	6/30/2014	Active	The IDFG Project Manager to attend up to three instructional seminars on land appraising, real estate land transfers, and laws pertaining to conservation easements.
H. Solicit bids for equipment purchase	7/1/2013	6/30/2014	Active	Coordinate the solicitation of bids for the purchase of equipment for the three Wildlife Management Areas (WMA). The equipment includes: - Seed Drill - CDA Tractor Land Pride 6 feet - Two Weed wiper booms - 15 foot Smucker @\$1,400 each - 3 - Bottom Plow - Arrow Equipment - ATV Sprayer Unit AgPro 2 tank/boomless sprayer.
I. Prepare paperwork for purchase of WMA equipment	7/1/2013	6/30/2014	Active	Coordinate with Regional Biologists and Headquarter staff in the preparation and completion of the paperwork to purchase the O&M equipment.
Deliverable: J. Project Management and WMA Equipment Purchase		6/30/2014	Active	<i>See the Deliverable Specification above</i>

Q: 175. Produce Design and/or Specifications

Title: Prepare designs and plans to protect and restore delta area in the Project Area

Description: Extensive bank erosion has occurred to islands and shorelines in the Pack River, Clark Fork River and Priest River deltas in northern Idaho, resulting in significant losses of soil, native riparian and wetland vegetation, as well as the quantity and quality of fish and wildlife habitat. IDFG is working with Avista Corporation, Bureau of Land Management and Ducks Unlimited, as well as the Kalispel Tribe and other partners, to protect and restore wildlife habitats in the deltas. The Pack River delta is about 1,440 acres in size, and a small restoration project conducted in 2009, has shown that restoration is a viable wildlife mitigation opinion. The Priest River delta is now almost completely eroded. The Clark Fork River delta is about 6,000 acres in size, and is composed of complex wildlife habitats that are at risk of eroding into Lake Pend Oreille. Numerous studies have shown that over 80% of all fish and wildlife use riparian and wetland habitats during some stage of their life cycle—ranging from endangered bull trout, to recovered bald eagles, and big game, fur bearing mammals, reptiles, amphibians and hundreds of species of neo-tropical migrant birds. A coordinated effort is needed to prepare plans and designs to protect and restore the delta areas.

Deliverable Specification: A document proposing protection and restoration actions for the deltas in the Albeni Falls Dam Project Area.

Locations: 1
Primary Focal Species: Wildlife
Country: US
State: ID
County: BONNER
Salmonid ESUs Present:

NPCC Subbasin: PEND OREILLE
HUC5 Watershed:
HUC6 Name:



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Coordinate with partners and interested stakeholders	7/1/2013	6/30/2014	Active	IDFG staff will meet with partners such as the U.S. Army Corps of Engineers, Kalispel Tribe, U.S. Bureau of Land Management, Avista Corporation, the Idaho Department of Lands, the Idaho Department of Environmental Quality, the U.S. Environmental Protection Agency, Ducks Unlimited and other interested parties to coordinate efforts in developing a plan and design to protect and restore wildlife habitat in the Project Area deltas.
B. Investigate all historical biological documents	7/1/2013	6/30/2014	Active	IDFG staff will investigate and inventory past studies and surveys completed for the Project Area deltas.
C. Complete survey and maintenance work in the Pack River delta	10/29/2013	6/30/2014	Active	A pilot restoration effort in Pack River delta served to provide IDFG and partners with information on how to approach other delta restoration projects. A survey of the constructed structures and the vegetation response will be completed on the Pack River delta project. Maintenance work will be completed in the Pack River delta to gain better understandings on how to construct vegetated rock breakwaters and Bendway weirs.
D. Prepare a proposal for the protection and restoration of the Pack River and Clark Fork River d	7/1/2013	6/30/2014	Active	IDFG Project Manager will coordinate with partners to prepare a proposal to protect and restore the Project Area deltas.
Deliverable: E. Engineered proposal for the protection and restoration of the deltas in the Project Area		6/30/2014	Active	<i>See the Deliverable Specification above</i>

R: 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:

Milestone Title	Start Date	End Date	Status	Milestone Description
A. Jul-Sep 2013 (7/1/2013 - 9/30/2013)	10/1/2013	10/15/2013	Completed	
B. Oct-Dec 2013 (10/1/2013 - 12/31/2013)	1/1/2014	1/15/2014	Completed	
C. Jan-Mar 2014 (1/1/2014 - 3/31/2014)	4/1/2014	4/15/2014	Active	
D. Final Apr-Jun 2014 (4/1/2014 - 6/30/2014)	6/16/2014	6/30/2014	Active	

S: 132. Produce (Annual) Progress Report

Title: Submit Progress Report for the period (July 1, 2013) to (June 30, 2014)
Description: 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. Date range July 1, 2013 to June 30, 2014 will be agreed upon by the COTR and the contractor. This may or may not coincide with the contract period. For an ongoing project, a progress report covering a contract period may be submitted under the subsequent contract, if approved by the COTR.

Progress reports must conform to BPA guidelines. See the "formatting guidelines" link at the Technical Reports and Publications page: <http://www.efw.bpa.gov/IntegratedFWP/technicalreports.aspx>.

If producing a technical report for this contract, a discrete experiment, or a peer-reviewed publication, use work element 183: Produce Journal Article.

Deliverable Specification: Use the attachment tab in Pisces to attach your progress report. Progress reports attached in Pisces will be posted on the web.

Planned Metrics:
 * Start date of reporting period : 7/1/2013
 * End date of reporting period : 6/30/2014



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Submit annual progress report to COTR	7/1/2013	6/30/2014	Active	Submit the completed annual report to the COTR.
Deliverable: B. Attach Progress Report in Pisces		6/30/2014	Active	See the Deliverable Specification above

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

Title: Coordinate, collect & generate field data for Monitoring of Bank Retreat and Vegetation Development

Description: Researchers at Washington State University (WSU), School of the Environment, will be contracted to monitor bank erosion and vegetation changes before and after the completion of a restoration project in the Clark Fork River delta. Bank erosion measurements will be completed using laser sensors. The laser sensors make fine scale distance measurements and their use should require less field time while producing a more detailed quantification of bank erosion. Two types of LiDAR sensors will be used in the study. The first method would be a temporally extensive study of multiple sites (i.e., 10-15) at roughly monthly time intervals and the second would be an intensive study of a few sites (i.e., 1-4) at daily time intervals for a couple of months over two time periods.

Terrestrial Scanning LiDAR (TSL) is a developed technology for measuring the environment rapidly with profound detail. TSL instruments make high resolution distance measurements of the geomorphic and vegetative surface. Many TSL sensors can penetrate water. Using the TSL, WSU researchers will make multiple measurements of selected bank erosion sites at key time periods over the study period. The data will provide a 3D surface of the bank, subsurface and vegetative surface. Subsequent overlays of these surfaces will indicate change over time.

Automated LiDAR is an emerging technology for measuring rapid geomorphic change. The automated TSL (ATSL) offers an unique way to monitor daily change in bank retreat. ATSL data will be used to monitor and compare daily changes in lake level and river hydrology to pinpoint the time and location of bank erosion.

WSU researchers will monitor the effect of the project on vegetation structure and composition at the selected sites on the delta. Dominant tree species will be measured with the two forms of LiDAR at the bank erosion sites. These data will be used to quantify bank retreat on vegetated versus non-vegetated banks. Traditional methods will be employed on these surfaces to match LiDAR data and potentially with the remotely-sensed data. Small field plots will also be used at specific locations to identify species recruitment. Plots will be surveyed in the winter and summer of 2014, before project implementation and a full year afterwards.

Deliverable Specification: The WSU Principal Investigator will make measurements of bank erosion and vegetation change before and after a proposed restoration project in the Clark Fork River delta. The Principal Investigator will provide all survey data and analyses to IDFG.

Planned Metrics:

- * Primary R, M, and E Focal Strategy : Multiple Strategies
- * 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 : Multiple Strategies

Locations: 1

Primary Focal Species: Wildlife

Country: US **NPCC Subbasin:** CLARK FORK

State: ID **HUC5 Watershed:**

County: BONNER **HUC6 Name:**

Salmonid ESUs Present:

Data Repositories: Idaho Fish and Wildlife Information System (<https://fishandgame.idaho.gov/ifwis/portal/>)
ID Conservation Data Center (<http://fishandgame.idaho.gov/cms/tech/CDC/>)

Protocol: Wildlife and habitat monitoring to assess ecological restoration projects v1.0

Protocol Owner: Kristi Kimmet **Protocol State:** Draft



Milestone Title	Start Date	End Date	Status	Milestone Description
A. Environmental compliance requirements complete	10/29/2013	6/30/2014	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	10/29/2013	6/30/2014	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. Contract WSU Principal Investigators	10/29/2013	1/24/2014	Active	Contract WSU Principal Investigator
D. Coordinate with IDFG Project Lead on identifying sample sites	11/22/2013	6/30/2014	Active	Coordinate with IDFG Project Lead to identify potential sample sites.
E. Conduct Terrestrial Scanning LiDAR (TSL)	11/22/2013	6/30/2014	Active	Conduct Terrestrial Scanning LiDAR surveys.
F. Provide all data to Project Lead	11/22/2013	6/30/2014	Active	Contractors from Washington State University will provide all data collected and any analyses and briefs to the IDFG Project Lead.
Deliverable: G. Monitoring Bank Erosion and vegetation change in the Clark Fork River Delta		6/30/2014	Active	<i>See the Deliverable Specification above</i>

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:
<http://www.efw.bpa.gov/IntegratedFWP/InadvertentDiscoveryProcedure.pdf>

Temporary Restoration of Bull Trout Passage at Albeni Falls Dam

2008 Progress Report

Prepared by

Brian J. Bellgraph

Pacific Northwest National Laboratory
Richland, Washington

Prepared for

U.S. Department of Energy
Bonneville Power Administration
Division of Fish and Wildlife
Portland, Oregon

Project No. 2007-246-00
Contract 26934 Release 16

February 2009

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PACIFIC NORTHWEST NATIONAL LABORATORY

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BATTELLE

for the

UNITED STATES DEPARTMENT OF ENERGY

under Contract DE-AC05-76RL01830



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Introduction

The goal of this project is to provide temporary upstream passage of bull trout around Albeni Falls Dam on the Pend Oreille River, Idaho. Our specific objectives are to capture fish downstream of Albeni Falls Dam, tag them with combination acoustic and radio transmitters, release them upstream of Albeni Falls Dam, and determine if genetic information on tagged fish can be used to accurately establish where fish are located during the spawning season. In 2007, radio receiving stations were installed at several locations throughout the Pend Oreille River watershed to detect movements of adult bull trout; however, no bull trout were tagged during that year. In 2008, four bull trout were captured downstream of Albeni Falls Dam, implanted with transmitters, and released upstream of the dam at Priest River, Idaho. The most-likely natal tributaries of bull trout assigned using genetic analyses were Grouse Creek ($N = 2$); a tributary of the Pack River, Lightning Creek ($N = 1$); and Rattle Creek ($N = 1$), a tributary of Lightning Creek. All four bull trout migrated upstream from the release site in Priest River, Idaho, were detected at monitoring stations near Dover, Idaho, and were presumed to reside in Lake Pend Oreille from spring until fall 2008. The transmitter of one bull trout with a genetic assignment to Grouse Creek was found in Grouse Creek in October 2008; however, the fish was not found. The bull trout assigned to Rattle Creek was detected in the Clark Fork River downstream from Cabinet Gorge Dam (approximately 13 km from the mouth of Lightning Creek) in September but was not detected entering Lightning Creek. The remaining two bull trout were not detected in 2008 after detection at the Dover receiving stations. This report details the progress by work element in the 2008 statement of work, including data analyses of fish movements, and expands on the information reported in the quarterly Pisces status reports.

Progress by Work Element

Work Element A: 165 – Produce Environmental Compliance Documentation – Complete environmental compliance requirements

All procedures involving the handling of bull trout for this study were reviewed and approved by the Institutional Animal Care and Use Committee for Toxicology Northwest and the Pacific Northwest National Laboratory (PNNL) prior to handling fish (IACUC File: 2007-19; Animal Welfare Assurance number: A3353-01). The animal care document is reviewed annually to ensure compliance and to account for changes in the project.

Work Element B: 157 – Collect/Generate/Validate Field and Lab Data – Weekly electrofishing

Pacific Northwest National Laboratory staff assisted Eastern Washington University (EWU) staff with electrofishing on two trips (one in the spring and one in the fall) in 2008. We will be available to assist EWU with further sampling in spring 2009.

Work Element C: 28 – Trap and Haul – Transport bull trout above Albeni Falls Dam

No bull trout were captured during electrofishing trips with which PNNL assisted. Consequently, no fish were transported upstream of Albeni Falls Dam during trips with PNNL biologists.

Work Element D: 158 – Mark/Tag Animals – Implant combination radio acoustic transmitters into bull trout

No bull trout were captured during electrofishing when PNNL personnel were present. As a result, PNNL staff implanted no fish with combination radio acoustic transmitter (CART) tags. However, four bull trout were captured by EWU and the Kalispel Tribe during other trips, implanted with CART transmitters, and transported to the Pend Oreille River upstream of Albeni Falls Dam (Table 1). Further information on bull trout tagging and genetic analyses can be found in the Kalispel Tribe annual report (Paluch et al. 2009).

Table 1. Information on bull trout study fish in 2008. Genetic origins indicate the most likely and second most likely natal tributaries, respectively. Tag types are CART (combination acoustic and radio tag) and NANO (radio tag only).

Code	Tagging Date	Length (mm)	Weight (g)	PIT Tag #	Collector	Sex	Genetic Origin	Tag Type
126	19 May 2008	505	1178	985121002196227	Kalispel	Unknown	Grouse Creek, Trestle Creek	CART 16_2S
128	19 May 2008	501	1133	985121002164616	Kalispel	Female	Grouse Creek, Rattle Creek	CART 16_2S
172	11 June 2008	363	374	4812405A7F	EWU	Unknown	Lightning Creek, Gold Creek	NANO
108	18 June 2008	496	1241	985121002194596	EWU	Female	Rattle Creek, Morris Creek	CART 16_1

Work Element E: 157 – Collect/Generate/Validate Field and Lab Data – Mobile tracking surveys by fixed wing aircraft, vehicle, and boat

Mobile tracking surveys by aircraft, vehicle, and boat were performed by staff of PNNL and/or EWU in 2008. Specific surveys performed and fish detections by EWU are reported in the Kalispel Tribe annual report (Paluch et al. 2009); fish detections are reported also in Work Element J as part of the detection history of each fish. Fish detections were recorded using a handheld Global Positioning System (GPS) receiver.

Two boat-tracking surveys were performed by PNNL on Lake Pend Oreille, one in mid-August and one in early October. For the first boat survey, PNNL staff worked with personnel from the Idaho Fish and Game Department who were performing acoustic tracking surveys for tagged lake trout in Lake Pend Oreille. During the second boat survey, acoustic tracking and radio tracking of Pend Oreille Lake occurred simultaneously using a PNNL boat. Points near the mouths of streams identified as potential natal tributaries of bull trout study fish (i.e., Pack River, Trestle Creek, and Clark Fork) were surveyed, as well as points along the shoreline between these tributaries. No bull trout were found during either boat-tracking survey.

Vehicle mobile tracking by PNNL occurred during the same trips as boat tracking. Mobile tracking by PNNL and EWU was conducted primarily along the Pack River and Grouse Creek complex because

this tributary did not have a radio receiving station installed to detect fish entering the tributary but was identified as a potential natal tributary of two study fish. Trestle Creek and Lightning Creek also were tracked by vehicle to ensure that fish did not pass the respective radio receiving stations without being detected. Mobile tracking was performed also along the Clark Fork River from Lake Pend Oreille upstream to Cabinet Gorge Dam because one tagged bull trout was located near Cabinet Gorge hatchery by staff of AVISTA (owner of Cabinet Gorge Dam).

Work Element F: 157 – Collect/Generate/Validate Field and Lab Data – Download stationary ground radio receiving stations

No additional radio receiving stations were installed in 2008. Radio receiving stations installed in 2007 and used in 2008 were

- Albeni Falls Dam spillway tailrace (Tailrace, site 1)
- Albeni Falls Dam spillway forebay (Forebay, site 2)
- Albeni Falls Dam powerhouse tailrace (Logchute, site 3)
- Albeni Falls Dam powerhouse forebay (Cement Pad, site 4)
- mouth of the Priest River (Mudhole, site 5)
- north side of Pend Oreille River near Dover, Idaho (North Dover, site 6)
- south side of Pend Oreille River near Dover, Idaho, and cross-river from site on north side (South Dover, site 7)
- mouth of Gold Creek, a tributary to Lake Pend Oreille (Gold, site 8)
- mouth of Granite Creek, tributary to Lake Pend Oreille (Granite, site 9)
- mouth of Lightning Creek, tributary to the Clark Fork River just upstream of Lake Pend Oreille (Lightning, site 10)
- mouth of Trestle Creek, tributary to Lake Pend Oreille (Trestle, site 11).

These radio receiving locations are shown in Figures 1 and 2. Technical and setup specifications of radio receiving stations can be found in Bellgraph and Deters (2007). The North and South Dover stations each were moved about 100–200 m downstream to private property in 2008 because of vandalism that occurred in 2007. No vandalism of radio receiving stations occurred in 2008. PNNL researchers tested the reception range of each monitoring station after installation of receivers in 2008; details of the testing are explained in Work Element H.

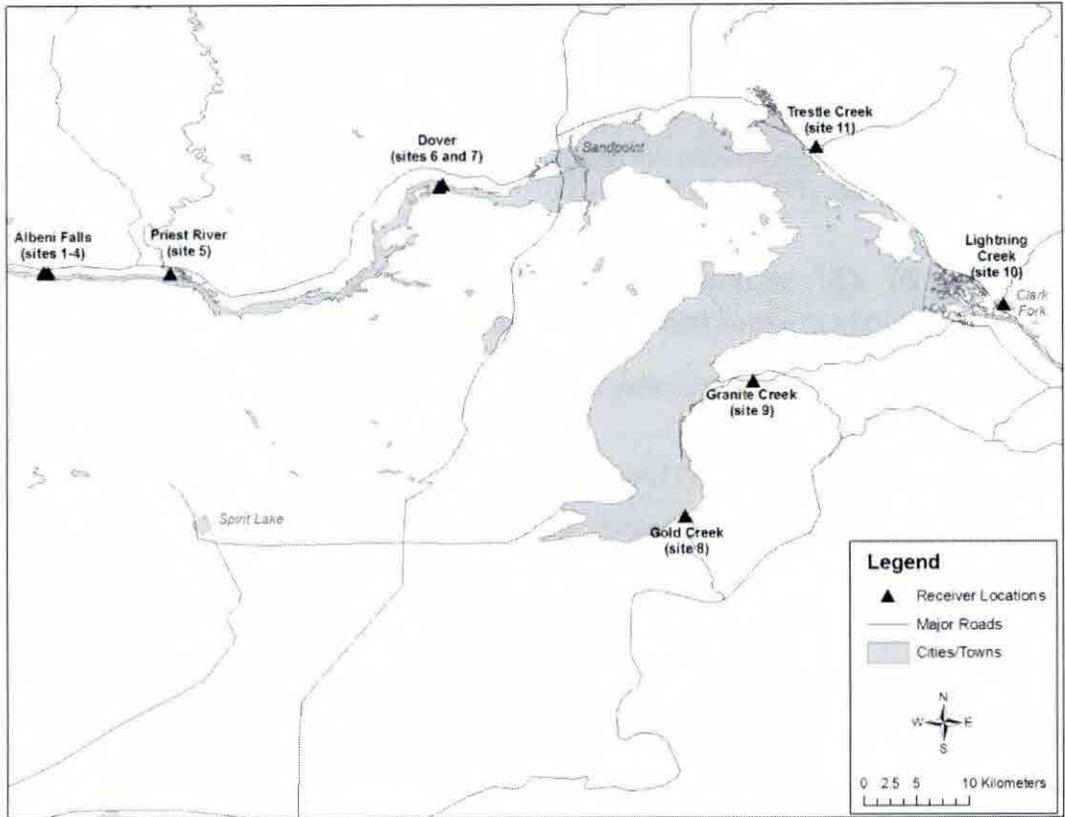


Figure 1. Locations of radio receiving monitoring stations on the Pend Oreille River and Pend Oreille Lake tributaries in 2008

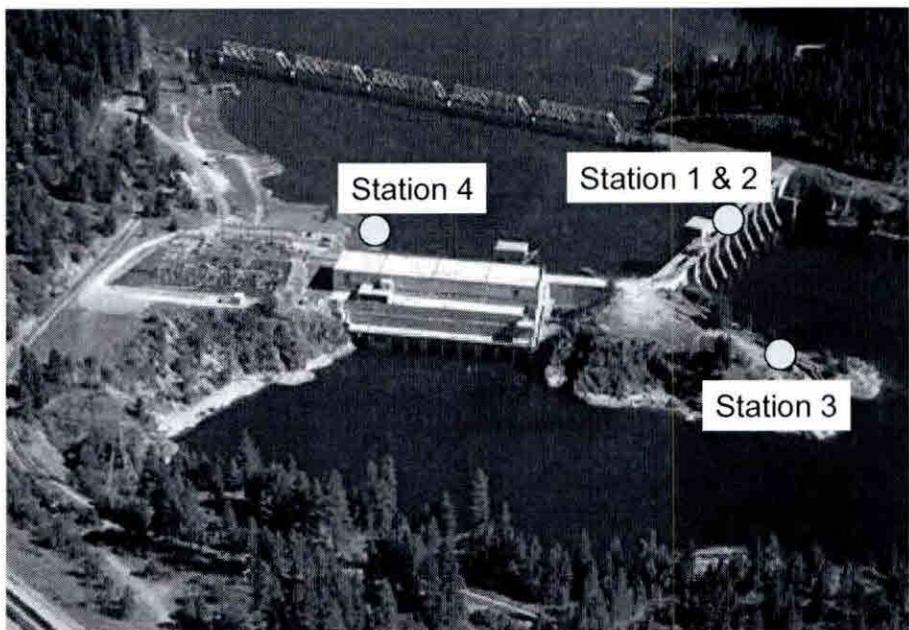


Figure 2. Locations of radio receiving monitoring stations at Albeni Falls Dam in 2008

Receivers were downloaded approximately once every two weeks during operation in 2008 by PNNL or EWU staff (Table 2). A standard operating procedure was used in 2008 to ensure data quality control during each download. This procedure involved a basic check of monitoring station performance and guidelines for saving and maintaining data. Staff ensured that interference signals were minimal (to allow for detection of fish transmitters), the beacon transmitter was detected hourly, the solar panel was charging the internal batteries, and the station was inspected for damage. Data were saved to a laptop computer and backed up to a removable thumb drive. Data collected by EWU were then sent to PNNL within a few working days. All receivers except those for the Tailrace, Forebay, and Logchute were removed in fall 2008. The three Albeni Falls Dam receivers will continue to collect data during winter 2008–2009 for a study funded by the U.S. Army Corps of Engineers (USACE) to track bull trout movements downstream of Albeni Falls Dam and concurrently will collect data on bull trout tagged for this study.

Table 2. Operation dates of radio receiving stations in 2008. End dates marked as N/A indicate that receivers were not removed in fall 2008 and will continue to record data during winter 2008–2009.

Receiver Name	Site #	Start Date	End Date
Tailrace	1	25 February 2008	N/A
Forebay	2	25 February 2008	N/A
Logchute	3	26 February 2008	N/A
Cement Pad	4	25 February 2008	26 November 2008
Mudhole	5	26 February 2008	25 October 2008
North Dover	6	11 March 2008	26 November 2008
South Dover	7	26 February 2008	26 November 2008
Gold	8	12 June 2008	25 October 2008
Granite	9	12 June 2008	25 October 2008
Lightning	10	27 February 2008	26 November 2008
Trestle	11	11 March 2008	26 November 2008

PNNL and EWU staff made miscellaneous repairs to radio receiving stations during 2008. A nine-element Yagi was installed to replace the six-element Yagi at the Logchute station (site 3) to decrease the reception range of the station and improve the capability to detect fish entering the powerhouse tailrace. In addition, a solar panel charger controller was replaced at the North Dover (site 6) station. Further, an additional deep-cycle battery and solar panel were added to the Trestle Creek (site 11) station to increase battery life.

Work Element G: 119 – Manage and Administer Projects – Manage project

Labor to accomplish electrofishing, mobile tracking, downloading of monitoring stations, and assembling data were coordinated in 2009 among staff from EWU, the Kalispel Tribe, and PNNL. A budget and statement of work for 2009 and the current property inventory are being assembled and will be submitted to BPA in January 2009.

Work Element H: 70 – Install Fish Monitoring Equipment – Annual overhaul and recalibration of ground receiver stations

Reception range of all monitoring stations was tested after installation of receivers in 2008 (Figures 3 through 6). The four stations at Albeni Falls Dam and the Mudhole station were tested in mid-March 2008. The North and South Dover stations on the Pend Oreille River were tested in early April 2008. The stations on Lake Pend Oreille tributaries were tested on the same dates as receiver reinstallations in Table 1. Transects located about 100 m apart, parallel to the concrete of the dam spillway and extending the width of the river, were used to test the tailrace and forebay receivers on the dam spillway. A linear transect extending from the downstream end of the dam logchute to the opposing bank of the powerhouse tailrace was used to test the powerhouse tailrace monitoring station. A linear transect extending across the forebay, parallel to the powerhouse, was used to test the powerhouse forebay monitoring station. Reception range of the Dover receiving stations was tested at five equally spaced points along a linear transect that extended from the North station to the South station (Figure 5). At about 50 m along each transect at Albeni Falls Dam and at the five points of the Dover transect, a transmitter was lowered to depths of 1, 3, 5, 7, and 10 m (or up to the maximum depth) and the signal strength of the transmitter decoded by the receiver was recorded. Range testing of receivers at the mouth of the Priest River and the Pend Oreille Lake tributaries was used to calibrate receivers so that transmitters could be decoded across the width of the tributary at all depths and upstream and downstream movements could be differentiated.

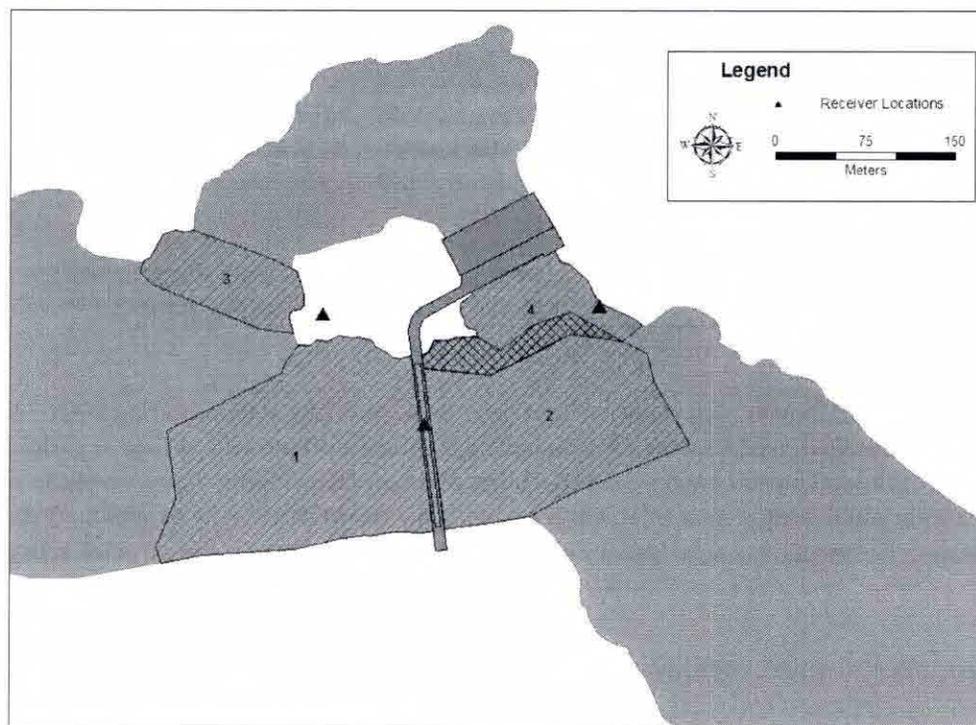


Figure 3. Reception range of receivers at Albeni Falls Dam at 1-m depth in spring 2008. The simple-hatched polygons represent areas in which radio receivers decoded a CART transmitter with power greater than 100. Numbered polygons correspond to receivers monitoring the spillway tailrace (1), spillway forebay (2), powerhouse tailrace (3, Logchute receiver), and powerhouse forebay (4, Cement Pad receiver). The cross-hatched polygon denotes range overlap between receivers 2 and 4.

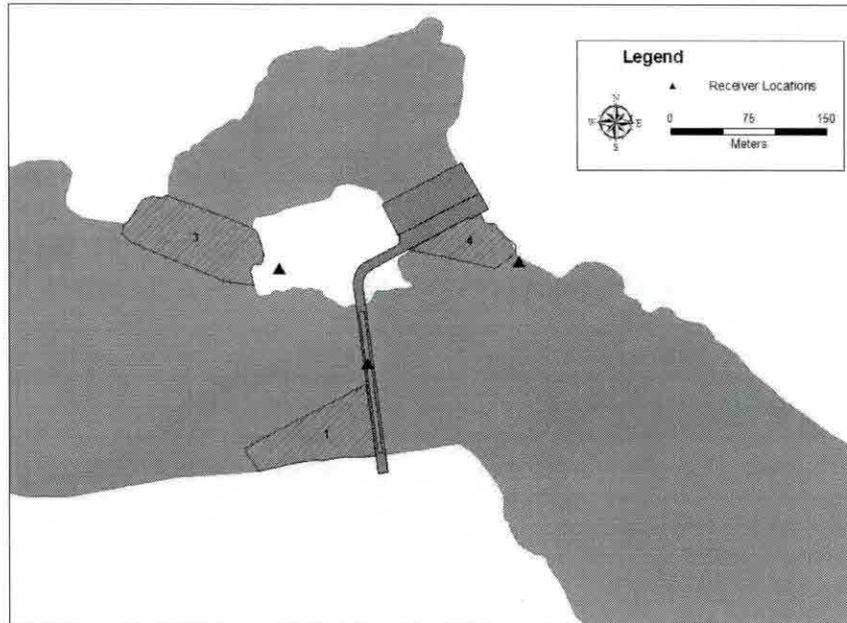


Figure 4. Reception range of receivers at Albeni Falls Dam at 5-m depth in spring 2008. The simple-hatched polygons represent areas in which the respective radio receivers decoded a fish transmitter with power greater than 100. Numbered polygons correspond to receivers monitoring the spillway tailrace (1), powerhouse tailrace (3, Logchute receiver), and powerhouse forebay (4, Cement Pad receiver).

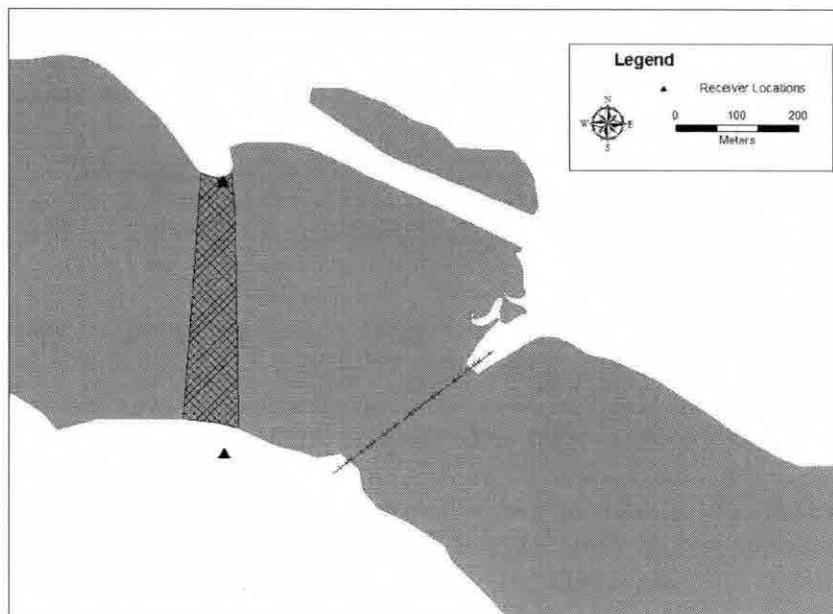


Figure 5. Reception range of the North Dover and South Dover receivers on the Pend Oreille River at 1-m depth in spring 2008. The cross-hatched polygon represents the area in which the radio receivers decoded a fish transmitter with a power greater than 100. The railroad bridge near Dover, Idaho, is denoted by the hatched line extending from the north to south bank of the river, where receivers were located in 2007.

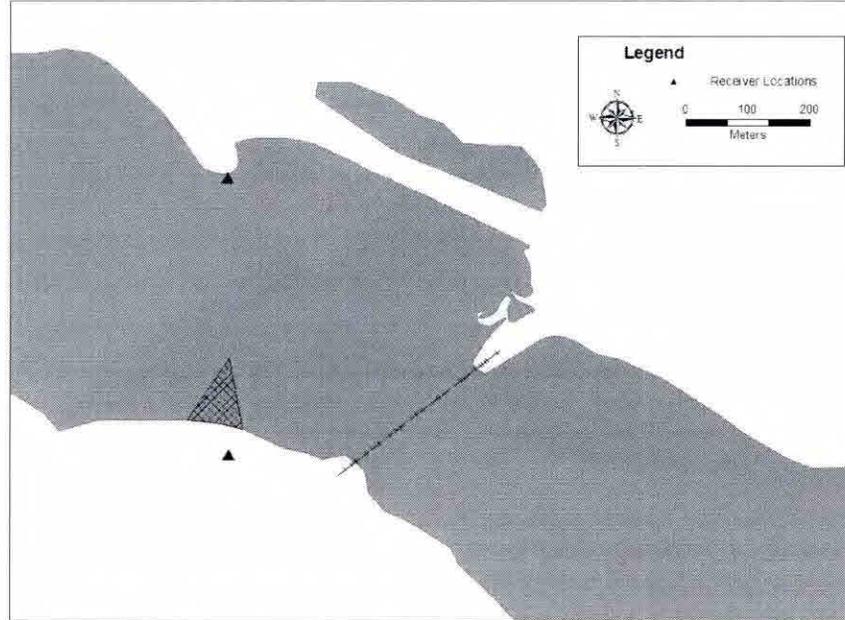


Figure 6. Reception range of the North Dover and South Dover receivers on the Pend Oreille River at 5-m depth in spring 2008. The cross-hatched polygon represents the area in which the South Dover radio receiver decoded a fish transmitter with a power greater than 100. The railroad bridge near Dover, Idaho, is denoted by the hatched line extending from the north to south bank of the river, where receivers were located in 2007.

Reception range of the tailrace and logchute receivers was retested in September 2008 after hardware changes to the logchute receiver and programming changes to the tailrace receiver (Figure 7). These changes were necessary to simultaneously meet the objectives for the current study and the USACE-funded study mentioned in Work Element F. To test receivers, multiple test transmitters were dragged throughout the tailrace at varying depths while receivers simultaneously decoded transmitters. Transmitter location data were then paired with receiver detection data to quantify the reception range of all receivers interrogating the Albeni Falls Dam tailrace, including the additional receivers installed for the USACE study (Figure 7).

The greater detection range of the Tailrace and Logchute receivers in September 2008 than spring 2008 likely is due to differences in testing methodology. Detection range was tested in the spring at specific points in the tailrace to ensure that transmitters would be detected downstream of the spillway, but points did not encompass the entire range of the receivers. In September 2008, the testing methodology was designed to find the ultimate range of each receiver, and, subsequently, the detection ranges differed. Additionally, transmitters were in the water for a much longer period during the September testing and thus provide a more accurate depiction of receiver range.

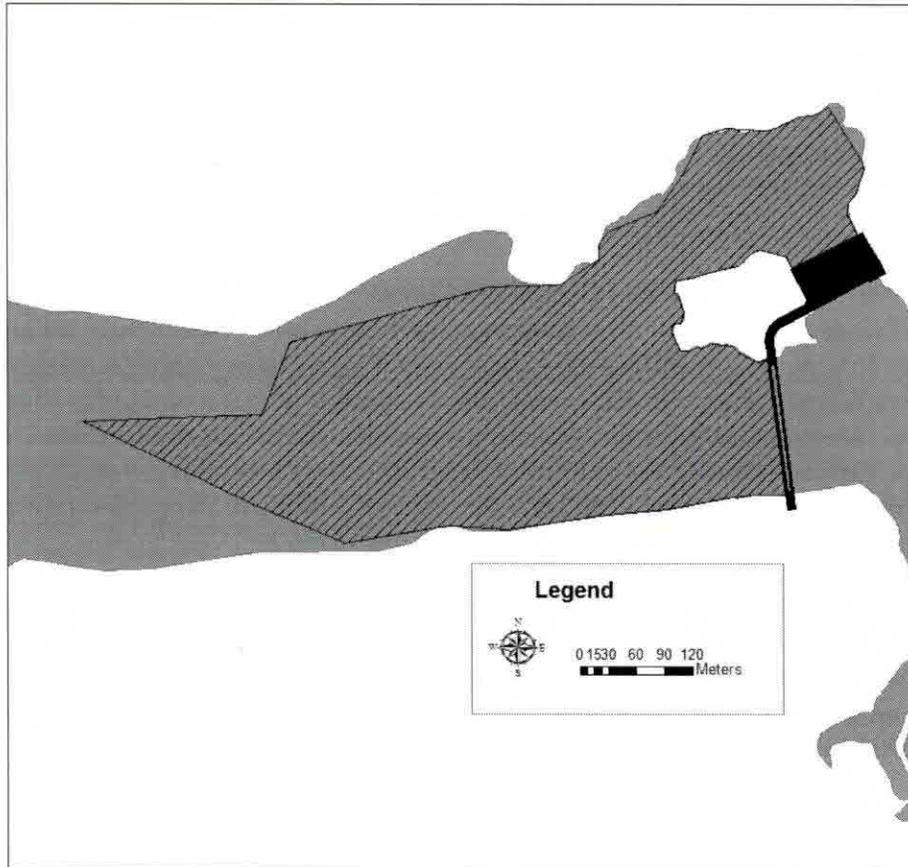


Figure 7. Reception range downstream of Albeni Falls Dam beginning 18 September 2008. The simple-hatched polygons represent areas in which the radio receivers decoded a radio transmitter with power greater than 100. The polygon represents the detection range of all receivers combined, including receivers installed for the concurrent USACE study.

Work Element I: 185 – Produce Pisces Status Report – Periodic status reports for BPA

PNNL submitted quarterly status reports to BPA through the Pisces reporting system.

Work Element J: Analyze/Interpret Data – Data reduction and analysis

Data files downloaded from radio receiving stations were checked for quality and loaded into a database for summarization and analysis. Detection histories of each bull trout were then queried from the database containing radio receiving station data, supplemented with mobile tracking data, and are reported below. Only detection data collected from the time of transmitter implantation through 15 November 2008 are included in this progress report. Fish detection data from 15 November 2008 through 15 November 2009 will be provided in the 2009 progress report.

Detection histories

Fish 126 – Fish 126 was caught downstream of Albeni Falls Dam, implanted with a CART transmitter, and released at the Priest River boat launch on 19 May 2008. Genetic analyses predicted that this fish was about 68 times more likely to have originated from Grouse Creek (most likely) than Trestle Creek (second most likely). The North and South Dover receiving stations detected this fish on 11 and 12 June 2008, and it was not detected thereafter.

Fish 128 – Fish 128 was caught downstream of Albeni Falls Dam, implanted with a CART transmitter, and released at the Priest River boat launch on 19 May 2008. Genetic analyses predicted that this fish was 2.577×10^7 times more likely to have originated from Grouse Creek (most likely) than Rattle Creek (second most likely). It was detected at the South Dover station on 28 May 2008 at 0600 hours. On 11 October 2008, it was detected during aerial tracking over Grouse Creek (N 48°27.829 W 116°16.352). On 22 October 2008, tag 128 was found in Grouse Creek and recovered (N 48°27.924 W 116°16.180); no fish carcass was seen in the area. No predator teeth marks were seen on the tag, suggesting that the transmitter may have exited the fish during spawning.

Fish 172 – Fish 172 was caught downstream of Albeni Falls Dam, implanted with a NANO transmitter, and released at the Priest River boat launch on 11 June 2008. Genetic analyses predicted that this fish was about 5 times more likely to have originated from Lightning Creek (most likely) than Gold Creek (second most likely). It was detected at the North Dover station on 18 June 2008 at 0800 hours and was not detected thereafter.

Fish 108 – Fish 108 was caught downstream of Albeni Falls Dam, implanted with a CART transmitter, and released at the Priest River boat launch on 18 June 2008. Genetic analyses predicted that this fish was about 15 times more likely to have originated from Rattle Creek (most likely) than Morris Creek (second most likely), which are both tributaries of Lightning Creek. It was first detected at the Mudhole receiver (mouth of Priest River) on 18 June at 2000 hours and again on 4 July at 2300 hours. There are no detection data to explain where this fish was between the subsequent detections at the Mudhole receiver; however, based on detection signal strengths, it is not likely that the fish passed the receiving station and went upstream into the Priest River. Fish 108 was then detected passing the Dover receiving stations on 5 July 2008 at 2000 hours. The final detections of this fish were recorded in the Clark Fork River near the Cabinet Gorge Fish Hatchery on 22 (by aircraft) and 26 (by boat) September 2008 by AVISTA staff. This fish was detected several times also on 25 September at Cabinet Gorge Dam by AVISTA staff. Vehicle mobile tracking of the Clark Fork River on 8 October by PNNL staff did not detect fish 108, suggesting that it left the Clark Fork River or was in deep water and out of the detection range. This fish was not detected entering Lightning Creek.

We suspect that fish 108 may not have moved to its genetically-assigned spawning tributary because the entire width of Lightning Creek was flowing subsurface a few hundred meters upstream of the Lightning Creek monitoring station in September 2008. If this fish had moved upstream into Lightning Creek far enough to realize the river was subsurface, it presumably would have been detected at the Lightning Creek monitoring station. However, at the time Lightning Creek was subsurface, the U.S. Army Corp of Engineers had re-routed the thalweg of the creek to the far side of the river channel, approximately 70 m from our receiving station. This alternate channel was not tested during range tests of the Lightning Creek station and consequently, it is possible that fish 108 moved through this section of Lightning Creek undetected.

Work Element K: Produce (Annual) Progress Report – Submit annual report for the period May 2008 to April 2009

The report described herein satisfies this work element. A comprehensive final report will be submitted in the final year of the study.

Equipment Purchased

Equipment purchased by PNNL in 2008 included one Knaack equipment box, one Garmin GPS unit, six 12-V deep-cycle batteries, and consumable supplies for maintenance of radio receiving stations. Additional items were purchased in the 2007 contract year but were not included in the 2007 report because they were purchased between finalization of the report and the beginning of the 2008 contract year. These items include two Knaack equipment boxes, one safety harness, and one 20-ft extension ladder for installation of radio antennae in trees, two deep-cycle batteries, and five beacon transmitters. In addition, six radio receivers were sent in for repair and tuning to Lotek Wireless, Inc.

Plans for 2009

One radio receiving station will be installed in 2009 to detect fish entering the Pack River because two bull trout tagged in 2008 were designated as probable descendants from the Grouse Creek spawning population. The addition of a receiving station at the Pack River likely will cover all potential spawning tributaries of bull trout between Albeni Falls Dam and Cabinet Gorge Dam. However, we will continue to use genetic data in 2009 and will relocate stations if necessary to determine migration paths of tagged bull trout.

Acoustic mobile tracking efforts need to be increased in 2009 to identify lake-staging areas of bull trout in Pend Oreille Lake. Acoustic tracking efforts in 2008 were unsuccessful due to poor reception range of the acoustic hydrophone. Currently we are working with the manufacturer to improve detection range of the hydrophone and will test it sufficiently before surveys in 2009. We also may continue to coordinate with Idaho Fish and Game staff who assisted us with acoustic tracking surveys in 2008.

Electrofishing effort will continue in spring 2009 to attempt to capture additional bull trout and transport them around Albeni Falls Dam. Staff from PNNL assisted with two surveys in 2008. However, planning of electrofishing trips by EWU and the Kalispel Tribe is often done at the last minute, so it is difficult for staff at PNNL to participate in these trips. Consequently, PNNL will be responsible for less electrofishing trips in 2009 but will be available if EWU or Kalispel Tribe help is not available.

References

Bellgraph, Brian J., and Katherine A. Deters. 2007. *Temporary restoration of bull trout passage at Albeni Falls Dam – 2007 Progress Report*. Document ID P105339, Bonneville Power Administration, Portland, Oregon.

Paluch, Mark C., Alan T. Scholz, Holly J. McLellan, and Jason Olson. 2009. *Temporary restoration of bull trout passage at Albeni Falls Dam – 2008 Progress Report*. Bonneville Power Administration Contract #2007-246-00. Bonneville Power Administration, Portland, Oregon.

Temporary Restoration of Bull Trout Passage at Albeni Falls Dam

2009 Progress Report

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U.S. Department of Energy
Bonneville Power Administration
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Introduction

The primary goals of this project are to provide temporary upstream passage of bull trout *Salvelinus confluentus* around Albeni Falls Dam on the Pend Oreille River in Idaho and to further the life history knowledge of bull trout in the Clark Fork/Pend Oreille Basin. Our specific objectives are to capture bull trout downstream of Albeni Falls Dam, tag them with combination acoustic and radio transmitters, release them upstream of Albeni Falls Dam, and track them to their spawning grounds to determine if the actual spawning tributary and genetically assigned natal tributary are the same.

This project is currently in the third year of funding, and progress has been made toward the primary goals and objectives. In 2007, radio receiving stations were installed at several locations throughout the Pend Oreille River and Lake Pend Oreille to detect movements of adult bull trout. However, no bull trout were captured downstream of Albeni Falls Dam despite extensive electrofishing and hook-and-line sampling.

In 2008, four bull trout were captured downstream of Albeni Falls Dam, implanted with combination acoustic and radio transmitters (CARTs), and released upstream of the dam at Priest River, Idaho. The most likely natal tributaries of bull trout assigned using genetic analyses were Grouse Creek (two fish), a tributary of the Pack River; Lightning Creek (one fish), a tributary of the Clark Fork River; and Rattle Creek (one fish), a tributary of Lightning Creek. After their release, all four bull trout migrated upstream from the release site in Priest River, Idaho; were detected at monitoring stations near Dover, Idaho; and were presumed to reside in Lake Pend Oreille from spring through summer 2008. One transmitter (code 128), originally implanted in a bull trout with a genetic assignment to Grouse Creek, was found in Grouse Creek in October 2008; however, the fish was not found with the transmitter. We presume that the transmitter was in the bull trout during its migration to Grouse Creek and that it was expelled from the fish during spawning. The bull trout genetically assigned to Rattle Creek (code 108) was detected in the Clark Fork River near the Cabinet Gorge Fish Hatchery (approximately 13 km upstream from the confluence with Lightning Creek) in September 2008 but was not detected entering Lightning Creek. The remaining two bull trout were not detected in 2008 after detection at the Dover receiving stations.

In 2009, four bull trout were captured downstream of Albeni Falls Dam. Because of the rarity of bull trout downstream of the dam, regional stakeholders and the Bonneville Power Administration (BPA) determined that all bull trout captured in 2009 would be used for a concurrent U.S. Army Corps of Engineers (USACE) study, which was designed to determine fine-scale bull trout movements downstream of Albeni Falls Dam. This information will be used to determine biologically based criteria for construction of a permanent passage structure at Albeni Falls Dam. After they were implanted with transmitters, these fish were released downstream of the dam. Of the four bull trout captured downstream of Albeni Falls Dam in 2009, two were genetically assigned to tributaries of Lightning Creek; the other two were determined to be hybrids, and a natal tributary could not be genetically determined. Tracking results of the 2009-captured fish will not be presented in this report; however, the three bull trout remaining from 2008 had active tags in 2009 (i.e., transmitter batteries were still active based on the manufacturer's guarantee), so tracking effort was focused on these fish. One bull trout transmitter (code 126) was detected in fall 2009 in Lake Pend Oreille; the two remaining bull trout were not detected in 2009. Additional detail on the progress to date can be found in Bellgraph and Deters (2008), Scholz et al. (2008), Bellgraph (2009), Paluch et al. (2009), and the 2009 annual report to the BPA prepared by the

Kalispel Tribe and Eastern Washington University (EWU).¹ This report details the progress by work element in the 2009 statement of work, including data analyses of fish movements, and expands on the information reported in the quarterly Pisces status reports.

Progress by Work Element

Work Element A: 165 – Produce Environmental Compliance Documentation – Complete environmental compliance requirements

All procedures involving the handling of bull trout from June 2007 to December 2009 were reviewed and approved by the Institutional Animal Care and Use Committee for Toxicology Northwest and the Pacific Northwest National Laboratory (PNNL) prior to handling fish (IACUC File 2007-19; Animal Welfare Assurance Number A3353-01). In December 2009, a new protocol (IACUC File 2009-36; Animal Welfare Assurance Number A3353-01) was submitted, reviewed, and approved to continue work with bull trout for the period of January 2010 through the anticipated end of the project in April 2011. The animal care document will be reviewed once more in December 2010.

Work Element B: 157 – Collect/Generate/Validate Field and Lab Data – Weekly electrofishing

Pacific Northwest National Laboratory staff assisted EWU staff on two electrofishing trips in 2009 (one in the spring and one in the fall). Staff will continue to assist EWU or Kalispel Tribe staff with electrofishing in spring and fall 2010. Specific information on electrofishing, including sampling transects and enumeration of species captured, can be found in the Kalispel Tribe and EWU 2009 annual report to BPA.¹

Work Element C: 28 – Trap and Haul – Transport bull trout above Albeni Falls Dam

No bull trout were transported upstream of Albeni Falls Dam in 2009. Four bull trout were captured downstream of the dam in 2009, implanted with transmitters, and released downstream of the dam for the concomitant USACE study. Transportation of bull trout captured downstream of Albeni Falls Dam to the Pend Oreille River upstream of Albeni Falls Dam will continue in 2010. No bull trout were captured during electrofishing trips when PNNL personnel were present.

Work Element D: 158 – Mark/Tag Animals – Implant combination radio acoustic transmitters into bull trout

No additional bull trout were implanted with transmitters for release upstream of Albeni Falls Dam in 2009. However, four bull trout (including two hybrid bull trout) were implanted with transmitters and

¹ Paluch, Mark C., Alan T. Scholz, Holly J. McLellan, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2009 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

released downstream of Albeni Falls Dam for the concurrent USACE study. No bull trout were implanted with transmitters by PNNL staff. Descriptive information on bull trout tagged in 2009 as well as bull trout tagged in 2008 that were transported upstream of Albeni Falls Dam is summarized in Table 1. Only descriptive information will be provided in this progress report for 2009-tagged bull trout; detection histories are detailed in a progress report to the USACE Seattle District² and summarized in the Kalispel Tribe and EWU annual report.³ Of the four bull trout captured in 2008 and transported upstream of Albeni Falls Dam, the transmitter of one fish (code 128) was recovered in Grouse Creek in fall 2008, and the remaining three implanted fish were available to the study in 2009. Complete detection histories of these fish are included under progress for Work Element H. Further information on bull trout tagging and genetic analyses can be found in the Kalispel Tribe and EWU annual report for 2009.³

Table 1. Descriptive information on bull trout implanted with transmitters and transported upstream of Albeni Falls Dam in 2008 and bull trout tagged and released downstream of the dam in 2009 for a concurrent U.S. Army Corps of Engineers study. Genetic origin indicates the most likely and second most likely natal tributaries, respectively. Bull trout with genetic origins of N/A were hybrids. Tag dead date is the expected date of transmitter battery failure based on the number of guaranteed tag-life days from the tagging date. One transmitter (code 128) was recovered in October 2008 and has been removed from the study.

Code	Tagging Date	Length (mm)	Weight (g)	Genetic Origin	Tag Dead Date
126	19 May 2008	505	1178	Grouse Creek, Trestle Creek	9 Nov 2010
128	19 May 2008	501	1133	Grouse Creek, Rattle Creek	Recovered
172	11 June 2008	363	374	Lightning Creek, Gold Creek	26 Aug 2009
108	18 June 2008	496	1241	Rattle Creek, Morris Creek	12 Apr 2010
148	11 May 2009	657	2787	East Fork Lightning Creek, Morris Creek	5 Mar 2011
110	11 June 2009	493	991	Morris Creek, Savage Creek	5 Apr 2011
178	11 June 2009	241	148	N/A	26 Aug 2010
180	17 June 2009	300	227	N/A	1 Sep 2010

Work Element E: 157 – Collect/Generate/Validate Field and Lab Data – Mobile tracking surveys by fixed wing aircraft, vehicle, and boat

Mobile tracking surveys by aircraft, vehicle, and boat were performed by PNNL and EWU staff in 2009. Aircraft and vehicle surveys were performed solely by EWU in 2009 and are reported in the

² Brian J. Bellgraph, Mark C. Paluch, Ryan A. Harnish, Jessica A. Carter, and Mike S. Hughes, *Movement Patterns of Adult Bull Trout in the Albeni Falls Dam Tailrace, Pend Oreille River, Idaho*, 2009 draft final report for the U.S. Army Corps of Engineers, Seattle District.

³ Mark C. Paluch, Alan T. Scholz, Holly J. McLellan, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2009 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

Kalispel Tribe and EWU annual report.⁴ Boat surveys were performed by PNNL staff. Fish detections obtained from mobile tracking surveys are reported also in Work Element H of this progress report as part of the detection history of each fish.

Reception range of both the acoustic hydrophone and radio antenna was tested daily before each tracking survey to ensure functionality of the tracking system and to determine tracking accuracy. A transmitter was hung on a weighted line from a buoy at 7.6-m depth for hydrophone testing. The boat-mounted hydrophone was placed just beneath the water surface with the unbaffled (i.e., “listening”) portion of the hydrophone facing the test transmitter. The boat and hydrophone were then moved progressively farther away from the transmitter until the receiver could not decode the transmitter. Reception range of the acoustic hydrophone (i.e., decoding of the transmitter code) was approximately 400 m during each survey; however, the transmitter’s acoustic signal could be heard (no code) up to 500 m away. For radio antenna testing, the transmitter was hung at about 6-m depth and the boat was moved progressively farther from the transmitter until the transmitter was no longer decoded. Decoding detection range for the radio antennas was about 100 m.

Three boat tracking surveys were performed by PNNL on Lake Pend Oreille in fall 2009 to locate the three bull trout tagged in 2008 and potentially determine pre-spawn locations. Based on anecdotal evidence from Idaho Fish and Game biologists familiar with the area, we presumed it was likely that bull trout would be located at staging areas in the lake near the mouth of their genetically assigned spawning tributaries. Thus, survey transects covered the 50-m depth contour of Lake Pend Oreille from the mouth of the Pack River, southeast to the mouth of the Clark Fork River, and then west along the south shore of the lake approximately 3 km from the mouth of the Clark Fork River. The size of the lake precluded us from tracking the entire lake; thus, this subsection was chosen because genetic analyses indicated that the tagged bull trout were most likely from Grouse Creek (a tributary of the Pack River) or Rattle Creek (a tributary of Lightning Creek and the Clark Fork River). Telemetry listening locations were spaced approximately 400 m along the survey transect based on reception range of the acoustic hydrophone. At each listening location, the boat remained stationary and the engine and depth sounders were turned off to minimize acoustic interference. The transmitter frequency was then scanned for a period of 2 min (30 s in each cardinal direction) using both an aerial radio antenna to listen for the radio signal produced by the CART and an underwater acoustic hydrophone to listen for the acoustic signal from the transmitter. When a transmitter was heard and decoded, the tag code, time of detection, and geographic coordinates of the location were recorded. One bull trout transmitter (code 126) was detected in Lake Pend Oreille on 30 September and 20 October 2009 approximately 4 km west of the mouth of the Clark Fork River (Figure 1). No other transmitters were detected during lake tracking surveys in 2009.

⁴ Mark C. Paluch, Alan T. Scholz, Holly J. McLellan, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2009 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

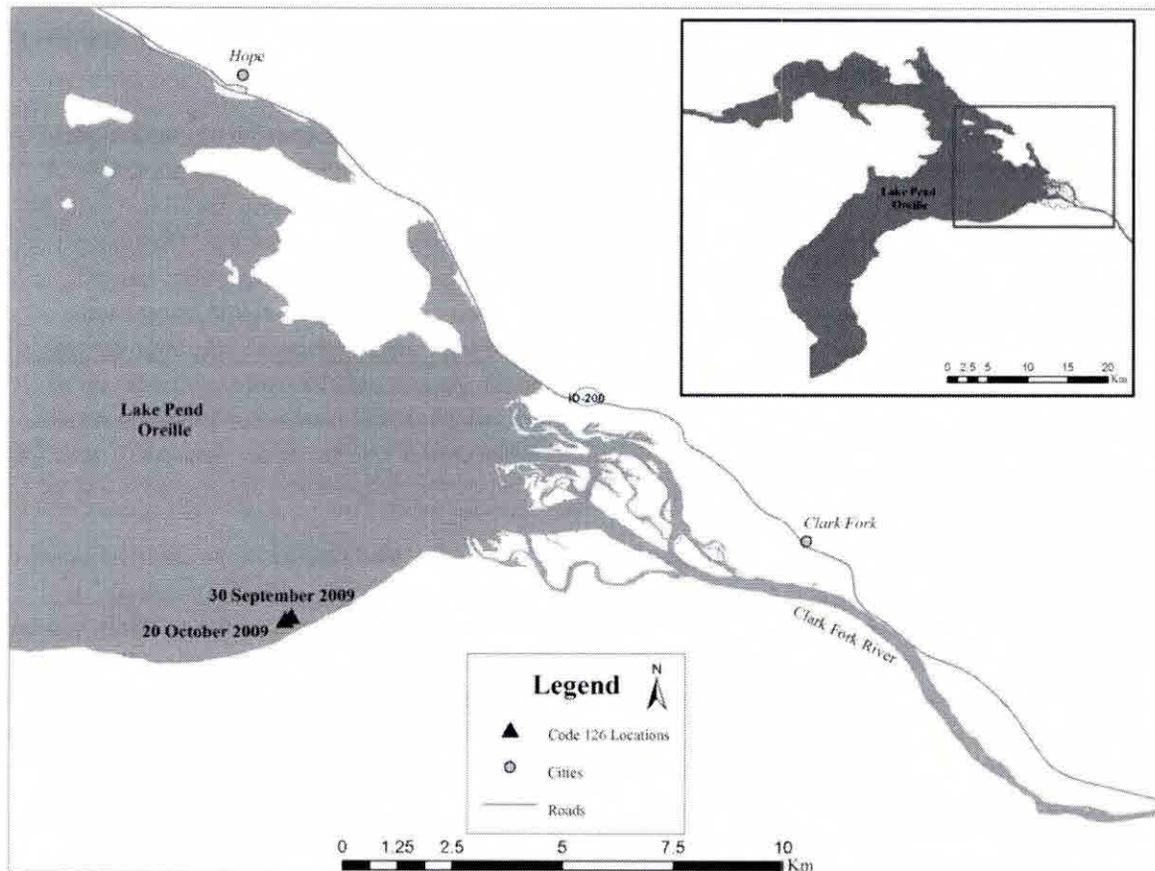


Figure 1. Detection locations of bull trout (code 126) in Lake Pend Oreille during September and October 2009

Work Element F: 157 – Collect/Generate/Validate Field and Lab Data – Download stationary ground radio receiving stations

Twelve radio telemetry receiving stations are located throughout the Pend Oreille Basin and at Albeni Falls Dam to detect bull trout implanted with radio transmitters (Figure 2 and Figure 3). Eleven stations were used in 2007 and 2008; however, one additional radio receiving station was installed on the Pack River downstream of the confluence with Grouse Creek in 2009. This monitoring station was installed to differentiate upstream and downstream movements of tagged fish moving through the Pack River because genetic data from 2008 indicated that two fish were likely from Grouse Creek, a tributary to the Pack River. The locations, site names (in parentheses), and site numbers (in parentheses) of radio receiving stations operating in 2009 were

- Albeni Falls Dam spillway tailrace (Tailrace, site 1)
- Albeni Falls Dam spillway forebay (Forebay, site 2)
- Albeni Falls Dam powerhouse tailrace (Logchute, site 3)
- Albeni Falls Dam powerhouse forebay (Cement Pad, site 4)

- mouth of the Priest River (Priest River, site 5)
- north side of Pend Oreille River near Dover, Idaho (North Dover, site 6)
- south side of Pend Oreille River near Dover, Idaho, (South Dover, site 7)
- mouth of Gold Creek, a tributary to Lake Pend Oreille (Gold, site 8)
- mouth of Granite Creek, tributary to Lake Pend Oreille (Granite, site 9)
- mouth of Lightning Creek, tributary to the Clark Fork River just upstream of the confluence with Lake Pend Oreille (Lightning, site 10)
- mouth of Trestle Creek, tributary to Lake Pend Oreille (Trestle, site 11)
- Pack River downstream of the Grouse Creek confluence (Pack River, site 23).

Radio receiving station locations in the Pend Oreille basin and specific locations at Albeni Falls Dam are shown in Figures 2 and 3, respectively. Technical and setup specifications of radio receiving stations can be found in Bellgraph and Deters (2008). The North and South Dover stations were moved about 100–200 m downstream to private property in 2008 because of vandalism that occurred in 2007. No vandalism of radio receiving stations occurred in 2008 or 2009. The reception range of each monitoring station was tested in March 2008 and 2009. Details of reception range testing in March 2009 can be found under Work Element I.

Receivers were downloaded approximately once every two weeks in 2009 by PNNL or EWU staff (Table 2). A standard operating procedure was used to ensure data quality control during each download. This procedure involved verifying monitoring station detection performance and saving and maintaining data. During each download, staff ensured that the station ran continuously since the last download, interference signals were minimal (to allow for detection of fish transmitters over ambient noise), and beacon transmitters were detected hourly at each station. In addition, the station was inspected for physical damage. Any problems identified were repaired as soon as possible. Data were saved to a laptop computer and backed up to a removable thumb drive, and data collected by EWU were sent to PNNL within a few working days. All telemetry receivers except those at sites 1, 2, 3, and 7 were removed in fall 2009. The three Albeni Falls Dam receivers (sites 1–3) and the North Dover receiver (site 7) will continue to scan during winter 2009–2010 to detect tagged bull trout.

Cellular modems were installed on the South Dover, Gold, Granite, and Pack River monitoring station receivers in 2009 to increase download frequency, ensure continuous operation of equipment, and reduce driving time during downloading. Modems will be installed at the Tailrace, Forebay, Logchute, Priest River, and North Dover monitoring stations in 2010. Modems cannot be installed at the Lightning and Trestle stations due to poor cellular reception. These two stations will be downloaded manually in 2010. The Cement Pad station will be removed in 2010 because of detection redundancy with the Forebay station, which will reduce the labor required to download all stations and will allow us to focus financial resources on other objectives.

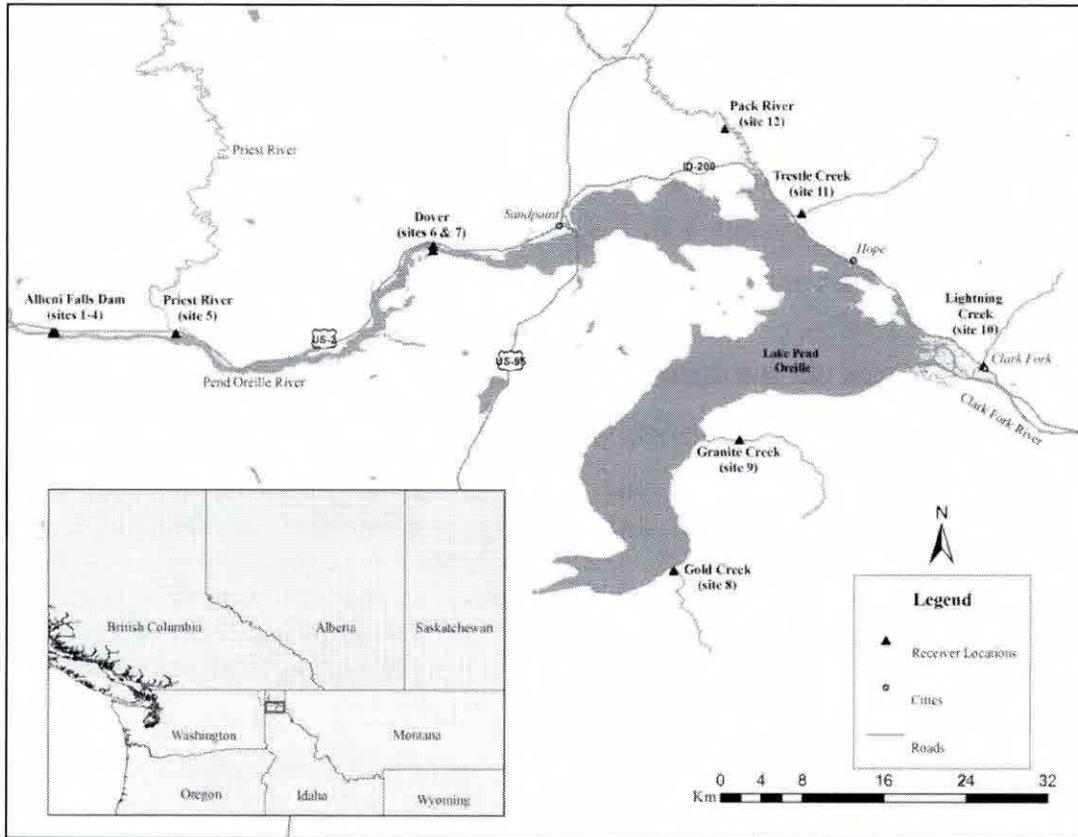


Figure 2. Locations of radio telemetry monitoring stations on the Pend Oreille River and Pend Oreille Lake tributaries



Figure 3. Locations of radio telemetry monitoring stations at Albeni Falls Dam

Table 2. Operation dates of radio telemetry monitoring stations in 2009. End dates of 31 December 2009 indicate that monitoring stations will continue scanning during winter 2009–2010.

Receiver Name	Site No.	Start Date	End Date
Tailrace	1	1 January 2009	31 December 2009
Forebay	2	1 January 2009	31 December 2009
Logchute	3	1 January 2009	31 December 2009
Cement Pad	4	3 March 2009	18 November 2009
Mudhole	5	4 March 2009	2 December 2009
North Dover	6	6 March 2009	2 December 2009
South Dover	7	6 March 2009	31 December 2009
Gold	8	12 May 2009	18 November 2009
Granite	9	12 May 2009	18 November 2009
Lightning	10	5 March 2009	29 December 2009
Trestle	11	2 March 2009	2 December 2009
Pack River	12	25 March 2009	29 December 2009

Work Element G: 119 – Manage and Administer Projects – Manage project

Labor to accomplish electrofishing, mobile tracking, downloading of monitoring stations, and data tasks was coordinated in 2009 among staff from EWU, the Kalispel Tribe, and PNNL. A budget and

statement of work for 2010 and the current property inventory are being assembled and will be submitted to BPA in February 2010.

Work Element H: 162 – Analyze/Interpret Data – Data reduction and analysis

Data files downloaded from radio receiving stations were checked for quality and loaded into a database. Detection histories of each bull trout were then queried from the database, supplemented with mobile tracking data, and are reported below. Detection data collected from the time of transmitter implantation through 15 November 2009 are included in this progress report. Fish detection data collected after 15 November 2009 will be provided in the 2010 progress report that will be submitted in 2011.

Detection histories

Fish 126 – Bull trout 126 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses indicated that this fish was about 68 times more likely to have originated from Grouse Creek than from Trestle Creek. The North and South Dover receiving stations detected this fish on 11 and 12 June 2008, and it was not detected thereafter. The transmitter was not detected again until 26 September 2009 (N 48°08'00.07" W 116°17'09.02") and 20 October 2009 (N 48°07'57.33" W 116°17'13.50") during acoustic mobile tracking of Lake Pend Oreille. Based on the proximity of these two locations (about 200 m apart) and the detection accuracy of the acoustic hydrophone (about 400 m), we were unable to determine if transmitter 126 moved between locations, which would indicate that the fish was alive. Thus, the fate of bull trout 126 is currently unknown. The battery of this transmitter is expected to fail in October 2010.

Fish 128 – Bull trout 128 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses predicted that this fish was 2.577×10^7 times more likely to have originated from Grouse Creek than from Rattle Creek. It was detected at the South Dover station on 28 May 2008 at 0600 hours. On 11 October 2008, code 128 was detected during aerial tracking over Grouse Creek (N 48°27.829 W 116°16.352). On 22 October 2008, tag 128 was found in Grouse Creek and recovered (N 48°27.924 W 116°16.180); no fish carcass was seen in the area.

Fish 172 – Bull trout 172 was caught downstream of Albeni Falls Dam, implanted with a Lotek NANO NTC162 transmitter (expected life of 441 d), and released at the Priest River boat launch on 11 June 2008. Genetic analyses predicted that this fish was about 5 times more likely to have originated from Lightning Creek than from Gold Creek. It was detected at the North Dover station on 18 June 2008 at 0800 hours. This transmitter had an expected tag-failure date in August 2009; thus, the battery likely has expired.

Fish 108 – Fish 108 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_1 transmitter (expected life of 663 d), and released at the Priest River boat launch on 18 June 2008. Genetic analyses predicted that this fish was about 15 times more likely to have originated from Rattle Creek than from Morris Creek, which are both tributaries of Lightning Creek. It was first detected at the mouth of Priest River on 18 June at 2000 hours and again on 4 July at 2300 hours. There are no detection

data to explain where this fish was between the subsequent detections at the Priest River receiver. However, based on detection signal strengths of the two antennae, it is unlikely that the fish passed the receiver and moved upstream into the Priest River. Fish 108 was detected passing upstream of the Dover receiving stations on 5 July 2008 at 2000 hours. The final detections of this fish were recorded in the Clark Fork River near the Cabinet Gorge Fish Hatchery on 22 (by aircraft) and 26 (by boat) September 2008 by AVISTA staff. This fish was detected several times also on 25 September at Cabinet Gorge Dam by AVISTA staff. Vehicle mobile tracking of the Clark Fork River on 8 October by PNNL staff did not detect fish 108, suggesting that it left the Clark Fork River or was in deep water and out of the detection range. This fish was not detected entering Lightning Creek. No detections of this transmitter occurred in 2009. This transmitter has an expected tag-failure date in April 2010.

We suspect that fish 108 may not have moved to its genetically assigned spawning tributary because the entire width of Lightning Creek was flowing subsurface a few hundred meters upstream of the Lightning Creek monitoring station in September 2008. If this fish had moved upstream into Lightning Creek far enough to reach the section of subsurface flow, it presumably would have been detected at the Lightning Creek monitoring station. However, at the time Lightning Creek was subsurface, the U.S. Army Corp of Engineers had rerouted the thalweg of the creek to the far side of the river channel, approximately 70 m from our receiving station. This alternative channel was not tested during range tests of the Lightning Creek station; consequently, it is possible that fish 108 moved through this section of Lightning Creek undetected.

Work Element I: 70 – Install Fish Monitoring Equipment – Annual overhaul and recalibration of ground receiver stations

All monitoring stations were checked in spring 2009 for damage from the previous winter; receivers removed in fall 2008 were reinstalled, and receiver testing indicated that all stations functioned properly and met the study objectives for 2009. The receivers at Albeni Falls Dam (sites 1–4), Priest River (site 5), Dover (sites 6–7), Trestle Creek (site 11), and Lightning Creek (site 10) were checked for damage. Receivers removed in fall 2008 were reinstalled and were tested the first week of March 2009. The Pack River station was installed on 26 March 2009 and tested on 27 March 2009. The stations at Granite Creek (site 9) and Gold Creek (site 8) were checked for damage, and receivers were reinstalled and tested on 12 May 2009.

Receiver reception range extended about 250 m upstream and 700 m downstream of Albeni Falls Dam (Figure 4). Reception range testing methods changed slightly between the 2008 and 2009 progress reports (see Bellgraph 2009). In 2009, reception range was determined by dragging a transmitter throughout the forebay and tailrace at 1-m depth. Test transmitter location was recorded in 1-s intervals in a geospatial mapping program (Fugawi Marine ENC software, Toronto, Ontario) and was viewed in real time to ensure that the test transmitter was dragged throughout all areas of the tailrace to about 1 km downstream and throughout the forebay to about 300 m upstream of the dam (beyond the presumed boundary of reception). After the transmitter drags were conducted, all dam receivers were downloaded to recover data, detection data were merged with transmitter location data, and reception range maps were created on-site to ensure that reception ranges met the study objectives. If reception ranges were not appropriately sized, radio receivers or antennas were adjusted and the tailrace or forebay were retested until the desired reception ranges were obtained.

Monitoring stations not at Albeni Falls Dam were tested using various methods, depending on the station location. The Priest River receiver was tested by placing a transmitter in the water near the antennas at 1-m depth. The mouth of the Priest River was frozen during testing, which prohibited boat testing to determine ultimate reception range. Relative signal strength (i.e., power) was about 250 during testing, which was similar to 2008 testing results of a transmitter in the same location and depth. This indicates that the Priest River monitoring station was working in a manner similar to that of 2008 and was assumed to have a reception range extending across the entire river width (as it did in 2008) and to the deepest cross-sectional depth (about 3 m). The North and South Dover stations were tested similarly but from opposite banks of the river (i.e., the north station was tested from the south bank, and vice versa) with the transmitter at 1-m depth. Both Dover stations were able to decode the transmitter from the opposing river bank. The Pack River and remaining tributary stations were configured and tested to ensure differentiation of upstream and downstream movements of transmitters. Reception range and direction differentiation were tested by submerging a transmitter in the deepest part of the river channel at about 5-m intervals extending about 100 m upstream and downstream of the monitoring station. During this time, one person remained at the receiver to ensure that the transmitter code was detected at each testing interval and that direction could be differentiated.

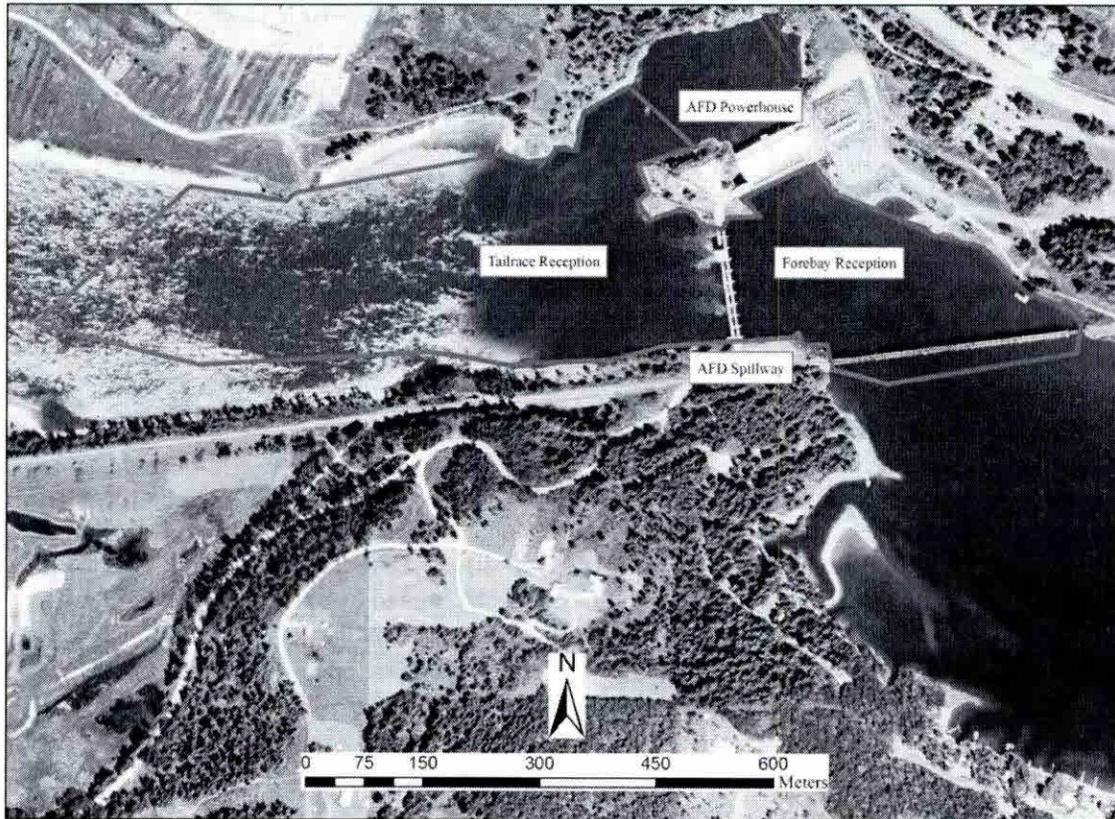


Figure 4. Forebay and tailrace reception range of radio telemetry receivers at Albeni Falls Dam (AFD) tested with a transmitter at 1-m depth in spring 2009. The direction of river flow is from right to left across the screen.

Work Element J: 185 – Produce Pisces Status Report – Periodic status reports for BPA

PNNL submitted quarterly status reports to BPA through the Pisces reporting system.

Work Element K: 132 – Produce (Annual) Progress Report – Submit annual report for the period May 2009 to April 2010

This progress report satisfies this work element. A comprehensive final report will be submitted in 2011 that will summarize results from the entire 4-year project.

Plans for 2010

Three primary efforts are scheduled for 2010:

- Mobile tracking efforts will be expanded in spring through fall 2010 to identify summer and pre-spawn locations of bull trout in Lake Pend Oreille and the Pend Oreille River. About once monthly from June through November 2010, we will track the north shore of Lake Pend Oreille, which is where we expect bull trout tagged in 2008 to stage prior to or after spawning. If any bull trout caught in 2010 are suspected to be from other tributaries (e.g., Gold or Granite Creek), we will also track the shoreline near those areas. We hope to identify regions where bull trout stage during the summer and where fish congregate before ascending spawning tributaries. Although few fish have been tagged and tracked for this study and the potential tracking area is very large, we will concentrate tracking efforts in areas where bull trout were found in 2008 and 2009 and will concentrate near the mouths of potential spawning streams. Anecdotal evidence suggests that bull trout may congregate with lake trout in lake trout spawning areas of Lake Pend Oreille, which may also be mobile-tracked to determine if study fish are located in these areas. Our ultimate goal is to obtain more detailed tracking profiles of bull trout following transport around Albeni Falls Dam.
- Cellular modems will be installed at all monitoring stations except at the Trestle and Lightning Creek sites in spring 2010 to increase download frequency and to expedite repairs of monitoring stations.
- Electrofishing effort will continue in spring 2010 to attempt to capture additional bull trout and transport them upstream of Albeni Falls Dam. Up to 12 electrofishing trips will be attended by a PNNL staff member.

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Temporary Restoration of Bull Trout Passage at Albeni Falls Dam

2010 Progress Report

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Introduction

The primary goals of this project are to provide temporary upstream passage of bull trout *Salvelinus confluentus* around Albeni Falls Dam on the Pend Oreille River in Idaho and to further the life history knowledge of bull trout in the Clark Fork/Pend Oreille Basin. Our specific objectives are to capture bull trout downstream of Albeni Falls Dam, tag them with combination acoustic and radio transmitters, release them upstream of Albeni Falls Dam, and track them to their spawning grounds to determine if the actual spawning tributary and genetically assigned natal tributary are the same.

This project is currently in the fourth year of funding, and progress has been made toward the primary goals and objectives. In 2007, radio receiving stations were installed at several locations throughout the Pend Oreille River and Lake Pend Oreille to detect movements of adult bull trout. However, no bull trout were captured downstream of Albeni Falls Dam in 2007, despite extensive electrofishing and hook-and-line sampling.

In 2008, four bull trout were captured downstream of Albeni Falls Dam, implanted with combination acoustic and radio transmitters (CARTs), and released upstream of the dam at Priest River, Idaho. The most likely natal tributaries of bull trout assigned using genetic analyses were Grouse Creek (two fish), a tributary of the Pack River; Lightning Creek (one fish), a tributary of the Clark Fork River; and Rattle Creek (one fish), a tributary of Lightning Creek. After their release, all four bull trout migrated upstream from the release site in Priest River, Idaho; were detected at monitoring stations near Dover, Idaho; and were presumed to reside in Lake Pend Oreille from spring through summer 2008. One transmitter (code 128), originally implanted in a bull trout with a genetic assignment to Grouse Creek, was found in Grouse Creek in October 2008; however, the fish was not found with the transmitter. We presume that the transmitter was in the bull trout during its migration to Grouse Creek and that it was expelled from the fish during spawning. The bull trout genetically assigned to Rattle Creek (code 108) was detected in the Clark Fork River near the Cabinet Gorge Fish Hatchery (approximately 13 km upstream from the confluence with Lightning Creek) in September 2008 but was not detected entering Lightning Creek. The remaining two bull trout were not detected in 2008 after detection at the Dover receiving stations.

In 2009, four bull trout were captured downstream of Albeni Falls Dam. Due to the rarity of bull trout downstream of the dam, regional stakeholders and the Bonneville Power Administration (BPA) determined that all bull trout captured in 2009 would be used for a concurrent U.S. Army Corps of Engineers (USACE) study, which was designed to determine fine-scale bull trout movements downstream of Albeni Falls Dam. This information will be used to determine biologically based criteria for construction of a permanent passage structure at Albeni Falls Dam, and results can be found in the final report to the USACE (Bellgraph et al. 2010). Tracking effort therefore focused on the three bull trout remaining from 2008 that had active tags in 2009. One bull trout transmitter (code 126) was detected in fall 2009 in the Clark Fork Delta of Lake Pend Oreille; the two remaining bull trout were not detected in 2009. Additional detail on the progress to date can be found in Bellgraph and Deters (2008), Scholz et al. (2008), Bellgraph (2009), Paluch et al. (2009), Bellgraph (2010), Paluch et al. (2010), and the 2010 annual report to the BPA prepared by the Kalispel Tribe and Eastern Washington University (EWU).¹

¹ Mark C. Paluch, Alan T. Scholz, Holly J. McLellan, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2010 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

In 2010, two bull trout were captured downstream of Albeni Falls Dam, implanted with transmitters (codes 166 and 178), and released upstream. Genetic analysis identified the most probable primary natal tributary for fish 166 as Lightning Creek, whereas the secondary tributary was predicted to be Grouse Creek. Genetic analysis for fish 178 identified Morris Creek (a tributary of Lightning Creek) as the most likely primary tributary; the secondary was identified as Lightning Creek. Fish 166 was detected in the upper Pack River, upstream of Grouse Creek, between 13 July and 28 September and was detected in Grouse Creek on 13 October. The last detection for this fish was 20 October at the Pack River receiver station. The fish assigned to Morris Creek (code 178) was detected 17 km upstream of the mouth of the Priest River on 13 July and was detected at the mouth of the Priest River on 25 July 2010. Two bull trout tagged in 2008 also were relocated in Lake Pend Oreille in 2010. In June 2010, fish 108 was detected in Rattle Creek, one of its genetically assigned natal tributaries, while fish 126 was detected from July through October in Lake Pend Oreille approximately 14 km from the mouth of the Pack River, which is connected to its genetically assigned natal tributary (Grouse Creek).

This report details the progress by work element in the FY 2010–2011 statement of work, including data analyses of fish movements, and expands on the information reported in the quarterly Pisces status reports.

Progress by Work Element

Work Element A: 165 – Produce Environmental Compliance Documentation – Complete environmental compliance requirements

All procedures involving the handling of bull trout from June 2007 to December 2009 were reviewed and approved by the Institutional Animal Care and Use Committee for Toxicology Northwest and the Pacific Northwest National Laboratory (PNNL) prior to handling fish (IACUC File 2007-19; Animal Welfare Assurance Number A3353-01). In December 2009, a new protocol (IACUC File 2009-36; Animal Welfare Assurance Number A3353-01) was submitted, reviewed, and approved to continue work with bull trout for the period of January 2010 through April 2011. The animal care document was reviewed and amended in January 2011 to extend through 31 December 2012.

Work Element B: 157 – Collect/Generate/Validate Field and Lab Data – Electrofish, tag, and transport bull trout

Pacific Northwest National Laboratory staff assisted EWU staff on seven electrofishing trips in spring 2010. Staff will continue to assist EWU or Kalispel Tribe staff with electrofishing in 2011. Specific information on electrofishing, including sampling transects and enumeration of species captured, can be found in the Kalispel Tribe and EWU 2010 annual report to BPA.²

No bull trout were captured during electrofishing in 2010 when PNNL personnel assisted. As a result, PNNL staff implanted no fish with transmitters and transported no fish upstream of the dam. However, two bull trout were captured by EWU and the Kalispel Tribe during other trips, implanted with

² Mark C. Paluch, Alan T. Scholz, Holly J. McLellan, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2010 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

Lotek SR-Series radio transmitters (radio frequency only), and transported to the Pend Oreille River upstream of Albeni Falls Dam. Radio-frequency transmitters were implanted because bull trout were too small for implantation of a CART tag. Further information on bull trout tagging and genetic analyses can be found in the EWU and Kalispel Tribe annual report.³ Descriptive information on bull trout tagged in 2008 and 2010 is summarized in Table 1. Of the four bull trout captured in 2008 and transported upstream of Albeni Falls Dam, the transmitter of one fish (code 128) was recovered in Grouse Creek in fall 2008, and the remaining three implanted fish were available to the study in 2009. Two of these fish continued to remain available in 2010. Complete detection histories of these fish are included under progress for Work Element F.

Table 1. Descriptive information on bull trout implanted with transmitters and transported upstream of Albeni Falls Dam through 2010. Genetic origin indicates the most likely and second most likely natal tributaries, respectively. Tag dead date is the expected date of transmitter battery failure based on the number of guaranteed tag-life days from the tagging date. One transmitter (code 128) was recovered in October 2008 and has been removed from the study.

Code	Tagging Date	Length (mm)	Weight (g)	Genetic Origin	Tag Dead Date
126	19 May 2008	505	1178	Grouse Creek, Trestle Creek	9 Nov 2010
128	19 May 2008	501	1133	Grouse Creek, Rattle Creek	Recovered
172	11 June 2008	363	374	Lightning Creek, Gold Creek	26 Aug 2009
108	18 June 2008	496	1241	Rattle Creek, Morris Creek	12 Apr 2010
166	31 March 2010	553	1615	Lightning Creek, Grouse Creek	25 March 2011
178	29 June 2010	454	857	Morris Creek, Lightning Creek	23 June 2011

Work Element C: 157 – Collect/Generate/Validate Field and Lab Data – Lake tracking surveys

Mobile tracking surveys by aircraft, vehicle, and boat were performed by PNNL and EWU staff in 2010. Aircraft and vehicle surveys were performed solely by EWU in 2010 and are reported in the Kalispel Tribe and EWU annual report.³ Boat tracking surveys of Lake Pend Oreille were performed by PNNL staff. Fish detections obtained from mobile tracking surveys are reported also in Work Element F of this progress report as part of the detection history of each fish.

Reception range of the acoustic hydrophone was tested daily before each tracking survey of Lake Pend Oreille to ensure functionality of the tracking system and to determine tracking accuracy. A transmitter was hung on a weighted line from a buoy at approximately 5-m depth for hydrophone testing. The boat-mounted hydrophone was placed just beneath the water surface with the unbaffled (i.e., “listening”) portion of the hydrophone facing the test transmitter. The boat and hydrophone were then moved progressively farther away from the transmitter until the receiver could not decode the transmitter. Reception range of the acoustic hydrophone (i.e., decoding of the transmitter code) ranged between 400 and 500 m during each survey. The transmitter’s acoustic signal could be heard clearly up to 750 m away without decoding.

³ Mark C. Paluch, Alan T. Scholz, Holly J. McLellan, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2010 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

Four boat tracking surveys were performed by PNNL on Lake Pend Oreille in fall 2010 to locate two bull trout that still had active tags and were likely located in the lake: the remaining bull trout tagged in 2008 (code 126), which had not yet reached its natal tributary; and fish code 108, which had presumably spawned in its natal tributary of Rattle Creek (a tributary of Lightning Creek) and had been detected returning to Lake Pend Oreille. Subsections of the lake were chosen for tracking because the size of the lake precluded tracking its entirety. We presumed that the highest probability for detection of fish code 126 would be in the area between its last known location approximately 5 km west of the mouth of the Clark Fork River and its genetically assigned natal tributaries of either Grouse Creek (a tributary of the Pack River) or Trestle Creek. Due to its exit from Lightning Creek, fish code 108 was believed to have the highest probability for detection near the Clark Fork River or in the southern part of the lake near Cape Horn, where it was previously captured by the Idaho Department of Fish and Game in March 2010.

Nearshore transects were conducted from Sandpoint to Indian Point (about 8 km west of the Clark Fork River) on the north and east banks of the lake (Figure 1). Nearshore transects from Anderson Point (directly west of Hope) to Talache were conducted on the west bank of the lake. Additional offshore transects were performed around the mouths of the Pack River, Trestle Creek, and the Clark Fork River, and near Cape Horn.

Telemetry listening locations were spaced at a maximum of 1000 m along the survey transect. This was expanded from the previous study year (FY 2009–2010) due to increased performance capability of the telemetry system as well as a preference to cover as large an area as possible. We were confident this would not exceed the reception range of the acoustic hydrophone as determined during testing since the range of detection would overlap between consecutive listening stations. At each listening location, the boat remained stationary and the engine and depth sounders were turned off to minimize acoustic interference. The transmitter frequency was then scanned for 2 min (30 s in each cardinal direction) using an underwater acoustic hydrophone to listen for the acoustic signal from the transmitter. When a transmitter was heard and decoded, the tag code, time of detection, and geographic coordinates of the location were recorded. Fish code 126 was located near the west end of the lake by Mineral Point (about 4 km northeast of Garfield Bay), as shown in Figure 2; fish code 108 was not detected during manual boat tracking in either 2010 or previous years.

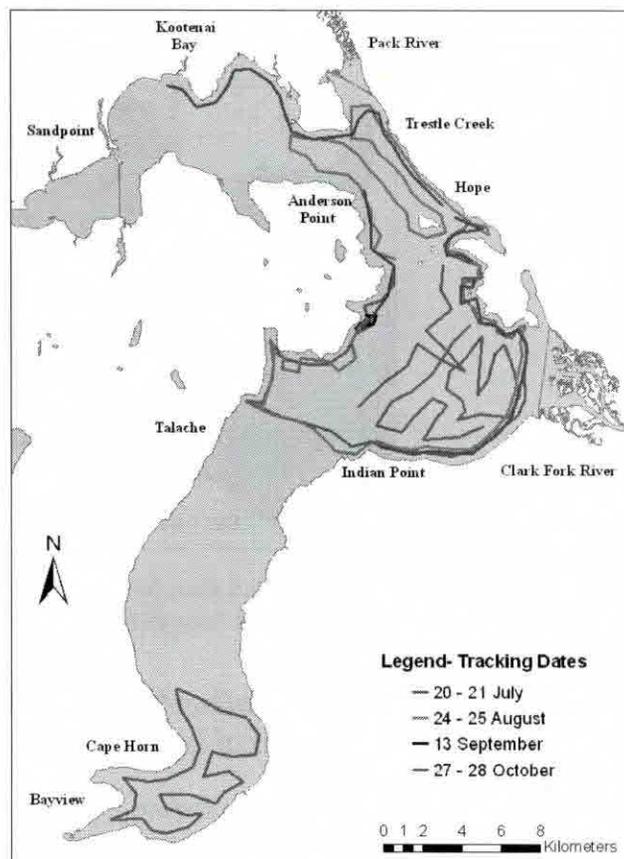


Figure 1. Boat tracking of Lake Pend Oreille from July through October 2010.

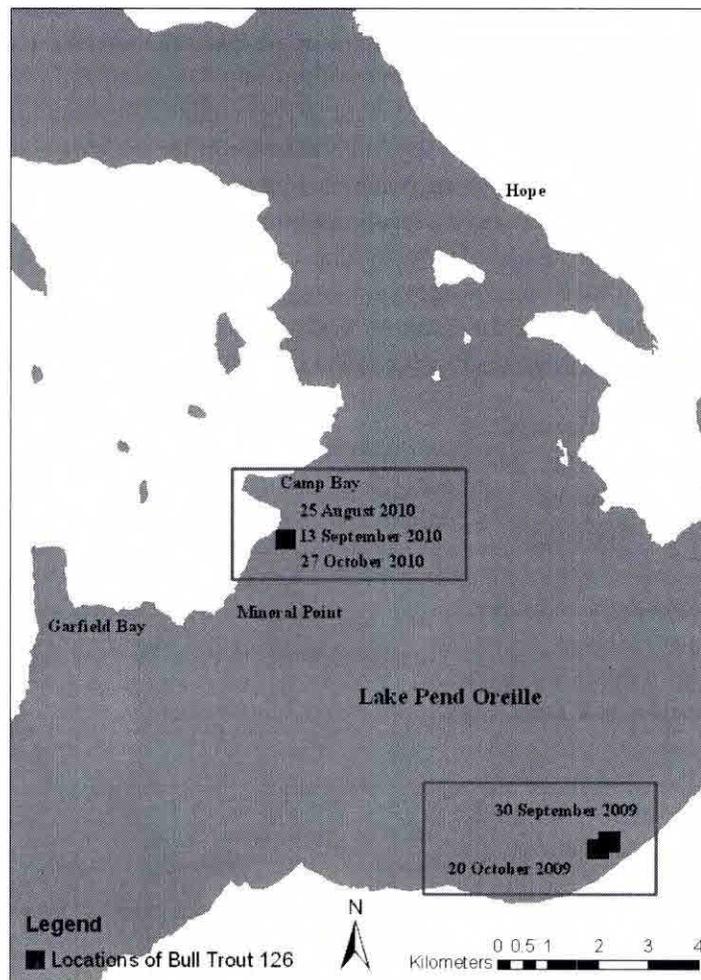


Figure 2. Detection locations of bull trout (code 126) in Lake Pend Oreille from September through October 2009 and August through October 2010.

Work Element D: 157 – Collect/Generate/Validate Field and Lab Data – Download and maintain stationary radio receiving stations

Twelve radio telemetry receiving stations located throughout the Pend Oreille Basin and at Albeni Falls Dam to detect bull trout implanted with radio transmitters have been used in the 4 years of this project. Eleven stations were installed in 2007 and used in 2007 and 2008. Twelve stations were used in 2009 due to the additional radio receiving station installed on the Pack River downstream of the confluence with Grouse Creek. In 2010, the Cement Pad station (site 4) was removed because of detection redundancy with the Forebay station, which reduced labor required to download all stations and allowed us to focus financial resources on other objectives. The locations, site names (in parentheses), and site numbers (in parentheses) of radio receiving stations operating in 2010 were

- Albeni Falls Dam spillway tailrace (Tailrace, site 1)
- Albeni Falls Dam spillway forebay (Forebay, site 2)

- Albeni Falls Dam powerhouse tailrace (Logchute, site 3)
- mouth of the Priest River (Priest River, site 5)
- north side of Pend Oreille River near Dover, Idaho (North Dover, site 6)
- south side of Pend Oreille River near Dover, Idaho, (South Dover, site 7)
- mouth of Gold Creek, a tributary to Lake Pend Oreille (Gold, site 8)
- mouth of Granite Creek, tributary to Lake Pend Oreille (Granite, site 9)
- mouth of Lightning Creek, tributary to the Clark Fork River just upstream of the confluence with Lake Pend Oreille (Lightning, site 10)
- mouth of Trestle Creek, tributary to Lake Pend Oreille (Trestle, site 11)
- Pack River downstream of the Grouse Creek confluence (Pack River, site 23).

Radio receiving station locations in the Pend Oreille Basin and specific locations at Albeni Falls Dam are shown in Figures 3 and 4, respectively. Technical and setup specifications of radio receiving stations can be found in Bellgraph and Deters (2008). The reception ranges of the spillway tailrace, spillway forebay, Priest River, and North and South Dover monitoring stations were tested in March 2010 by PNNL staff, and all other stations were tested by EWU staff.

Monitoring stations were checked in spring 2010 for damage from the previous winter, receivers removed in fall 2009 were reinstalled, and receiver testing indicated that all stations functioned properly and met the study objectives for 2010. Receivers located at the Tailrace (site 1), Forebay (site 2), Logchute (site 3), and South Dover (site 7) were operational throughout the 2009/2010 winter. Receivers removed in fall 2009 were reinstalled and tested in March–June 2010. Priest River (site 5), North Dover (site 6), Lightning Creek (site 10), Trestle Creek (site 11) and the Pack River (site 23) were reinstalled on 15 March 2010. The stations at Gold Creek (site 8) and Granite Creek (site 9) were reinstalled on 18 May and 18 June 2010, respectively, after snowmelt allowed access. Receiver testing at the Tailrace, Forebay, North and South Dover, and Priest River was performed by PNNL staff. Testing at the remaining locations was conducted by EWU staff.

Receiver reception range extended about 450 m upstream and 900 m downstream of Albeni Falls Dam (Figure 5). In 2010, reception range was determined by dragging a transmitter throughout the forebay and tailrace at 1-m depth. Test transmitter location was recorded in 1-s intervals in a geospatial mapping program (Fugawi Marine ENC software, Toronto, Ontario, Canada) and was viewed in real time to ensure that the test transmitter was dragged throughout all areas of the tailrace to about 1 km downstream and throughout the forebay to about 500 m upstream of the dam (beyond the presumed boundary of reception). After the transmitter drags were conducted, all dam receivers were downloaded to recover data, detection data were merged with transmitter location data, and reception range maps were created (Figure 5) to ensure that reception ranges met the study objectives.

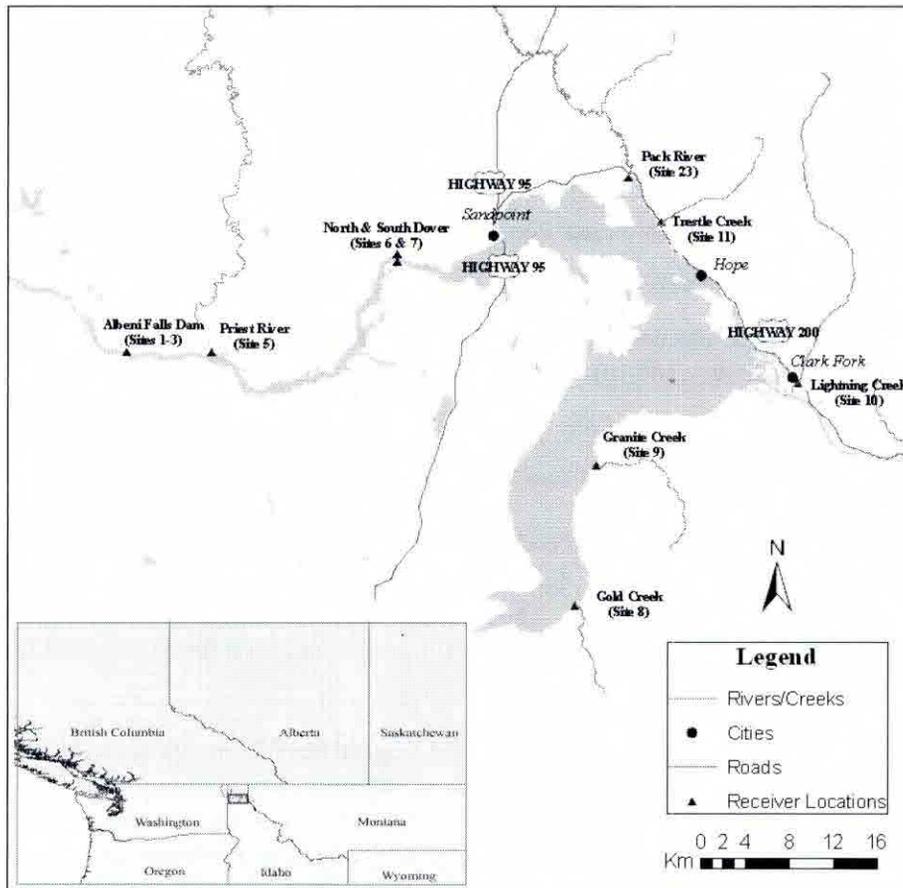


Figure 3. Locations of radio telemetry monitoring stations on the Pend Oreille River and Pend Oreille Lake tributaries.



Figure 4. Locations of radio telemetry monitoring stations at Albeni Falls Dam.

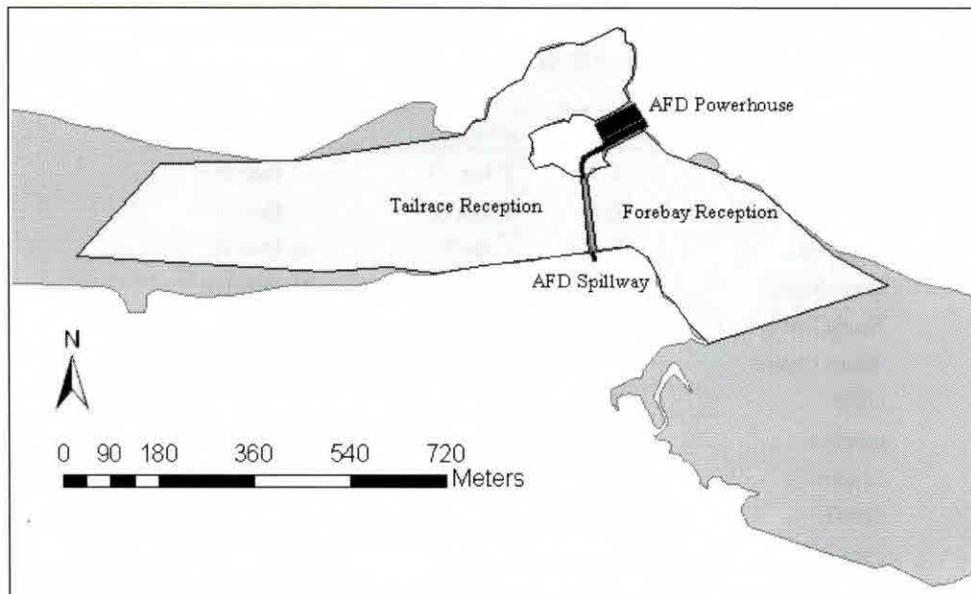


Figure 5. Forebay and tailrace reception range of radio telemetry receivers at Albeni Falls Dam (AFD) tested with a transmitter at 1-m depth in spring 2010.

Monitoring stations not at Albeni Falls Dam were tested using various methods, depending on the station location. The Priest River receiver was tested by placing a transmitter in the water near the antennas at 1-m depth. The mouth of the Priest River was frozen during testing, which prohibited boat testing to determine ultimate reception range. Relative signal strength (i.e., power) was similar to the 2008 and 2009 testing results of a transmitter in the same location and depth. This indicates that the Priest River monitoring station was working in a manner similar to that of 2008 and 2009 and was assumed to have a reception range extending across the entire river width (as it did in 2008) and to the deepest cross-sectional depth (about 3 m). North and South Dover stations were tested in the same manner by placing a transmitter in the water at 1-m depth near the antenna at North Dover. Both Dover stations were able to decode the transmitter. The Priest River station also was tested to ensure differentiation of upstream and downstream movements of transmitters. Reception range and direction differentiation were tested by submerging a transmitter in the river at 50-m intervals extending about 150-m upstream and downstream of the monitoring station. During this time, one person remained at the receiver to ensure that the transmitter code was detected at each testing interval and that direction could be differentiated.

Receivers were downloaded approximately once every two weeks in 2010 by PNNL or EWU staff (Table 2). A standard operating procedure ensured data quality control during each download. This procedure involved verifying monitoring station detection performance and saving and maintaining data. During each download, staff ensured that the station ran continuously since the last download, interference signals were minimal (to allow for detection of fish transmitters over ambient noise), and beacon transmitters were detected hourly at each station. In addition, the station was inspected for physical damage. Any problems identified were repaired as soon as possible. Data were saved to a laptop computer and backed up to a removable thumb drive, and data collected by EWU were sent to PNNL within a few working days.

Table 2. Operation dates of radio telemetry monitoring stations in 2010. End dates of 31 December 2010 indicate that monitoring stations will continue scanning during winter 2010–2011.

Receiver Name	Site No.	Start Date	End Date
Tailrace	1	1 Jan 10	31 Dec 10
Forebay	2	1 Jan 10	31 Dec 10
Logchute	3	1 Jan 10	31 Dec 10
Priest River	5	15 Mar 10	31 Dec 10
North Dover	6	15 Mar 10	15 Nov 10
South Dover	7	1 Jan 10	31 Dec 10
Gold	8	18 May 10	12 Oct 10
Granite	9	18 Jun 10	12 Oct 10
Lightning	10	15 Mar 10	21 Nov 10
Trestle	11	15 Mar 10	30 Nov 10
Pack River	23	15 Mar 10	29 Nov 10

Cellular modems were installed on the Tailrace, Forebay, Logchute, Priest River, and North Dover monitoring stations in 2010 to increase download frequency, ensure continuous operation of equipment, and reduce driving time during downloading. Because modems could not be installed at the Lightning and Trestle stations due to poor cellular reception, data collected by these two stations were downloaded manually in 2010.

Work Element E: 119 – Manage and Administer Projects – Manage project

Labor to accomplish electrofishing, mobile tracking, downloading of monitoring stations, and data tasks was coordinated in 2010 among staff from EWU, the Kalispel Tribe, and PNNL. A budget and statement of work for 2011 were submitted to BPA in January 2011 for work in FY 2011–2012. An inventory of property was also submitted in January 2011.

Work Element F: 162 – Analyze/Interpret Data- Data reduction and analysis

Data files downloaded from radio receiving stations were checked for quality. Data from Lotek SRX400 receivers were downloaded in a text format; however, data downloaded from Lotek SRX600 receivers were first converted to a text format using the Lotek Wireless Fish and Wildlife Monitoring SRX600 Application utility. All files were then parsed and formatted to a csv (comma separated values) file and then uploaded to a Microsoft SQL Server relational database (Microsoft Corporation, Redmond, Washington). Detection histories of each bull trout were then queried from the database, supplemented with mobile tracking data, and are reported below. Detection data collected from the time of transmitter implantation through 31 December 2010 are included in this progress report.

Detection histories

Fish 126 – Bull trout 126 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses indicated that this fish was about 68 times more likely to have originated

from Grouse Creek than from Trestle Creek. The North and South Dover receiving stations detected this fish on 11 and 12 June 2008. The transmitter was not detected again until 26 September 2009 (N 48°08'00.07" W 116°17'09.02") and 20 October 2009 (N 48°07'57.33" W 116°17'13.50") during acoustic mobile tracking of Lake Pend Oreille. This fish was believed to be dead because it was detected in the same location one month apart in 2009. However, the transmitter was detected on the west end of the lake during acoustic mobile tracking on 24 August, 13 September, and 27 October 2010 (N 48°11'14.92" W 116°22'35.99"). The transmitter was detected with the highest signal strength in the same area, so it did not appear that the fish had moved during this time. However, the acoustic hydrophone has limited detection accuracy (about 400 m) so it is uncertain if this fish was alive. The battery of this transmitter was expected to fail in November 2010.

Fish 128 – Bull trout 128 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses predicted that this fish was 2.577×10^7 times more likely to have originated from Grouse Creek than from Rattle Creek. It was detected at the South Dover station on 28 May 2008 at 0600 hours. On 11 October 2008, code 128 was detected during aerial tracking over Grouse Creek (N 48°27.829 W 116°16.352). On 22 October 2008, tag 128 was found in Grouse Creek and recovered (N 48°27.924 W 116°16.180); no fish carcass was seen in the area.

Fish 172 – Bull trout 172 was caught downstream of Albeni Falls Dam, implanted with a Lotek NANO NTC162 transmitter (expected life of 441 d), and released at the Priest River boat launch on 11 June 2008. Genetic analyses predicted that this fish was about 5 times more likely to have originated from Lightning Creek than from Gold Creek. It was detected at the North Dover station on 18 June 2008 at 0800 hours. This transmitter had an expected tag-failure date in August 2009; thus, the battery likely has expired.

Fish 108 – Bull trout 108 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_1 transmitter (expected life of 663 d), and released at the Priest River boat launch on 18 June 2008. Genetic analyses predicted that this fish was about 15 times more likely to have originated from Rattle Creek than from Morris Creek, which are both tributaries of Lightning Creek. It was first detected at the mouth of Priest River on 18 June at 2000 hours and again on 4 July at 2300 hours. There are no detection data to explain where this fish was between the subsequent detections at the Priest River receiver. However, based on detection signal strengths of the two antennae, it is unlikely that the fish passed the receiver and moved upstream into the Priest River. Fish 108 was detected passing upstream of the Dover receiving stations on 5 July 2008 at 2000 hours. The final detections of this fish in 2008 were recorded in the Clark Fork River near the Cabinet Gorge Fish Hatchery on 22 September (by aircraft) and 26 September (by boat) by AVISTA staff. This fish was detected several times also on 25 September at Cabinet Gorge Dam by AVISTA staff. Vehicle mobile tracking of the Clark Fork River on 8 October by PNNL staff did not detect fish 108, suggesting that it left the Clark Fork River or was in deep water and out of the detection range. This fish was not detected entering Lightning Creek in 2008. No detections of this transmitter occurred in 2009. On 25 March 2010, it was caught by the Idaho Department of Fish and Game near Cape Horn in Lake Pend Oreille. A month later, it was detected in Lightning Creek, and on 18 June, it was at the mouth of Rattle Creek, its genetically determined natal tributary. It remained in Rattle Creek until 28 September, when it was detected moving downstream of the Lightning Creek receiver station and re-entering the Clark Fork River. This transmitter had an expected tag-failure date in April 2010.

Fish 166– Bull trout 166 was caught in the tailrace of the Albeni Falls Powerhouse and implanted with a Lotek SR-11-18 radio telemetry transmitter (expected life of 359 d) and released upstream of Albeni Falls dam on 31 March 2010. Genetic analysis indicated that this fish was 2.49 times more likely to be from Lightning Creek than from Grouse Creek. It was first detected passing the Dover Receiver stations on 3 April and was detected moving into the Pack River on 9 June. It was consistently relocated by vehicle mobile tracking in the Upper Pack River upstream of the mouth of Grouse Creek through September, and was detected in Grouse Creek on 13 October. Although the fish returned to the tributary predicted as its secondary rather than primary, genetic analysis showed small difference between the likelihoods of returning to the two locations. The final detection from this fish was on 20 October on the Pack River receiver, although it was unknown if the fish passed downstream of the Pack River receiver. This transmitter has an expected tag-failure date of 25 March 2011.

Fish 178– Bull trout 178 was caught downstream of Albeni Falls Dam, implanted with a Lotek SR-11-18 radio telemetry tag, and released upstream of the dam on 29 June 2010. Genetic analysis predicted that this fish was 1.75 times more likely to have originated from Morris Creek than from Lightning Creek. This fish was first detected moving upstream of the Priest River receiver station on 30 June and was located approximately 17 km upstream in the Priest River on 13 July. This fish was located a final time on the Priest River receiver on 25 July. Despite regular aerial tracking efforts by EWU staff, this fish was not relocated, and its fate is uncertain. It is possible that this fish was using Priest River as a feeding area before proceeding to its predicted natal tributary. The transmitter for bull trout 178 has an expected tag-failure date of 23 June 2011.

Work Element G: 132 – Produce (Annual) Progress Report – Submit annual report for the period May 2010 to April 2011

This progress report satisfies this work element.

Work Element H: 183 – Produce Journal Article – Write journal article

Some data collected as part of this project are currently being included in a journal article discussing the entrainment of bull trout by Albeni Falls Dam. The journal article will primarily discuss data collected in a related study funded by the U.S. Army Corps of Engineers, Seattle District, describing movements and behavior of adult bull trout in the Albeni Falls Dam tailrace. However, some information on the life history of bull trout in the Pend Oreille Basin (i.e., genetic-assigned tributaries) collected in this study, will also be included. We expect to submit this article for review to the *North American Journal of Fisheries Management* in spring 2011. Additional data on bull trout life history collected from this study, but not included in this publication, will be included in a future publication specific to bull trout life history in the greater Pend Oreille basin. We expect to write and submit this latter publication in the final year of this study (BPA Project No. 2007-046-00) so that as much life history data as possible can be included.

Work Element I: 70 – Install Fish Monitoring Equipment – Uninstall all radio monitoring stations

Because of the previous uncertainty regarding continuation of this study into FY 2011–2012, we removed the Gold and Granite creek receiving stations in October 2010 and expected to remove the remaining stations in spring 2011 prior to the end of the contract year funding. However, this work element to uninstall all radio monitoring stations will not be performed due to the extension of the project into FY 2011–2012. Thus, both the Gold and Granite receiving stations will be reinstalled in spring 2011. All radio monitoring stations will then remain intact, pending the completion of the study.

Work Element J: 185 – Produce Pisces Status Report – Periodic status reports for BPA

PNNL submitted quarterly status reports to BPA through the Pisces reporting system.

Plans for 2011

Four primary efforts scheduled for PNNL in 2011 are outlined in the following paragraphs.

Mobile tracking efforts will continue in summer and fall 2011 to identify summer and pre-spawn locations of bull trout in Lake Pend Oreille. Four trips totaling a maximum of 12 days effort will be made from July through November 2011. We will concentrate tracking effort near the mouths of tributaries (e.g., Gold or Granite Creek) from which fish caught in 2011 are suspected to have originated. We will also track the shoreline near those areas. We hope to identify regions where bull trout stage during the summer and where fish congregate before ascending spawning tributaries. The ultimate goal is to obtain more detailed tracking profiles of bull trout following transport around Albeni Falls Dam. It is likely that all bull trout tagged prior to 2011 will have expired tag batteries. However, we will make an attempt to track areas where fish with soon-to-be-expiring tags (codes 166 and 178 are expected to expire in spring–summer 2011), in case the transmitter batteries are still operating.

Six bull trout have been implanted with transmitters and tracked for this study. Of those, four were genetically determined to have Lightning Creek (a tributary of the Clark Fork River), Rattle Creek, or Morris Creek (both tributaries of Lightning Creek) as their most likely populations of origin. In 2008, a bull trout (code 108) genetically assigned to Rattle Creek was detected in the Clark Fork River near the Cabinet Gorge Fish Hatchery but was not detected entering Lightning Creek. This fish was not detected entering Lightning Creek until April 2010 and thus may have been using the Clark Fork River as a staging or feeding area. To improve understanding of potential use of the Clark Fork River by fish genetically assigned to that river basin, a twelfth telemetry station may be installed near Cabinet Gorge Fish Hatchery.

To increase the probability of catching bull trout, we will use hook-and-line sampling in 2011 to attempt to capture entrained bull trout downstream of Albeni Falls Dam. In other regions of the Pacific Northwest where bull trout fishing is permitted, anecdotal fishing reports state that they are typically captured in 3–7 m of water depth. This depth exceeds the range of the electrical field produced by the

electrofishing boat, which extends to a depth of about 2 m. Thus, if bull trout in the Pend Oreille River are highly bottom-oriented, a higher catch rate may be yielded from hook-and-line fishing. The fisherman will focus solely on capturing bull trout in the area between Albeni Falls Dam and the Washington–Idaho state border.

Electrofishing effort will continue in spring 2011 to attempt to capture additional bull trout and transport them upstream of Albeni Falls Dam. Up to 10 electrofishing trips will be attended by a PNNL staff member.

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Temporary Restoration of Bull Trout Passage at Albeni Falls Dam

2011 Progress Report

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Bonneville Power Administration
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Introduction

Bull trout *Salvelinus confluentus* in the Columbia River basin were listed in 1998 as a threatened species by the U.S. Fish and Wildlife Service under the Endangered Species Act. Although many factors contributed to the decline of this species, the primary mechanism for the decline in the Pend Oreille River basin population was the construction of Albeni Falls Dam between 1951 and 1955. The construction of the dam blocked bull trout from upstream tributaries in the Pend Oreille River and Lake Pend Oreille from returning to their natal spawning tributaries once entrained by the dam. Populations from spawning tributaries downstream of Albeni Falls Dam were also unable to return to Lake Pend Oreille, which was historically used as a feeding area and cold water refuge during the summer. No current fish passage facilities exist at the dam; therefore, this migration corridor has been eliminated.

The work described in this report is ongoing as part of a multiyear project funded by the Bonneville Power Administration. The primary goals are to relocate entrained bull trout upstream of Albeni Falls Dam on the Pend Oreille River in Idaho and to further the life history knowledge of bull trout in the Clark Fork/Pend Oreille Basin. Our specific objectives for the study period in 2011, as in previous years, were to capture bull trout downstream of Albeni Falls Dam, surgically implant them with combination acoustic and radio transmitters (CARTs), and release them upstream of Albeni Falls Dam. Fish were then tracked to determine if they returned to spawn in the tributary that was dictated by genetic assignment. Tasks for this study were subdivided among staff at the Pacific Northwest National Laboratory (PNNL), Eastern Washington University (EWU), and the Kalispel Tribe of Indians. EWU and the Kalispel Tribe conducted electrofishing transects downstream of AFD to capture entrained bull trout. They surgically implanted fish with transmitters and released them upstream of the dam. Downloading receivers and performing mobile vehicle tracking were the responsibilities primarily of EWU staff. Boat tracking and data processing and analysis were performed by PNNL staff.

This project is currently in the fifth year of funding, and progress has been made toward the primary goals and objectives. In 2007, radio receiving stations were installed at several locations throughout the Pend Oreille River and Lake Pend Oreille to detect movements of adult bull trout. One bull trout was captured downstream of Albeni Falls Dam in 2007; however, it was too small to tag with a transmitter.

In 2008, four bull trout were captured downstream of Albeni Falls Dam, implanted with CARTs (codes 126, 128, 172, 108), and released upstream of the dam at Priest River, Idaho. The most likely natal tributaries of bull trout assigned using genetic analyses were Grouse Creek (codes 126 and 128), a tributary of the Pack River; Lightning Creek (code 172), a tributary of the Clark Fork River; and Rattle Creek (code 108), a tributary of Lightning Creek (Figure 1). After their release, all four bull trout migrated upstream from the release site in Priest River, Idaho; were detected at monitoring stations near Dover, Idaho; and were presumed to reside in Lake Pend Oreille from spring through summer 2008. One transmitter (code 128), originally implanted in a bull trout with a genetic assignment to Grouse Creek, was found in Grouse Creek in October 2008; however, the fish was not found with the transmitter. We presume that the transmitter was in the bull trout during its migration to Grouse Creek and that it was expelled from the fish during spawning. The bull trout genetically assigned to Rattle Creek (code 108) was detected in the Clark Fork River near the Cabinet Gorge Fish Hatchery (approximately 13 km upstream from the confluence with Lightning Creek) in September 2008 but was not detected entering Lightning Creek. The remaining two bull trout (codes 126 and 172) were not detected in 2008 after detection at the Dover receiving stations.

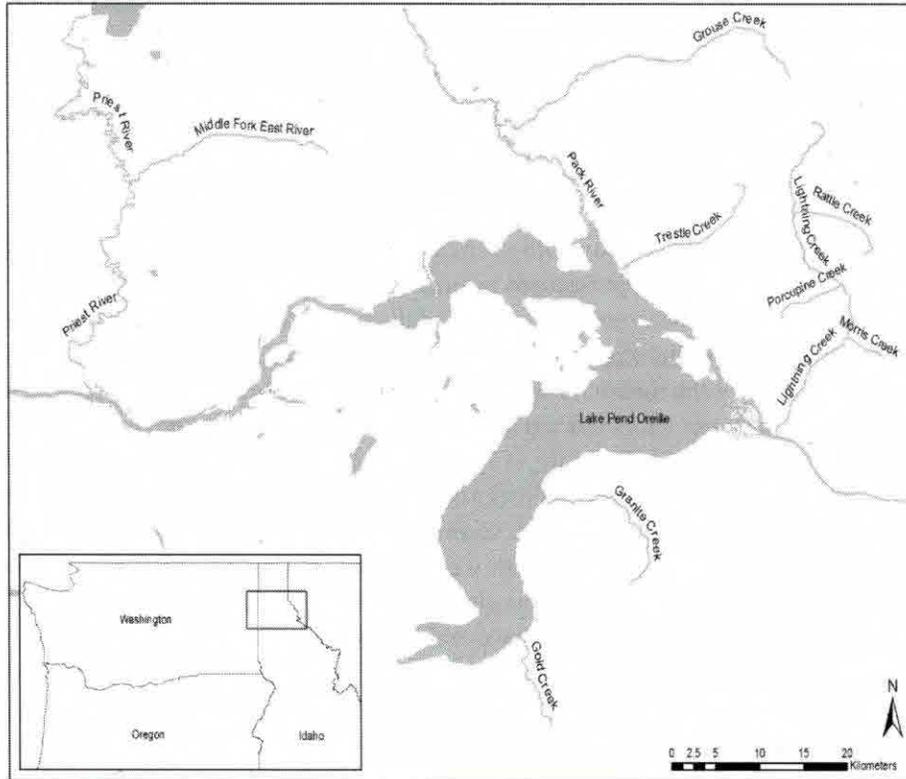


Figure 1. Locations of the genetically assigned primary and secondary tributaries of all fish captured from 2008 through 2011.

In 2009, four bull trout were captured downstream of Albeni Falls Dam. Due to the rarity of bull trout downstream of the dam, regional stakeholders and the Bonneville Power Administration (BPA) determined that all bull trout captured in 2009 would be used for a concurrent U.S. Army Corps of Engineers (USACE) study, which was designed to determine fine-scale bull trout movements downstream of Albeni Falls Dam. This information will be used to determine biologically based criteria for construction of a permanent upstream passage structure at Albeni Falls Dam, and results can be found in the final report to the USACE (Bellgraph et al. 2010). Therefore, tracking effort for the current study focused on the three bull trout remaining from 2008 that had active tags in 2009. One bull trout transmitter (code 126) was detected in fall 2009 in the Clark Fork Delta of Lake Pend Oreille; the two remaining bull trout were not detected in 2009.

In 2010, two bull trout were captured downstream of Albeni Falls Dam, implanted with transmitters (codes 166 and 178), and released upstream of the dam. Genetic analysis identified the most probable primary natal tributary for fish 166 as Lightning Creek, whereas the secondary tributary was predicted to be Grouse Creek. Genetic analysis for fish 178 identified Morris Creek (a tributary of Lightning Creek) as the most likely primary tributary; the secondary was identified as Lightning Creek. Fish 166 was detected in the mainstem Pack River, upstream of Grouse Creek, between July and September 2010 and in Grouse Creek in mid-October 2010. The last detection for this fish in 2010 was late October at the Pack River receiver station. The fish assigned to Morris Creek (code 178) was detected 17 km upstream

of the mouth of the Priest River in July 2010 and detected again at the mouth of the Priest River in late July 2010. Two bull trout tagged in 2008 (codes 108 and 126) also were relocated in Lake Pend Oreille in 2010. In June 2010, fish 108 was detected in Rattle Creek, one of its genetically assigned natal tributaries, while fish 126 was detected from July through October in Lake Pend Oreille approximately 14 km from the mouth of the Pack River, which is connected to its genetically assigned natal tributary (Grouse Creek).

In 2011, seven bull trout were captured downstream of Albeni Falls Dam, implanted with transmitters (codes 49, 175, 56, 46, 16, 47, 59), and released upstream near the mouth of the Priest River or at the Trestle Creek Boat Launch. Genetic analysis identified the most likely primary natal tributary for fish 49 as Morris Creek (tributary to Lightning Creek) and the secondary as the mainstem of Lightning Creek. This fish was first detected at the mouth of the Priest River and subsequently at the North Dover receiver in late June 2011. This fish was later detected at Granite Creek, south of its predicted natal tributary within the Lightning Creek watershed in July, August, and September 2011. Mobile vehicle tracking located this fish downstream of the Granite Creek station between late September and early November. Fish 175 was genetically determined to be from Granite Creek or Porcupine Creek, a tributary of Lightning Creek. The only detections of this fish were in July 2011 at the mouth of the Priest River and at the North Dover receiver. Granite Creek was also listed as the primary genetic tributary for fish 56 and 46, and both their secondary tributaries were listed as Lightning Creek. Fish 56 was detected at Albeni Falls Dam in June and downstream of the dam in July. This fish was also reported in the Boundary Dam tailrace (Mark Paluch, EWU, personal communication) in November. Fish 46 was detected in Gold Creek and at the Lightning Creek station in October. This fish was killed in a gill net later in October at the southern end of the lake during an Idaho Fish and Game lake-trout-removal project. Fish 16 was genetically predicted to be from the Middle Fork East River, a tributary of the Priest River. This transmitter was detected near the dam in July and was vehicle tracked by the Kalispel Tribe to a muskrat den downstream of the dam in August. Fish 47 and 59 were bull trout × brook trout *Salvelinus fontinalis* hybrids, so their natal tributaries were unable to be determined. Two days following release, fish 47 was detected at and passed downstream of Albeni Falls Dam and was detected for 2 weeks in July in the dam tailrace. Fish 59 was detected in the Priest River from July through September. Both fish tagged in 2010 (166 and 178) were also detected in 2011. Fish 166 was detected at the Pack River station in October. Fish 178 was found near its natal tributary this year. It was captured by AVISTA staff near Cabinet Gorge Dam July 2011 (Jason Olson, Kalispel Tribe of Indians, personal communication) and was detected 3 days later at the Lightning Creek receiver.

The following report details the progress by work element in the FY 2011–2012 statement of work, including data analyses of fish movements, full detection histories of all bull trout that have been studied since this project's inception in 2007. The report also expands on the information reported in the quarterly Pisces status reports. Additional detail on the progress to date can be found in Bellgraph and Deters (2008), Scholz et al. (2008), Bellgraph (2009), Paluch et al. (2009), Bellgraph (2010), Paluch et al. (2010), Bellgraph and Ortega (2011), Paluch et al. (2011), and the 2011 annual report to the BPA prepared by the Kalispel Tribe and Eastern Washington University (EWU).¹

¹ Mark C. Paluch, Alan T. Scholz, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2011 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

Progress by Work Element

Work Element A: 165 – Produce Environmental Compliance Documentation – Complete environmental compliance requirements

All procedures involving the handling of bull trout during this project were reviewed and approved by the Institutional Animal Care and Use Committee for Toxicology Northwest and the Pacific Northwest National Laboratory (PNNL) prior to handling fish (IACUC File 2007-19 and 2009-36; Animal Welfare Assurance Number A3353-01).

Work Element B: 157 – Collect/Generate/Validate Field and Lab Data – Electrofish, tag, and transport bull trout

Pacific Northwest National Laboratory staff assisted EWU staff on three electrofishing trips in spring 2011. Specific information on electrofishing, including sampling transects and enumeration of species captured, can be found in the Kalispel Tribe and EWU 2011 annual report to BPA.²

No bull trout were captured during electrofishing in 2011 when PNNL personnel assisted. As a result, PNNL staff implanted no fish with transmitters and did not transport any fish upstream of the dam. However, seven bull trout were captured by EWU and the Kalispel Tribe during other trips, implanted with Lotek SR or Nano-Series (radio frequency only) transmitters or combination acoustic/radio transmitters (CARTs), and transported to the Pend Oreille River upstream of Albeni Falls Dam. Although implantation of CART tags is preferred, radio transmitters were surgically implanted on smaller fish to minimize tag burden (mass of the tag relative to the mass of the fish). Further information on bull trout tagging and genetic analyses can be found in the Kalispel Tribe and EWU 2011 annual report to BPA.² Descriptive information on bull trout tagged from 2008 to 2011 is summarized in Table 1. Of the four bull trout captured in 2008 and transported upstream of Albeni Falls Dam, the transmitter of one fish (code 128) was recovered in Grouse Creek in fall 2008, and the remaining three implanted fish were available to the study in 2009. Two of these fish continued to be detected in 2010 but were not detected in 2011, likely due to battery expiration. No transmitters implanted in fish in 2010 have been recovered and fish tagged in 2010 continued to be detected in 2011. Two of the fish tagged in 2011 have been removed from the study due to confirmed mortality. Complete detection histories of these fish are included under progress for Work Element G.

² Mark C. Paluch, Alan T. Scholz, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2011 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

Table 1. Descriptive information on bull trout and bull trout × brook trout hybrids (codes 46 and 47) implanted with transmitters and transported upstream of Albeni Falls Dam through 2011. Genetic origin indicates the most likely and second most likely natal tributaries, respectively. Tag dead date is the expected date of transmitter battery failure based on the number of guaranteed tag-life days from the tagging date. One transmitter (code 128) was recovered in October 2008 and has been removed from the study. Two transmitters (codes 16 and 46) were also removed from the study in August and October 2011, respectively.

Code	Tagging Date	Length (mm)	Weight (g)	Genetic Origin	Tag Dead Date
126	19 May 2008	505	1178	Grouse Creek, Trestle Creek	09 Nov 2010
128	19 May 2008	501	1133	Grouse Creek, Rattle Creek	Recovered
172	11 Jun 2008	363	374	Lightning Creek, Gold Creek	26 Aug 2009
108	18 Jun 2008	496	1241	Rattle Creek, Morris Creek	12 Apr 2010
166	31 Mar 2010	553	1615	Lightning Creek, Grouse Creek	25 Mar 2011
178	29 Jun 2010	454	857	Morris Creek, Lightning Creek	23 June 2011
47	22 Jun 2011	460	813	Unknown	15 Apr 2013
49	22 Jun 2011	486	965	Morris Creek, Lightning Creek	15 Apr 2013
175	23 Jun 2011	360	418	Granite Creek, Porcupine Creek	25 Mar 2013
56	27 Jun 2011	259	157	Granite Creek, Lightning Creek	10 Sep 2012
16	18 Jul 2011	248	163	Middle Fork, East River	Removed
59	29 Jun 2011	309	289	Unknown	12 Sep 2012
46	09 Aug 2011	658	2751	Granite Creek, Lightning Creek	Removed

Work Element C: 157 – Collect/Generate/Validate Field and Lab Data – Lake mobile tracking surveys

Mobile tracking surveys by aircraft, vehicle, and boat were performed by PNNL, the Kalispel Tribe of Indians, and EWU staff in 2011. Aircraft and vehicle surveys were performed solely by the Tribe and EWU in 2011 and are reported in the Kalispel Tribe and EWU annual report.³ One boat-tracking survey of Lake Pend Oreille was performed by PNNL staff in 2011.

Reception range of the acoustic hydrophone was tested daily before each tracking survey of Lake Pend Oreille to ensure functionality of the tracking system and to determine tracking accuracy. A transmitter was hung on a weighted line from a buoy at approximately 5 m depth for hydrophone testing. The boat-mounted hydrophone was placed just beneath the water surface with the un baffled (i.e., “listening”) portion of the hydrophone facing the test transmitter. The boat and hydrophone were then moved progressively farther away from the transmitter until the receiver could not decode the transmitter. Reception range of the acoustic hydrophone (i.e., decoding of the transmitter code) varied between 400 and 500-m during each survey. The transmitter’s acoustic signal could be heard clearly up to 750 m away without decoding.

³ Mark C. Paluch, Alan T. Scholz, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2011 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

One boat-tracking survey was performed by PNNL on Lake Pend Oreille in September 2011 to locate two bull trout, codes 46 and 49. The focus was on these fish because they were implanted with CART tags, whose acoustic signals were able to be detected in the deep water of Lake Pend Oreille. Other bull trout were suspected (code 175) or known (code 178) to be located in Lake Pend Oreille, but they were implanted with radio-frequency-only tags, which are undetectable if fish are at deeper depths; thus we did not search for these fish. All other fish were downstream of Albeni Falls Dam (codes 47, 56), known to be dead (code 16), or still located in the Pend Oreille River (code 59). Subsections of the lake were chosen for tracking because the size of the lake precluded tracking its entirety (Figure 2). We presumed that the highest probability for detection of fish code 46 would be in the area between its release location at the Trestle Creek Recreation Area Launch and its genetically assigned primary natal tributary of Granite Creek, including its secondary genetic tributary of Lightning Creek. However, due to the large size of this area, we chose to focus on areas near the Trestle Creek Boat Launch and near the mouths of Granite and Lightning creeks. Fish 49 was believed to have the highest probability for detection near the mouth of Granite Creek, where it had recently been detected on the Granite Creek receiver, or near its predicted natal tributary of Morris Creek, a tributary of Lightning Creek. Inclement weather prohibited lake tracking in the Clark Fork Delta, where the entrance of Lightning Creek is located, so focus was increased near Granite Creek. Surveys of nearshore transects were conducted from Trestle Creek to Hope, Idaho, on the northeastern side of the lake and extended to the western shore near Anderson Point (Figure 2). Transect surveys were conducted also from Indian Point to approximately 10 km south and extended to the western shore to cover the area around Granite Creek extensively.

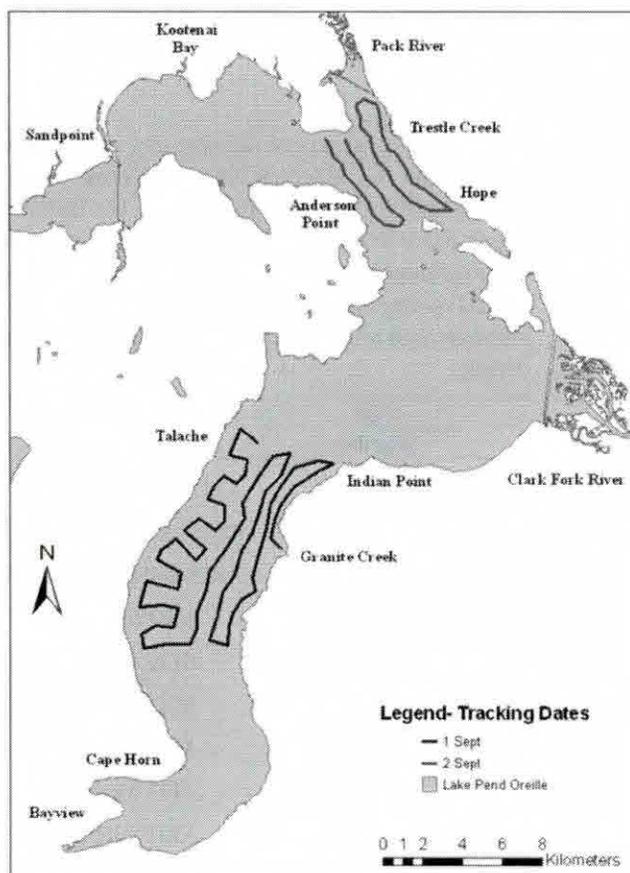


Figure 2. Boat-tracking transects in Lake Pend Oreille on 1 and 2 September 2011.

Telemetry listening locations were spaced at a maximum of 1000 m along each survey transect in order to cover as large an area as possible. We were confident this would not exceed the reception range of the acoustic hydrophone as determined during testing because the range of detection would overlap between consecutive listening stations by about 500 m. At each listening location, the boat remained stationary and the engine and depth sounders were turned off to minimize acoustic interference. The transmitter frequency was then scanned for 2 min (30 s in each cardinal direction) using an underwater

acoustic hydrophone to listen for the acoustic signal from the transmitter. When a transmitter was heard and decoded, the tag code, time of detection, and geographic coordinates of the location were recorded. No fish were detected during manual lake tracking in 2011.

Work Element D: 157 – Collect/Generate/Validate Field and Lab Data – Maintain and download radio receiving stations

Eleven radio telemetry receiving stations located throughout the Pend Oreille Basin and at Albeni Falls Dam were used to detect bull trout implanted with radio transmitters in 2011. The locations, site names, and site numbers of radio receiving stations as well as associated antennas operating in 2011 are shown in Table 2.

Table 2. Names and locations of all sites and associated antennas for each receiving station in 2011. Priest River, Gold Creek, Granite Creek, and Trestle Creek are tributaries of Lake Pend Oreille, and receiving stations were positioned at the mouths of these tributaries. Lightning Creek is a tributary of the Clark Fork River; its receiving station was placed just upstream of the confluence with the Clark Fork River. North and South Dover receiving stations were placed at the north and south banks of the Pend Oreille River near Dover, Idaho. Site numbers and antenna names correspond to labels within raw data, stored in a database at PNNL.

Site Name	Site Number	Site Location	Antenna Name	Antenna Location
Tailrace	1	AFD spillway tailrace	4	Center tailrace
Tailrace	1	AFD spillway tailrace	6	River left
Tailrace	1	AFD spillway tailrace	8	River right
Forebay	2	AFD forebay	6	Center forebay
Forebay	2	AFD forebay	A	Antennas grouped
Forebay	2	AFD forebay	7	River right
Forebay	2	AFD forebay	3	River-right center
Forebay	2	AFD forebay	1	River left
Forebay	2	AFD forebay	4	River-left center
Logchute	3	AFD powerhouse tailrace	0	Logchute
Logchute	3	AFD powerhouse tailrace	AH0	Logchute
Priest River	5	Mouth of river	0	Downstream
Priest River	5	Mouth of river	A	Upstream
North Dover	6	N. side of Pend Oreille River	1	Downstream
North Dover	6	N. side of Pend Oreille River	A	Upstream
South Dover	7	S. side of Pend Oreille River	0	Downstream
South Dover	7	S. side of Pend Oreille River	A	Upstream
Gold Creek	8	Mouth of river	0	Downstream
Gold Creek	8	Mouth of river	A	Upstream

Site Name	Site Number	Site Location	Antenna Name	Antenna Location
Granite Creek	9	Mouth of river	0	Downstream
Granite Creek	9	Mouth of river	A	Upstream
Lightning Creek	10	Mouth of river	1	Downstream
Lightning Creek	10	Mouth of river	A	Upstream
Trestle Creek	11	Mouth of river	1	Downstream
Trestle Creek	11	Mouth of river	A	Upstream
Pack River	12	Downstream of Grouse Creek confluence	A	Downstream
Pack River	12	Downstream of Grouse Creek confluence	1	Upstream

Radio receiving station locations in the Pend Oreille Basin and specific locations at Albeni Falls Dam are shown in Figures 3 and 4, respectively. Additional technical and setup specifications of radio receiving stations can be found in Bellgraph and Deters (2008). The reception ranges of the spillway tailrace, spillway forebay, Priest River, and North and South Dover monitoring stations were tested in March 2011 by PNNL staff, and all other stations were tested by EWU staff.

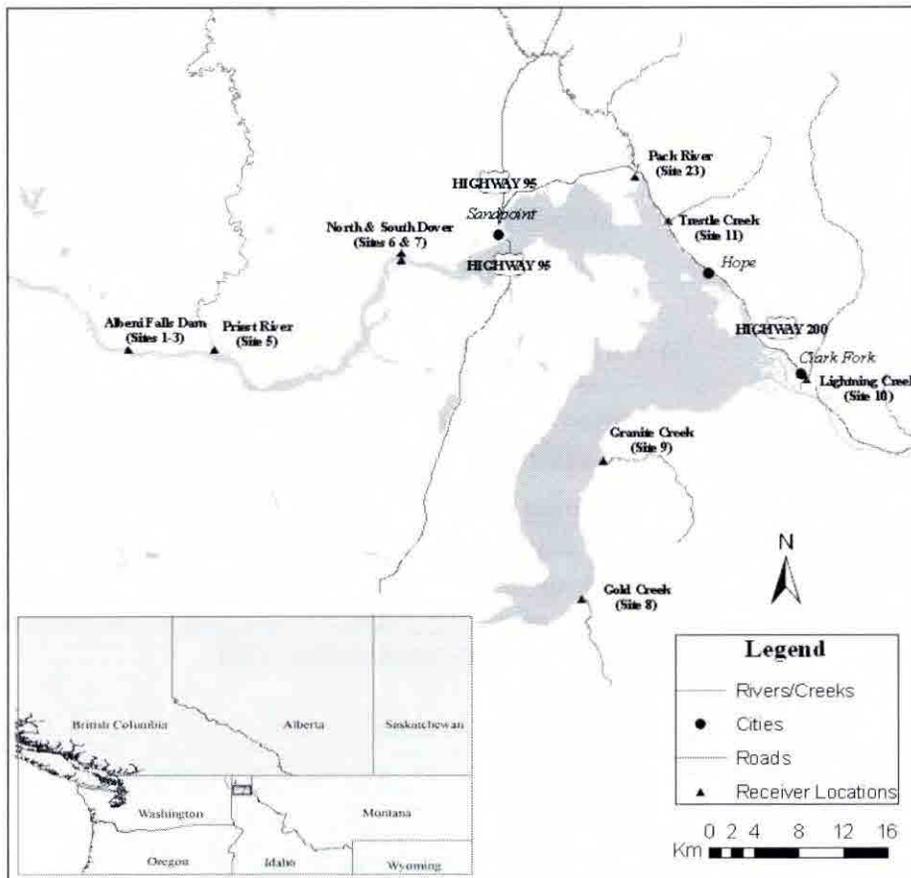


Figure 3. Locations of radio telemetry monitoring stations on the Pend Oreille River and Pend Oreille Lake tributaries.



Figure 4. Locations of radio telemetry monitoring stations at Albeni Falls Dam.

Monitoring stations were checked in spring 2011 for damage from the previous winter, receivers removed in fall 2010 were reinstalled, and receiver testing indicated that all stations functioned properly and met the study objectives for 2011. Receivers located at the Tailrace (site 1), Forebay (site 2), Logchute (site 3), Priest River (site 5), and South Dover (site 7) were operational throughout the 2010/2011 winter. Receivers removed in fall 2010 were reinstalled and tested in March–July 2011. North Dover (site 6), Lightning Creek (site 10), Trestle Creek (site 11), and the Pack River (site 12) were reinstalled on 21 March 2011. The stations at Gold Creek (site 8) and Granite Creek (site 9) were reinstalled on 6 July 2010 after snowmelt allowed access. Dates of operation for each receiver site are shown in Table 3.

Table 3. Operation dates of radio telemetry monitoring stations in 2011. End dates of 31 December 2011 indicate that monitoring stations will continue scanning during winter 2011–2012.

Receiver Name	Site No.	Start Date	End Date
Tailrace	1	1-Jan-11	31-Dec-11
Forebay	2	1-Jan-11	31-Dec-11
Logchute	3	1-Jan-11	31-Dec-11
Priest River	5	1-Jan-11	31-Dec-11
North Dover	6	21-Mar-11	11-Nov-11
South Dover	7	1-Jan-11	31-Dec-11
Gold	8	6-Jul-11	26-Oct-11
Granite	9	6-Jul-11	26-Oct-11
Lightning	10	21-Mar-11	11-Nov-11
Trestle	11	21-Mar-11	11-Nov-11
Pack River	12	21-Mar-11	12-Nov-11

Receiver reception range extended about 450 m upstream and 900 m downstream of Albeni Falls Dam in 2011. Reception range was determined by dragging a transmitter throughout the forebay and tailrace at 1 m depth. Test transmitter location was recorded in 1-s intervals in a geospatial mapping program (Fugawi Marine ENC software, Toronto, Ontario, Canada) and was viewed in real time to ensure that the test transmitter was dragged throughout all areas of the tailrace to about 1-km downstream and throughout the forebay to about 500 m upstream of the dam (beyond the presumed boundary of reception). After the transmitter drags were conducted, all dam receivers were downloaded to recover data, detection data were merged with transmitter location data, and reception range maps were created (Figure 5) to ensure that reception ranges met the study objectives.

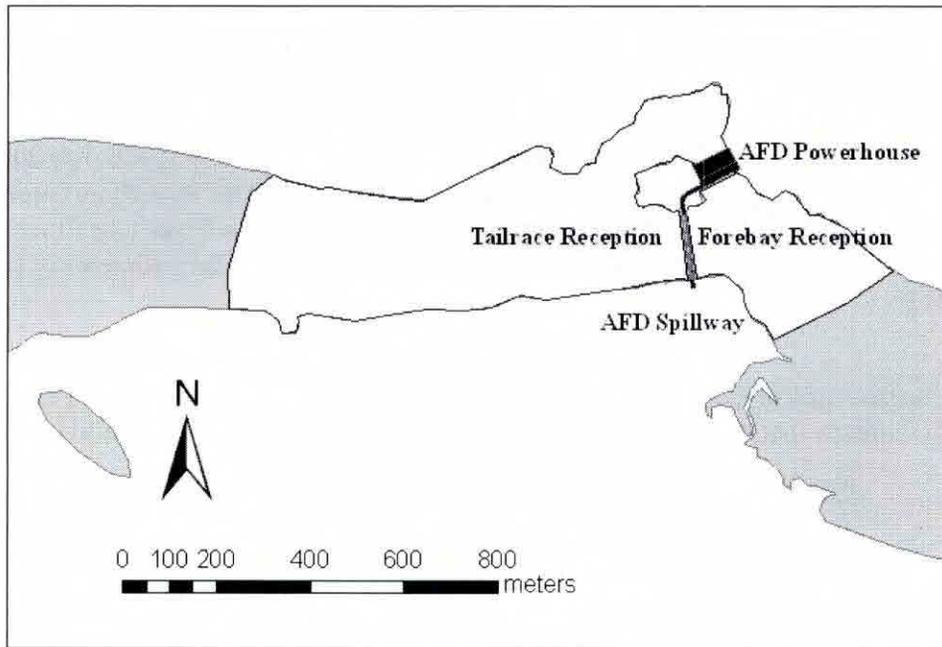


Figure 5. Forebay and tailrace reception range of radio telemetry receivers at Albeni Falls Dam (AFD) tested with a transmitter at 1 m depth in spring 2011.

Monitoring stations not located at Albeni Falls Dam were tested using various methods, depending on the station location. The Priest River receiver was tested by placing a transmitter in the water near the antennas at 1 m depth. The mouth of the Priest River was frozen during testing, which prohibited boat testing to determine ultimate reception range. Relative signal strength (i.e., power) was similar to the 2008-2010 testing results of a transmitter in the same location and depth. This indicates that the Priest River monitoring station was working in a manner similar to that of previous years and was assumed to have a reception range extending across the entire river width (as it did in 2008–2010) and to the deepest cross-sectional depth (about 3 m). The Priest River station also was tested to ensure differentiation of upstream and downstream movements of transmitters. Reception range and direction differentiation were tested by submerging a transmitter in the river at 50-m intervals extending about 150 m upstream and downstream of the monitoring station. During this time, one person remained at the receiver to ensure that the transmitter code was detected at each testing interval and that direction could be differentiated. North and South Dover stations were tested in the same manner by placing a transmitter in the water at 1 m depth near the antenna at North Dover. Both Dover stations were able to decode the transmitter. The North and South Dover stations were also tested to ensure differentiation of upstream and downstream movements of transmitters. A transmitter was submerged at North Dover at 50-m intervals extending about 150 m upstream and downstream of the receiver station. One person remained at the North Dover receiver to ensure that the direction could be differentiated. Data were downloaded from South Dover and detections of the test transmitter during testing were examined to ensure directionality was also determinable by this station.

Receivers were downloaded approximately once every 2 weeks in 2011 by PNNL or EWU staff during the period in which each receiver was operating (Table 3). A standard operating procedure ensured data quality control during each download. This procedure involved verifying monitoring station

detection performance and saving and maintaining data. During each download, staff ensured that the station had run continuously since the last download, interference signals were minimal (to allow for detection of fish transmitters over ambient noise), and beacon transmitters were detected hourly at each station. In addition, the station was inspected for physical damage. Any problems identified were repaired as soon as possible. Data were saved to a laptop computer and backed up to a removable thumb drive, and data collected by EWU were sent to PNNL within a few working days. Gaps in data collected by each receiver station were few in 2011 (Figure 6). Eleven receivers were deployed during the study period for a total of 3044 receiver days. Receivers detected data 94.1% of the time they were deployed.

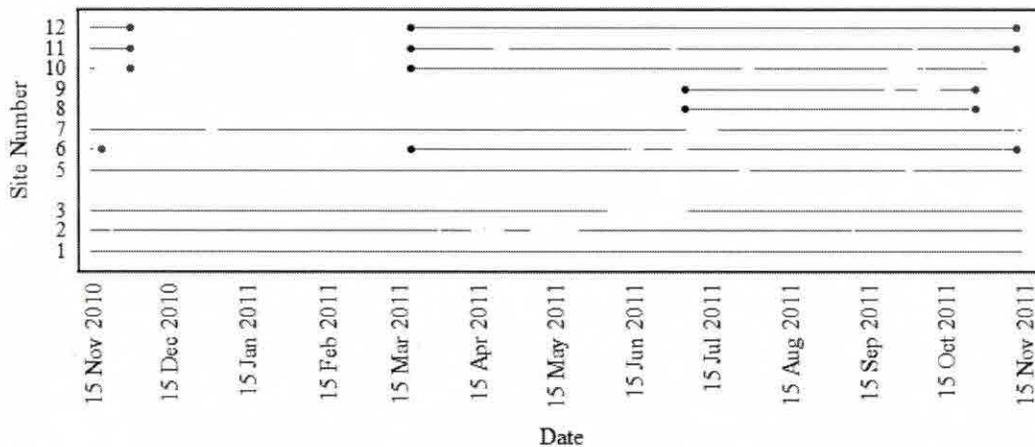


Figure 6. Gaps in data collected per receiving station in 2011. Horizontal lines represent the period of time each receiver was deployed and detecting beacon transmitters from 15 November 2010 through 15 November 2011. Beacon tags are radio tags which are located nearby and set to ping 5 times every hour to test reception. A valid receiver day occurs when the receiver is functioning well enough to detect its beacon at least 20 times during that day. Red dots indicate when receivers were removed for the season (in both 2010 and 2011) and blue dots indicate the date receivers were installed.

There were 140 days (4.6% of total days) when receivers did not function due to power failures or equipment malfunction. The primary gaps in 2011 data occurred at site 2 from 12 through 25 April and 6 through 24 May; site 3 from 5 June through 6 July; and site 7 from 6 through 18 July. The data gaps at site 2 were due to low receiver battery. The gap in data at site 3 was due to a loose connection between the receiver and the antenna. A power outage causing the receiver to go offline was likely responsible for the data gap at site 7. Minor gaps in data occurred at site 5 from 27 through 30 July and 30 September through 2 October; site 6 from 15 through 19 June and 1 through 6 July; site 7 from 1 through 3 January; site 9 from 22 through 25 September and 5 through 13 October; site 10 from 28 July through 1 August and 23 September through 4 October; and site 11 from 22 through 27 April, 30 June through 2 July, and 3 through 4 October. The majority of these minor data gaps were due to temporary malfunctions with the receiver or a low receiver battery. Of the minor gaps in data, there were 40 receiver days (1.3% of possible days) in which the receivers logged primarily noise from external sources. For example, the three data gaps at station 11 that lasted for 2, 3, and 6 days were due to interference. A combination of interference and low power interrupted valid data collection at site 10 in late September. Interference

noise may have been caused by higher than average flows or the operation of nearby hydropower equipment.

Cellular modems were used to download the Tailrace, Forebay, Logchute, Priest River, North Dover, South Dover, Gold, Granite, and Pack River receiving stations in 2011 to increase download frequency, ensure continuous operation of equipment, and reduce driving time during downloading. Because modems could not be installed at the Lightning and Trestle stations due to poor cellular reception, data collected by these two stations were downloaded manually in 2011.

Work Element E: 157 – Collect/Generate/Validate Field and Lab Data – Professional hook/line fish, tag, transport fish

PNNL did not hire a professional fisherman to capture bull trout in 2011, so no fish were tagged or transported from this effort. A fisherman and a qualified fish surgeon were not available at the same time to complete this task.

Work Element F: 119 – Manage and Administer Projects – Manage project

Labor to accomplish electrofishing, mobile tracking, downloading of monitoring stations, and data tasks was coordinated in 2011 among staff from EWU, the Kalispel Tribe, and PNNL. A budget and statement of work for 2012 were submitted to BPA in January 2012 for work in FY 2012–2013. An inventory of property was also submitted in January 2012.

Work Element G: 162 – Analyze/Interpret Data- Data reduction and analysis

Data files downloaded from radio receiving stations were checked for quality using a standard operating procedure as soon as possible after downloading. After files were received from EWU, they were parsed and formatted to comma-separated value (csv) files and then uploaded to a Microsoft SQL Server relational database (Microsoft Corporation, Redmond, Washington). Detection histories of each bull trout were then queried from the database for the period from 15 November 2010 through 15 November 2011, supplemented with the previous years' data and mobile tracking data, and are reported in the 'Detection histories' section below. To avoid false positive detections, signals required a minimum power of 100 (Lotek value of signal strength; possible range is 0–255) and a maximum threshold value to be considered valid. Detection data collected from the time of transmitter implantation through 15 November are included in this progress report.

Detection histories

To date, 13 bull trout have been surgically implanted with transmitters and tracked by fixed receivers, vehicle, and boat. Genetically determined primary and secondary natal tributaries were assigned to 11 fish (two were hybrids, and natal tributaries were indeterminable). Two fish were tracked to their genetically assigned primary tributary, and three fish were tracked to their predicted secondary tributary. The remaining fish were not detected, were captured or found dead, or were tracked elsewhere. Detection histories for individual fish are given below, and detection locations are shown in Appendix A.

Fish 126 – Bull trout 126 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses indicated that this fish was about 68 times more likely to have originated from Grouse Creek than from Trestle Creek. The North and South Dover receiving stations detected this fish on 11 and 12 June 2008. The transmitter was not detected again until 26 September 2009 (N 48°08'00.07" W 116°17'09.02") and 20 October 2009 (N 48°07'57.33" W 116°17'13.50") during acoustic mobile tracking of Lake Pend Oreille. This fish was believed to be dead because it was detected in the same location one month apart in 2009. However, the transmitter was detected on the western end of the lake during acoustic mobile tracking on 24 August, 13 September, and 27 October 2010 (N 48°11'14.92" W 116°22'35.99"). The transmitter was detected with the highest signal strength in the same area, so it did not appear that the fish had moved during this time. However, the acoustic hydrophone has limited detection accuracy (about 400 m), so it is uncertain if this fish was alive. The battery of this transmitter was expected to fail in November 2010.

Fish 128 – Bull trout 128 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses predicted that this fish was 2.577×10^7 times more likely to have originated from Grouse Creek than from Rattle Creek. It was detected at the South Dover station on 28 May 2008 at 0600 hours. On 11 October 2008, code 128 was detected during aerial tracking over Grouse Creek (N 48°27.829 W 116°16.352). On 22 October 2008, tag 128 was found in Grouse Creek and recovered (N 48°27.924 W 116°16.180); no fish carcass was seen in the area.

Fish 172 – Bull trout 172 was caught downstream of Albeni Falls Dam, implanted with a Lotek NANO NTC162 transmitter (expected life of 441 d), and released at the Priest River boat launch on 11 June 2008. Genetic analyses predicted that this fish was about 5 times more likely to have originated from Lightning Creek than from Gold Creek. It was detected at the North Dover station on 18 June 2008 at 0800 hours. This transmitter had an expected tag-failure date in August 2009; thus, the battery likely has expired.

Fish 108 – Bull trout 108 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_1 transmitter (expected life of 663 d), and released at the Priest River boat launch on 18 June 2008. Genetic analyses predicted that this fish was about 15 times more likely to have originated from Rattle Creek than from Morris Creek, which are both tributaries of Lightning Creek. It was first detected at the mouth of Priest River on 18 June at 2000 hours and again on 4 July at 2300 hours. There are no detection data to explain where this fish was between the subsequent detections at the Priest River receiver. However, based on detection signal strengths of the two antennae, it is unlikely that the fish passed the receiver and moved upstream into the Priest River. Fish 108 was detected passing upstream of the Dover receiving stations on 5 July 2008 at 2000 hours. The final detections of this fish in 2008 were recorded in the Clark Fork River near the Cabinet Gorge Fish Hatchery on 22 September (by aircraft) and 26 September (by boat) by AVISTA staff. This fish was detected several times also on 25 September at Cabinet Gorge Dam by AVISTA staff. Vehicle mobile tracking of the Clark Fork River on 8 October by PNNL staff did not detect fish 108, suggesting that it left the Clark Fork River or was in deep water and out of the detection range. This fish was not detected entering Lightning Creek in 2008. No detections of this transmitter occurred in 2009. On 25 March 2010, it was caught by the Idaho Department of Fish and Game near Cape Horn in Lake Pend Oreille. A month later, it was detected in Lightning Creek, and on 18 June, it was at the mouth of Rattle Creek, its genetically determined natal tributary. It remained in Rattle Creek until 28 September 2010, when it was detected moving downstream of the Lightning Creek

receiver station and re-entering the Clark Fork River. This transmitter had an expected tag-failure date in April 2010.

Fish 166 – Bull trout 166 was caught in the tailrace of the Albeni Falls Powerhouse and implanted with a Lotek SR-11-18 radio telemetry transmitter (expected life of 359 d) and released upstream of Albeni Falls Dam on 31 March 2010. Genetic analysis indicated that this fish was 2.49 times more likely to be from Lightning Creek than from Grouse Creek. It was first detected passing the Dover receiver stations on 3 April 2010 and was detected moving into the Pack River on 9 June. It was consistently relocated by vehicle mobile tracking in the Upper Pack River upstream of the mouth of Grouse Creek through September and was detected in Grouse Creek on 13 October 2010. Although the fish returned to the tributary predicted as its secondary rather than primary, genetic analysis showed small difference between the likelihoods of returning to the two locations. This fish was detected on the Pack River receiver on 20 October 2010, although it was unknown if the fish passed downstream of the receiver. Despite an expected tag-failure date of 25 March 2011, this fish was detected on 19 October 2011 on the downstream-facing antenna of the Pack River monitoring station.

Fish 178 – Bull trout 178 was caught downstream of Albeni Falls Dam, implanted with a Lotek SR-11-18 radio telemetry tag, and released upstream of the dam on 29 June 2010. Genetic analysis predicted that this fish was 1.75 times more likely to have originated from Morris Creek than from Lightning Creek. This fish was first detected moving upstream of the Priest River receiver station on 30 June and was located approximately 17 km upstream in the Priest River on 13 July. This fish was located a final time in 2010 on the Priest River receiver on 25 July. On 7 July 2011, this fish was captured by AVISTA staff near Cabinet Gorge Dam. It was also detected throughout the day at the Lightning Creek station on 10 July. This fish was further detected during vehicle mobile tracking in the East Fork of Lightning Creek on 4, 11, 24, and 30 August, 16 and 30 September, and 25 October. It is possible that this fish was using Priest River as a feeding area before proceeding to its predicted natal tributary. The transmitter for bull trout 178 had an expected tag-failure date of 23 June 2011.

Fish 47 – Bull trout hybrid 47 was captured on 22 June 2011 downstream of Albeni Falls Dam, implanted with a Lotek CART tag, and released upstream of the dam. This fish was a hybrid; therefore, its natal tributary was unable to be determined due to a lack of a genetic database for bull trout hybrids. This fish was detected on the Forebay and Tailrace receivers at Albeni Falls Dam on 25 June 2011 and passed downstream of the dam on this day. It was then detected in the dam tailrace at both the Logchute and Tailrace stations consistently from 10 through 23 July. The transmitter for hybrid 47 has an expected tag-failure date of 15 April 2013.

Fish 49 – Bull trout 49 was captured downstream of Albeni Falls Dam, implanted with a Lotek CART tag, and released upstream of the dam on 22 June 2011. Genetic analysis identified the most likely primary natal tributary for this fish as Morris Creek, a tributary of Lightning Creek, and the secondary as Lightning Creek. This fish was first detected at the mouth of the Priest River via mobile vehicle tracking on 23 June and on the receiver station from 24 June to 26 June. This fish was next detected at the North Dover receiver on 27 June 2011. On 23 July through 24 August and again on 19 September 2011, the fish was detected south of its predicted natal tributary, at Granite Creek. Vehicle mobile tracking also located this fish downstream of the Granite Creek station on 26 and 30 September, 14 and 25 October, and 10 November. The transmitter for this fish has an expected tag-failure date of 15 April 2013.

Fish 175 – Bull trout 175 was captured on 23 June 2011 downstream of Albeni Falls Dam, implanted with a Lotek SR-11-18 radio telemetry tag, and released upstream. Fish 175 was genetically determined to be from Granite Creek or Porcupine Creek (a tributary of Lightning Creek). The only detections for this fish were on 6 July during vehicle mobile tracking by EWU, 8 July at the mouth of the Priest River, and on 10 July at North Dover. The transmitter for bull trout 175 has an expected tag-failure date of 25 March 2013.

Fish 56 – Bull trout 56 was captured downstream of Albeni Falls Dam, implanted with a Lotek Nano transmitter, and released upstream of the dam on 27 June 2011. The predicted primary natal tributary was Granite Creek, and its secondary tributary was predicted as Lightning Creek. Fish 56 was detected at Albeni Falls Dam only on 28 June. This fish was also detected downstream of Albeni Falls Dam on 11, 18, and 27 July near Pioneer Park during mobile vehicle tracking. The last detection for this fish was on 1 November, reported by Seattle City Lights in the tailrace of Boundary Dam. The transmitter for bull trout 56 has an expected tag-failure date of 10 September 2012.

Fish 16 – Bull trout 16 was captured on 29 June 2011 downstream of Albeni Falls dam, implanted with a Lotek SuperNano transmitter, and released upstream of the dam. Fish 16 was predicted to be from the Middle Fork of the East River, a tributary of the Priest River. This fish was detected near the dam on 19 July. Its transmitter was detected on 27 July downstream of Albeni Falls Dam and again on 2 and 28 August in a muskrat hole near Kelly Island during mobile vehicle tracking.

Fish 59 – Bull trout hybrid 59 was captured downstream of Albeni Falls Dam on 29 June 2011, implanted with a Lotek Nano transmitter, and released upstream of the dam. Fish 59 was a hybrid, so its natal tributary was undeterminable. The only detection on a receiver station for this fish occurred on 3 July at the mouth of the Priest River. The location of this fish in Priest River was verified repeatedly by mobile vehicle tracking by EWU, where it was detected approximately every other week from 6 July through 26 September. The expected tag-failure date for the transmitter in this hybrid is 12 September 2012.

Fish 46 – Fish 46 was captured downstream of Albeni Falls Dam on 9 August 2011. It was implanted with a Lotek CART tag and released upstream of the dam at the Trestle Creek Recreation Area. Granite Creek was given as its primary genetic tributary, and Lightning Creek was listed as its secondary tributary. Fish 46 was detected at the Gold Creek station from 8 through 11 October and passed upstream of the Gold Creek station once during this period. This fish was mortally captured in a gill net on 13 October 2011 just south of Lakeview.

Work Element H: 132 – Produce (Annual) Progress Report – Submit Annual Report for the period April 2011 to November 2011

This progress report satisfies this work element.

Work Element I: 183 – Produce Journal Article – Submit journal article

We are currently in the final stages of editing a peer-reviewed manuscript describing the movements of entrained adult bull trout at Albeni Falls Dam. The journal article uses data collected from both the current study and a closely related study funded by the U.S. Army Corps of Engineers, which described

movements and behavior of adult bull trout in the Albeni Falls Dam tailrace. Information on the life history of bull trout in the Pend Oreille Basin (i.e., genetic-assigned tributaries) collected in this study will also be included. We will submit this article for review to the *North American Journal of Fisheries Management* in winter 2012, prior to the end of the current study contract. Additional data on bull trout life history collected from this study, but not included in this publication, will be included in a future publication specific to bull trout life history in the greater Pend Oreille Basin. We expect to write and submit this latter publication once sufficient sample sizes of bull trout have been transported upstream of Albeni Falls Dam and tracked back to their spawning grounds so that as much life history data as possible can be included.

Work Element J: 70 – Install Fish Monitoring Equipment – Test all stations prior to FY12/13 monitoring season, if applicable

Currently it is assumed that this study will continue for at least one more year. Thus, all monitoring stations will be tested and calibrated in March 2012 prior to the primary migration season of bull trout. Status of this testing will be reported in the annual report for FY12/13, which will be published in winter 2013.

Work Element K: 185 – Produce Pisces Status Report – Periodic status reports for BPA

PNNL submitted quarterly status reports to BPA through the Pisces reporting system.

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Appendix A

Appendix A

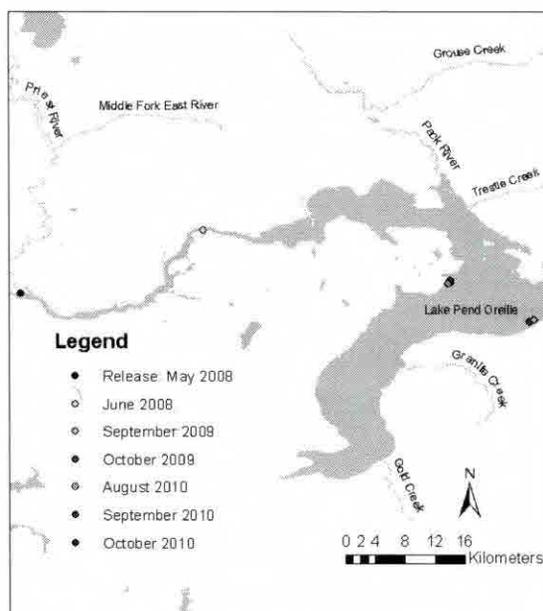


Figure A.1. Detections of bull trout code 126 in Lake Pend Oreille from release in May 2008 through October 2010. Genetic analyses predicted the primary natal tributary for this fish to be Grouse Creek and the secondary tributary was assigned to Trestle Creek.

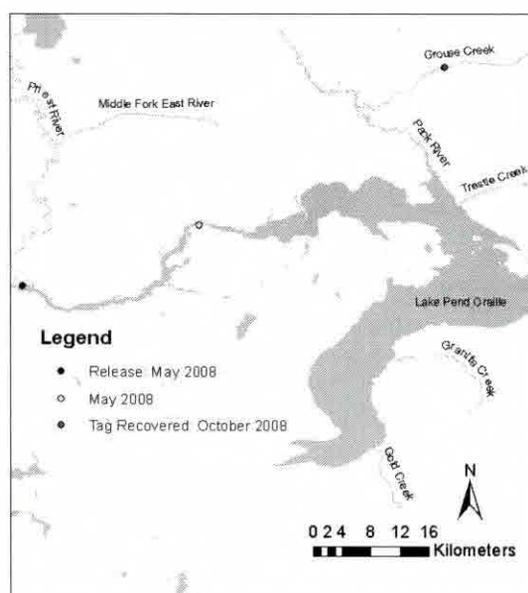


Figure A.2. Detections of bull trout code 128 in Lake Pend Oreille from release in May 2008 through October 2008. Genetic analyses predicted the primary natal tributary for this fish to be Grouse Creek and the secondary tributary was assigned to Rattle Creek, a tributary of Lightning Creek.

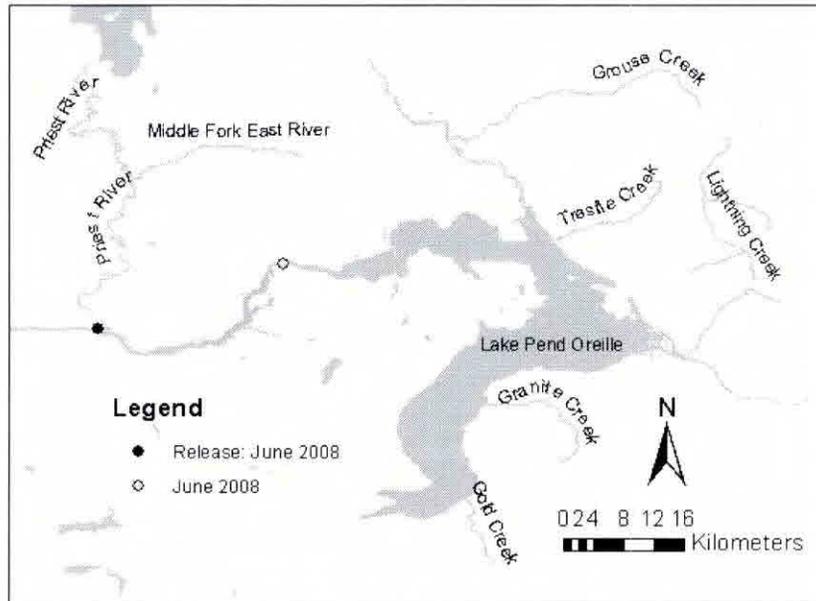


Figure A.3. Detections of bull trout code 172 in Lake Pend Oreille in June 2008. Genetic analyses predicted the primary natal tributary for this fish to be Lightning Creek and the secondary tributary was assigned to Gold Creek.

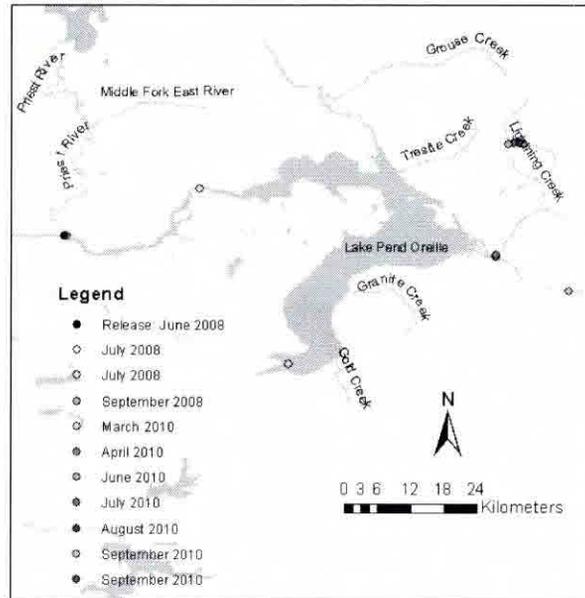


Figure A.4. Detections of bull trout code 108 in Lake Pend Oreille from release in June 2008 through September 2010. Genetic analyses predicted the primary natal tributary for this fish to be Rattle Creek, and the secondary tributary was assigned to Morris Creek, both of which are tributaries of Lightning Creek.

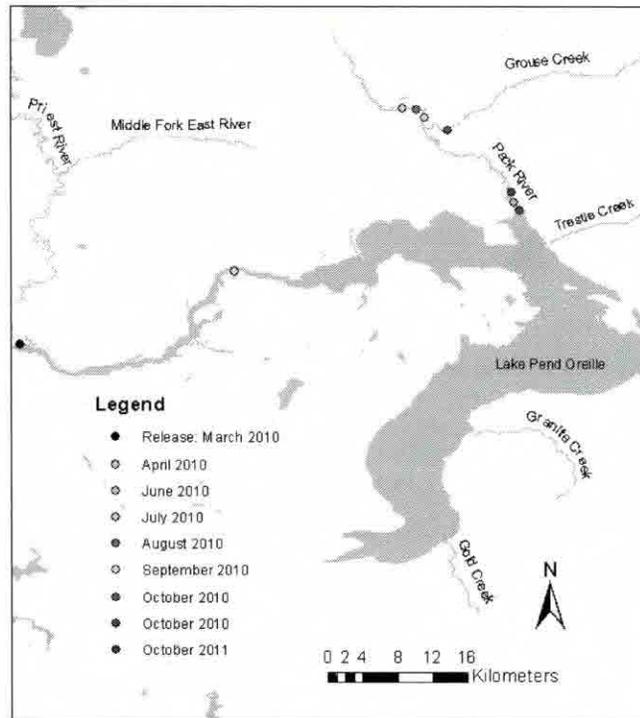


Figure A.5. Detections of bull trout code 166 in Lake Pend Oreille from release in March 2010 through October 2011. Genetic analyses predicted the primary natal tributary for this fish to be Lightning Creek and the secondary tributary was assigned to Grouse Creek.

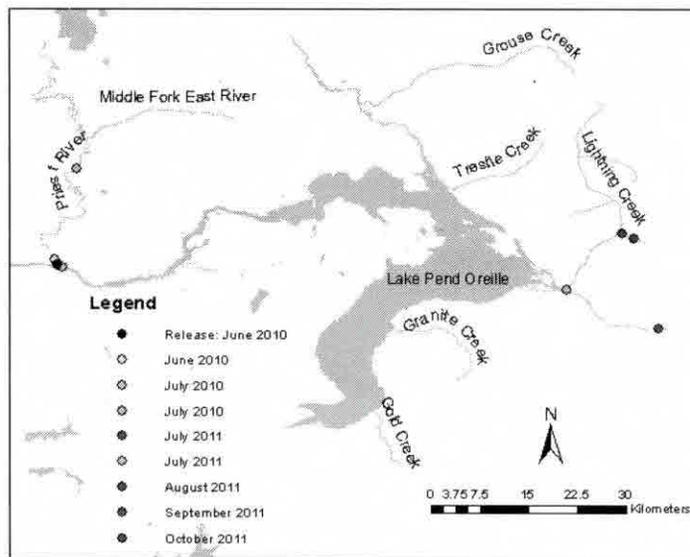


Figure A.6. Detections of bull trout code 178 in Lake Pend Oreille from release in March 2010 through October 2011. Genetic analyses predicted the primary natal tributary for this fish to be Morris Creek, a tributary of Lightning Creek, and the secondary tributary was assigned to Lightning Creek.

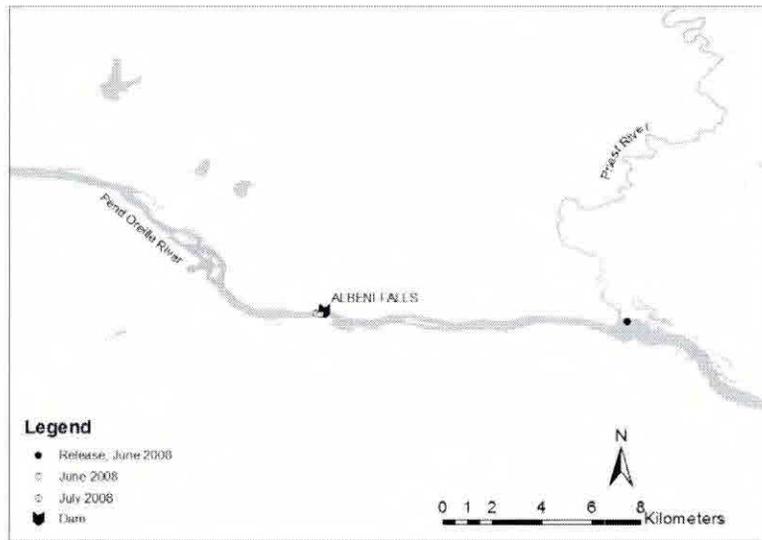


Figure A.7. Detections of bull trout code 47 in Lake Pend Oreille from release in June 2011 through July 2011. This fish was a hybrid and therefore its natal tributary could not be genetically assigned.

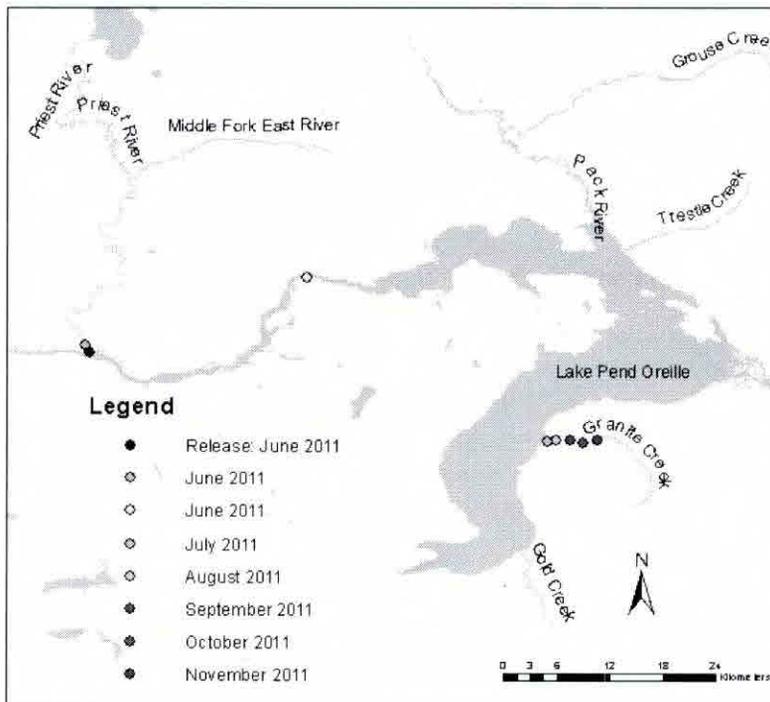


Figure A.8. Detections of bull trout code 49 in Lake Pend Oreille from release in June 2011 through November 2011. Genetic analysis identified the most likely primary natal tributary for this fish as Morris Creek, a tributary of Lightning Creek, and the secondary as Lightning Creek.

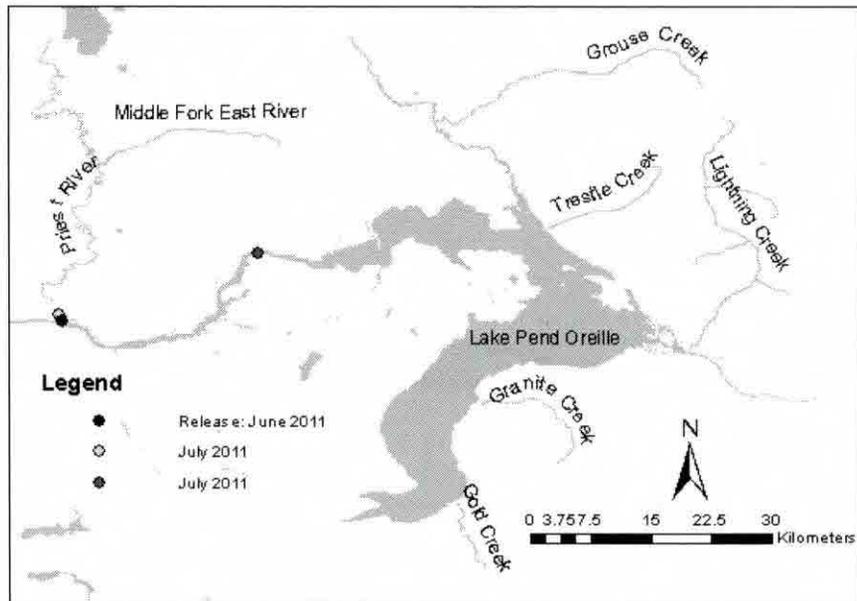


Figure A.9. Detections of bull trout code 175 in Lake Pend Oreille from release in June 2011 through July 2011. Genetic analysis identified the most likely primary natal tributary for this fish as Granite Creek and the secondary as Porcupine Creek, a tributary of Lightning Creek.

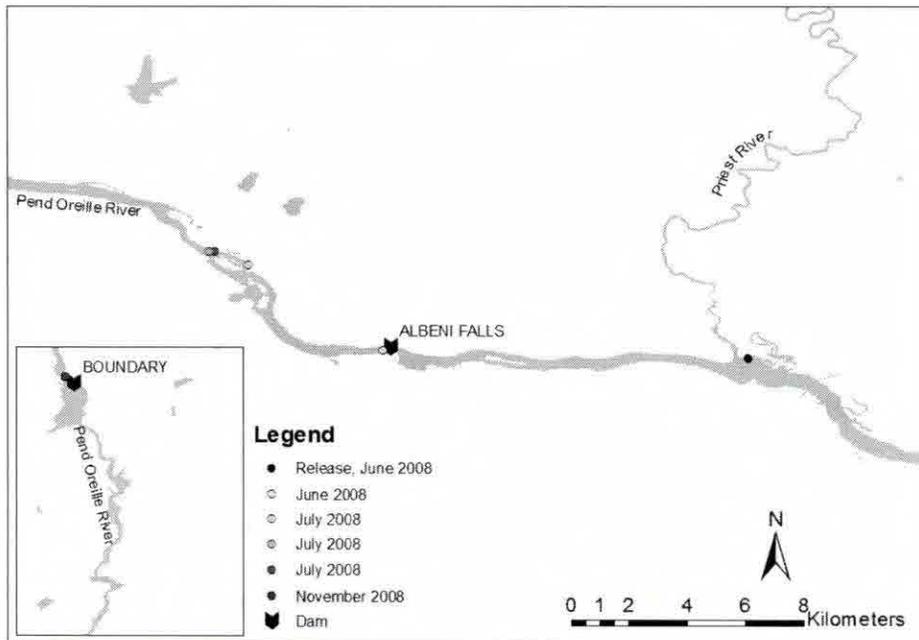


Figure A.10. Detections of bull trout code 56 in Lake Pend Oreille from release in June 2011 through November 2011. Genetic analysis identified the most likely primary natal tributary for this fish as Granite Creek and the secondary as Lightning Creek.

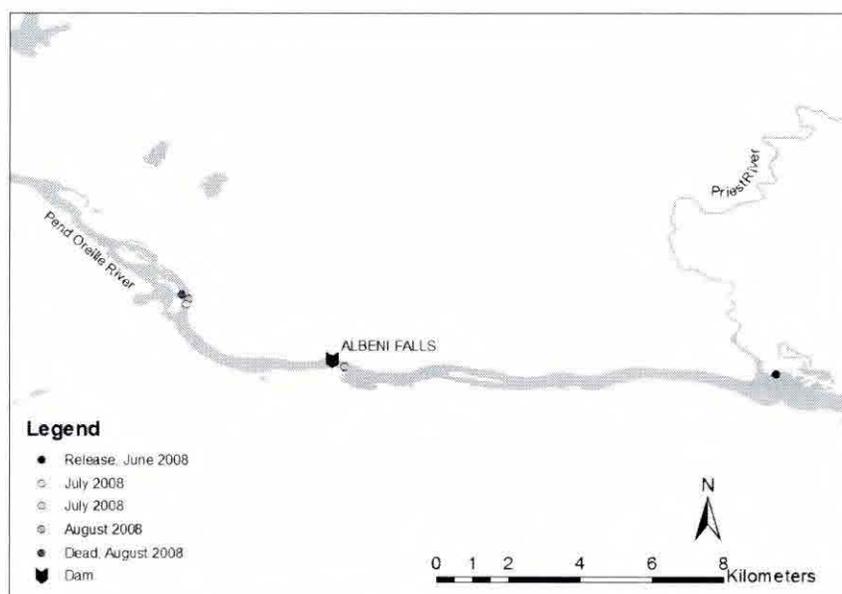


Figure A.11. Detections of bull trout code 16 in Lake Pend Oreille from release in June 2011 through July 2011. Genetic analysis identified the most likely primary natal tributary for this fish as the Middle Fork of the East River.

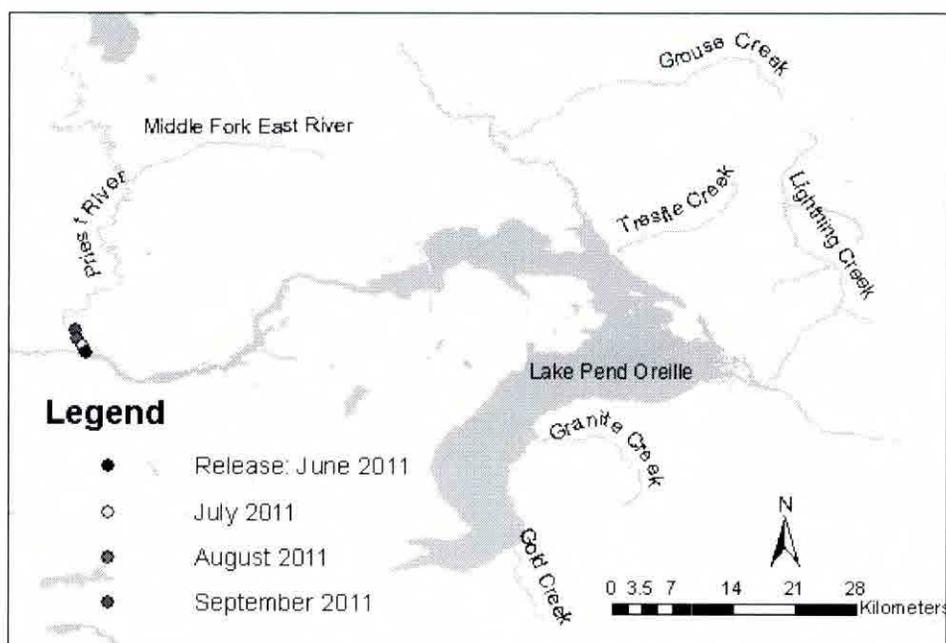


Figure A.12. Detections of bull trout code 59 in Lake Pend Oreille from release in June 2011 through September 2011. This fish was a hybrid and therefore its natal tributary could not be genetically assigned.

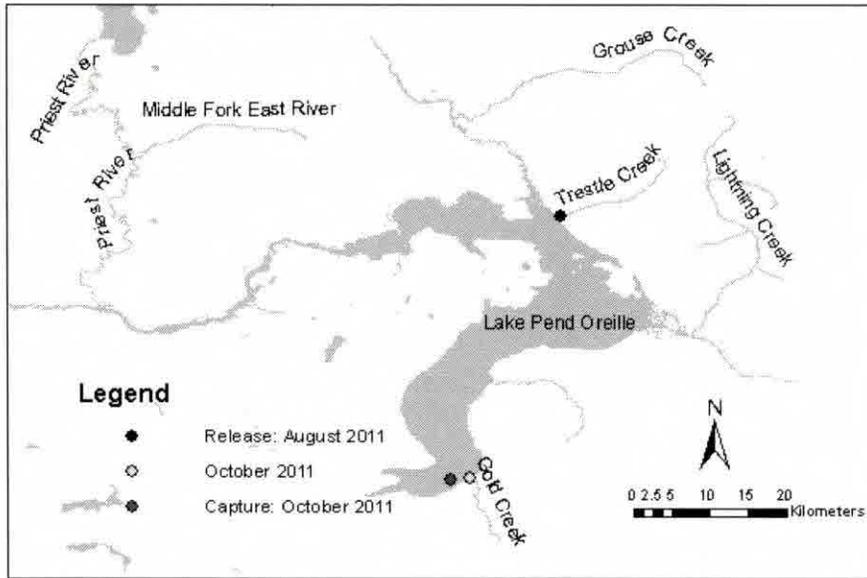


Figure A.13. Detections of bull trout code 46 in Lake Pend Oreille from release in August 2011 through October 2011. Genetic analysis identified the most likely primary natal tributary for this fish as Granite Creek and the secondary as Lightning Creek.

Temporary Restoration of Bull Trout Passage at Albeni Falls Dam

**2012 Progress Report
11/11 – 11/12**

Prepared by

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U.S. Department of Energy
Bonneville Power Administration
Division of Fish and Wildlife
Portland, Oregon

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March 2013

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Introduction and To-Date Project Summary

Bull trout *Salvelinus confluentus* in the Columbia River basin were listed in 1998 as a threatened species by the U.S. Fish and Wildlife Service under the *Endangered Species Act of 1973*. Although many factors contributed to the decline of this species, one of the primary mechanisms for the decline in the Pend Oreille River basin population was the construction of Albeni Falls Dam between 1951 and 1955. The construction of the dam blocked bull trout from upstream tributaries in the Pend Oreille River and Lake Pend Oreille from returning to their natal spawning tributaries once entrained by the dam. Populations from spawning tributaries downstream of Albeni Falls Dam were also unable to return to Lake Pend Oreille, which was historically used as a feeding area and cold-water refuge during the summer. No current fish passage facilities exist at the dam; therefore, this migration corridor has been eliminated.

The Pacific Northwest National Laboratory (PNNL) work described in this report is ongoing as part of a multiyear study funded by the Bonneville Power Administration. The primary goal of the project is to maintain gene flow within the population, until a permanent passage is available, by relocating entrained bull trout to the upstream side of Albeni Falls Dam. A secondary goal is to more precisely determine the specific populations of bull trout that are entrained by the dam (i.e., which populations are prone to migrate through the Pend Oreille River). The specific objectives for the PNNL portion of the study in 2012 were to maintain the watershed-wide telemetry system used to detect the presence of bull trout implanted with radio transmitters and to maintain the quality control and storage of the study's telemetry data. The study collaborators, the Kalispel Tribe and Eastern Washington University (EWU), captured bull trout using electrofishing and implanted them with radio transmitters, tracked study fish with mobile-detection methods, and assisted with data recovery and maintenance of data-collection systems. Bull trout implanted with radio transmitters were detected to determine if they returned to their tributary of origin as determined by genetic assignment.

This project is currently in the sixth year of funding, and progress has been made toward the objectives. In the first year of funding in 2007, radio receiving stations were installed at several locations throughout the Pend Oreille watershed (Pend Oreille River and Lake Pend Oreille) to detect movements of bull trout implanted with radio transmitters.

In spring 2008, four bull trout were captured downstream of Albeni Falls Dam, implanted with transmitters (codes 126, 128, 172, and 108), and released upstream of the dam at Priest River, Idaho. The most likely natal tributaries of bull trout assigned using genetic analyses were Grouse Creek (codes 126 and 128), Lightning Creek (code 172), and Rattle Creek (code 108). All four bull trout migrated upstream from the release site, were detected at monitoring stations near Dover, Idaho, and were presumed to reside in Lake Pend Oreille from spring through summer 2008. The transmitter implanted in bull trout 128 was found in Grouse Creek in October 2008; however, the fish was not found with the transmitter. We presume that the transmitter was in the bull trout during its migration to Grouse Creek and that it was expelled from the fish during spawning. The bull trout genetically assigned to Rattle Creek (code 108) was detected in the Clark Fork River near the Cabinet Gorge Fish Hatchery (approximately 13 km upstream from the confluence with Lightning Creek) in September 2008 but was not detected entering Lightning Creek. The remaining two bull trout (codes 126 and 172) were not detected in 2008 after detection at the Dover receiving stations.

In 2009, four bull trout were captured downstream of Albeni Falls Dam. Due to the extreme difficulty of capturing bull trout downstream of the dam, regional stakeholders and the Bonneville Power Administration (BPA) determined that all bull trout captured in 2009 would be used for a concurrent U.S. Army Corps of Engineers (USACE) study, which was designed to determine fine-scale bull trout movements downstream of Albeni Falls Dam. This information was used to determine biologically based criteria for construction of an upstream passage facility to be constructed at Albeni Falls Dam, and results can be found in the final report to the USACE (Bellgraph et al. 2010). Therefore, tracking effort for the current study focused on the three bull trout tagged in 2008 that still had active tags in 2009. One bull trout transmitter was detected in fall 2009 in the Clark Fork Delta of Lake Pend Oreille; the two remaining bull trout were not detected in 2009.

In 2010, two bull trout were captured downstream of Albeni Falls Dam, implanted with transmitters (codes 166 and 178), and released upstream of the dam. Genetic analysis identified the most probable tributaries-of-origin as Lightning Creek (code 166) and Morris Creek (a tributary of Lightning Creek; code 178); the second most probable tributaries were Grouse Creek and Lightning Creek, respectively. Fish 166 was detected in the mainstem Pack River, upstream of Grouse Creek, between July and September 2010 and in Grouse Creek in mid-October 2010. The last detection for this fish in 2010 was late October at the Pack River receiver station. The fish assigned to Morris Creek (code 178) was detected 17 km upstream of the mouth of the Priest River in July 2010 and detected again at the mouth of the Priest River in late July 2010. Two bull trout tagged in 2008 (codes 108 and 126) also were relocated in Lake Pend Oreille in 2010. In June 2010, code 108 was detected in Rattle Creek, the primary genetically assigned natal tributary, while fish 126 was detected from July through October in Lake Pend Oreille approximately 14 km from the mouth of the Pack River, which is connected to its primary genetically assigned natal tributary (Grouse Creek).

In 2011, seven bull trout were captured downstream of Albeni Falls Dam, implanted with transmitters (codes 49, 175, 56, 46, 16, 47, 59), and released upstream near the mouth of the Priest River or at the Trestle Creek Boat Launch. Genetic analysis identified the most likely primary natal tributary for fish 49 as Morris Creek (tributary to Lightning Creek) and the secondary as the mainstem of Lightning Creek. This fish was first detected at the mouth of the Priest River and subsequently at the North Dover receiver in late June 2011. This fish was later detected at Granite Creek, south of its predicted natal tributary within the Lightning Creek watershed in July, August, and September 2011. Mobile vehicle tracking located this fish downstream of the Granite Creek station between late September and early November. Fish 175 was genetically determined to be from Granite Creek or Porcupine Creek, a tributary of Lightning Creek. The only detections of this fish were in July 2011 at the mouth of the Priest River and at the North Dover receiver. Granite Creek was also listed as the primary genetic tributary for fish 56 and 46, and both of their secondary tributaries were predicted to be Lightning Creek. Fish 56 was detected at Albeni Falls Dam in June and downstream of the dam in July. This fish was then detected in the Boundary Dam tailrace by researchers with Seattle City Light (owners of Boundary Dam) in November and was thus lost to the study. Fish 46 was detected in Gold Creek and at the Lightning Creek station in October. This fish was killed in a gill net later in October at the southern end of the lake during an Idaho Fish and Game lake-trout-removal project. Fish 16 was genetically predicted to be from the Middle Fork East River, a tributary of the Priest River. This transmitter was detected near the dam in July and was vehicle tracked by the Kalispel Tribe to a muskrat den downstream of the dam in August; the fish was presumed dead. Fish 47 and 59 were bull trout × brook trout *Salvelinus fontinalis* hybrids, so their natal tributaries were unable to be determined. Two days following release, fish 47 was detected at and passed

downstream of Albeni Falls Dam and was detected for 2 weeks in July in the dam tailrace. Fish 59 was detected in the Priest River from July through September. Both fish tagged in 2010 (166 and 178) were also detected in 2011. Fish 166 was detected at the Pack River station in October 2011. Fish 178 was captured by AVISTA staff near Cabinet Gorge Dam July 2011 and was detected 3 days later at the Lightning Creek receiver, and subsequently within the East Fork of Lightning Creek.

In 2012, three bull trout (codes 135, 164, and 50) were tagged and released upstream of Albeni Falls Dam. Bull trout 135 with predicted natal tributaries of Lightning Creek and Savage Creek was detected moving into Lightning Creek in late June 2012, was detected numerous times by mobile tracking in Lightning Creek and Savage Creek, and was detected leaving Lightning Creek in mid-October 2012. The two additional bull trout tagged in 2012 (164 and 50) were detected at the Dover stations in early June and early July, respectively, but were not detected thereafter. Hybrid bull trout 47 (tagged in 2011) was detected at the dam and upstream at the Priest River station in summer 2012. Hybrid bull trout 59 (also tagged in 2011) was detected in the Priest River until mid-May 2012 and was then entrained by Albeni Falls Dam and detected repeatedly by mobile tracking near Kelly Island, a few kilometers downstream of the dam until mid-July 2012.

The following report details the progress by work element in the FY 2012–2013 statement of work for the period 16 November 2011 through 15 November 2012, including full detection histories of all bull trout that have been studied since this project’s inception in 2007. The report also expands on the information reported in the quarterly Pisces status reports. Additional detail on the progress to date can be found in Bellgraph and Deters (2008), Scholz et al. (2008), Bellgraph (2009), Paluch et al. (2009), Bellgraph (2010), Paluch et al. (2010), Bellgraph and Ortega (2011), Paluch et al. (2011), Bellgraph et al. (2012), Paluch et al. (2012), and the 2012 annual report to the BPA prepared by EWU and the Kalispel Tribe.¹

Progress by Work Element

Work Element A: 165 – Produce Environmental Compliance Documentation – Complete environmental compliance requirements

All procedures involving the handling of bull trout during this project were reviewed and approved by the Institutional Animal Care and Use Committee (IACUC) for Toxicology Northwest and the Pacific Northwest National Laboratory (PNNL) prior to handling fish during the 2007–2011 years of study (IACUC Approval No. 2007-19 and 2009-36; Animal Welfare Assurance Number A3353-01). Fish handling was not part of the scope for PNNL in 2012; thus the IACUC permits were closed. For all PNNL boating activities in 2012, boats and equipment were inspected for aquatic invasive species following each field work activity; no aquatic invasive species were found.

¹ Mark C. Paluch, Alan T. Scholz, and Jason Olson, *Temporary Restoration of Bull Trout Passage at Albeni Falls Dam – 2012 Progress Report*, in preparation under Bonneville Power Administration Contract No. 2007-246-00.

Work Element B: 157 – Collect/Generate/Validate Field and Lab Data – Maintain and download radio receiving stations

Eleven radio telemetry receiving stations located throughout the Pend Oreille basin and at Albeni Falls Dam were used to detect bull trout in 2012 (Figure 1, Figure 2, Table 1). Based on the expected battery life of transmitters implanted throughout the study's duration, we expected the three bull trout released in 2012 and five of the bull trout released in 2011 to have active tags during the 2012 study year (Table 2). Additional technical and setup specifications of radio receiving stations can be found in Bellgraph and Deters (2008). The reception ranges and verification of antenna directionality at the Tailrace, Forebay, Priest River, and North and South Dover monitoring stations were tested in March 2012 by PNNL staff; all other testing of stations in 2012 were performed by EWU staff.

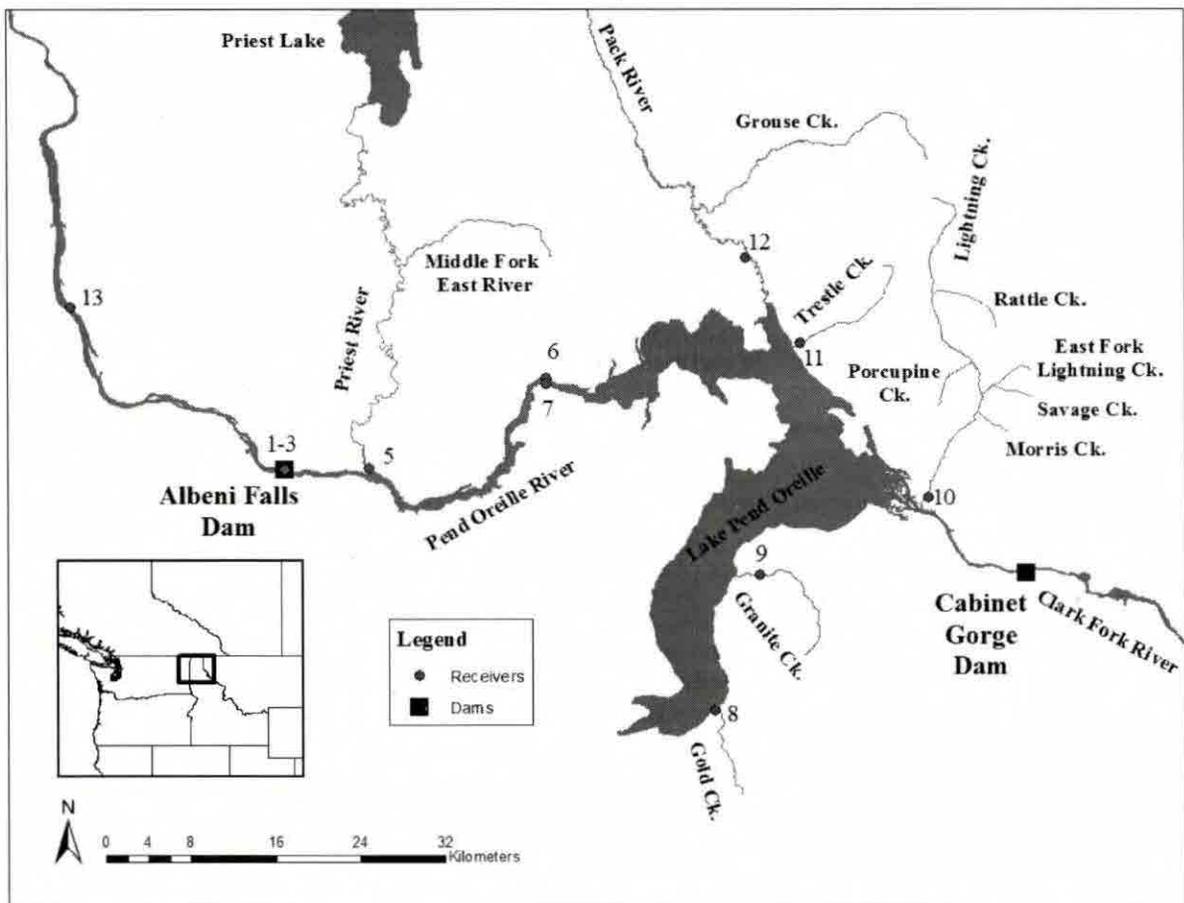


Figure 1. Study area showing receiver locations, major rivers, and genetically determined natal tributaries of bull trout in this study. Numbers adjacent to receiver symbols correspond to site numbers identified in Table 1 except for site 13, which was not present in 2012.



Figure 2. Locations of telemetry receivers at Albeni Falls Dam corresponding to site numbers in Table 1.

Table 1. Information describing telemetry receivers and antennas for each receiving station at Albeni Falls Dam (AFD) and spawning tributaries in 2012, corresponding to the labeling within the raw data files stored in a database maintained by PNNL.

Site Name	Site Number	Detection Area	Antenna Name	Antenna Location
Tailrace	1	AFD spillway tailrace	4	Center tailrace
Tailrace	1	AFD spillway tailrace	6	River left
Tailrace	1	AFD spillway tailrace	8	River right
Forebay	2	AFD forebay	6	Center forebay
Forebay	2	AFD forebay	A	Antennas grouped
Forebay	2	AFD forebay	7	River right
Forebay	2	AFD forebay	3	River-right center
Forebay	2	AFD forebay	1	River left
Forebay	2	AFD forebay	4	River-left center
Logchute	3	AFD powerhouse tailrace	0	Logchute
Logchute	3	AFD powerhouse tailrace	AH0	Logchute
Mudhole	5	Mouth of Priest River	0	Downstream
Mudhole	5	Mouth of Priest River	A	Upstream
N Dover	6	N. side of Pend Oreille River	1	Downstream
N Dover	6	N. side of Pend Oreille River	A	Upstream
S Dover	7	S. side of Pend Oreille River	0	Downstream
S Dover	7	S. side of Pend Oreille River	A	Upstream
Gold Creek	8	Mouth of creek	0	Downstream
Gold Creek	8	Mouth of creek	A	Upstream
Granite Creek	9	Mouth of creek	0	Downstream
Granite Creek	9	Mouth of creek	A	Upstream
Lightning Creek	10	Mouth of creek	1	Downstream
Lightning Creek	10	Mouth of creek	A	Upstream
Trestle Creek	11	Mouth of creek	1	Downstream
Trestle Creek	11	Mouth of creek	A	Upstream
Pack River	12	Downstream of Grouse Creek confluence	A	Downstream
Pack River	12	Downstream of Grouse Creek confluence	1	Upstream

Table 2. Descriptive information on bull trout and bull trout × brook trout hybrids (codes 47 and 59) implanted with transmitters and transported upstream of Albeni Falls Dam through 2012. Genetic origin indicates the most probable and second most probable natal tributaries, respectively. Tag dead date is the expected date of transmitter battery failure based on the number of guaranteed tag-life days from the tagging date. “Recovered” transmitters were found and removed from the study area.

Code	Tagging Date	Length (mm)	Weight (g)	Genetic Origin	Tag Dead Date
126	19 May 2008	505	1178	Grouse Creek, Trestle Creek	09 Nov 2010
128	19 May 2008	501	1133	Grouse Creek, Rattle Creek	Recovered
172	11 Jun 2008	363	374	Lightning Creek, Gold Creek	26 Aug 2009
108	18 Jun 2008	496	1241	Rattle Creek, Morris Creek	12 Apr 2010
166	31 Mar 2010	553	1615	Lightning Creek, Grouse Creek	25 Mar 2011
178	29 Jun 2010	454	857	Morris Creek, Lightning Creek	23 June 2011
47	22 Jun 2011	460	813	Unknown	15 Apr 2013
49	22 Jun 2011	486	965	Morris Creek, Lightning Creek	15 Apr 2013
175	23 Jun 2011	360	418	Granite Creek, Porcupine Creek	25 Mar 2013
56	27 Jun 2011	259	157	Granite Creek, Lightning Creek	10 Sep 2012
16	18 Jul 2011	248	163	Middle Fork East River, Lightning Creek	Recovered
59	29 Jun 2011	309	289	Unknown	12 Sep 2012
46	09 Aug 2011	658	2751	Granite Creek, Lightning Creek	Recovered
135	29 May 2012	678	-	Lightning Creek, Savage Creek	19 Nov 2014
164	29 May 2012	508	1064	Lightning Creek, Morris Creek	21 Aug 2013
50	07 Jun 2012	458	940	Granite Creek, Porcupine Creek	30 Aug 2013

All monitoring stations were visually inspected in spring 2012 for damage from the previous winter, receivers removed in fall 2011 were reinstalled, and receiver testing indicated that all stations were functioning properly prior to the 2012 data-collection season. Receivers located at the Tailrace, Forebay, Logchute, Priest River, and South Dover sites operated throughout the winter of 2011–2012. Dates of operation for the period of this report, 16 Nov 2011 through 15 Nov 2012, including data gaps due to technical issues, are shown in Figure 3. Receiver reception range extended about 350 m upstream and 700 m downstream of Albeni Falls Dam in 2012 (Figure 4). Reception range was determined by dragging a transmitter throughout the forebay and tailrace at 1-m depth. Test transmitter location was recorded in 1-s intervals in a geospatial mapping program (Fugawi Marine ENC software, Toronto, Ontario, Canada) and was viewed in real time to ensure that the test transmitter was dragged throughout all areas of the tailrace to about 1 km downstream and throughout the forebay to about 500 m upstream of the dam (beyond the presumed boundary of reception). After the transmitter drags were conducted, all dam receivers were downloaded to recover data and detection data were merged with transmitter location data. These data verified that reception range spanned the width of the river and at least several hundred meters upstream and downstream of the dam to detect bull trout approaching the dam from either direction.

Monitoring stations at the 11 sites were deployed a total of 3081 days during the study period and were functional for 2863 days (92.92% of the time), as indicated by at least 21 beacon transmitter detections per day (Figure 3). Of the 218 receiver-days (7.08%) with less than 21 beacon detections per day, 121 receiver-days had zero beacon detections (3.93% of total study days) and 97 receiver-days had less than 21 beacon detections (3.15% of total study days). The receivers at the Priest River (site #5) and Trestle Creek (site #10) sites performed flawlessly throughout their deployment period (Figure 3). The

Tailrace and Forebay receivers at Albeni Falls Dam experienced low or no beacon detections intermittently during the first two months of the study period; the ultimate problem was difficult to diagnose but eventually rectified by replacing the “old” beacon, which had a failing battery and inconsistent beacon transmissions. The Logchute receiver at the dam lost electrical power and was not operational for a 16-day period in late September–mid-October 2012. The reasons for the absence of beacon detections at the North Dover receiver in late June and at the end of August are unknown; an absence of beacon detections in early October was due to a failing beacon. Similarly, the South Dover station had a failed beacon in late 2011, which was remedied by installing a new beacon. The Gold Creek receiver had a dead battery near the end of its deployment and stopped detecting its beacon on 28 October 2012. The Granite Creek receiver had 22 days of sparse beacon detections in early summer and a few days in mid-August, likely due to signal interference from ambient environmental noise (i.e., electromagnetic interference). No beacon detections on the first 6 days of the Lightning Creek station’s deployment were due to a dead beacon battery, and two data-gap days 26–27 June 2012 resulted from failure of the receiver to reinitialize following that day’s download. The Pack River receiver also did not reinitialize after download on 14 June. Data gaps at the end of the Pack River receiver’s deployment were probably due to insufficient battery power of the receiver due to low-light conditions and inability of the solar panel to charge the station’s power source.

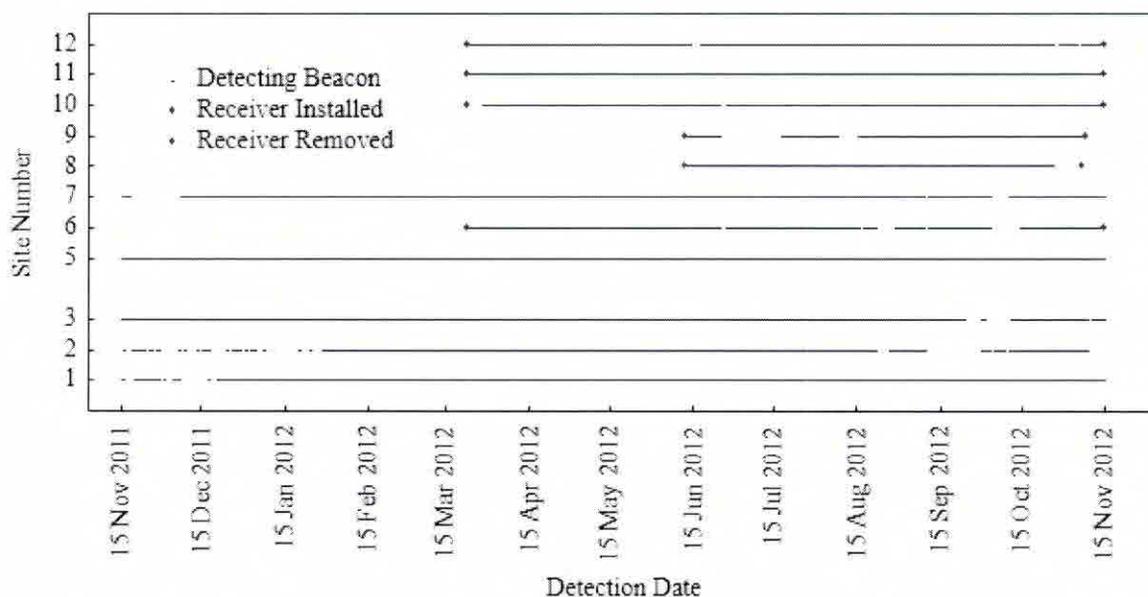


Figure 3. Period of deployment for each receiver from 16 November 2011 through 15 November 2012. Horizontal lines represent the period of time each receiver was deployed and detecting beacon transmitters. Red dots indicate when receivers were removed for the season, and blue dots indicate the date receivers were reinstalled.

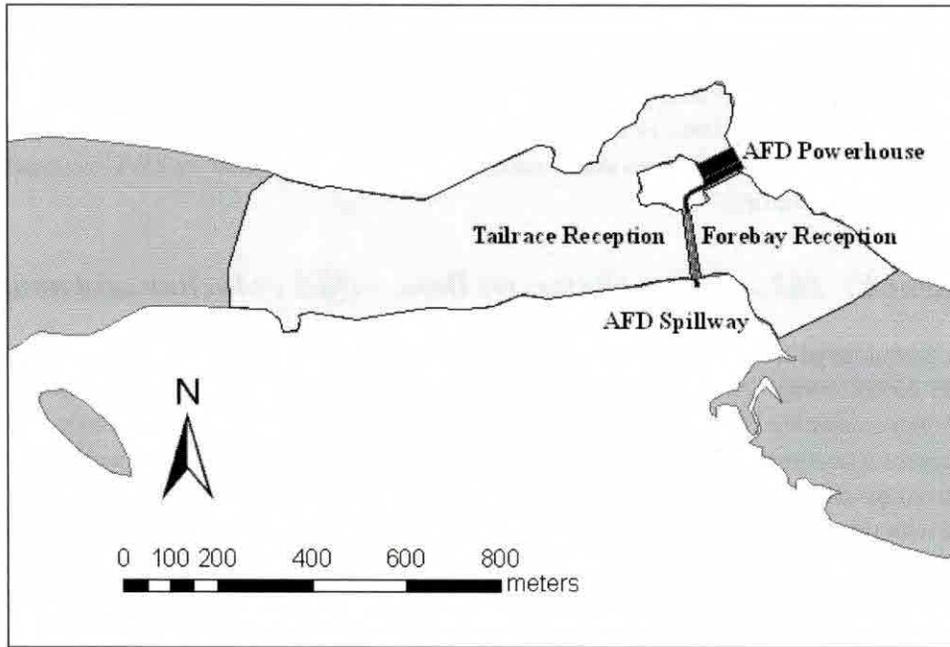


Figure 4. Forebay and tailrace reception range of radio telemetry receivers (yellow shading) at Albeni Falls Dam (AFD) tested with a transmitter at 1-m depth in spring 2012.

Monitoring stations not located at Albeni Falls Dam were tested using various methods, depending on the station location. For the Priest River station, the mouth of the river was too shallow to operate a boat in spring 2012; thus the ultimate reception range was not determined using this method. Instead, we compared the relative signal strength (i.e., power) of detections in 2012 to detections in 2008–2011 of a transmitter placed at 1-m depth immediately adjacent to the antennas. We assumed that similar power between 2012 and previous years indicated that the Priest River station was working similarly to that of previous years and was assumed to have a reception range extending across the entire river width (as it did in 2008) and to the deepest cross-sectional depth (about 3 m). Differentiation of upstream and downstream movements of transmitters was tested also at the Priest River station by submerging a transmitter in the river at 1-m depth every 50 m for 150 m upstream and downstream of the antennas. In 2012, the North and South Dover stations were tested similarly to range testing at Albeni Falls Dam with a transmitter at 1-m depth. The combined reception range of both receivers extended across the entire river width, to a maximum depth of 8 m (maximum depth of the river cross section was 9 m), and both upstream and downstream directionality were verified. All other receivers were tested by EWU in 2012.

Receivers were downloaded approximately once every 2 weeks in 2012 by EWU or PNNL staff during the period in which each receiver was in operation (Figure 3). Cellular modems were used to download the Tailrace, Forebay, Logchute, Priest River, North Dover, South Dover, Gold, Granite, and Pack River receiving stations in 2012 to increase download frequency, ensure continuous operation of equipment, and reduce driving time during downloading. Because modems could not be installed at the Lightning and Trestle stations due to poor cellular reception, data collected by these two stations were downloaded manually in 2012.

A standard operating procedure was followed to ensure data quality control after each download. This procedure involved verifying monitoring station detection performance and saving and maintaining

data. During each download, staff verified that the station had run continuously since the last download, interference signals were minimal (to allow for detection of fish transmitters over ambient noise), and beacon transmitters were detected hourly at each station. In addition, the station was inspected for physical damage. Any problems identified were repaired as soon as possible. Data were saved to a laptop computer and backed up to a removable thumb drive, and data collected by EWU were sent to PNNL within a few working days.

Work Element C: 162 – Analyze/Interpret Data – Data reduction and analysis

Data files downloaded from radio receiving stations were quality-checked using a standard operating procedure after downloading. After raw data files were received from EWU, they were parsed and formatted to comma-separated value (.csv) files and then uploaded to a Microsoft SQL Server relational database (Microsoft Corporation, Redmond, Washington). Detection histories of each bull trout were then queried from the database for the period from 16 November 2011 through 15 November 2012, supplemented with the previous years' data and mobile tracking data, and are reported in the 'Detection histories' section below. To minimize false-positive detections, transmitter detections were considered valid only when power was greater than 100 (Lotek value of signal strength; possible range is 0–255); 10 detections within a single day at a single site were also required. Single, erroneous detections were considered to be false positives and were not used in determining detection histories.

Detection histories

To date, 16 bull trout, including 2 hybrids, have been surgically implanted with transmitters, relocated upstream of Albeni Falls Dam, and have been detected by fixed and mobile receivers. Genetically determined primary and secondary natal tributaries were assigned to 14 fish (natal tributaries were indeterminable for hybrids). Over all years of the study, four bull trout (128, 108, 178, and 135) have been detected during the spawning period in the primary genetically assigned tributary, and one bull trout (166) has been detected in a secondary tributary. Two bull trout (49 and 46) were detected in a spawning tributary different from their genetic assignment, six bull trout (126, 172, 175, 16, 164, and 50) have not been detected in a spawning tributary, and one fish (56) was detected outside of the study area below Boundary Dam and was therefore lost to the study. Detection histories for individual fish are given below.

Fish 126 – Bull trout 126 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses indicated that this fish was about 68 times more likely to have originated from Grouse Creek than from Trestle Creek. The North and South Dover receiving stations detected this fish on 11 and 12 June 2008. The transmitter was not detected again until 26 September 2009 (N 48°08'00.07" W 116°17'09.02") and 20 October 2009 (N 48°07'57.33" W 116°17'13.50") during acoustic mobile tracking of Lake Pend Oreille. This fish was believed to be dead because it was detected in the same location one month apart in 2009. However, the transmitter was detected on the western end of the lake during acoustic mobile tracking on 24 August, 13 September, and 27 October 2010 (N 48°11'14.92" W 116°22'35.99"). The transmitter was detected with the highest signal strength in the same area, so it did not appear that the fish had moved during this time. However, the acoustic hydrophone has limited detection accuracy (about 400 m), so it is uncertain if this fish was alive. The battery of this transmitter was expected to fail in November 2010.

Fish 128 – Bull trout 128 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_2S transmitter (expected life of 904 d), and released at the Priest River boat launch on 19 May 2008. Genetic analyses predicted that this fish was 2.577×10^7 times more likely to have originated from Grouse Creek than from Rattle Creek. It was detected at the South Dover station on 28 May 2008 at 0600 hours. On 11 October 2008, code 128 was detected during aerial tracking over Grouse Creek (N 48°27.829 W 116°16.352). On 22 October 2008, tag 128 was found in Grouse Creek and recovered (N 48°27.924 W 116°16.180); no fish carcass was seen in the area.

Fish 172 – Bull trout 172 was caught downstream of Albeni Falls Dam, implanted with a Lotek NANO NTC162 transmitter (expected life of 441 d), and released at the Priest River boat launch on 11 June 2008. Genetic analyses predicted that this fish was about 5 times more likely to have originated from Lightning Creek than from Gold Creek. It was detected at the North Dover station on 18 June 2008 at 0800 hours. This transmitter had an expected tag-battery failure date in August 2009.

Fish 108 – Bull trout 108 was caught downstream of Albeni Falls Dam, implanted with a Lotek CART 16_1 transmitter (expected life of 663 d), and released at the Priest River boat launch on 18 June 2008. Genetic analyses predicted that this fish was about 15 times more likely to have originated from Rattle Creek than from Morris Creek, which are both tributaries of Lightning Creek. It was first detected at the mouth of Priest River on 18 June at 2000 hours and again on 4 July at 2300 hours. Based on detection signal strengths of the two antennae, it is unlikely that the fish passed the receiver and moved upstream into the Priest River. It was then detected passing upstream of the Dover receiving stations on 5 July 2008. The final detections of this fish in 2008 were recorded in the Clark Fork River near the Cabinet Gorge Fish Hatchery on 22 September (by aircraft) and 26 September (by boat) by AVISTA staff. This fish was detected several times also on 25 September at Cabinet Gorge Dam by AVISTA staff. This fish was not detected again until 25 March 2010 when it was caught by the Idaho Department of Fish and Game near Cape Horn in Lake Pend Oreille and released alive. A month later, it was detected in Lightning Creek, and on 18 June, it was at the mouth of Rattle Creek, its genetically determined natal tributary. It remained in Rattle Creek until 28 September 2010, when it was detected moving downstream of the Lightning Creek receiver station and re-entering the Clark Fork River. Its transmitter had an expected tag-failure date in April 2010.

Fish 166 – Bull trout 166 was caught in the tailrace of the Albeni Falls Powerhouse and implanted with a Lotek SR-11-18 radio telemetry transmitter (expected life of 359 d) and released upstream of Albeni Falls Dam on 31 March 2010. Genetic analysis indicated that this fish was 2.49 times more likely to be from Lightning Creek than from Grouse Creek. It was first detected passing the Dover receiver stations on 3 April 2010 and was detected moving into the Pack River on 9 June. It was consistently relocated by vehicle mobile tracking in the Upper Pack River upstream of the mouth of Grouse Creek through September and was detected in Grouse Creek on 13 October 2010. Although the fish returned to the tributary predicted as its secondary rather than primary, genetic analysis showed small difference between the likelihoods of returning to the two locations. This fish was detected on the Pack River receiver on 20 October 2010, although it was unknown if the fish passed downstream of the receiver. Despite an expected tag-failure date of 25 March 2011, this fish was detected on 19 October 2011 on the downstream-facing antenna of the Pack River monitoring station. No further detections of this code have occurred; thus we expect the battery to have expired.

Fish 178 – Bull trout 178 was caught downstream of Albeni Falls Dam, implanted with a Lotek SR-11-18 radio telemetry tag, and released upstream of the dam on 29 June 2010. Genetic analysis predicted

that this fish was 1.75 times more likely to have originated from Morris Creek than from Lightning Creek. This fish was first detected moving upstream of the Priest River receiver station on 30 June and was located approximately 17 km upstream in the Priest River on 13 July. This fish was located a final time in 2010 on the Priest River receiver on 25 July. On 7 July 2011, this fish was captured by AVISTA staff near Cabinet Gorge Dam and released alive. It was then detected at the Lightning Creek station throughout the day on 10 July. This fish was further detected during vehicle mobile tracking in the East Fork of Lightning Creek on 4, 11, 24, and 30 August, 16 and 30 September, and 25 October. The transmitter for bull trout 178 had an expected tag-failure date of 23 June 2011.

Fish 47 – Hybrid bull trout 47 was captured on 22 June 2011 downstream of Albeni Falls Dam, implanted with a Lotek CART tag, and released upstream of the dam. Its natal tributary was unable to be determined due to a lack of a genetic database for bull trout hybrids. This fish was detected on the Forebay and Tailrace receivers at Albeni Falls Dam on 25 June 2011, and we presume it passed downstream of the dam (was entrained) on this day. It was then detected in the dam tailrace at both the Logchute and Tailrace stations consistently from 10 through 11 July. No valid detections of this transmitter occurred in 2012. The transmitter for hybrid 47 has an expected tag-failure date of 15 April 2013.

Fish 49 – Bull trout 49 was captured downstream of Albeni Falls Dam, implanted with a Lotek CART tag, and released upstream of the dam on 22 June 2011. Genetic analysis identified the most likely primary natal tributary for this fish as Morris Creek and the secondary as Lightning Creek. This fish was first detected at the mouth of the Priest River via mobile vehicle tracking on 23 June and on the Priest River receiver station from 24 through 26 June. This fish was next detected at the North Dover receiver on 27 June 2011. On 23 July through 24 August and again on 19 September 2011, the fish was detected south of its predicted natal tributary, at the Granite Creek station. Vehicle mobile tracking also located this fish downstream of the Granite Creek station on 26 and 30 September, 14 and 25 October, and 10 November. In 2012, this fish was detected again at the Granite Creek station from 23 through 31 July. The transmitter for this fish has an expected tag-failure date of 15 April 2013.

Fish 175 – Bull trout 175 was captured on 23 June 2011 downstream of Albeni Falls Dam, implanted with a Lotek SR-11-18 radio telemetry tag, and released upstream. Fish 175 was genetically determined to be from Granite Creek or Porcupine Creek. The only detections for this fish were on 6 July during vehicle mobile tracking by EWU, 8 July at the mouth of the Priest River, and on 10 July at North Dover. This fish was not detected in 2012. The transmitter for bull trout 175 has an expected tag-failure date of 25 March 2013.

Fish 56 – Bull trout 56 was captured downstream of Albeni Falls Dam, implanted with a Lotek Nano transmitter, and released upstream of the dam on 27 June 2011. The predicted primary natal tributary was Granite Creek, and its secondary tributary was predicted as Lightning Creek. Fish 56 was detected at Albeni Falls Dam only on 28 June. This fish was also detected downstream of Albeni Falls Dam on 11, 18, and 27 July near Pioneer Park during mobile vehicle tracking. The last detection for this fish was on 1 November, reported by Seattle City Light in the tailrace of Boundary Dam—and thus was lost to the study. The transmitter for bull trout 56 had an expected tag-failure date of 10 September 2012.

Fish 16 – Bull trout 16 was captured on 29 June 2011 downstream of Albeni Falls dam, implanted with a Lotek SuperNano transmitter, and released upstream of the dam. Fish 16 was predicted to be from the Middle Fork of the East River (primary) or Lightning Creek (secondary). This fish was detected near

the dam on 19 July. Its transmitter was detected on 27 July downstream of Albeni Falls Dam and again on 2 and 28 August in a muskrat hole near Kelly Island during mobile vehicle tracking. This fish was assumed to be dead as of August 2011.

Fish 59 – Hybrid bull trout 59 was captured downstream of Albeni Falls Dam on 29 June 2011, implanted with a Lotek Nano transmitter, and released upstream of the dam. Fish 59 was a hybrid, so its natal tributary was undeterminable. It was first detected on 3 July 2011 at the mouth of the Priest River. The location of this fish in Priest River was verified repeatedly by mobile vehicle tracking by EWU, where it was detected approximately every other week from 6 July through 26 September 2011. From late March to mid-May in 2012, this fish was detected repeatedly by mobile tracking in the Priest River. On 21 May 2012 at 1440 hours, it was detected near the town of McAbee Falls, Idaho, then at the mouth of the Priest River on the monitoring station at 2025 hours, and finally on the Forebay receiver at Albeni Falls Dam at 2252 hours—a journey of about 30 km in 6 hours. It was then entrained by Albeni Falls Dam and was detected on the Tailrace receiver the evening of 29 May 2012 until about 0400 hours on 30 May, and detected about 4 hours later via mobile tracking near Treasure Island, about 3 km downstream of AFD. Through 18 July, hybrid 59 was detected repeatedly via mobile tracking near Kelly Island (~3km downstream of AFD). The expected tag-failure date for this transmitter was 12 September 2012.

Fish 46 – Bull trout 46 was captured downstream of Albeni Falls Dam on 9 August 2011. It was implanted with a Lotek CART tag and released upstream of the dam at the Trestle Creek Recreation Area. Granite Creek was given as its primary genetic tributary, and Lightning Creek was listed as its secondary tributary. Fish 46 was detected at the Gold Creek station from 8 through 11 October and passed upstream of the Gold Creek station once during this period. This fish was mortally captured in a gill net on 13 October 2011 just south of Lakeview.

Fish 135 – Bull trout 135 was captured downstream of Albeni Falls Dam on 29 May 2012, implanted with a CART 16-2 transmitter, and released upstream of the dam. The first and second most probable genetic tributaries were Lightning Creek and Savage Creek, respectively. On 31 May and 14–15 June, it was detected at the mouth of the Priest River. On 16 June, it was detected at the North Dover station and on 19 June it was detected at the Pack River station. On 24–25 June, it was detected passing the Lightning Creek station in an upstream direction. From 28 June through 23 July, it was detected by mobile tracking in the mainstem of Lightning Creek. It was then detected by mobile tracking in Rattle Creek from 16 August through 3 October 2012. On 16 October, this fish passed the Lightning Creek monitoring station in a downstream direction. The battery of this transmitter is expected to last through 19 November 2014.

Fish 164 – Bull trout 164 was captured downstream of Albeni Falls Dam on 29 May 2012, implanted with a SR-11-18 transmitter, and released upstream of the dam. The most probable genetic tributaries were Lightning Creek and Morris Creek (a tributary of Lightning Creek), respectively. On 30 May and 4 June, it was detected at the Priest River station, and on 5 June, it was detected at the South Dover station. The expected battery life of this tag is through 21 August 2013.

Fish 50 – Bull trout 50 was captured downstream of Albeni Falls Dam on 7 June 2012, implanted with a SR-11-18 transmitter, and released upstream of the dam. The most probable genetic tributaries were Granite Creek and Porcupine Creek (a tributary of Lightning Creek), respectively. It was detected from 12 through 29 June at the Priest River station, and also during this period at the Priest River mouth

via mobile tracking. On 1 July, it was detected at the North and South Dover receiving stations. This transmitter is expected to have a functioning battery through 30 August 2013.

Work Element D: 132 – Produce (Annual) Progress Report – Submit Annual Report for the period 16 November 2011 through 15 November 2012

This progress report satisfies this work element.

Work Element E: 119 – Manage and Administer Projects – Manage project

Labor to accomplish electrofishing, mobile tracking, downloading of monitoring stations, and data tasks was coordinated in 2012 among staff from EWU, the Kalispel Tribe, and PNNL. A budget and statement of work for 2013 will be submitted to BPA in early February 2013 for work in FY 2013–2014. An inventory of property will also be submitted to BPA in 2013 in conjunction with the proposed budget.

Work Element F: 70 – Install Fish Monitoring Equipment – Test all stations prior to FY13–14 monitoring season, if applicable

Currently it is assumed that this study will continue for at least one more year. Thus, all monitoring stations at Albeni Falls Dam and all tributaries will be tested and calibrated in March 2013 prior to the primary migration season of bull trout. Status of this testing will be reported in the annual report for FY13–14, which will be published in early 2014.

Work Element G: 185 – Produce Pisces Status Report – Periodic status reports for BPA

PNNL submitted quarterly status reports to BPA through the Pisces reporting system.

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Temporary restoration of bull trout passage at Albeni Falls Dam

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Abstract

This study was designed to monitor movements of bull trout that were provided passage above Albeni Falls Dam, Pend Oreille River. Electrofishing and angling were used to collect bull trout below the dam. Tissue samples were collected from each bull trout and sent to the U. S. Fish and Wildlife Service Abernathy Fish Technology Center Conservation Genetics Lab, Washington. The DNA extracted from tissue samples were compared to a catalog of bull trout population DNA from the Priest River drainage, Lake Pend Oreille tributaries, and the Clark Fork drainage to determine the most probable tributary of origin. A combined acoustic radio or radio tag was implanted in each fish prior to being transported and released above the dam. Bull trout relocated above the dam were able to volitionally migrate into their natal tributary, drop back downstream, or migrate upstream to the next dam. A combination of stationary radio receiving stations and tracking via aircraft, boat, and vehicle were used to monitor the movement of tagged fish to determine if the spawning tributary it selected matched the tributary assigned from the genetic analysis. Seven bull trout were captured during electrofishing surveys in 2008. Of these seven, four were tagged and relocated above the dam. Two were tagged and left below the dam as part of a study monitoring movements below the dam. One was immature and too small at the time of capture to implant a tracking tag. All four fish released above the dam passed by stationary receivers stations leading into Lake Pend Oreille and no fish dropped back below the dam. One of the radio tags was recovered in the tributary corresponding with the results of the genetic test. Another fish was located in the vicinity of its assigned tributary, which was impassable due to low water discharge at its mouth. Two fish have not been located since entering the lake. Of these fish, one was immature and not expected to enter its natal tributary in the fall of 2008. The other fish was large enough to be mature, but at the time of capture its sex was unable to be determined, indicating it may not have been mature at the time of capture. These fish are expected to enter their natal tributaries in early summer or fall of 2009.

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Landowners allowing access to their property for stationary receiver stations: Fred Blood, Gordon Nyberg, Win Taylor, Idaho Department of Lands, State of Idaho Transportation Department, Idaho Department of Fish and Game, and U.S. Army Corp of Engineers.

Aircraft was chartered from Felts Field Aviation and flown by pilots George Perks and Rick Haber.

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Collection of threatened bull trout and other fish species were authorized under scientific collectors permits issued to EWU in 2007 by the USFWS (Recovery Permit No. TE-068143-2) and WDFW (Permit No. 08-029). Fish collections in Idaho were authorized under a scientific collectors permit issued to the Kalispel Tribe (Permit No. F-04-03).

Introduction

The Pend Oreille and Clark Fork rivers flow 789 km (490 miles) from its source near Butte, Montana, through Pend Oreille Lake, Idaho, to its confluence with the Columbia River in British Columbia, Canada. Prior to the installation of dams, bull trout were able to migrate from tributaries located upstream and downstream of Lake Pend Oreille. The construction of Waneta (rkm 0.8), Seven Mile (rkm 9.7), Boundary (rkm 27.4), Box Canyon (rkm 55.0), Albeni Falls (rkm 145.0), Cabinet Gorge (rkm 241.2), Noxon Rapids (rkm 273.1), Thompson Falls (rkm 334.7) and Milltown (rkm 586.3) dams fragmented the bull trout habitat. None of these dams were constructed with fish passage, causing migratory corridors used by bull trout to be blocked. Blocking of migratory corridors has resulted in the failure of bull trout to return to their natal tributaries (USFWS 2000). Bull trout in the Columbia River Basin were listed as threatened by the U.S. Fish and Wildlife Service (USFWS) in 1998 (USFWS 2000).

Bull trout were historically abundant in the Box Canyon (rkm 55.5-141.5) reach of the Pend Oreille River between Metaline Falls and Albeni Falls (Scholz et al. 2008) prior to dam construction. Populations became isolated when the reach was blocked by Albeni Falls Dam at the upper end in 1952 and Box Canyon Dam at the lower end in 1957. Completion of Box Canyon Dam inundated the Box Canyon Reach, converting it from “an ideal trout stream” into a reservoir that was not conducive to bull trout production. Due to migration corridors being blocked by Albeni Falls Dam, bull trout with migratory life histories were no longer able to migrate upstream to a potential cold-water refuge in Lake Pend Oreille. As a result, the fragmented bull trout populations in Box Canyon went into “decline” and are in imminent danger of extinction unless immediate action is taken to restore the migration corridor. In the Pend Oreille Basin of Washington and Idaho, there is a paucity of bull trout in tributaries located below Albeni Falls Dam (Ashe and Scholz 1992; Scholz et al. 2005a, 2005b). Bull trout are temperature sensitive requiring water temperatures below 16° C. Between Albeni Falls Dam and Box Canyon Dam there are few cold water refuges available to bull trout. The blocking of the bull trout’s historical upstream migratory route to Lake Pend Oreille by Albeni Falls Dam has made the survival of bull trout entrained below Albeni Falls Dam remote.

Above the dam bull trout are more abundant in the Priest River drainage (Fredericks et al. 2002; Dupont and Horner 2004), several inlet tributaries of Lake Pend Oreille, notably Trestle, Granite and Gold creeks (Fredericks et al. 2002; Downs et. al. 2003) and some tributaries of the Clark Fork River (notably Lightning Creek) below Cabinet Gorge Dam (Downs et al. 2003). The Pend Oreille River, between its origin at the outlet of Lake Pend Oreille and Albeni Falls Dam, appears to be used as a migration corridor and possibly an overwintering area by bull trout (Bennett and Dupont 1993; Dupont and Horner 2004; Geist et al. 2004).

The USFWS biological opinion (USFWS 2000) noted that, “*Albeni Falls Dam was constructed without fishways to accommodate safe upstream and downstream passage of fish. . . Bull trout were abundant in the Pend Oreille River through 1957, and then abruptly their numbers decreased to the point that individual fish are now noteworthy.*”

This abrupt decline correlates with the commencement of operation of Albeni Falls Dam in 1952. No other abrupt or widespread threat can be identified for this portion of the Pend Oreille River Basin during 1950s. In the absence of passage, migratory bull trout remaining in the Pend Oreille River will continue to be harmed." As a result, the USFWS (2000a, 2002b) proposed a recovery plan to address this issue. Page 166 of the recovery plan calls on the Corps of Engineers and other agencies to by October 1, 2008, *Investigate and implement upstream passage at Albeni Falls (USFWS Biological Opinion), ...as needed, to reconnect fragmented core habitat of bull trout with Lake Pend Oreille.* The Recovery Plan emphasizes conserving genetic diversity and providing opportunities for genetic exchange, which is at the heart of our proposed capture-and-haul strategy. Captured bull trout in this study that are released 8 km above Albeni Falls Dam can voluntarily move back below the dam, or into the Priest River (or it's tributary the East River), tributaries of Pend Oreille Lake, or migrate up the Clark Fork River to the tailrace of Cabinet Gorge Dam.

Recovery of Pend Oreille bull trout has been limited by Albeni Falls Dam on the Pend Oreille River, which blocks the migration of bull trout between the river and Lake Pend Oreille (USFWS 2002a, 2002b). Fluvial bull trout that spawn in tributaries of Lake Pend Oreille and migrate downstream to the Pend Oreille River in search of forage can no longer return to their natal streams once passing the dam. This has lead to a consistent annual net loss of genetic material from these natal streams. The adfluvial life history form, which historically spawned in tributaries of the Box Canyon Reach of the Pend Oreille River and migrated upstream to the cold-water refuge of Lake Pend Oreille, can no longer migrate into the lake. Both life history forms of bull trout have been impacted since the construction of Albeni Falls Dam. Because of these impacts, the USFWS Biological Opinion (USFWS 2000) directed the action agencies to evaluate the feasibility of restoring passage at Albeni Falls Dam (see Reasonable and Prudent Measure 10.A.1.3 and Terms and Conditions 11.A.1.3 of the 2000 USFWS BiOp).

In a 2003 study by Geist et al. (2004) seven bull trout capture below the dam were implanted with radio transmitters and released in the spring effluent to determine their interaction with the dam. Through the use of radio receiver stations on the dam and mobile tracking by boat, six of the tagged bull trout below the dam were found to make repeated forays between a cold-water effluent and the base of the dam. The data collected supported the hypothesis that the bull trout originated from tributaries above the dam. If they would have originated from the tributaries below the dam, they would most likely have sought thermal refuge in their home tributary when the water temperature reached the upper end of their thermal tolerance zone.

In a 2004 study by Scholz et al. (2005a, 2005b) two bull trout captured below Albeni Falls Dam were tagged and relocated above the dam to determine if they would migrate upstream or pass back over the dam. Tracking was conducted using stationary receiver stations and mobile surveys by aircraft and vehicle. Both fish migrated from their release point into Lake Pend Oreille. One fish entered Lightning Creek and returned to the lake approximately one month later. It is presumed to have spawned in this tributary. The second fish, which was immature at the time of capture, entered Trestle Creek during the

spawning season the following year. The movements of these two fish supported the hypothesis that these bull trout originated from tributaries above the dam.

Genetic samples were taken from the bull trout captured in the Geist et al. (2004) and Scholz et al. (2005a, 2005b) studies. DNA analysis was used to compare the genetic samples with populations from the Priest River and Lake Pend Oreille drainages as well as populations from Clark Fork River tributaries below Cabinet Gorge Dam (DeHaan and Arden 2008). All nine of the fish from that were collected below Albeni Falls Dam were assigned to tributary populations of Lake Pend Oreille or the Clark Fork River below Cabinet Gorge Dam (DeHaan and Arden 2008).

Varied spawning migration strategies are used by bull trout within the Lake Pend Oreille Basin. Spawning tributaries are entered by some sexually mature bull trout in May or June, 3-4 months prior to peak spawning in September and early October. Early migrations are a critical life history adaptation allowing access to spawning tributaries with intermittent reaches of elevated water temperature during the summer and fall months (Anderson 1971; Pratt 1985; Pratt and Huston 1993; PBTTAT 1998). Due to the geology of this basin many of the streams have influent reaches that are above the water table level. During peak flows water is maintained in the channel but can drop below ground during low flows. Early migrations are a local adaptation allowing bull trout to access natal tributaries before low flow makes them inaccessible.

A late summer/early fall spawning migration also occurs from Lake Pend Oreille into the Clark Fork River and tributaries entering along the Clark Fork (Jeppson 1960; Pratt 1985; Pratt and Huston 1993; PBTTAT 1998; Scholz et al. 2005a, 2005b). A portion of the spawning population in Lightning Creek enters in August and September. Late summer or fall migration is potentially advantageous in terms of reproductive fitness because the fish remains in a more productive environment continuing to feed for a longer period, and converting more energy into gamete production. The downside of a later spawning migration is that intermittent stream reaches may block migration into home tributaries and increase the probability of straying. This is not necessarily a bad strategy, as it could potentially promote some genetic exchange between populations. Both early migrating and late migrating adult bull trout have been reported in Lightning Creek (Anderson 1971; Scholz et al. 2005a, 2005b). These behavioral differences may reflect some of the genetic diversity observed by Spruell et al. (1999) and illustrates why it is important to maintain genetic diversity among these populations. The potential of Albeni Falls Dam preventing bull trout from returning to natal tributaries above the dam to spawn and preventing those of tributaries below the dam from completing their life cycle has been documented in recent studies (Dupont and Horner 2004; Geist et al. 2004; Scholz et al. 2005a, 2005b, Scholz et al. 2008; Dupont et al. 2007).

Recently, the Avista Corporation, in conjunction with the USFWS, has initiated a program to restore upstream fish passage above Cabinet Gorge Dam on the Clark Fork River. Bull trout captured below Cabinet Gorge Dam are held in a temporary fish holding facility at Cabinet Gorge Dam. Biopsy samples are collected from each fish for "rapid response genetic analysis". The tissue samples are sent to the USFWS genetics lab

in Abernathy Washington, where within 24-48 hours its microsatellite DNA is analyzed and compared to the microsatellite DNA of bull trout populations in tributaries of Pend Oreille Lake (below the dam) and in tributaries of Clark Fork River (above the dam). Tributary assignment based on genetic analysis is used to determine if the fish will be released above or below Cabinet Gorge Dam. The success of the Cabinet Gorge bull trout transportation project has prompted similar efforts at Noxon Rapids and Thompson Falls dams. The recent removal of dams on Big Blackfoot River, a principle tributary of the upper Clark Fork River, and Milltown Dam in the Clark Fork River have restored the Upper Clark Fork and Big Blackfoot rivers to free flowing conditions allowing more natural connectivity of bull trout. The bull trout transportation projects at Cabinet Gorge, Noxon Rapids and Thompson Falls dams provide a temporary solution for bull trout passage at each of these facilities and will likely increase the number of spawning bull trout returning back to their natal tributaries.

This approach appears to be effective in stemming the constant loss of genetic diversity of adfluvial bull trout from their spawning populations. By relocating bull trout captured below Albeni Falls Dam some measure of fish passage is restored over 734.1 km (93%) of the Pend Oreille/Clark Fork rivers, from Box Canyon Dam (rkm 55.0) to the headwaters of the Clark Fork River (rkm 789.1).

The objectives of this project are: (1) relocate bull trout collected below the dam to a release site upstream from the dam, (2) use microsatellite DNA analysis to assign the most probable natal tributary of each fish, and (3) determine if genetically assign natal tributaries match the actual tributary used for spawning. This project is consistent with other bull trout passage restoration efforts underway in the Pend Oreille/Clark Fork subunits. Moving bull trout above the dam will potentially decrease the threat of genetic integrity loss to known small, threatened populations of bull trout in the Pend Oreille basin.

Methods

Study Area

Eastern Washington University (EWU) and Kalispel Tribe Natural Resources Department (KNRD) crews sampled for bull trout in a 14 km reach of the Pend Oreille River between Indian Creek (RKM 131) and Albeni Falls Dam (RKM 145) (Figure 1).

Albeni Falls Dam was built by the U.S. Army Corps of Engineers between 1951 and 1955. Over 200 million kilowatt hours of electrical energy is produced annually by three generators at Albeni Falls Dam. Albeni Falls Dam had a mean discharge of 24.2 KCFS from 1960-2007 and a peak discharge of 138.2 KCFS during this period of record. In 2008, the mean discharge was 26.9 KCFS and the peak discharge was 97.6 KCFS. The average water temperature in 2008 was 10°C.

EWU and Battelle Northwest Laboratories maintained eleven stationary radio tracking stations on and above Albeni Falls Dam on the Pend Oreille River and Pend Oreille Lake. Four stations were setup on Albeni Falls Dam (N 48° 10.721 W 116° 59.975), one at the Priest River Mudhole Campground (N 48° 10.755 W 116° 53.517), two near the Dover Railroad Bridge north (N 48° 15.379 W 116° 39.948) and south (N 48° 15.136 W 116° 39.964) stations, and four tributaries to Lake Pend Oreille: Trestle (N 48° 17.113 W 116° 20.513), Lightning (N 48° 09.090 W 116° 10.902), Granite (N 48° 05.036 W 116° 25.323) and Gold creeks (N 47° 58.272 W 116° 27.250).

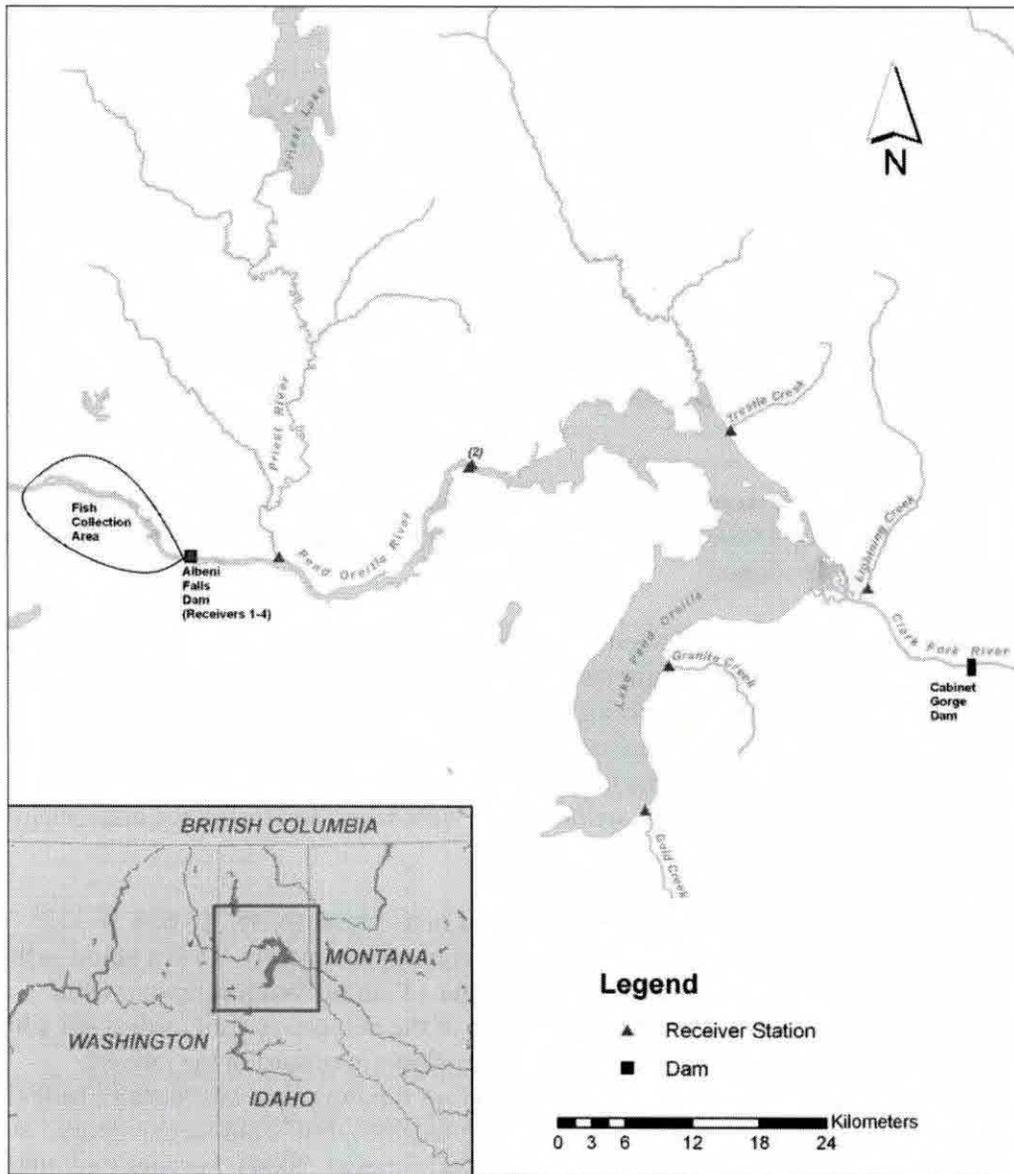


Figure 1. Map describing areas of fisheries surveys (from Indian Creek to below Albeni Falls Dam) and stationary receiver locations.

Field Collections

Boat electrofishing, hook and line, and snorkeling methods were employed to capture bull trout from the Pend Oreille River between Indian Creek, Washington (N 48° 14.650 W 117° 09.093) and Albeni Falls Dam, Idaho (N 48° 10.721 W 116° 59.975) in 2008.

Boat electrofishing - Standardized ten minute boat electrofishing surveys (2-4 amps, 250 volts, 120 pps, DC current) were conducted by EWU and KNRD with one boat sampling the north shoreline and the other boat sampling the south shoreline. Nineteen trips by each agency were conducted between 11-25 March, 2-30 April, 13-27 May, 3-30 June, 15-20 October, and 4 November 2008. Transects were sampled during both day and night hours.

During sampling all fish were collected and identified to species using dichotomous keys (Wydoski and Whitney 1979, 2003). All fish collected were measured to the nearest mm total length (TL) and released.

Genetic tissue samples were collected from bull trout and cutthroat trout by removing a piece of fin with a hole punch. Samples were preserved in 95% ethanol and sent to the Kalispel Tribe to be included in their basin wide microsatellite DNA analysis being funded by Bonneville Power Administration (Olson et al. 2004). A sub-sample of rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), kokanee (*O. nerka*) and mountain whitefish (*Prosopium williamsoni*) were taken and tested for diseases by the USFWS Fish Disease Center.

Snorkel surveys - Snorkel surveys were conducted in a culvert (N 48° 10.614 W 117° 01.137), on the south shore of the Pend Oreille River approximately 1.5 km below Albeni Falls Dam, when water elevations permitted at least 15 cm of breathing room. Cold spring water feeds the culvert from the south side of the culvert, as well as through a hole in the middle of the culvert. The direction of water flow (in or out) in the culvert depended on the elevation of the water in the river. A thermograph was placed inside the culvert to gather water temperature data. In previous years, bull trout were captured at this cold-water refuge during the summer months (Geist et al. 2004). Surveys took place on 22 July, 28 July, 6 August, and 22 August 2008 during the day. Each end of the culvert was blocked using a block net. Surveys were conducted with 2-3 individuals moving in one direction together through the culvert using underwater flashlights to spot fish. After one direction was completed, a sweep the other direction was completed. Water temperatures were taken from the center and mouths of the culvert. Water elevation, temperature, and discharge data was gathered from the US Army Corps of Engineers, Northwestern Division (www.nwd-wc.usace.army.mil).

Bull Trout Tagging and Relocation

Tagging Procedures - Methods for tagging bull trout with a radio/acoustic tags are described below. The fish were placed in a large cooler (142.5 liters) with fresh water. The cooler was aerated with oxygen from a small oxygen cylinder and regulator. Ice was

used to maintain ambient river temperatures when needed. The lid was kept closed until the fish stabilizes and recovers from the stress. The fish were anesthetized with 70-100 mg/L MS 222. Once the anesthesia took effect (3- 5 minutes) the fish were checked for fin clips and scanned with a PIT tag detector to confirm it had not previously been captured and tagged.

Experienced surgeons surgically implanted transmitters using procedures described by McLeod and Clayton (1997) and Brown et al. (1999). The fish were placed in a water soaked foam block with a cut out V-notched cradle. The fish were placed dorsal side down, and water was flushed through the gills using a gravity flow bucket filled with a maintenance solution (40-60 mg/L MS 222). The bucket has a valve at the bottom that is connected to a piece of tubing that was placed into the mouth of the fish. Water was periodically poured over the fishes body during surgery to keep it hydrated. A 2-3 cm longitudinal incision was made three cm anterior to the pelvic fins. A PIT tag (DF TX 1400BE, 12 mm long, 134.KHz) was placed in the body cavity according to standard protocols (CBFWA 1999). A 16-gauge hypodermic needle was inserted through the body wall to the side and posterior to the incision. The transmitter antenna wire was inserted through the hollow needle. Once the needle was removed, the antenna was exiting the body wall of the fish. The Lotek digitally encoded radio/ acoustic transmitter (CART 16_1, 23.8 g, 5 sec burst rate, 663 day tag life or CART 16_2, 31.5 g, 5 sec burst rate, 904 day tag life) are operating at a frequency of 151.89 MHz (radio frequency) and 76.8 KHz (acoustic frequency). The Lotek digitally encoded radio transmitters (SR 11-18 8.0g, 5 sec burst rate, 449 day tag life or NTC-6-2, 4.5g, 5 sec burst rate, 441 day tag life) are operating at 151.89 MHz (radio frequency). The decision of which size tag to implant was based on the weight of the fish. Tag weight did not exceed 3% of the fish's weight. The incision was closed using the individual simple sutures method at approximately 1-cm intervals. Finally, a veterinary grade liquid Band-Aid (Nexband) was placed over the sutures. The fish were placed in an oxygenated cooler with fresh cold water to recover.

Relocation - The fish were then transported by vehicle in an oxygenated cooler to the public boat launch (N 48° 10.617 W 116° 54.245) on the east side of the town of Priest River, Idaho 7.5 km above Albeni Falls Dam. Once the fish had completely recovered, it was released into the water at the boat launch, located on the north bank of the Pend Oreille River about 1 km downstream of its confluence with the Priest River. This location was selected because it was above Albeni Falls Dam, but far enough downstream that it provides an opportunity for the fish to swim up Priest River or continue past towards Lake Pend Oreille.

Tracking

Fish movements were tracked using a combination of fixed receiver ground stations and mobile tracking using; vehicle, aircraft, and boat. The ground receiver stations operated 24 hours a day. A total mobile tracking effort of 114 hours was conducted between 28 May and 10 November 2008. A total of 65.5 hours of tracking occurred by truck, 41 hours by aircraft, and 7.5 hours by boat. Additional tracking by truck and boat was performed by Battelle, see Bellgraph and Deters (2009) for summary.

Fixed Ground Stations - Eleven radio receiving stations were setup for the study in the spring 2008. Receiver locations and setup were the same as during the 2003 and 2004 study (Geist et al. 2004; Scholz et al. 2005). Sites included: Albeni Falls Dam (4 stations), Mudhole Campground on the Priest River (1 station), and the Dover Railroad Bridge (2 stations) approximately 26 km upstream of the Priest River. Four additional stations were set up at the mouths of tributaries to Lake Pend Oreille: Trestle, Lightning, Granite, and Gold creeks. Each station consisted of a Lotek SRX-400 or SRX-600 radio receiver connected to aerial Yagi antennas. The receivers were supplied with either AC or DC (12 volt vehicle batteries) power. Solar panels were used to recharge DC power systems. Beacon tags were used at all stationary receiver locations to monitor receiver status. The beacon tags were programmed to transmit a one-minute signal every hour. See Bellgraph and Deters (2007) for a complete summary of installation and details of each station.

EWU worked with landowners to secure access, and to download and maintain stations via hold harmless agreements and/or permission to entry agreements. Agreements were setup with a private landowner at Gold Creek, Idaho Department of Fish and Wildlife at Granite Creek, Idaho Department of Transportation at Lightning Creek, and Idaho Department of Lands at Trestle Creek (\$100 fee for five year agreement). Procedures for calibrating each receiver station were reported by Bellgraph and Deters (2007).

All fixed receiver stations were inspected and data downloaded April 2008 through May 2009. Data were downloaded using a Lotek *Winhost* program onto a laptop computer, saved and then backed up on a removable thumb drive. After each download, data were examined for active tags, beacon tag signals, and noise. Proper adjustments to the gain were made when necessary. Each station was inspected for damage and repaired if necessary. Beacon and 12 volt batteries were replaced when necessary. Stations were winterized at the end of November, and then reset at the end of March before the April sampling began.

Vehicle Tracking - Tracking by vehicle was conducted 18 times between 28 May and 10 November 2008. A Lotek SRX-600 radio receiver connected to a three element Yagi antenna was used when tracking by truck. The receiver's gain was set at 50 and adjusted as needed. The antenna was attached to the hood of the truck using a Magnetic Roto Antenna Mount manufactured by Midway Telemetry.

Vehicle Route #1- On 28 May, 4 June, 16 June, 23 June, 2 July, and 7 July 2008 tracking began at Albeni Falls Dam (N 48° 10.721 W 116° 59.975) and followed the Pend Oreille River to Lake Pend Oreille along U.S. Route 2. The north shore of Lake Pend Oreille was tracked along ID S.R. 200 between Sandpoint, ID (N 48° 17.420 W 116° 32.933) and Clark Fork, ID (N 48° 08.752 W 116° 10.616). Colburn Culver Road (N 48° 19.386 W 116° 26.388), off of ID S.R. 200, was used to access Grouse Creek Road (N 48° 24.995 W 116° 26.381), Gold Creek Road (N 48° 22.911 W 116° 26.377), and Rapid Lightning Creek Road (N 48° 21.835 W 116° 26.377). Grouse Creek, Gold Creek, and Rapid Lightning Creek were followed for 10-15 km along these roads. Trestle Creek Road (N 48° 16.994 W 116° 20.972) and Lightning Creek Road (N 48° 08.752 W 116° 10.655)

were directly accessed from ID S.R. 200 and used to track Trestle Creek and Lightning Creek for 10- 15 km.

Vehicle Route #2- On 14 July, 4 August, 12 August, 27 August, and 10 September 2008 tracking began at Dover, ID (N 48° 15.153 W 116° 36.644) and followed the Pend Oreille River to Lake Pend Oreille along U.S. Route 2. The north shore of Lake Pend Oreille was tracked along ID S.R. 200 between Sandpoint, ID (N 48° 17.420 W 116° 32.933) and Clark Fork, ID (N 48° 08.752 W 116° 10.616). Colburn Culver Road (N 48° 19.386 W 116° 26.388), off of ID S.R. 200, was used to access Grouse Creek Road (N 48° 24.995 W 116° 26.381), Gold Creek Road (N 48° 22.911 W 116° 26.377), and Rapid Lightning Creek Road (N 48° 21.835 W 116° 26.377). Grouse Creek, Gold Creek, and Rapid Lightning Creek were followed for 10-15 km along these roads. Trestle Creek Road (N 48° 16.994 W 116° 20.972) and Lightning Creek Road (N 48° 08.752 W 116° 10.655) were directly accessed from ID S.R. 200 and used to track Trestle Creek and Lightning Creek for 10- 15 km.

Vehicle Route #3 - Tracking on 15 September, 28 September, 15 October, 22 October, 29 October, and 10 November 2008 followed the same path as vehicle route #2 with the addition of following ID S.R. 200 along the north shore of the Clark Fork River between Clark Fork, ID (N 48° 08.752 W 116° 10.616) and the Cabinet Gorge Dam (N 48° 05.196 W 116° 03.859). The south shore of the Clark Fork River was tracked traveling west on Johnson Creek Road (N 48° 08.070 W 116° 10.465) for approximately 3.5 km from the bridge crossing over the Clark Fork River and River Road (N 48° 08.026 W 116° 10.469) was used to track east from the bridge to the Cabinet Gorge Dam (N 48° 05.196 W 116° 03.859).

Aircraft Tracking - Tracking by aircraft was conducted using a Cessna C-182 chartered from Felts Field Aviation, Spokane, WA. A Lotek SRX-600 radio receiver connected to single two element Yagi antenna externally mounted under the right wing was utilized for aerial tracking. The receiver's gain was set at 50 and adjusted as needed. Four different flight routes were used during eleven flights between 13 June and 26 October 2008. Two test tags were placed along the flight route over Grouse Creek. One tag was attached to a tree along the shore (N 48° 26.571 W 116° 23.610) and the other was attached to a rock underwater about 1m deep (N 48° 26.266 W 116° 23.770).

Flight Route #1 - On 6 June 2008 the flight left Felts Field at 06:00 and proceeded directly to Albeni Falls Dam (N 48° 10.721 W 116° 59.975). Tracking began at Albeni Falls Dam and continued up the Pend Oreille River to the mouth of the Priest River (N 48° 10.600 W 116° 54.745). The flight turned up the Priest River to Priest Lake (N 48° 24.912 W 116° 55.389). The Priest River was followed on the return route to the Pend Oreille River, during which the flight branched off to track along the Upper West Branch of the Priest River (N 48° 24.912 W 116° 55.389), East River (N 48° 21.159 W 116° 51.167), North Fork East River (N 48° 22.280 W 116° 49.196) and the Middle Fork East River (N 48° 22.280 W 116° 49.196). Upon returning to the Pend Oreille River, the flight continued up the Pend Oreille River to Lake Pend Oreille (N 48° 14.391 W 116° 36.096). The flight followed along the North shore of Lake Pend Oreille to the mouth of the Pack

River (N 48° 19.187 W 116° 22.984). The flight followed the Pack River for approximately 45 km. The Pack River was followed on the return to Lake Pend Oreille, with the route branching at Grouse Creek (N 48° 24.159 W 116° 28.705) and Rapid Lighting Creek (N 48° 21.779 W 116° 24.447). Upon returning to Lake Pend Oreille, the north shoreline was followed to Trestle Creek (N 48° 16.949 W 116° 21.165). The flight followed Trestle Creek for approximately 15 km before returning down the same route to Lake Pend Oreille. The flight continued along the north shore of Lake Pend Oreille to Lightning Creek (N 48° 08.453 W 116° 11.470). The flight continued approximately 23 km up Lightning Creek, with passes over its tributaries of Rattle Creek (N 48° 19.580 W 116° 10.381) and Morris Creek (N 48° 13.458 W 116° 06.970) for approximately 5 km. The flight returned back down Lightning Creek to Lake Pend Oreille. The flight passed over Lake Pend Oreille on its return to Felts Field.

Flight Route #2- On 17 July 2008 and 29 July 2008 flights left Felts Field at 06:00. The flights proceeded directly to the Pend Oreille River, intercepting it at approximately (N 48° 13.608 W 117° 05.146). Tracking began at the interception point and continued down the Pend Oreille River to Box Canyon Dam (N 48° 46.799 W 117° 24.737). The flight returned up the Pend Oreille River to Albeni Falls Dam (N 48° 10.721 W 116° 59.975). After passing the dam the flight continued up the Pend Oreille River at Lake Pend Oreille (N 48° 14.391 W 116° 36.096). The flight followed along the north shore of Lake Pend Oreille to the mouth of the Pack River (N 48° 19.187 W 116° 22.984). The flight followed the Pack River for approximately 45 km. The Pack River was followed on the return to Lake Pend Oreille, with the route branching at Grouse Creek (N 48° 24.159 W 116° 28.705) and Rapid Lighting Creek (N 48° 21.779 W 116° 24.447). Upon returning to Lake Pend Oreille the north shoreline was followed to Trestle Creek (N 48° 16.949 W 116° 21.165). The flight followed Trestle Creek for approximately 15 km before returning down the same route to Lake Pend Oreille. The flight continued along the north shore of Lake Pend Oreille to Lightning Creek (N 48° 08.453 W 116° 11.470). The flight continued approximately 23 km up Lightning Creek, with passes over its tributaries of Rattle Creek (N 48° 19.580 W 116° 10.381) and Morris Creek (N 48° 13.458 W 116° 06.970) for approximately 5 km. The flight returned back down Lightning Creek to Lake Pend Oreille. The flight passed over Lake Pend Oreille on its return to Felts Field.

Flight Route #3 - On 7 August, 18 August, 28 August, 4 September, and 11 September 2008 flights left Felts field at 06:00. These flights flew directly for the mouth of the Pack River (N 48° 19.187 W 116° 22.984). Tracking began when the flight reached Lake Pend Oreille, approximately N 48° 15.225 W 116° 23.387. Several loops were made where the Pack River enters Lake Pend Oreille. The flight followed the Pack River for approximately 45 km. The Pack River was followed on the return to Lake Pend Oreille, with the route branching at Grouse Creek (N 48° 24.159 W 116° 28.705) and Rapid Lighting Creek (N 48° 21.779 W 116° 24.447). Upon returning to Lake Pend Oreille, the north shoreline was followed to Trestle Creek (N 48° 16.949 W 116° 21.165). The flight followed Trestle Creek for approximately 15 km before returning down the same route to Lake Pend Oreille. The flight continued along the north shore of Lake Pend Oreille to Lightning Creek (N 48° 08.453 W 116° 11.470). The flight continued approximately 23 km up Lightning Creek, with passes over its tributaries of Rattle Creek (N 48° 19.580 W

116° 10.381) and Morris Creek (N 48° 13.458 W 116° 06.970) for approximately 5 km. The flight returned back down Lightning Creek to Lake Pend Oreille. The east shore of Lake Pend Oreille was followed down to Granite Creek (N 48° 05.194 W 116° 25.670). Granite Creek was followed for approximately 15 km before returning down the same route to Lake Pend Oreille. The east shore line of Lake Pend Oreille was followed to North Gold Creek (N 48° 58.261 W 116° 27.282) and Gold Creek (N 48° 58.406 W 116° 27.165). The flight traveled up each of these tributaries for approximately 15 km before following them back down to the lake. The flight flew over the lake on its return to Felt Field.

Fight Route #4 - On 27 September, 11 October, and 28 October 2008 flights left Felts Field at 07:00. These flights flew directly for the mouth of the Pack River (N 48° 19.187 W 116° 22.984). Tracking began when the flight reached Lake Pend Oreille, approximately (N 48° 15.225 W 116° 23.387). Several loops were made where the Pack River enters Lake Pend Oreille. The flight followed the Pack River for approximately 45 km. The Pack River was followed on the return to Lake Pend Oreille, with the route branching at Grouse Creek (N 48° 24.159 W 116° 28.705) and Rapid Lighting Creek (N 48° 21.779 W 116° 24.447). Upon returning to Lake Pend Oreille, the north shoreline was followed to Trestle Creek (N 48° 16.949 W 116° 21.165). The flight followed Trestle Creek for approximately 15 km before returning down the same route to Lake Pend Oreille. The flight followed the shoreline of Lake Pend Oreille to the Clark Fork River (N 48° 08.373 W 116° 11.370). The Clark Fork River was followed up to the Cabinet Gorge Dam (N 48° 05.196 W 116° 03.859). The flight followed the Clark Fork River back to the lake turning up Lightning Creek (N 48° 08.453 W 116° 11.470) along the way. The flight continued approximately 23 km up Lightning Creek, with passes over its tributaries of Rattle Creek (N 48° 19.580 W 116° 10.381) and Morris Creek (N 48° 13.458 W 116° 06.970) for approximately 5 km. The flight returned back down Lightning Creek to Lake Pend Oreille. On the return flight down Lightning Creek, the flight turned up Rattle Creek (N 48° 19.580 W 116° 10.381) and Morris Creek (N 48° 13.458 W 116° 06.970) for approximately 5 km. The east shore of Lake Pend Oreille was followed down to Granite Creek (N 48° 05.194 W 116° 25.670). Granite Creek was followed for approximately 15 km before returning down the same route to Lake Pend Oreille. The east shore line of Lake Pend Oreille was followed to North Gold Creek (N 48° 58.261 W 116° 27.282) and Gold Creek (N 48° 58.406 W 116° 27.165). The flight traveled up each of these tributaries for approximately 15 km before following them back down to the lake. The flight flew over the lake on its return to Felt Field.

Boat Tracking - Tracking by boat was conducted on 31 July and 6 August 2008. A Lotek SRX-600 radio receiver was connected to a three element Yagi antenna and a Lotek LHP hydrophone were used when tracking by boat. The receiver's gain was set at 50 and adjusted as needed.

Boat Route #1- On 31 July 2008 the boat was launched at the Trestle Creek boat launch (N 48° 16.606 W 116° 20.806). The northeast shoreline of Lake Pend Oreille was followed up to the bay (N 48° 17.127 W 116° 21.301) leading to the Pack River. The east shoreline of the bay was followed to the Pack River (N 48° 19.187 W 116° 22.984). The

west shore of the bay was followed back to the lake (N 48° 19.132 W 116° 22.906). A pass was made up the middle of the bay between the lake and the Pack River and back to the lake. The northeast shoreline was followed back to the boat launch.

Boat Route #2 - On 6 August 2008 the boat was launched at the boat launch (N 48° 14.139 W 116° 17.179) in Hope, ID. Tracking was conducted in the bay south of Hope, ID and from the bay about 0.5 km into the lake. The area tracked was limited due to a hydrophone malfunction.

Genetic Analysis

Rapid Response Genetic Identification - Genetic samples from each bull trout were shipped to the USFW Service Abernathy Fish Technology Center for rapid genetic analysis. Each genetic sample was compared to a genetic baseline data set of 2,020 bull trout from 37 known populations within the Lake Pend Oreille and Clark Fork River system of northern Idaho and northwestern Montana. The watershed is divided into four regions: Region 1 includes tributaries to the Pend Oreille River, Lake Pend Oreille and the Clark Fork River up to Cabinet Gorge Dam, Region 2 contains Clark Fork River tributaries from Cabinet Gorge Dam to Noxon Rapids Dam, Region 3 contains Clark Fork River tributaries from Noxon Rapids Dam to Thompson Falls Dam and Region 4 contains all Clark Fork River tributaries above Thompson Falls Dam (DeHaan and Arden 2008). Baseline allele frequency data for each population was determined by genotyping all fish in 12 highly polymorphic microsatellite loci (DuPont et al. 2007).

A modified Chelex protocol was used to extract DNA from genetic samples (Miller and Kapuscinski 1996). DNA extracted at 12 microsatellite loci; *Omm1070*, *Omm1128*, *Omm1130* (Rexroad et al. 2001), *Sco104*, *Sco105*, *Sco106*, *Sco107*, *Sco200*, *Sco212*, *Sco216*, *Sco218* (DeHaan and Arden 2005) and *Smm22* (Crane et al. 2004) was amplified using polymerase chain reaction (PCR). PCR reactions were carried out in 15 µl volumes containing 2 µl template DNA, 1X polymerase buffer (10mM Tris-HCl, 50mM KCl, 0.1% Triton X-100), 1.5 or 2.0mM MgCl₂, 0.2mM of each dNTP, 0.5µM of each primer and 0.2 units of GoTaq DNA polymerase (Promega Co.) (DeHaan and Arden 2008). Initial denaturation of DNA occurred for 3 minutes at 94°C, followed by 38 one second cycles at 94°C, primer specific annealing temperature for 30 seconds and primer extension for 30 seconds at 72°C, and a final extension of 7 minutes at 72°C. Applied Biosystems fluorescent dyes were used to label all forward primers. The loci produced during PCR were pooled into three multiplex sets and run on an AB 3130xl genetic analyzer. *Genemapper v4.0* (Applied Biosystems Inc.) software was used to determine multi-locus genotype of each bull trout. Genotyping error was minimized by running a positive control (a fish with a known genotype), a negative control (a sample containing no DNA), and duplicates of each sample being analyzed (DeHaan and Arden 2008).

Natal Tributary Assignment - Population assignment techniques implemented via the program *Whichrun v4.1* (Banks and Eichert, 2000) were used to determine the first and second most likely population of origin from within the genetic baseline dataset for each individual fish (DeHaan and Arden 2008).

Results

A synoptic list of fish collected during the Pend Oreille River survey in 2008 was summarized (Table 1). In 2008, a total of 3,464 fish were collected via boat electrofishing in the Pend Oreille River, which represented 21 species, during 67.9 total hours of boat electrofishing (Table 2) and 18 fish were collected, representing 7 species, during 32.0 hours of hook-and-line sampling (Table 3). Seven bull trout were collected between 2 April and 22 July (Table 4). Four fish were implanted with a CART tag and a PIT tag, two were implanted with a NANO tag, and one juvenile fish, not large enough to implant a tracking tag, was implanted with a PIT tag (Table 4). Four fish implanted with a tracking tag were released at the Priest River boat launch, 7.0 km above Albeni Falls Dam. Two fish were tagged and released below the dam as part of the KNRD and Battelle Northwest study of bull trout movement below the dam. The untagged juvenile fish was released 2.6 km below the dam at the Newport boat launch.

All of the bull trout released above Albeni Falls Dam passed the Dover receiver stations heading toward Lake Pend Oreille (Table 5). Two bull trout were located during mobile tracking. One was in the vicinity of a tributary matching the results of the genetic assignment and one tag was recovered in the tributary matching the results of the genetic assignment. Two of the bull trout have not been detected at any of the stationary receivers or by mobile tracking since passing the Dover stations. A summary of the movements of each fish released above the dam are summarized below.

Table 1. Synoptic list of fish captured during Pend Oreille River surveys 2008.

Family	Species	Scientific Name
Cyprinidae	Peamouth	<i>Mylocheilus caurinus</i> (Richardson, 1836)
	Northern pikeminnow	<i>Ptychocheilus oregonensis</i> (Richardson, 1836)
	Tench	<i>Tinca tinca</i> (Linnaeus, 1758)
Catostomidae	Longnose sucker	<i>Catostomus Catostomus</i> (Forster, 1773)
	Largescale sucker	<i>Catostomus macrocheilus</i> Girard, 1856
Ictaluridae	Brown bullhead	<i>Ameiurus nebulosus</i> (Lesueur, 1819)
Esocidae	Northern pike	<i>Esox lucius</i> Linnaeus, 1758
Salmonidae	Lake whitefish	<i>Coregonus clupeaformis</i> (Mitchell, 1818)
	Cutthroat trout	<i>Oncorhynchus clarki</i> (Richardson, 1836)
	Rainbow trout	<i>Oncorhynchus mykiss</i> (Walbaum, 1792)
	Brook trout	<i>Oncorhynchus fontinalis</i>
	Kokanee	<i>Oncorhynchus nerka</i> (Walbaum, 1792)
	Mountain whitefish	<i>Prosopium williamsoni</i> (Girard, 1856)
	Brown trout	<i>Salmo trutta</i> Linnaeus, 1758
	Bull trout	<i>Salvelinus confluentus</i> (Suckley, 1858)
	Lake trout	<i>Salvelinus namaycush</i> (Walbaum, 1792)
	Centrarchidae	Pumpkinseed
Smallmouth bass		<i>Micropterus dolomieu</i> Lacepède, 1802
Largemouth bass		<i>Micropterus salmoides</i> (Lacepède, 1802)
Black crappie		<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)
Percidae	Yellow perch	<i>Perca flavescens</i> (Mitchell, 1814)
	Walleye	<i>Sander vitreus</i> (Mitchell, 1818)

Table 2. Electrofishing mean total length (mm), range in total length (mm), and relative abundance (RA) of fish captured in the Pend Oreille River, 2008 (effort = 67.9 hrs).

Species	N	RA (%)	TL (SD)	Range TL (mm)
Peamouth	144	4.16	290 (50)	29-530
Northern pikeminnow	305	8.80	354 (124)	47-728
Tench	111	3.20	333 (72)	96-460
Longnose sucker	299	8.63	400 (107)	47-572
Largescale sucker	1092	31.52	456 (47)	45-570
Brown bullhead	15	0.43	251 (88)	45-318
Cutthroat trout	30	0.87	320 (65)	154-425
Lake whitefish	57	1.65	437 (29)	337-510
Rainbow trout	67	1.93	380 (137)	130-650
Kokanee	55	1.59	144 (41)	90-373
Mountain whitefish	525	15.16	326(37)	130-450
Brown trout	217	6.26	356 (78)	107-699
Bull trout	7	0.20	441(93)	285-535
Lake trout	8	0.23	557 (167)	396-947
Northern pike	7	0.20	942(221)	603-1350
Pumpkinseed	38	1.10	107 (89)	48-610
Smallmouth bass	171	4.94	248 (104)	24-500
Largemouth bass	23	0.66	291 (108)	80-470
Black crappie	9	0.26	210 (41)	132-276
Yellow perch	270	7.79	160 (65)	70-441
Walleye	14	0.40	577(100)	437-710
Grand Total	3,464	100.00		

Table 3. Hook-and-line mean total length (mm), range in total length (mm), and relative abundance (RA) of fish captured in the Pend Oreille River, 2008 (effort = 32.0 hrs).

Species	N	RA %	TL (SD)	Range TL mm
Brown trout	1	5.56	328	328
Largescale sucker	1	5.56	458	458
Mountain whitefish	1	5.56	333	333
Northern pikeminnow	2	11.11	285	285
Pumpkinseed	3	16.67	n/a	n/a
Smallmouth bass	7	38.89	270 (34)	225 - 312
Yellow perch	3	16.67	278 (30)	257 - 300
Grand Total	18	100.00		

Table 4. Capture date, total length, weight, sex, tag type, and tag codes for bull trout captured below Albeni Falls Dam during 2008.

Fish #	Capture date	Total length (mm)	Weight (g)	Sex	Pit tag #	Radio tag type	Tag code #
1	4/2/2008	402	546	Unknown	98512002233446	n/a	n/a
2	5/19/2008	505	1178	F	985121002196227	CART 16_2s	126
3	5/19/2008	501	1133	Unknown	985121002164616	CART 16_2s	128
4	6/11/2008	363	374.5	Unknown	Not tagged	NANO	172
5	6/18/2008	496	1241	F	985121002194596	CART 16_1	108
6	6/24/2008	535	1535	Unknown	985121002157373	CART 16_1	102
7	7/22/2008	285	200	Unknown	985121002193751	NANO	175

Table 5. Tag code, detection location, date, and current status for bull trout captured in the Pend Oreille River below Albeni Falls Dam during 2008.

Fish #	RF code	Location of last detection	Date of last location	Status
1	n/a	n/a	n/a	Fish untagged left below the dam
2	126	Passing North and South Dover stations	6/12/2008	Location unknown believed to be in lake Pend Oreille
3	128	21 km up Grouse Creek	5/28/2008	Tag recovered in Grouse Creek
4	172	Passing North and South Dover stations	6/18/2008	Location unknown believed to be in lake Pend Oreille
5	108	One mile blow the Cabinet Gorge Dam	9/22/2008	Location unknown believed to be in lake Pend Oreille
6	102	n/a	n/a	See Bellgraph (2008) status report for the US Army Corps of Engineers.
7	175	n/a	n/a	See Bellgraph (2008) status report for the US Army Corps of Engineers.

Fish # 1 - The first bull trout was captured 0.26 km (N 48° 10.785 W 117° 00.113) below the dam on 2 April 2008 by EWU. It had a total length of 402 mm, weight of 546 g, and the sex was undetermined. This fish was not large enough to implant with a radio tag at time of capture (Figure 2). The NANO and SR Series tags were not received until later in the year. A PIT tag (#98512002233446) was inserted into the abdomen of fish#1 and it was release 2.6 km below the below the dam, at the Newport boat launch. Genetic tests determined fish #1 to be a F1 hybrid, between a bull trout and a brook trout.

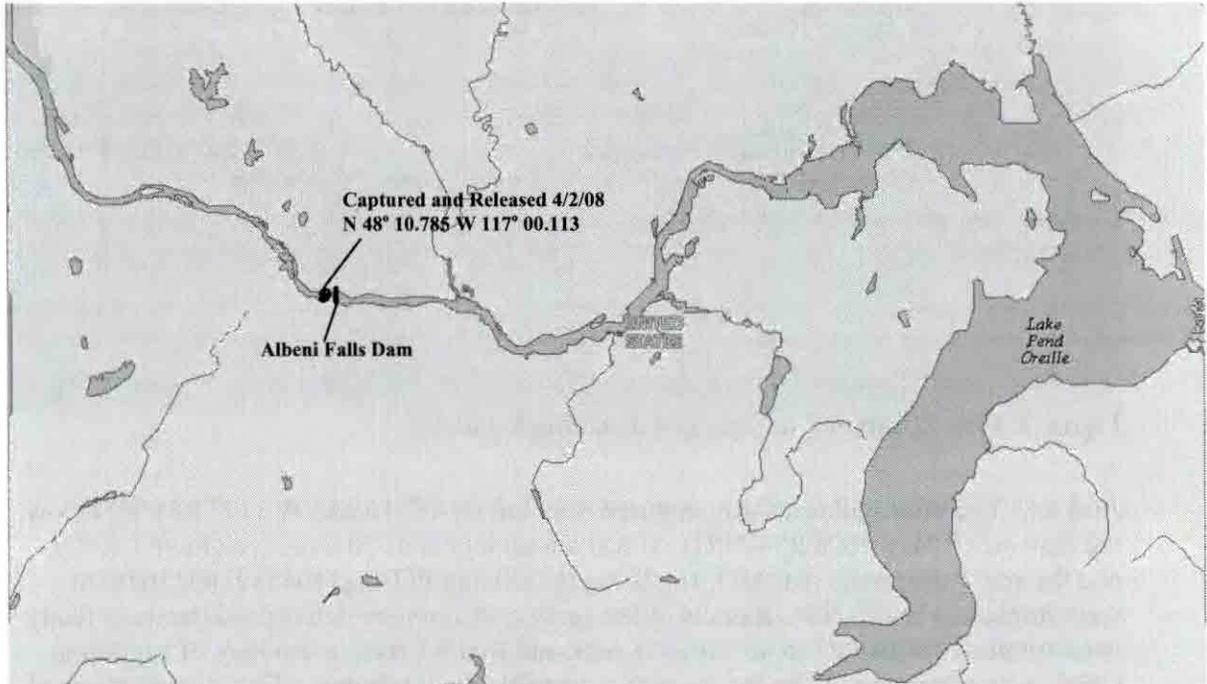


Figure 2. Fish #1 capture and release location.

Fish #2 - The second bull trout was captured 0.88 km (N 48° 10.639 W 117° 00.637) below the dam on 19 May 2008 by KNRD. It had a total length of 505 mm, weight of 1,178 g, and the sex was undetermined. A CART 16_2s tag (#126) and PIT tag (#985121002196227) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for fish #2 to be Grouse Creek and Trestle Creek was determined to be the secondary possible natal tributary. Fish #2 was released on 19 May 2008 at the Priest River boat launch. During the next twenty three days fish #2 traveled 26.5km between its release site and the Dover receiver stations. Fish #2 was recorded passing the South Dover station between 11 June 2008 21:14:16 and 12 June 2008 04:04:47 and the North Dover station between 11 June 2008 21:28:58 and 12 June 2008 04:30:41. There is an overlap in the coverage areas of the North and South Dover stations, resulting in simultaneous detections at both stations. No detections were recorded on either the stationary receivers or by mobile tracking for fish #2 after passing the Dover stations (Figure 3). Transmissions for tag #128 are expected to last into November 2010. Fish #2 is currently believed to be residing in Lake Pend Oreille.

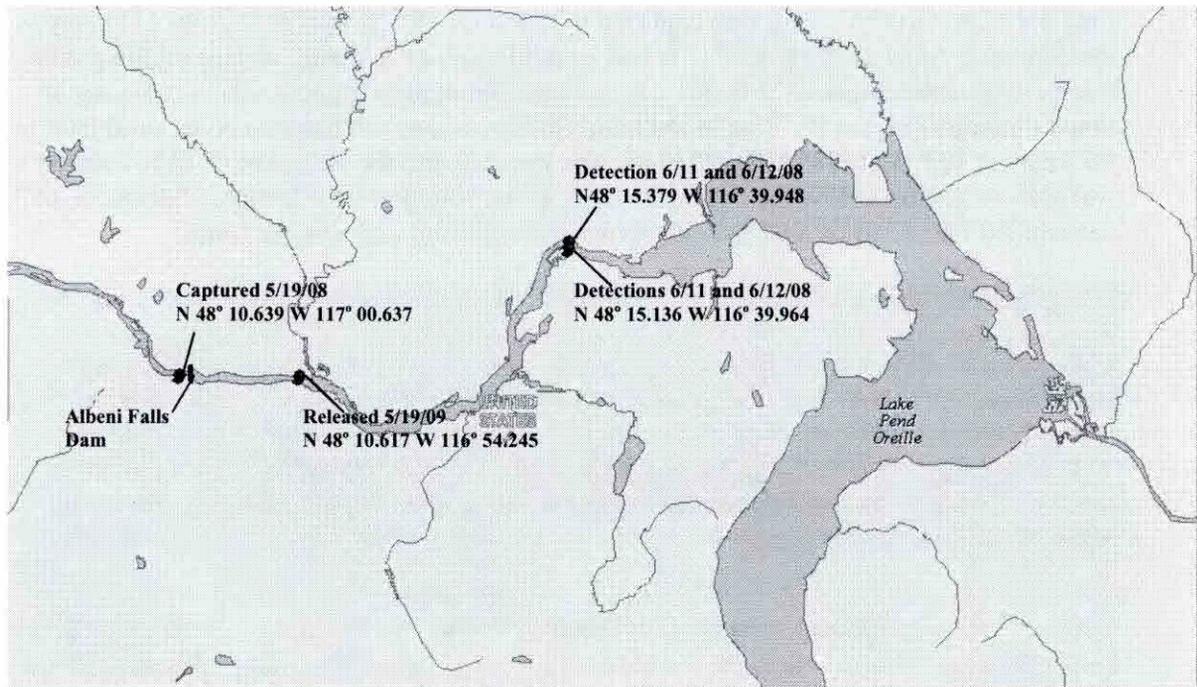


Figure 3. Fish #2 capture, release, and detection locations.

Fish #3 - The third bull trout was captured 0.89 km (N 48° 10.652 W 117° 00.655) below the dam on 19 May 2008 by KNRD. It had a total length of 501mm, weight of 1,133 g, and the sex was female. A CART 16_2s tag (#128) and PIT tag (#985121002164616) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for fish #3 to be Grouse Creek and Rattle Creek, a tributary of Lightning Creek, was determined to be the secondary possible natal tributary. Fish #3 was released on 19 May 2008 at the Priest River boat launch. During the next nine days fish #3 traveled 26.5 km between its release site and the Dover receiver stations. Fish #3 was recorded passing the South Dover between 28 May 2008 06:11:01 and 28 May 2008 12:31:06. On 11 October 2008 at 08:07 fish #3 was detected during the flight over Grouse Creek (N 48° 27.829 W 116° 16.352). Detections were made on 15 October 2008 16:30 (N 48° 27.925 W 116° 16.184) and 22 October 2008 (N 48° 27.924 W 116° 16.180) during mobile tracking by truck. Tag # 128 was recovered in Grouse Creek (N 48° 27.924 W 116° 16.180) on 22 October 2008 under brush in the creek. Tag #128 was recovered undamaged in 20 cm of 10 °C water (Figure 4). No redds were found in the immediate area surrounding where the tag was recovered.

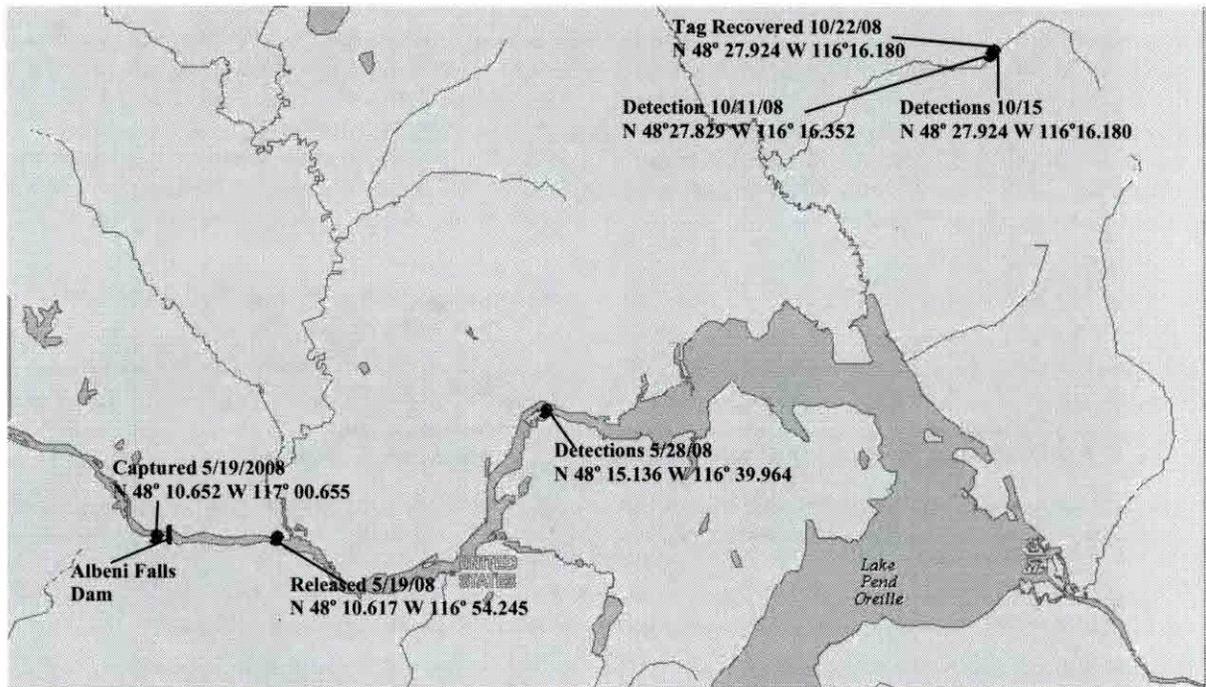


Figure 4. Fish #3 capture, release, detections, and tag recovery locations.

Fish #4 - The fourth bull trout was captured 0.26 km (N48°10.776 W 117° 00.116) below the dam on 11 June 2008 by EWU. It had a total length of 363 mm, weight of 374 g, and the sex was undetermined. A NANO tag (#172) was implanted in this fish. Scanning with the PIT tag detector indicated a PIT tag present. It was later determined this was a false reading. Fish #4 does not have a PIT tag implanted. Results of the genetic assignment determined the most likely natal tributary for fish #3 to be Lightning Creek and Gold Creek was determined to be the secondary possible natal tributary. Fish #4 was released on 11 June 2008 at the Priest River boat launch. During the next seven days fish #4 traveled 26.5 km between its release site and the Dover receiver stations. Fish #4 was recorded passing North Dover between 18 June 2008 09:26:02 and 18 June 09:26:02. A single detection was recorded at the South Dover station on 18 June 2008 at 09:07:08 (Figure 5). No detects were recorded by either the stationary receivers or mobile tracking for fish #4 after passing the Dover stations. Transmissions for tag #172 are expected to last into August 2009. Fish #4 is currently believed to be residing in Lake Pend Oreille.

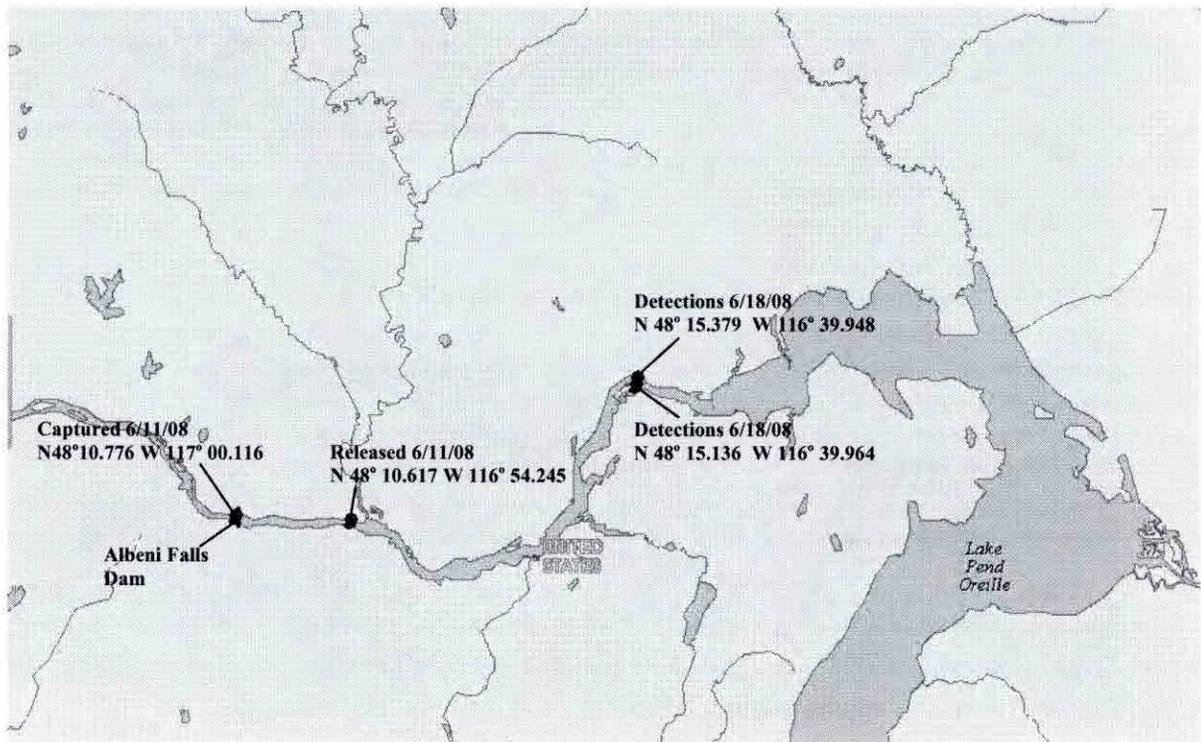


Figure 5. Fish #4 capture, release, and detection locations.

Fish #5 - The fifth bull trout was captured 4 km (N 48° 11.732 W 117° 02.145) below the dam on 18 June 2008 by EWU. It had a total length of 496 mm, weight of 1,241 g, and the sex was determined to be female. A CART 16_1 tag (#108) and PIT tag (#985121002194596) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for fish #5 to be Rattle Creek and Morris Creek was determined to be the secondary possible natal tributary. Both Morris Creek and Rattle Creek are tributaries of Lightning Creek. Fish #5 was released on 18 June 2008 at the Priest River boat launch. During the five hours following being released fish #5 traveled 1 km between the boat launch and the Priest River. Detections were recorded on the Mudhole receiver on 18 June 2008 between 20:35:46 and 21:11:22. A second set of detections were recorded at the Mudhole receiver between 4 July 2008 23:22:42 and 5 July 2008 00:22:52. Analysis of detection signal strengths do not indicate fish #5 passed upstream into the Priest River. No detections were recorded for fish #5 during the 16 days between detections at the Mudhole receiver. During the twenty hours following the second set of detections at the Mudhole receiver, fish #5 travel 25.5 km to the North Dover station. Detections for fish #5 were recorded as the North Dover station was passed on 5 July 2008 between 20:50:36 and 21:20:03. On 26 September 2008 at 11:40 fish #5 was detected in the Clark Fork River (N 48° 05.647 W 116° 06.349) about 3 km downstream from the Cabinet Gorge Dam and 8 km upstream from Lightning Creek (Figure 6). No detections were recorded by either the stationary receivers or mobile tracking for fish #5 after the detection on 26 September 2008. Transmissions for tag #108 are expected to last into March 2010. Fish #5 is currently believed to be residing in Lake Pend Oreille.

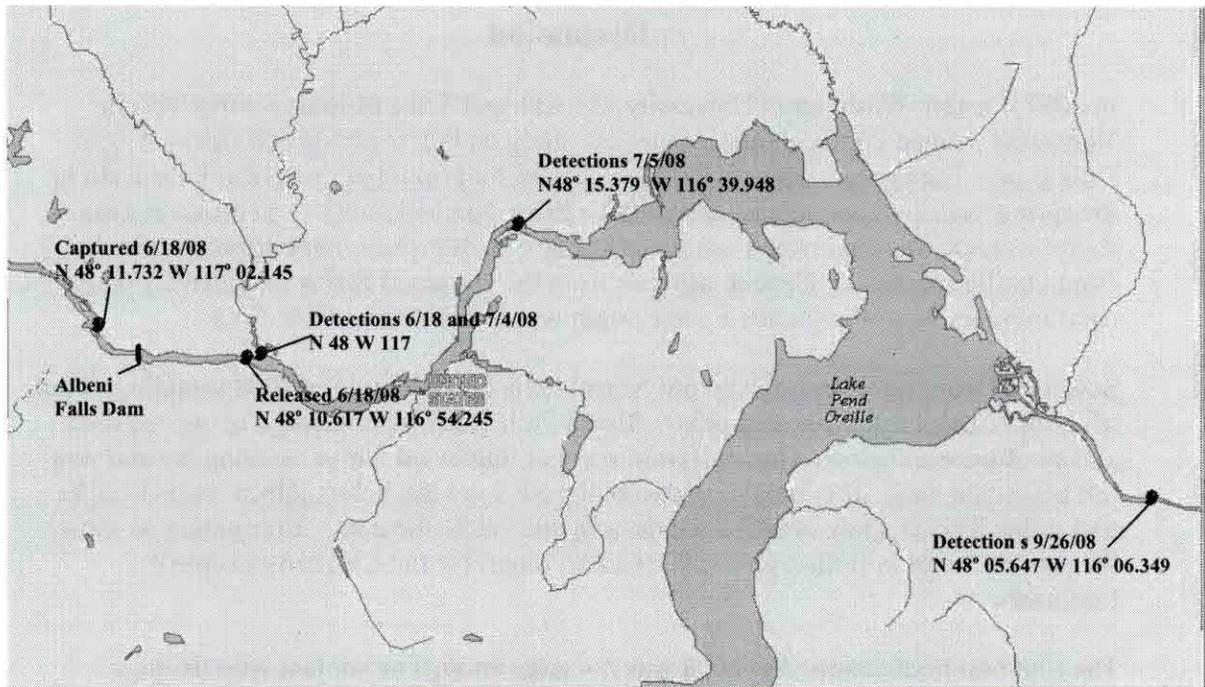


Figure 6. Fish #5 capture, release, and detection locations.

Tagged Fish Below Dam – Bull trout and potential surrogate species were tagged and released below Albeni Falls Dam to study movements approaching the dam. Between 24 June and 4 November 2008, 9 fish have been tagged and released below Albeni Falls Dam including; 3 westslope cutthroat trout, 1 lake trout, 2 rainbow trout, and 3 bull trout. Two of the three bull trout were captured below Albeni Falls Dam (fish #6 and fish #7) and one was relocated from Lake Pend Oreille. For fish tag data and detections see Bellgraph (2008) status report for the US Army Corps of Engineers.

Discussion

In 2007, Eastern Washington University, the Kalispel Tribe of Indians, and Battelle Northwest teamed up to conduct a four year study on bull trout trapped below Albeni Falls Dam. The primary objective was to capture bull trout below Albeni Falls Dam in the spring, transport and release them above the dam and monitor their movements. Radio and acoustic tags would enable us to track them to their home tributaries in the Pend Oreille sub-basin. Genetic analysis from the entrained fish would identify their natal tributary as well as confirm their origin was above Albeni Falls Dam.

Seven bull trout were captured below Albeni Falls Dam during the 2008 sampling. Four of the seven bull trout captured below Albeni Falls Dam were released above the dam and are discussed below. One bull trout was not implanted with a tracking tag and was left below the dam. The remaining two bull trout were left below Albeni Falls Dam as part of the KNRD study of bull trout movements below the dam. Information on these fish can be found in Bellgraph's (2008) status report for the US Army Corps of Engineers.

The first bull trout captured in 2008 was not large enough to implant with the tags available at that time. Tags have since been purchased which can be implanted in smaller size bull trout captured during the remainder of the study. This fish was implanted with PIT tag and released at its capture location.

The second bull trout was implanted with an acoustic/radio tag, which is expected to continue transmitting until November of 2010. This fish was recorded entering Lake Pend Oreille, but not detected entering in any of the tributaries. There are several possible reasons why this fish was not detected in after entering Lake Pend Oreille: 1) This fish may have been lost from the study through predation. This is unlikely because this fish was 505 mm in length and not susceptible to predation by very many fish. 2) This fish may not have been sexually mature. The sex of fish #2 was unable to be determined. Had fish #2 been sexually mature its sex would have been determinable. 3) This fish may have been from a population that enters its spawning tributaries in early summer prior to spawning in the fall (Anderson 1971; Pratt 1985; Pratt and Huston 1993; PBTTAT 1998). The genetic analysis of this fish indicated its primary tributary to be Grouse Creek and its secondary tributary is Trestle Creek. There is a stationary receiver station on Trestle Creek and the placement of an additional station at the mouth of the Pack River, of which Grouse Creek is a tributary, is in the process of being set up. It is suspected that this fish may enter one of these tributaries in the late spring/early summer or fall of 2009.

The third bull trout was a female. This fish was implanted with an acoustic/radio tag. Grouse Creek was the assigned natal tributary which did not have a remote receiver station, and was monitored via flight and vehicle tracking. On 11 October 2008, this fish was detected in Grouse Creek approximately 21 km from the mouth. This tag was recovered in Grouse Creek on 22 October 2008. No carcass was found in the area the tag was recovered. The tag was recovered undamaged under a snag of branches crossing Grouse Creek (Figure 7). It is possible that fish #3 expelled its tag during or after

spawning (Mendel et al. 2003). No redds were located in the immediate area the tag was recovered. The status of this fish is unknown. However, since the tag was recovered in the exact tributary the genetic analysis indicated it would migrate back to, it is highly likely that this fish entered the tributary and attempted to spawn. Whether this fish was victim to poaching, predation, natural mortality, or natural expelling of its tag, will likely never be determined.



Figure 7. Snag crossing Grouse Creek (N 48° 27.924 W116° 16.180), oval indicates recovery location of tag #126 from fish #3 on 22 October 2008.

The fourth fish was not sexually mature at the time of capture and only 363 mm in total length. The small radio tag implanted in this fish is expected to continue transmitting until August 2009. It is possible this fish will reach sexual maturity in the fall of 2009. Since most bull trout enter their spawning tributaries in the late spring/early summer or early fall, hopefully it be detected entering its spawning tributary prior to the tag's battery expiring.

The last bull trout released above Albeni Falls Dam was a sexually mature female. This fish was implanted with an acoustic/radio tag. This fish was assigned to Rattle Creek, a tributary of Lightning Creek. Detections of this fish occurred upstream from Lightning Creek, in the Clark Fork River during late September. During flights over Lightning Creek between mid-August through mid-October, we could see that the mouth of Lightning Creek had insufficient water flow to allow of passage to tributaries located upstream (Figure 8). This fish was located near the Cabinet Gorge Fish Hatchery, which has several cold water springs that enter the river. It is likely this fish was attracted to the cold water flow since passage to its natal tributary was blocked. The tag implanted in this fish will continue to transmit until March of 2010. Bull trout are capable of spawning annually. A study of Trestle Creek, a tributary of Lake Pend Oreille located

approximately 19 km northwest of Lightning Creek, by Downs et al. (2006) reported 93 percent of 255 tagged bull trout spawned in both 2001 and 2002. Therefore, if this fish does not enter a refractory period during 2009 it should be detected during the spawning period in 2009.

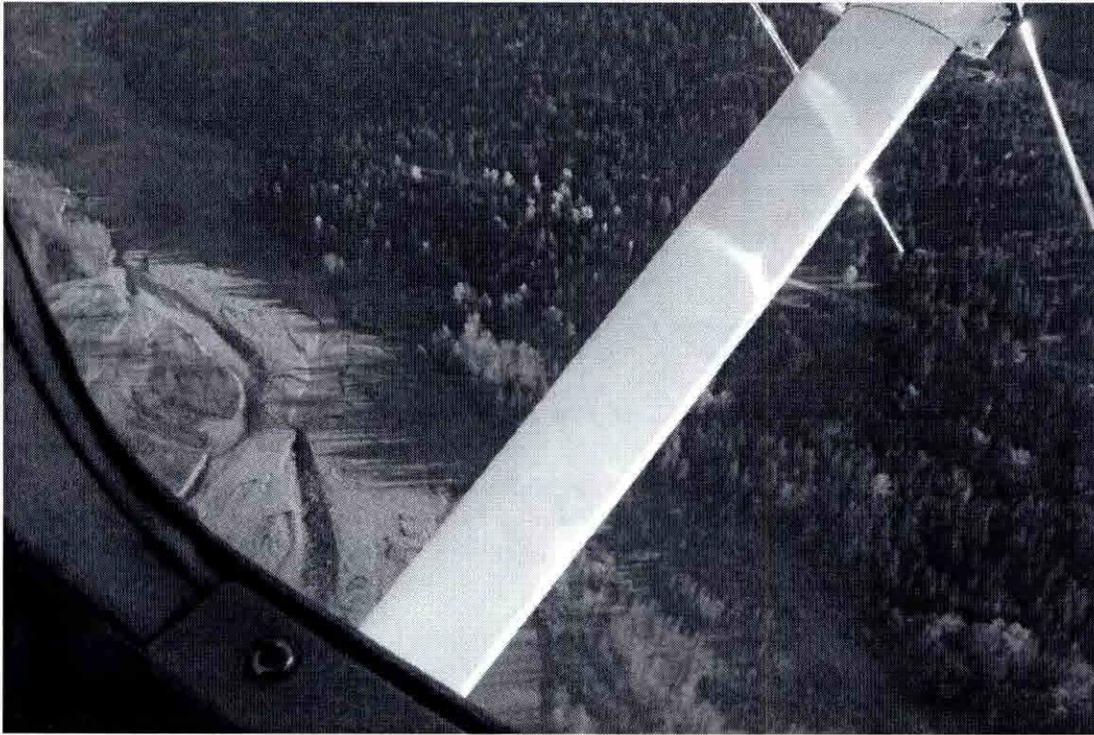


Figure 8. Lightning Creek approximately 1 km upstream from its confluence with Clark Fork River on 27 September 2008.

The sample size of this study remains low, similar to the first year. A goal of collecting 27-40 bull trout below Albeni Falls Dam was set for this study. This number was based on the capture per unit effort (CPUE) from studies performed in 2003 and 2004 (Geist et al. 2004; Scholz et al. 2005). Ten bull trout were captured during 5.2 hours of electrofishing effort by Geist et al. (2004) and two bull trout were captured during 17.5 hours of electrofishing by Scholz et al. (2005). During this two year interval 12 bull trout were captured during 17.5 hours of electrofishing for an average CPUE of 0.69 fish per hour. Assuming this catch rate was representative, we estimated 40 hours of electrofishing would provide 27 fish (40×0.69). Ideally, these fish would be collected in May and June, coinciding with the period of peak river flows and before the temperature of the Pend Oreille River reach critical temperature for bull trout (≥ 16 °C). The USFWS required all sampling efforts for bull trout be suspended once river temperatures reach critical levels.

This goal was not achieved during 2008. Seven bull trout were captured during 67.8 hours of electrofishing effort, which calculated to a CPUE of 0.10 fish per hour. Factors leading to this failure may include: incorrect assumption that the 2003-04 studies were

typical representations of CPUE in the area, an alternate sampling method may have worked better for conditions present in 2008, and/or extremely high flow rate during the ideal sampling times limited electrofishing efficacy.

A study by Ashe and Scholz (1992) of the whole Box Canyon Reservoir between 1998 and 1990 only produced four bull trout during 216.6 hours of electrofishing effort for a calculated CPUE of 0.02 fish per hour. During 2003 study by Geist et al. (2004) a surprising number of bull trout were caught in a short period of time producing a CPUE of 0.69 fish per hour. During high discharge periods the water temperature below the dam is relatively low and the bull trout have no need to seek out coldwater refuges. When discharge is decreased water temperature below the dam begins to rise and bull trout begin searching for a coldwater refuge, such as the culvert 1.5 km below the dam. It is possible that these fish may have been collecting below the dam for several years and using the culvert as a coldwater refuge. The CPUE for bull trout in 2004 was 0.16 fish per hour (Scholz et al. 2005), the CPUE in 2007 was 0.05 fish per hour (Scholz et al. 2008), and the current study had a CPUE of 0.10 fish per hour. If the CPUE of the Geist, Scholz, and the current study are averaged the calculated mean CPUE is 0.19 (20/107.5). The CPUE for setting the goal of this study may have been artificially inflated by the unusual number of bull trout captured during a short period of sampling in the Geist et al. study (2004).

Electrofishing is most effective in water less than two meters deep. About 75 percent of the tailrace below Albeni Falls Dam has a depth greater than two meters. Discharge from the spillway and powerhouse between 1 March and 30 June 2008 increased the water level in the tailrace by an average of approximately 2.3 meters with a maximum increase of approximately 4.3 meters during the peak discharge. During 2008 our fish sonar indicated large numbers of fish at depths greater than two meters. The majority of sampling in 2008 occurred during periods where water depths were much greater than two meters. We suspect bull trout may be residing at depths below the effective range of the electrofishing equipment. In 2009 we plan to increase the use hook-and-line sampling during times when water depths would make hook-and-line sampling more effective than electrofishing.

Snotel data (15 April 2008) reported snow accumulation in the Idaho Panhandle region (includes Pend Oreille and Clark Fork rivers) was 111% of normal and that the snow pack contained 121% snow water equivalent (Snotel Internet site: http://www.wrcc.dri.edu/cgi-bin/sno_nar3_pl). In western Montana, snow pack averaged 96% of normal with a snow water equivalent averaging 106% of normal in the Flathead, Clark Fork, and Bitterroot basins, which form the headwaters of the Pend Oreille River (Snotel Internet site: http://www.wrcc.dri.edu/cgi-bin/sno_nar3_pl). Therefore an above average discharge, similar to the 2003 discharge, was anticipated for 2008. It was then hypothesized that more bull trout would be entrained below the Albeni Falls Dam during the above average spring freshet.

More bull trout were captured below the dam in 2008 than 2007. However, the discharge was much greater than anticipated. The mean discharge (26.9 KCFS) in 2008 was 111%

of the mean discharge (24.2 KCFS) for the period of record (1960-2007) and the peak discharge (97.6 KCFS) was 71% of the peak discharge (138.2 KCFS) for the period of record (1960-2007). The mean discharge during the May 2008 was 18.7 KCFS greater than the May 2003 discharge and the June 2008 was 40.0 KCFS greater than the June 2003 discharge. It was hypothesized the distribution of the bull trout was over a greater area due to increased discharge over an extended time period. This year the discharge rate will be closely monitor and adjustments will be made to fishing effort accordingly to increase our chances of capturing bull trout. There are several tributaries downstream from Albeni Falls Dam which have the potential to attract bull trout. In 2009 we plan to expend more effort fishing the mouths of these tributaries during the time of high discharge at Albeni Falls Dam.

During sampling at the Boundary Dam tailrace, two bull trout with Trestle Creek origins were collected (Seattle City Lights, 2008 *unpublished data*). These fish passed through three dams (Albeni Falls, Box Canyon, and Boundary) before being captured. Recovery of these fish below Boundary Dam supports the hypothesis that the high flow rates increased the range over which the bull trout traveled downstream. Another hypothesis is that these fish continued traveling downstream in search of a cold water refuge.

As of 21 April 2009, the snow accumulation (Snotel Internet Site, 2009) in the Idaho Panhandle Region, based on 7 of 10 stations reporting, was 84% of normal with a 90% snow water equivalent. In Montana, the snow accumulation (Snotel Internet Site, 2009) in the Flathead River Basin, based on 15 of 15 stations reporting, was 87% of normal with an 90% snow water equivalent. The Upper Clark Fork River Basin, based on 14 of 15 stations reporting, was 104% of normal with a 106% snow water equivalent. The Bitterroot River Basin, based on 7 of 7 stations reporting, was 101% of normal with a 102% snow water equivalent. These three Montana river basins form the head of the Pend Oreille River. As of 21 April 2009, the snow accumulation in the Northern Idaho Panhandle is 95% of the accumulation in 2003. In Montana, the Flathead River Basin is at 101%, Upper Clark Fork is at 106%, and the Bitterroot River basin is at 95% of the snow accumulation in 2003. Depending on temperature, the timing of the melt, and amount of drainage within these basins the level of discharge at Albeni Falls Dam could be comparable to what was seen in 2003. We suspect the number of bull trout passing over the dam is related to the amount and timing of the discharge. This year's discharge could potentially match that of 2003 when a large number of bull trout were caught in a short time period.

In addition to this study, bull trout are being collected below Albeni Falls Dam to study their movements related to flows as part of a fish passage assessment study. This study is being conducted for the US Army Corps of Engineers by KNRD and Battelle Northwest. The fisheries agencies in the area have requested a portion of the bull trout we capture in 2009 be released below Albeni Falls Dam to increase their data points. In 2008, two of the seven bull trout captured during sampling were left below Albeni Falls Dam as part of this study. The division of bull trout between the two projects can potentially reduce the number of bull trout released above the dam in 2009.

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Temporary restoration of bull trout passage at Albeni Falls Dam

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Abstract

This study was designed to monitor movements of bull trout that were either provided passage above or left below Albeni Falls Dam, Pend Oreille River, Idaho. Electrofishing, angling, and snorkeling were used to collect bull trout below the dam during the spring and fall months. Tissue samples were collected from each bull trout and sent to the U. S. Fish and Wildlife Service Abernathy Fish Technology Center Conservation Genetics Lab, Washington. The DNA extracted from tissue samples were compared to a catalog of bull trout population DNA from the Priest River, Lake Pend Oreille, and the Clark Fork River drainages to determine the most probable tributary of origin. A combined acoustic/radio or radio tag was implanted in each fish prior to being transported and released. Bull trout relocated above the dam were able to volitionally migrate into their natal tributary, drop back downstream, or migrate upstream to the next dam. Bull trout below the dam were able to approach the dam or migrate downstream. A combination of stationary radio receiving stations and tracking via aircraft, boat, and vehicle were used above and below the dam to monitor the movement of tagged fish. Above the dam, tracking was used to determine if the spawning tributary selected matched the tributary assigned from the genetic analysis. Four bull trout were captured during electrofishing surveys in 2009. All four fish were tagged and released below the dam to study movements below the dam related to varying flow operations. Three of the four bull trout tagged and released above the dam in 2008 remained available for detection during the 2009 monitoring period. Movements of the bull trout below the dam were recorded by the dam receiver stations and at several downstream tributary via mobile tracking. Three of these fish were located in or near tributaries that severed as cold water refuges. One fish was last recorded passing a receiver station 20 km downstream of the dam. Of the 2008 tagged fish, only one was located in Lake Pend Oreille and the other two fish went undetected during the sampling period.

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Collection of threatened bull trout and other fish species were authorized under scientific collectors permits issued to EWU in 2007 by the USFWS (Recovery Permit No. TE-068143-2) and WDFW (Permit No. 08-029). Fish collections in Idaho were authorized under a scientific collectors permit issued to the Kalispel Tribe (Permit No. F-04-03).

Introduction

The Pend Oreille and Clark Fork rivers flow 789 km (490 miles) from their source near Butte, Montana, through Pend Oreille Lake, Idaho, to their confluence with the Columbia River in British Columbia, Canada. The construction of Boundary (rkm 27.4), Box Canyon (rkm 55.0), Albeni Falls (rkm 145.0), Cabinet Gorge (rkm 241.2), Noxon Rapids (rkm 273.1), Thompson Falls (rkm 334.7) and Milltown (rkm 586.3) dams have disrupted bull trout (*Salvelinus confluentus*) migration patterns from tributaries located upstream and downstream of Lake Pend Oreille. All of these dams were constructed without fish passage, causing historical migratory corridors used by bull trout to be blocked. Blocking of migratory corridors has resulted in the fragmentation of bull trout habitat and failure of bull trout to return to their natal tributaries (USFWS 2000). The U.S. Fish and Wildlife Service (USFWS) listed bull trout in the Columbia River Basin as threatened in 1998 (USFWS 2000).

Construction of Milltown Dam, located at the confluence of the Blackfoot and Clark Fork rivers, was completed in 1907. Prior to the removal of Milltown Dam in 2008, passage upstream from the dam was blocked. However, during periods of high discharge water was diverted over the spillway allowing fish downstream passage. The North Fork of the Blackfoot River and Monture Creek are located upstream of Milltown Dam, and are primary spawning grounds for fluvial bull trout (Swanberg 1997).

In a 2000/2001 study by Schmetterling (2003), fourteen bull trout, seven in 2000 and seven in 2001, were collected below the Milltown Dam, implanted with radio transmitters, and relocated above the dam. In 2000, six of the bull trout migrated up the Blackfoot River, three to Monture Creek and three to the North Fork of the Blackfoot River. One bull trout migrated up the Clark Fork River to Copper Creek. Migration distances averaged 109.3 km. In 2001, four bull trout migrated up the Blackfoot River, one to Monture Creek and the three to the North Fork of the Blackfoot River. Two bull trout migrated up the Clark Fork River, one to Ranch Creek and one to Hogback Creek. One bull trout died in the Milltown Reservoir. The average migration distance was 109.9 km. Eight of the bull trout in this study were located near bull trout redds and presumably spawned there. This study indicated that bull trout collected below the dam originated from tributaries upstream of the dam and would return to their natal tributary to spawn if provided passage above the dam.

Construction of the Cabinet Gorge Dam, located on the Clark Fork River, was completed in 1952. Prior to construction of Cabinet Gorge Dam, large numbers of adfluvial bull trout freely migrated into Lake Pend Oreille for their subadult and adult life stages before returning to their natal tributary to spawn (Pratt and Huston 1993). Jeppson (1954) reported seeing large numbers of bull trout congregating below Cabinet Gorge Dam, although no bull trout redds were observed. A spawning channel was created by the Idaho Department of Fish and Game in 1961 in an attempt to mitigate the loss of upstream spawning grounds. Hundreds of bull trout were surveyed near the spawning channel during the mid 1960's. Biologist conducted surveys at the spawning channel from 1984 to 1991, but did not observe any redds. The disruption of the migratory route

by the dam resulted in loss of spawning habitat which the spawning channel could not mitigate for.

Migratory bull trout begin their spawning migration at the end of the high flows, in early fall. During this time large bull trout congregate near the spillway of Cabinet Gorge Dam. One hypothesis by Neraas and Spruell's (2001) was that bull trout congregating below Cabinet Gorge Dam may be migratory fish from tributaries upstream of the dam that passed over the dam during their outmigration and are attempting to return to their natal tributary. Neraas and Spruell collected bull trout from locations above the dam, below the dam, and at the dam between 1997 and 1999. Microsatellite DNA analysis was conducted on genetic samples taken from each fish and compared to a genetic data baseline of known bull trout populations to assign probable tributary of origin for each fish. An average of 89% of the fish collected below the dam were assigned to tributaries below the dam, an average of 76% of the fish collect above the dam were assigned to tributaries above the dam, and an average of 56% of the fish collected at the dam were assigned to tributaries above the dam. These results supported the hypothesis that bull trout collected below Cabinet Gorge Dam originated from tributaries upstream of the dam.

In 2004 and 2007, Avista biologist collected bull trout below Cabinet Gorge Dam, collected genetic samples, and maintained them in holding tanks awaiting natal tributary assignment from genetic analysis. Genetic samples were analyzed at the Abernathy Fish Technology Center Conservation Genetics Lab (AFTC). Once natal tributaries were assigned, fish were relocated to the region their natal tributary was located. During this period genetic samples were also collected from known bull trout populations and added to the genetic data baseline (DeHaan and Arden 2008). In 2004, fifty-two genetic samples were analyzed at AFTC and assigned natal tributaries. Seventy-nine percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan et al. 2005). In 2007, thirty-five genetic samples were analyzed at AFTC. Seventy-seven percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan and Ardren 2008). These studies supported the hypothesis that bull trout congregating below Cabinet Gorge Dam originated from tributaries upstream of the dam.

Construction of Albeni Falls Dam, located on the Pend Oreille River, was completed in 1955, blocking historical migratory bull trout routes between the river and Lake Pend Oreille. Fluvial bull trout that spawn in tributaries of Lake Pend Oreille and migrate downstream to the Pend Oreille River in search of forage can no longer return to their natal streams once passing the dam. The adfluvial life history form, which historically spawned in tributaries of the Box Canyon Reach of the Pend Oreille River and migrated upstream to the cold-water refuge of Lake Pend Oreille, can no longer migrate into the lake. Due to these impacts, the USFWS Biological Opinion (USFWS 2000) directed the action agencies to evaluate the feasibility of restoring passage at Albeni Falls Dam (see Reasonable and Prudent Measure 10.A.1.3 and Terms and Conditions 11.A.1.3 of the 2000 USFWS BiOp).

In a 2003 study by Geist et al. (2004), seven bull trout capture below the dam were implanted with radio transmitters and released in the spring effluent to determine their

interaction with the dam. Through the use of radio receiver stations on the dam and mobile tracking by boat, six of the tagged bull trout below the dam were found to make repeated forays between a cold-water effluent and the base of the dam. The data collected supported the hypothesis that the bull trout originated from tributaries above the dam.

In a 2004 study by Scholz et al. (2005a, 2005b), two bull trout captured below Albeni Falls Dam were tagged and relocated above the dam to determine if they would migrate upstream or pass back over the dam. Tracking was conducted using stationary receiver stations and mobile surveys by aircraft and vehicle. Both fish migrated from their release point into Lake Pend Oreille. One fish entered Lightning Creek and returned to the lake approximately one month later. It is presumed to have spawned in this tributary. The second fish, which was immature at the time of capture, entered Trestle Creek during the spawning season the following year. The movements of these two fish supported the hypothesis that bull trout captured below Albeni Falls Dam originated from tributaries above the dam.

Genetic samples were taken from the bull trout captured in the Geist et al. (2004) and Scholz et al. (2005a, 2005b) studies. DNA analysis was used to compare the genetic samples with populations from the Priest River and Lake Pend Oreille drainages as well as populations from Clark Fork River tributaries below Cabinet Gorge Dam (DeHaan and Arden 2008). All nine of the fish collected below Albeni Falls Dam were assigned to tributary populations of Lake Pend Oreille or the Clark Fork River below Cabinet Gorge Dam (DeHaan and Arden 2008). The two bull trout released above the dam entered the tributary matching those assigned from genetic analysis.

The USFWS biological opinion (USFWS 2000) noted that, "*Albeni Falls Dam was constructed without fishways to accommodate safe upstream and downstream passage of fish. . . Bull trout were abundant in the Pend Oreille River through 1957, and then abruptly their numbers decreased to the point that individual fish are now noteworthy. This abrupt decline correlates with the commencement of operation of Albeni Falls Dam in 1952. No other abrupt or widespread threat can be identified for this portion of the Pend Oreille River Basin during 1950s. In the absence of passage, migratory bull trout remaining in the Pend Oreille River will continue to be harmed.*" As a result, the USFWS (2000a, 2002b) proposed a recovery plan to address this issue. Page 166 of the recovery plan calls on the Corps of Engineers and other agencies to by October 1, 2008, *Investigate and implement upstream passage at Albeni Falls (USFWS Biological Opinion), ...as needed, to reconnect fragmented core habitat of bull trout with Lake Pend Oreille.* The Recovery Plan emphasizes conserving genetic diversity and providing opportunities for genetic exchange, which is at the heart of our proposed capture-and-haul strategy. Captured bull trout in this study that are released 8 km above Albeni Falls Dam can voluntarily move back below the dam, or into the Priest River (or it's tributary the East River), tributaries of Pend Oreille Lake, or migrate up the Clark Fork River to the tailrace of Cabinet Gorge Dam.

Prior to construction of Albeni Falls Dam, sustainable populations of bull trout existed in the Box Canyon reach (rkm 55.5-141.5) of the Pend Oreille River between Metaline Falls

and Albeni Falls (Scholz et al. 2008). The upper end of the Box Canyon reach was blocked by the construction of Albeni Falls Dam in 1955 and the lower end of the reach was blocked by Box Canyon Dam in 1957, causing the fragmentation and isolation of bull trout populations. The Box Canyon reach, which historically served as ideal habitat during certain life stages of migratory bull trout, was converted into a reservoir adversely affecting the sustainability of bull trout populations within the reach. Bull trout were no longer able to seek cold water refuge in Lake Pend Oreille due to their migratory route being blocked by Albeni Falls Dam. The water temperatures in the Box Canyon reach exceed 16°C, the upper limit of bull trout thermal zone of tolerance, during the summer months. Without access to Lake Pend Oreille, bull trout are forced to seek cold water in a section of river which offers few cold water refuges. Without restoration of the migratory route into Lake Pend Oreille, bull trout in the Box Canyon reach are in imminent danger of extinction. There is a scarcity of bull trout in Pend Oreille Basin tributaries located below Albeni Falls Dam (Ashe and Scholz 1992; Scholz et al. 2005a, 2005b). Without access to Lake Pend Oreille, the survival of bull trout entrained below Albeni Falls Dam is remote.

In 2001, Avista Corporation in conjunction with the USFWS, has initiated a program to restore upstream fish passage above Cabinet Gorge Dam on the Clark Fork River. Bull trout captured below Cabinet Gorge Dam are assigned to a natal tributary using “rapid response genetic analysis”. Tributary assignment is used to determine if the fish will be released above or below Cabinet Gorge Dam. The success of the Cabinet Gorge bull trout transportation project has prompted similar efforts at Noxon Rapids and Thompson Falls dams. The recent removal of dams on Big Blackfoot River, a principle tributary of the upper Clark Fork River, and Milltown Dam in the Clark Fork River have restored the Upper Clark Fork and Big Blackfoot rivers to free flowing conditions allowing more natural connectivity of bull trout. The bull trout transportation projects at Cabinet Gorge, Noxon Rapids and Thompson Falls dams provide a temporary solution for bull trout passage at each of these facilities and will likely increase the number of spawning bull trout returning back to their natal tributaries.

In 2007, a four year study was initiated to determine movements and genetics of bull trout captured below Albeni Falls Dam as a first step in assessing bull trout passage at Dam. The objectives of this project were to: (1) relocate bull trout collected below the Albeni Falls Dam to a release site upstream from the dam, (2) use microsatellite DNA analysis to assign the most probable natal tributary of each fish, and (3) determine if genetically assigned natal tributaries match the actual tributary used for spawning. By relocating bull trout captured below Albeni Falls Dam, some measure of fish passage is restored over 734.1 km (93%) of the Pend Oreille/Clark Fork rivers, from Box Canyon Dam (rkm 55.0) to the headwaters of the Clark Fork River (rkm 789.1).

In 2008, four bull trout were relocated above Albeni Falls Dam. All of these fish migrated upstream and entered Lake Pend Oreille and none return below the dam. One tag was recovered in the Grouse Creek corresponding to the fish’s genetic assignment. One fish was located near the mouth of its genetically assigned tributary, which was most

likely impassable due to low flow. Two fish were not located since entering the lake (Paluch et al. 2009).

In 2009, the primary objective to relocate bull trout below Albeni Falls Dam to a release site upstream from the dam was postponed. Since bull trout are rare below Albeni Falls Dam, regional stakeholders and the Bonneville Power Administration decided bull trout collected below the dam would be left below the dam as part of the U.S. Army Corp of Engineers (USACE) study looking at the fine-scale movements of bull trout below the dam. Four potential locations for installing permanent fish passage have been identified at Albeni Falls Dam: left and right ends of the powerhouse, and left and right ends of the spill way (Pizzimenti and Rainey 2009). The four bull trout caught and left below the dam in 2009 increased the sample size for the USACE study and provided biologically data needed to help determine the best potential location for the installation of a permanent fish passage structure at the dam.

Therefore the objectives for 2009 were to: 1) partner with PNNL to monitor, via stationary receiver stations on and above Albeni Falls Dam, and to determining if the three fish marked in 2008 entered their genetically assigned natal tributaries, 2) track the downstream movements of the tagged bull trout left below Albeni Falls Dam.

Methods

Study Area

Eastern Washington University (EWU) and Kalispel Tribe Natural Resources Department (KNRD) crews sampled for bull trout in a 14 km reach of the Pend Oreille River between Indian Creek (RKM 131) and Albeni Falls Dam (RKM 145) (Figure 1). Albeni Falls Dam was built by the U.S. Army Corps of Engineers between 1951 and 1955. Over 200 million kilowatt hours of electrical energy is produced annually by three generators at Albeni Falls Dam. Albeni Falls Dam had a mean discharge of 24.3 KCFS from 1960-2009 and a peak discharge of 138.2 KCFS during this period of record. In 2009, the mean discharge was 23.2 KCFS and the peak discharge was 75.5 KCFS (www.nwd-wc.usace.army.mil/perl/dataquery.pl). The average water temperature in 2009 was 10°C (Figure 2).

EWU and Pacific Northwest National Laboratories (PNNL) maintained twelve stationary radio tracking stations on and above Albeni Falls Dam on the Pend Oreille River and Pend Oreille Lake. Four stations were setup on Albeni Falls Dam (N 48° 10.721 W 116° 59.975), one at the Priest River (Mudhole Campground (N 48° 10.755 W 116° 53.517)), two near the Dover Railroad Bridge (north (N 48° 15.379 W 116° 39.948) and south (N 48° 15.136 W 116° 39.964)), and five tributaries to Lake Pend Oreille (Pack River (N 48° 21.544 W 116° 24.118) Trestle (N 48° 17.113 W 116° 20.513), Lightning (N 48° 09.090 W 116° 10.902), Granite (N 48° 05.036 W 116° 25.323), and Gold creeks (N 47° 58.272 W 116° 27.250)).

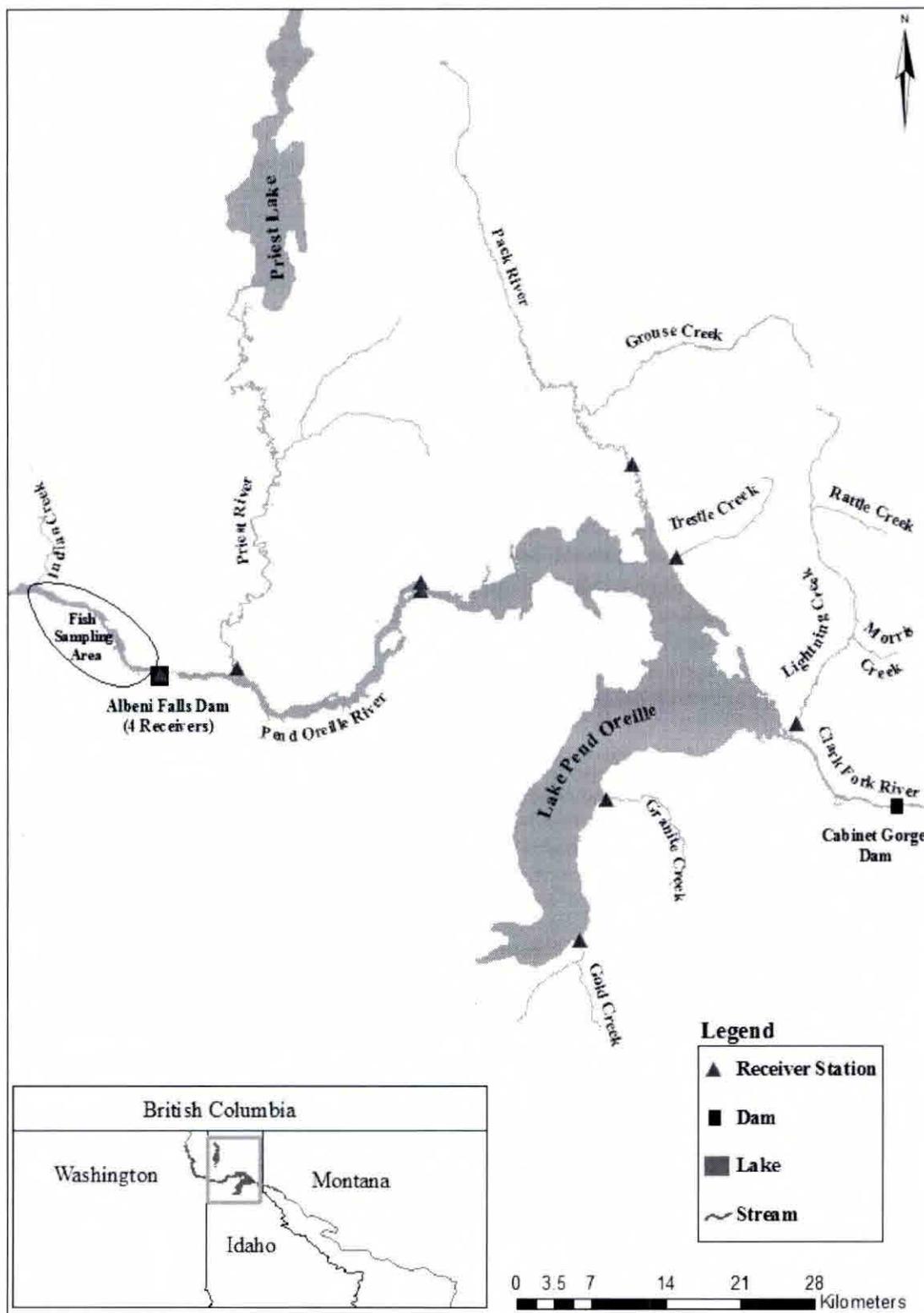


Figure 1. Map of Pend Oreille River and Lake with fisheries surveys area (from Indian Creek to below Albeni Falls Dam) and stationary receiver locations, 2009.

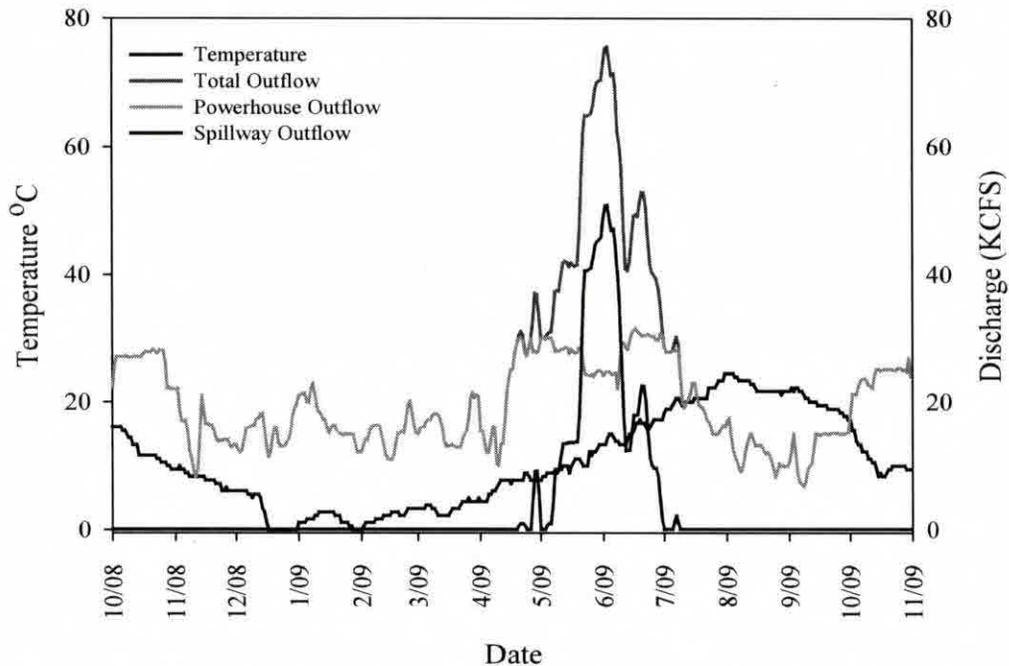


Figure 2. Temperature and discharge data below Albeni Falls Dam, 10/2008-11/2009 (data from www.nwd-wc.usace.army.mil/index.html)

Field Collections

Boat electrofishing, hook and line, and snorkeling methods were employed to capture bull trout from the Pend Oreille River between Indian Creek, Washington (N 48° 14.650 W 117° 09.093) and Albeni Falls Dam, Idaho (N 48° 10.721 W 116° 59.975) in 2009.

Boat electrofishing - Standardized ten minute boat electrofishing surveys (2-4 amps, 250 volts, 120 pps, DC current) were conducted by EWU and KNRD along the north and south shorelines. Sixteen trips were conducted by EWU between 22 April and 12 October. Thirteen trips were conducted by KDNR between 27 April and 14 October. Transects were sampled during both day and night hours.

During sampling all fish were collected and identified to species using dichotomous keys (Wydoski and Whitney 1979, 2003). All fish collected were measured to the nearest mm total length (TL) and released.

Genetic tissue samples were collected from bull trout and cutthroat trout by removing a piece of fin with a hole punch. Samples were preserved in 95% ethanol and sent to the KDNR to be included in their basin wide microsatellite DNA analysis being funded by Bonneville Power Administration (Olson et al. 2004).

Snorkel surveys - Snorkel surveys were conducted in a culvert (N 48° 10.614 W 117° 01.137), on the south shore of the Pend Oreille River approximately 1.5 km below Albeni

Falls Dam, when water elevations permitted at least 15 cm of breathing room. Cold spring water feeds the culvert from the south side of the culvert, as well as through a hole in the middle of the culvert. The direction of water flow (in or out) of the culvert depended on the elevation of the water in the river. A thermograph was placed inside the culvert to gather water temperature data. In previous years, bull trout were captured at this cold-water refuge during the summer months (Geist et al. 2004). Surveys took place on 28 July and 12 August 2009 during the day. Each end of the culvert was blocked using a block net. Surveys were conducted with 2-3 individuals moving in one direction together through the culvert using underwater flashlights to spot fish. After one direction was completed, a sweep the other direction was completed. Water temperatures were taken from the center and mouths of the culvert. Water elevation, temperature, and discharge data was gathered from the US Army Corps of Engineers, Northwestern Division; www.nwd-wc.usace.army.mil.

Bull Trout Tagging and Relocation

Tagging Procedures – Captured fish were placed in a large cooler (142.5 liters) with fresh water. An oxygen cylinder was used to aerate the water. Ice was used to maintain ambient river temperatures when needed. The lid was kept closed until the fish stabilized and recovered from the stress. The fish were anesthetized with 70-100 mg/L tricaine methanesulfonate (MS 222). Once the anesthesia took effect (3- 5 minutes) the fish were checked for fin clips and scanned with a PIT tag detector to confirm it had not previously been captured and tagged.

Transmitters were surgically implanted by experienced surgeons using procedures described by McLeod and Clayton (1997) and Brown et al. (1999). The fish were placed in a water soaked foam block with a cut out V-notched cradle. The fish were placed dorsal side down, and water was flushed through the gills using a gravity flow bucket filled with a maintenance solution (40-60 mg/L MS 222). The bucket had a valve at the bottom that was connected to a piece of tubing that was placed into the mouth of the fish. Water was periodically poured over the fishes body during surgery to keep it hydrated. A 2-3 cm longitudinal incision was made three cm anterior to the pelvic fins. A PIT tag (DF TX 1400BE, 12 mm long, 134.KHz) was placed in the body cavity according to standard protocols (CBFWA 1999). A 16-gauge hypodermic needle was inserted through the body wall to the side and posterior to the incision. The transmitter antenna wire was inserted through the hollow needle. Once the needle was removed, the antenna exited the body wall of the fish. The Lotek digitally encoded radio/ acoustic transmitter (CART 16_1, 23.8 g, 5 sec burst rate, 663 day tag life or CART 16_2, 31.5 g, 5 sec burst rate, 904 day tag life) operated at a frequency of 151.89 MHz (radio frequency) and 76.8 KHz (acoustic frequency). The Lotek digitally encoded radio transmitters (SR 11-18 8.0g, 5 sec burst rate, 449 day tag life or NTC-6-2, 4.5g, 5 sec burst rate, 441 day tag life) are operating at 151.89 MHz (radio frequency). The decision of which size tag to implant was based on the weight of the fish. Tag weight did not exceed 2% of the fish's weight. The incision was closed using the individual simple sutures method at approximately 1-cm intervals. A veterinary grade liquid Band-Aid (Nexband) was placed over the sutures. The fish were placed in an oxygenated cooler with fresh cold water to recover.

Relocation - The fish were then transported by boat in an oxygenated cooler to the public boat launch (N 48° 11.123 W 117° 01.940) located on the north shore of the Pend Oreille River, across from the town of Newport, WA. Once the fish had completely recovered, it was released into the water at the boat launch, approximately 2.8 km downstream from Albeni Falls Dam.

Tracking

Fish movements were tracked using a combination of fixed receiver ground stations and mobile tracking using; vehicle, aircraft, and boat. The ground receiver stations operated 24 hours a day. A total mobile tracking effort of 119 hours was conducted between 19 May and 18 November 2009. A total of 29 hours of tracking occurred by truck, 41 hours by aircraft, and 48 hours by boat.

Fixed Ground Stations - Twelve radio receiving stations were setup for the study in the spring 2009. Receiver locations and setup were the same as during the 2003 and 2004 study (Geist et al. 2004; Scholz et al. 2005). Sites included: Albeni Falls Dam (4 stations), Mudhole Campground on the Priest River (1 station), and the Dover Railroad Bridge (2 stations) approximately 26 km upstream of the Priest River. Five additional stations were set up at the mouths of tributaries to Lake Pend Oreille: Pack River, Trestle, Lightning, Granite, and Gold creeks. Each station consisted of a Lotek SRX-400 or SRX-600 radio receiver connected to aerial Yagi antennas. The receivers were supplied with either AC or DC (12 volt vehicle batteries) power. Solar panels were used to recharge DC power systems. Beacon tags were used at all stationary receiver locations to monitor receiver status. The beacon tags were programmed to transmit a one-minute signal every hour. See Bellgraph and Deters (2007) for a complete summary of installation and details of each station.

EWU worked with landowners to secure access, and to download and maintain stations via hold harmless agreements and/or permission to entry agreements. Agreements were setup with a private landowner at Gold Creek, Idaho Department of Fish and Wildlife at Granite Creek, Idaho Department of Transportation at Lightning Creek, and Idaho Department of Lands at Trestle Creek (\$100 fee for five year agreement). Procedures for calibrating each receiver station were reported by Bellgraph and Deters (2007).

All fixed receiver stations were inspected and data downloaded April 2009 through May 2010. Data were downloaded using a Lotek *Winhost* program onto a laptop computer, saved and then backed up on a removable thumb drive. After each download, data were examined for active tags, beacon tag signals, and noise. Proper adjustments to the gain were made when necessary. Each station was inspected for damage and repaired if necessary. Beacon and 12 volt batteries were replaced when necessary. Stations were winterized at the end of December, and then reset at the beginning of March before the April sampling began.

Vehicle Tracking - Tracking by vehicle was conducted 19 times between 19 May and 18 November 2009. A Lotek SRX-600 radio receiver connected to a three element Yagi antenna was used when tracking by truck. The receiver's gain was set at 50 and adjusted

as needed. The antenna was attached to the hood of the truck using a Magnetic Roto Antenna Mount manufactured by Midway Telemetry.

Vehicle Route #1- Tracking began at Albeni Falls Dam (N 48° 10.721 W 116° 59.975) and followed the Pend Oreille River to Lake Pend Oreille along U.S. Route 2. The north shore of Lake Pend Oreille was tracked along ID S.R. 200 between Sandpoint, ID (N 48° 17.420 W 116° 32.933) and Clark Fork, ID (N 48° 08.752 W 116° 10.616). Colburn Culver Road (N 48° 19.386 W 116° 26.388), off of ID S.R. 200, was used to access Grouse Creek Road (N 48° 24.995 W 116° 26.381), Gold Creek Road (N 48° 22.911 W 116° 26.377), and Rapid Lightning Creek Road (N 48° 21.835 W 116° 26.377). Grouse Creek, Gold Creek, and Rapid Lightning Creek were followed for 10-15 km along these roads. Trestle Creek Road (N 48° 16.994 W 116° 20.972) and Lightning Creek Road (N 48° 08.752 W 116° 10.655) were directly accessed from ID S.R. 200 and used to track Trestle Creek and Lightning Creek for 10- 15 km.

Vehicle Route #2- Tracking began at the on Le Clerc Rd (N 48° 19.062 W 117° 16.258) across the river from the town of Usk. The Pend Oreille River was followed along Le Clerc Rd to U.S. Route 2 (N 48° 11.162 W 117° 01.881) U.S. Route 2 was followed the along the Pend Oreille River to Lake Pend Oreille. The north shore of Lake Pend Oreille was tracked along ID S.R. 200 between Sandpoint, ID (N 48° 17.420 W 116° 32.933) and Clark Fork, ID (N 48° 08.752 W 116° 10.616).

Vehicle Route #3 – Vehicle route #3 followed the same path as vehicle route #2 with the addition of following ID S.R. 200 along the north shore of the Clark Fork River between Clark Fork, ID (N 48° 08.752 W 116° 10.616) and the Cabinet Gorge Dam (N 48° 05.196 W 116° 03.859). The south shore of the Clark Fork River was tracked traveling west on Johnson Creek Road (N 48° 08.070 W 116° 10.465) for approximately 3.5 km from the bridge crossing over the Clark Fork River and River Road (N 48° 08.026 W 116° 10.469) was used to track east from the bridge to the Cabinet Gorge Dam (N 48° 05.196 W 116° 03.859).

Aircraft Tracking - Tracking by aircraft was conducted using a Cessna C-182 chartered from Felts Field Aviation, Spokane, WA. A Lotek SRX-600 radio receiver connected to single two element Yagi antenna externally mounted under the right wing was utilized for aerial tracking. The receiver's gain was set at 50 and adjusted as needed. Eleven flights were conducted between 12 June and 5 November 2009. Two test tags were placed along the flight route over Grouse Creek. One tag was attached to a tree along the shore (N 48° 26.571 W 116° 23.610) and the other was attached to a rock underwater about 1m deep (N 48° 26.266 W 116° 23.770).

Flight Route - Flights left Felts Field at sunrise and proceeded directly to Albeni Falls Dam (N 48° 10.721 W 116° 59.975). Tracking began at Albeni Falls Dam and continued down the Pend Oreille River to Boundary Dam (N 48° 59.227 W 117° 20.848). The flight turned around at Boundary Dam and followed the Pend Oreille River back to Albeni Falls Dam. On the return route to Albeni falls Dam, the flight turned over Sullivan Creek (N 48° 51.875 W 117° 22.063), Ruby Creek (N 48° 33.312 W 117° 20.619), Le Clerc Creek

(N 48° 31.165 W 117° 16.928), Mill Creek (N 48° 29.340 W 117° 15.870), and Indian Creek (N 48° 14.647 W 117° 09.094). Each creek was followed for approximately 10 km before turning around and following them back to the Pend Oreille River. After passing Albeni Falls Dam the flight continued up the Pend Oreille River at Lake Pend Oreille (N 48° 14.391 W 116° 36.096). The flight followed along the north shore of Lake Pend Oreille to the mouth of the Pack River (N 48° 19.187 W 116° 22.984). The flight followed the Pack River for approximately 45 km. The Pack River was followed on the return to Lake Pend Oreille, with the route branching at Grouse Creek (N 48° 24.159 W 116° 28.705) and Rapid Lighting Creek (N 48° 21.779 W 116° 24.447). Upon returning to Lake Pend Oreille the north shoreline was followed to Trestle Creek (N 48° 16.949 W 116° 21.165). The flight followed Trestle Creek for approximately 15 km before returning down the same route to Lake Pend Oreille. The flight continued along the north shore of Lake Pend Oreille to the Clark Fork River (N 48° 08.550 W 116° 12.237). The Clark Fork River was followed until reaching Cabinet Gorge Dam (N 48° 05.196 W 116° 03.859). The flight followed the Clark Fork River back to Lake Pend Oreille. On the return route to Lake Pend Oreille, the flight turned over Lightning Creek (N 48° 08.449 W 116° 11.468). The flight continued approximately 23 km up Lightning Creek, with passes over its tributaries of Rattle Creek (N 48° 19.580 W 116° 10.381) and Morris Creek (N 48° 13.458 W 116° 06.970) for approximately 5 km. The east shore of Lake Pend Oreille was followed down to Granite Creek (N 48° 05.194 W 116° 25.670). Granite Creek was followed for approximately 15 km before returning down the same route to Lake Pend Oreille. The east shore line of Lake Pend Oreille was followed to North Gold Creek (N 47° 58.261 W 116° 27.282) and Gold Creek (N 47° 58.406 W 116° 27.165). The flight traveled up each of these tributaries for approximately 15 km before following them back down to the lake. The flight flew over the lake on its return to Felt Field.

Boat Tracking – Six days of boat tracking were conducted by PNNL between 9 September and 21 October 2009, EWU assisted on three of these days. A Lotek SRX-400 radio receiver was connected to a three element Yagi antenna and a Lotek SRX 600 receiver was connected to a LHP hydrophone during tracking by boat. Complete details of boat tracking can be found in Bellgraph (2010 in preparation).

Weekly boat tracking was conducted by the KNRD between June and October 2009, including tracking trips over a twenty-four hour period on 1 July, 29 July, 16, and September 2009. Where the boat was launched was determined by driving on both sides of the reservoir and launching at the closest boat launch to where a radio signal was detected. On 29 July 2009 EWU conducted a boat tracking trip on the Pend Oreille River between the town of Ione and Albeni Falls Dam.

Genetic Analysis

Rapid Response Genetic Identification - Genetic samples from each bull trout were shipped to the USFW Service Abernathy Fish Technology Center for rapid genetic analysis. Each genetic sample was compared to a genetic baseline data set of 2,020 bull trout from 37 known populations within the Lake Pend Oreille and Clark Fork River system of northern Idaho and northwestern Montana. The watershed is divided into four

regions: Region 1 includes tributaries to the Pend Oreille River, Lake Pend Oreille and the Clark Fork River up to Cabinet Gorge Dam, Region 2 contains Clark Fork River tributaries from Cabinet Gorge Dam to Noxon Rapids Dam, Region 3 contains Clark Fork River tributaries from Noxon Rapids Dam to Thompson Falls Dam and Region 4 contains all Clark Fork River tributaries above Thompson Falls Dam (DeHaan and Arden 2008). Baseline allele frequency data for each population was determined by genotyping all fish in 12 highly polymorphic microsatellite loci (DuPont et al. 2007).

A modified Chelex protocol was used to extract DNA from genetic samples (Miller and Kapuscinski 1996). DNA extracted at 12 microsatellite loci; *Omm1070*, *Omm1128*, *Omm1130*, *Sco104*, *Sco105*, *Sco106*, *Sco107*, *Sco200*, *Sco212*, *Sco216*, *Sco218* (DeHaan and Arden 2005) and *Smm22* (Crane et al. 2004) was amplified using polymerase chain reaction (PCR). PCR reactions were carried out in 15 µl volumes containing 2 µl template DNA, 1X polymerase buffer (10mM Tris-HCl, 50mM KCl, 0.1% Triton X-100), 1.5 or 2.0mM MgCl₂, 0.2mM of each dNTP, 0.5µM of each primer and 0.2 units of GoTaq DNA polymerase (Promega Co.) (DeHaan and Arden 2008). Initial denaturation of DNA occurred for 3 minutes at 94 °C, followed by 38 one second cycles at 94 °C, primer specific annealing temperature for 30 seconds and primer extension for 30 seconds at 72 °C, and a final extension of 7 minutes at 72 °C. Applied Biosystems fluorescent dyes were used to label all forward primers. The loci produced during PCR were pooled into three multiplex sets and run on an AB 3130xl genetic analyzer. *Genemapper v4.0* (Applied Biosystems Inc.) software was used to determine multi-locus genotype of each bull trout. Genotyping error was minimized by running a positive control (a fish with a known genotype), a negative control (a sample containing no DNA), and duplicates of each sample being analyzed (DeHaan and Arden 2008).

Natal Tributary Assignment - Population assignment techniques implemented via the program *Whichrun v4.1* (Banks and Eichert, 2000) were used to determine the first and second most likely population of origin from within the genetic baseline dataset for each individual fish (DeHaan and Arden 2008).

Results

A synoptic list of fish collected during the Pend Oreille River survey in 2009 was summarized (Table 1). In 2009, a total of 2,581 fish were collected via boat electrofishing in the Pend Oreille River, which represented 23 species, during 54.3 total hours of boat electrofishing and 9 hours of angling (Table 2). Four bull trout were collected between 5 May and 17 June 2009. Two fish were implanted with a CART tag and a PIT tag, two were implanted with a NANO tag and a PIT tag (Table 3). All fish implanted with a tracking tag were released at the Newport boat launch, 2.6 km below Albeni Falls Dam. A summary of the movements of each fish released below the dam are summarized below (Table 4).

Table 1. Synoptic list of fish captured during Pend Oreille River surveys 2009.

Family	Species	Scientific Name
Cyprinidae	Northern pikeminnow	<i>Ptychocheilus oregonensis</i> (Richardson, 1836)
	Peamouth	<i>Mylocheilus caurinus</i> (Richardson, 1836)
	Tench	<i>Tinca tinca</i> (Linnaeus, 1758)
Catostomidae	Largescale sucker	<i>Catostomus macrocheilus</i> (Girard, 1856)
	Longnose sucker	<i>Catostomus catostomus</i> (Forster, 1773)
Ictaluridae	Brown bullhead	<i>Ameiurus nebulosus</i> (Lesueur, 1819)
Esocidae	Northern pike	<i>Esox lucius</i> (Linnaeus, 1758)
Salmonidae	Brook trout	<i>Oncorhynchus fontinalis</i>
	Brown trout	<i>Salmo trutta</i> (Linnaeus, 1758)
	Bull trout	<i>Salvelinus confluentus</i> (Suckley, 1858)
	Cutthroat trout	<i>Oncorhynchus clarki</i> (Richardson, 1836)
	Kokanee	<i>Oncorhynchus nerka</i> (Walbaum, 1792)
	Lake trout	<i>Salvelinus namaycush</i> (Walbaum, 1792)
	Lake whitefish	<i>Coregonus clupeaformis</i> (Mitchell, 1818)
	Mountain whitefish	<i>Prosopium williamsoni</i> (Girard, 1856)
	Rainbow trout	<i>Oncorhynchus mykiss</i> (Walbaum, 1792)
	Tiger Trout	<i>Salmo trutta</i> x <i>Salvelinus fontinalis</i>
Centrarchidae	Black crappie	<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)
	Largemouth bass	<i>Micropterus salmoides</i> (Lacepède, 1802)
	Pumpkinseed	<i>Lepomis gibbosus</i> (Linnaeus, 1758)
	Smallmouth bass	<i>Micropterus dolomieu</i> (Lacepède, 1802)
Percidae	Walleye	<i>Sander vitreus</i> (Mitchell, 1818)
	Yellow perch	<i>Perca flavescens</i> (Mitchell, 1814)

Table 2. Electrofishing mean total length (mm), range in total length (mm), and relative abundance (RA) of fish captured in the Pend Oreille River, 2009 (effort = 54.3 hrs).

Family	Species	N	RA (%)	TL (SD)	Range TL (mm)
Cyprinidae	Northern pikeminnow	284	11	293 (151)	46-613
	Peamouth	56	2.17	290 (54)	85-342
	Tench	59	2.29	350 (82)	135-494
Catostomidae	Largescale sucker	495	19.18	451 (88)	50-593
	Longnose sucker	233	9.03	201 (157)	10-521
Ictaluridae	Brown bullhead	9	0.35	253 (40)	172-286
Esocidae	Northern pike	5	0.19	674 (144)	450-824
Salmonidae	Brook trout	3	0.12	255 (5)	252-261
	Bull trout	4	0.15	423 (190)	241-657
	Brown trout	248	9.61	351 (153)	99-1365
	Kokanee	33	1.28	203 (41)	112-305
	Lake trout	6	0.23	506 (103)	319-635
	Lake whitefish	29	1.12	427 (62)	233-515
	Mountain whitefish	359	13.91	195 (74)	112-512
	Rainbow trout	82	3.18	372 (183)	116-1318
	Rainbow x Westslope cutthroat trout	1	0.04	400 (0)	400
	Westslope cutthroat	35	1.36	313 (85)	127-493
Centrarchidae	Tiger trout	1	0.04	205 (0)	205
	Black crappie	13	0.5	204 (71)	73-285
	Largemouth bass	13	0.5	337 (103)	64-445
	Pumpkinseed	41	1.59	112 (14)	70-150
	Smallmouth bass	288	11.16	272 (77)	63-475
Percidae	Walleye	7	0.27	564 (122)	420-763
	Yellow perch	277	10.73	150 (43)	55-323
		2581	100		

Table 3. Capture date, total length (TL), weight (WT), sex, tag type, and tag codes for bull trout captured below Albeni Falls Dam during 2008/2009 via electrofishing.

Fish #	Capture date	TL (mm)	WT (g)	Sex	Pit tag #	Radio tag	Code#
Released Above Albeni Falls Dam							
1	5/19/2008	505	1178	F	98512100219622 7	CART 16_2s	126
2*	5/19/2008	501	1133	Unknown	98512100216461 6	CART 16_2s	128
3	6/11/2008	363	374.5	Unknown	Not tagged	NANO	172
4	6/18/2008	496	1241	F	98512100219459 6	CART 16_1	108
Released Below Albeni Falls Dam							
5	5/11/2009	657	2787	Unknown	98512101171373 2	CART 16_1	148
6	6/11/2009	241	148	Unknown	98512100220391 3	NTC 6-2	178
7	6/11/2009	493	991	Unknown	98512100217064 8	CART 16_1	110
8	6/17/2009	300	227	Unknown	98512100220231 3	NTC 6-2	180

* This tag was recovered in Grouse Creek in 2008.

Table 4. Tag code, detection location, date, and current status for bull trout captured in the Pend Oreille River below Albeni Falls Dam during 2008/2009.

Fish #	Code#	Location of last detection	Last Detection	Status
1	126	4 km west of the mouth of the Clark Fork River	6/12/2008	Located in lake Pend Oreille
2	128	21 km up Grouse Creek	5/28/2008	Tag recovered in Grouse Creek
3	172	Passing North and South Dover stations	6/18/2008	Location unknown believed to be in Lake Pend Oreille
4	108	One mile below Cabinet Gorge Dam	9/22/2008	Location unknown believed to be in lake Pend Oreille
5	148	South bank of Indian Creek	10/13/2009	Dead
6	178	1.2 km up Ruby Creek	8/3/2009	Dead
7	110	Mid-river between Davis and Skookum Creek	8/10/2009	Dead
8	180	East Usk Receiver Station	7/19/2009	Location Unknown

Fish #1 – This bull trout was tagged in 2008. It was collected 0.88 km (N 48° 10.639 W 117° 00.637) below the dam on 19 May 2008 by KNRD. It had a total length of 1,178 mm, weight of 505 g, and the sex was undetermined. A CART 16_2s tag (#126) and PIT tag (#985121002196227) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for fish #1 to be Grouse Creek and Trestle Creek was determined to be the secondary possible natal tributary. Fish #1 was released on 19 May 2008 at the Priest River boat launch. During the next twenty three days fish #1 traveled 26.5km between its release site and the Dover receiver stations. Fish #2 was recorded passing the South Dover station between 11 June 2008 21:14:16 and 12 June 2008 04:04:47 and the North Dover station between 11 June 2008 21:28:58 and 12 June 2008 04:30:41. There is an overlap in the coverage areas of the North and South Dover stations, resulting in simultaneous detections at both stations. Fish #1 was detected 30 September 2009 and 20 October 2009 approximately 4 km west of the Clark Fork River; see Bellgraph et al. (2010 in preparation) for complete details (Figure 3). Transmissions for tag #126 are expected to last into November 2010.

Fish #2, 3, and 4 – These three bull trout were tagged in 2008. Tag from fish #2 was recovered in Grouse Creek in 2008. This fish is no longer active in the study. No additional detections were recorded for these fish #3 or #4 in 2009. Summary of movements in 2008 can be found in Paluch et al (2009).

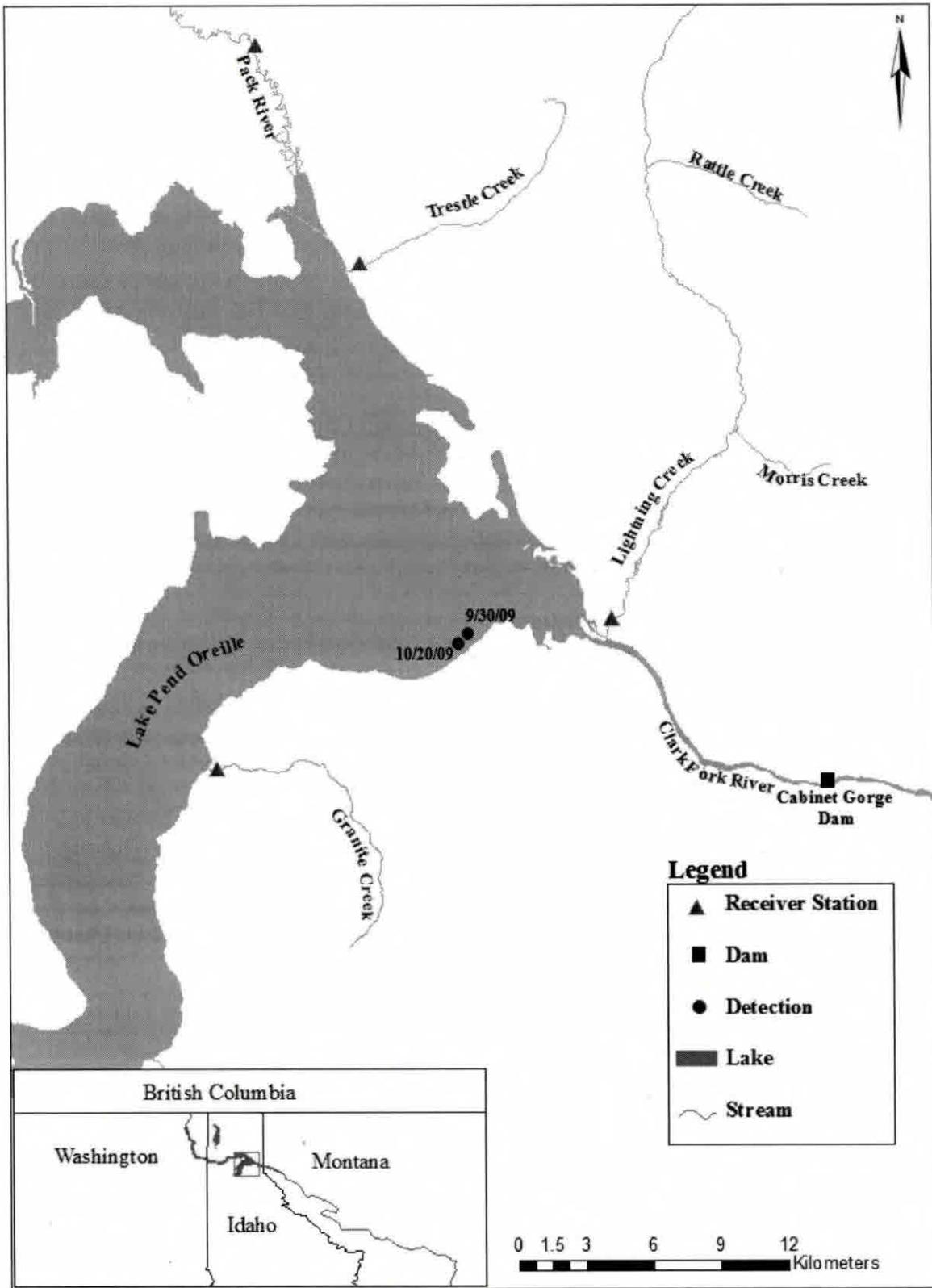


Figure 3. Detection map of Fish#1 (Code 126) in Lake Pend Oreille, 2009.

Fish #5 - The fifth bull trout was captured 1.52 km (N 48° 10.823 W 117° 01.087) below the dam on 11 May 2009 by KNRD. It had a total length of 657 mm, weight of 2787 g, and the sex was male. A CART 16_1 tag (#148) and PIT tag (# 985121011713732) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for fish #5 to be the East Fork of Lightning Creek and Morris Creek was determined to be the secondary possible natal tributary. Fish #5 was released on 11 May 2009 at the Newport boat launch below Albeni Falls Dam.

At Albeni Falls Dam, fish #5 was detected on sixteen different days between 13 May and 30 May 2009, on twenty different days between 3 June and 29 June 2009, and on four days in 13 July and 28 July 2009. Fish #5 was detected at the East Usk receiver station on 21 June and 12, 16, 20, and 26 July 2009. Detections by truck occurred at the mouth of Mill Creek on 8 and 22 July 2009 and near Marshall Creek, Duncan Springs on 31 August 2009. Detections by aircraft occurred on 4 September 2009. Detections were made in the Pend Oreille River in the area near Marshall Creek. Detections by boat occurred near the dam on 8, 15, and 29 June 2009, at the mouth of Mill Creek on 8 July 2009, near Sandy Shores Spring on 4 August, 17 August, and 24 September 2009, near Marshall Creek and Duncan Springs on 1 September and 9 September 2009, and at the Mouth of Indian Creek on 29 September and 5 October 2009. The transmitter tag from fish #5 was found on the south bank of Indian Creek on 13 October 2009 (Figure 4).

Fish #6 - The sixth bull trout was captured 1.35 km (N 48° 10.823 W 117° 00.904) below the dam on 11 June 2009 by EWU. It had a total length of 241 mm, weight of 148 g, and the sex was undetermined. A NTC 6-2 tag (#178) and PIT tag (# 985121002203913) was implanted in this fish. Results of the genetic assignment determined this fish to be a F1 hybrid. No natal tributary was assigned to this fish. Fish #6 was released on 11 June 2009 at the Newport boat launch.

Detections of fish #6 at the East Usk station on 18 June 2009. Detections by truck were made in Ruby Creek on 24 June, 29 June, 8 July, and 21 July 2009. The transmitter tag from fish #6 was retrieved in Ruby Creek on 3 August 2009, in 3 cm of 9.5°C water. Detections by aircraft were made approximately 3 km below Albeni Falls Dam on 12 June 2009 and in the Pend Oreille River between Cedar Creek and Mill Creek on 19 June 2009 (Figure 5).

Fish #7 - The seventh bull trout was captured 1.26 km (N 48° 10.679 W 117° 00.886) below the dam on 11 June 2009 by EWU. It had a total length of 493 mm, weight of 991 g, and the sex was undetermined. A CART 16_1 tag (#110) and PIT tag (#985121002170648) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for fish #7 to be the Morris and Savage Creek was determined to be the secondary possible natal tributary. Fish #7 was released on 11 June 2009 at the Newport boat launch.

At Albeni Falls Dam, fish #7 was detected on sixteen different days between 12 June and 27 June, and on 2 July 2009. Detections by aircraft occurred on 12 June and 19 June 2009. Detections by aircraft were approximately 1 km below the dam. Detections by

boat occurred near the dam on 15 June and 24 June 2009, at the south end of Indian Island on 29 June 2009, and between Davis Creek and Skookum Creek on 15 July and 4 August 2009 (Figure 6).

Fish #8 – The eighth bull trout was captured 3.47 km (N 48° 11.431 W 117° 02.168) below the dam on 17 June 2009 by EWU. It had a total length of 300 mm, weight of 227 g, and the sex was undetermined. A NTC 6-2 tag (#180) and PIT tag (#985121002202313) was implanted in this fish. Results of the genetic assignment determined this fish to be a F1 hybrid. No natal tributary was assigned to this fish. Fish #8 was released on 17 June 2009 at the Newport boat launch.

At Albeni Falls Dam, fish #8 was detected on 19 June and 20 June and on eight different days between 2 and 17 July 2009. Fish #8 was detected at the East Usk receiver station on 17 July and 19 July 2009. Detections by aircraft occurred on 19 June 2009 approximately 1 km below Albeni Falls Dam. Detections by boat occurred near the dam on 24 June and 9 July 2009 (Figure 7).

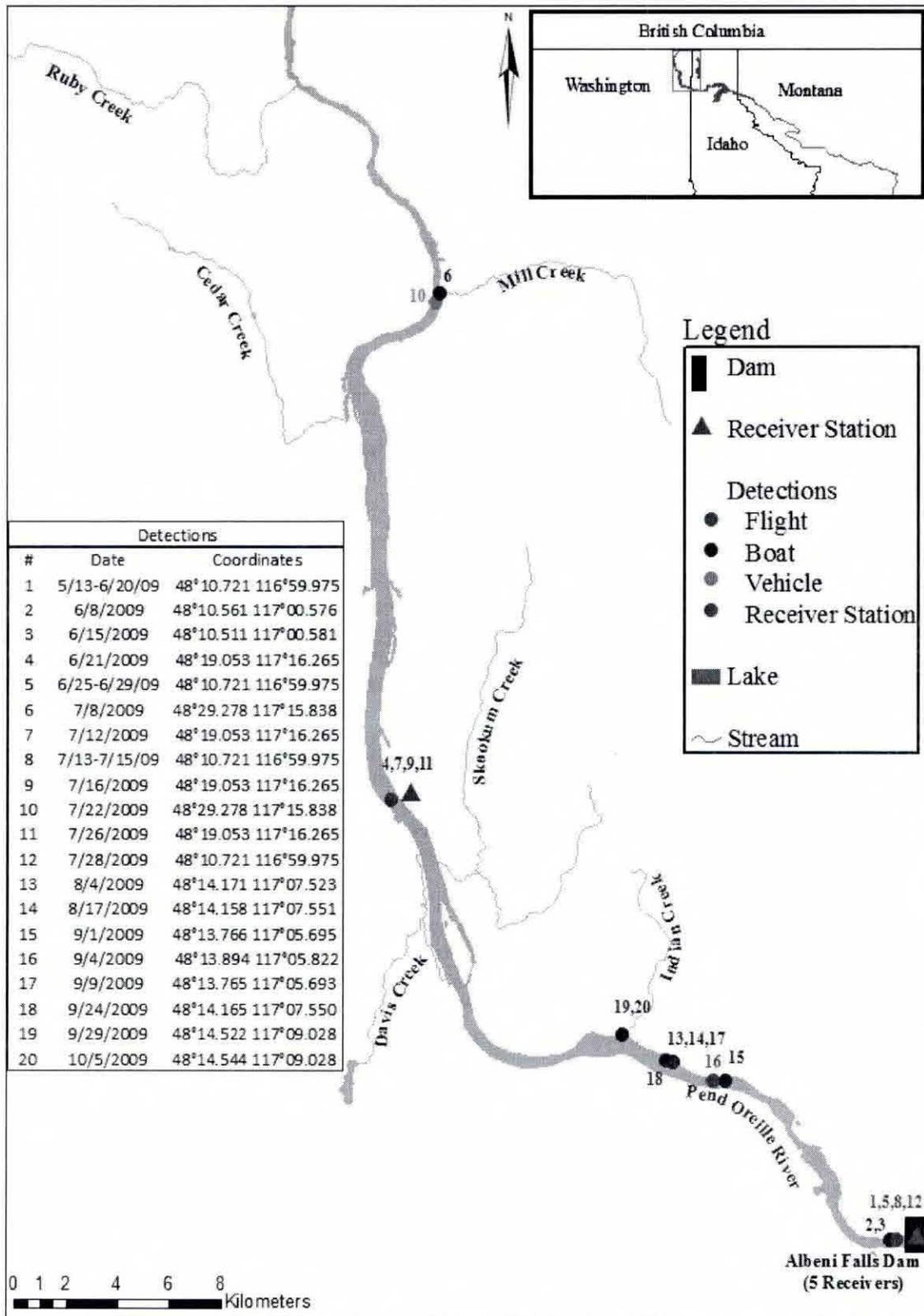


Figure 4. Detection map of Fish #5 (Code 148) downstream from Albeni Falls Dam, 2009.

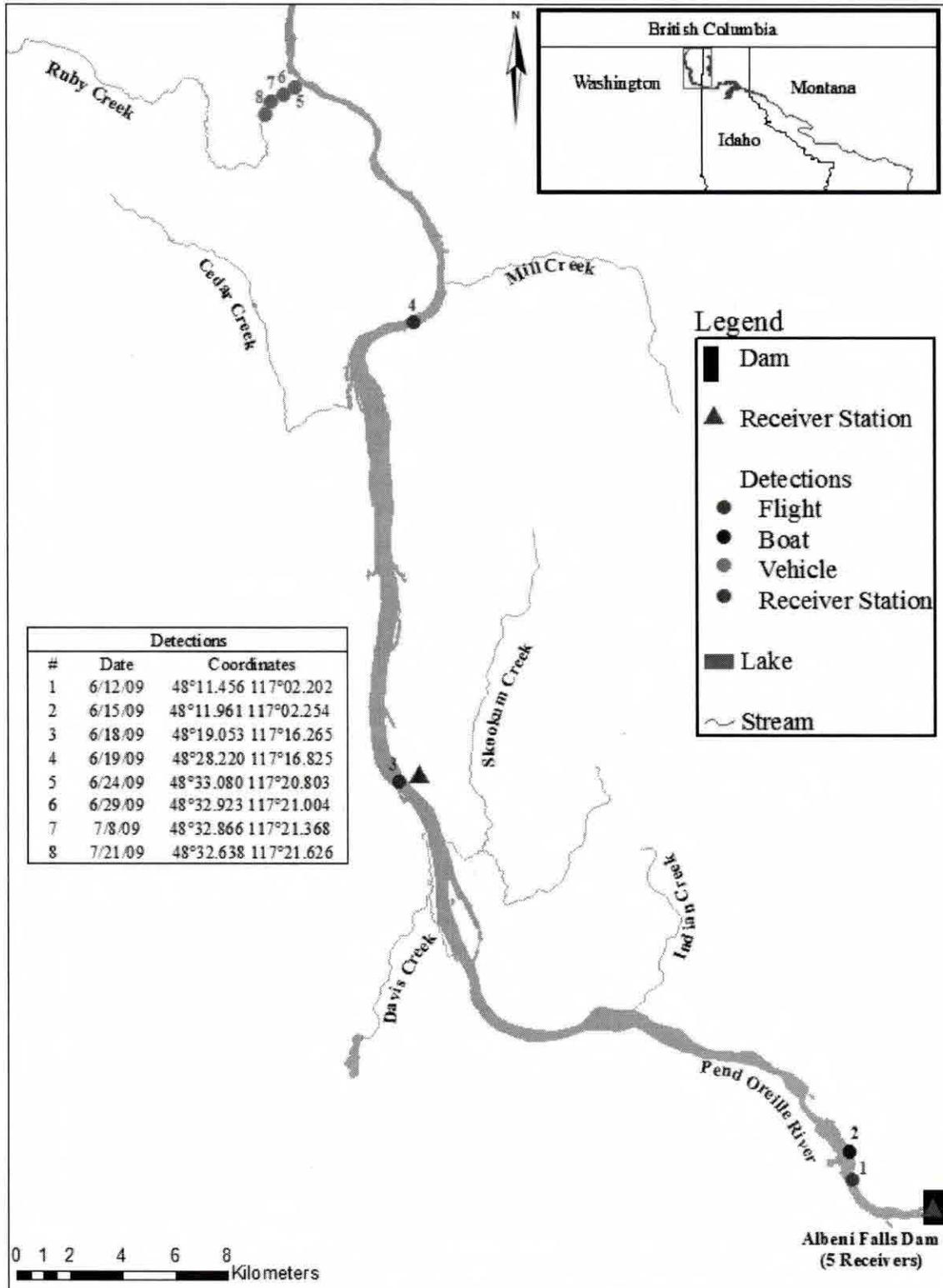


Figure 5. Detection map of Fish #6 (Code 178) downstream from Albeni Falls Dam, 2009.

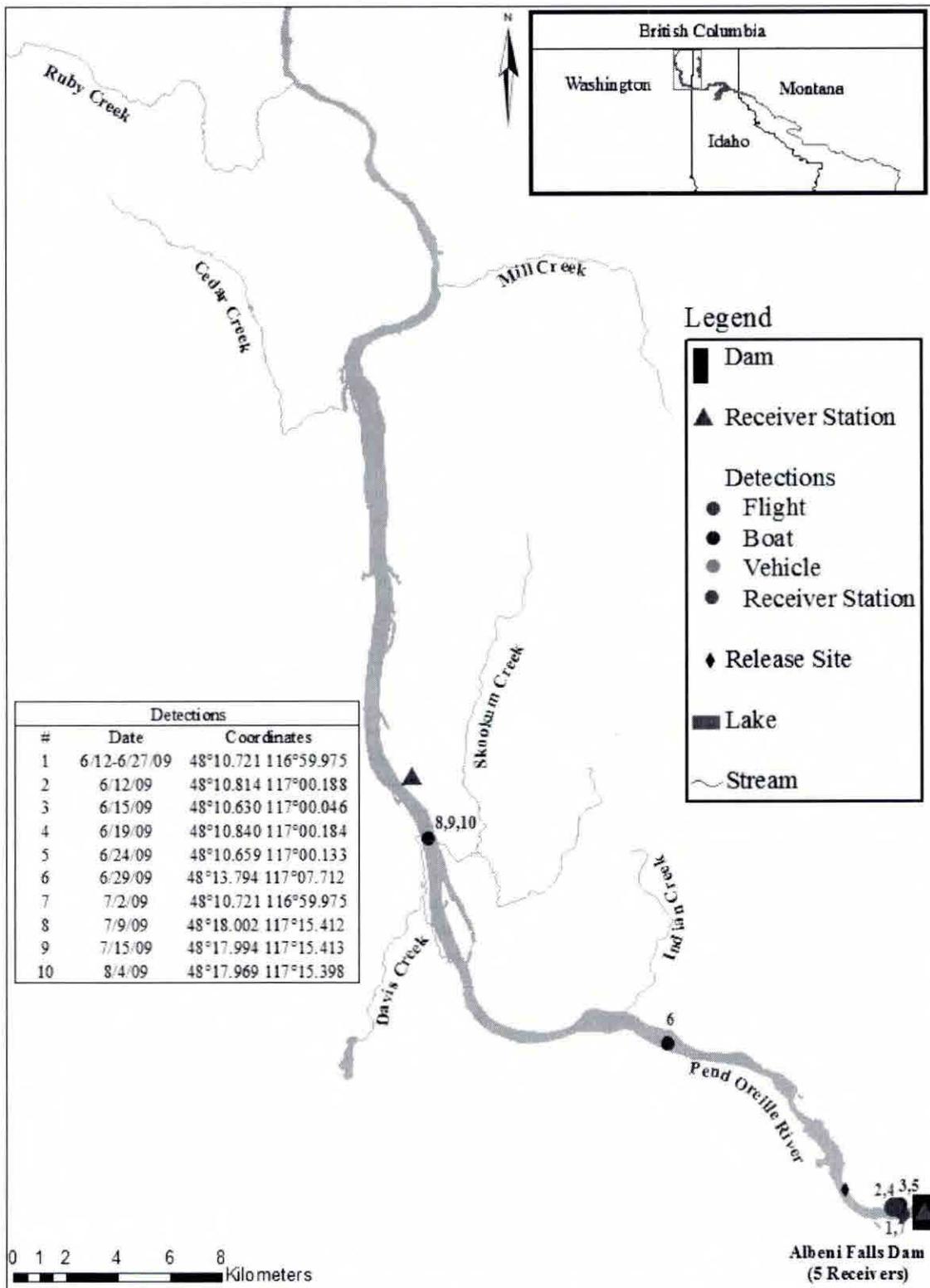


Figure 6. Detection map of Fish #7 (Code 110) downstream from Albeni Falls Dam, 2009.

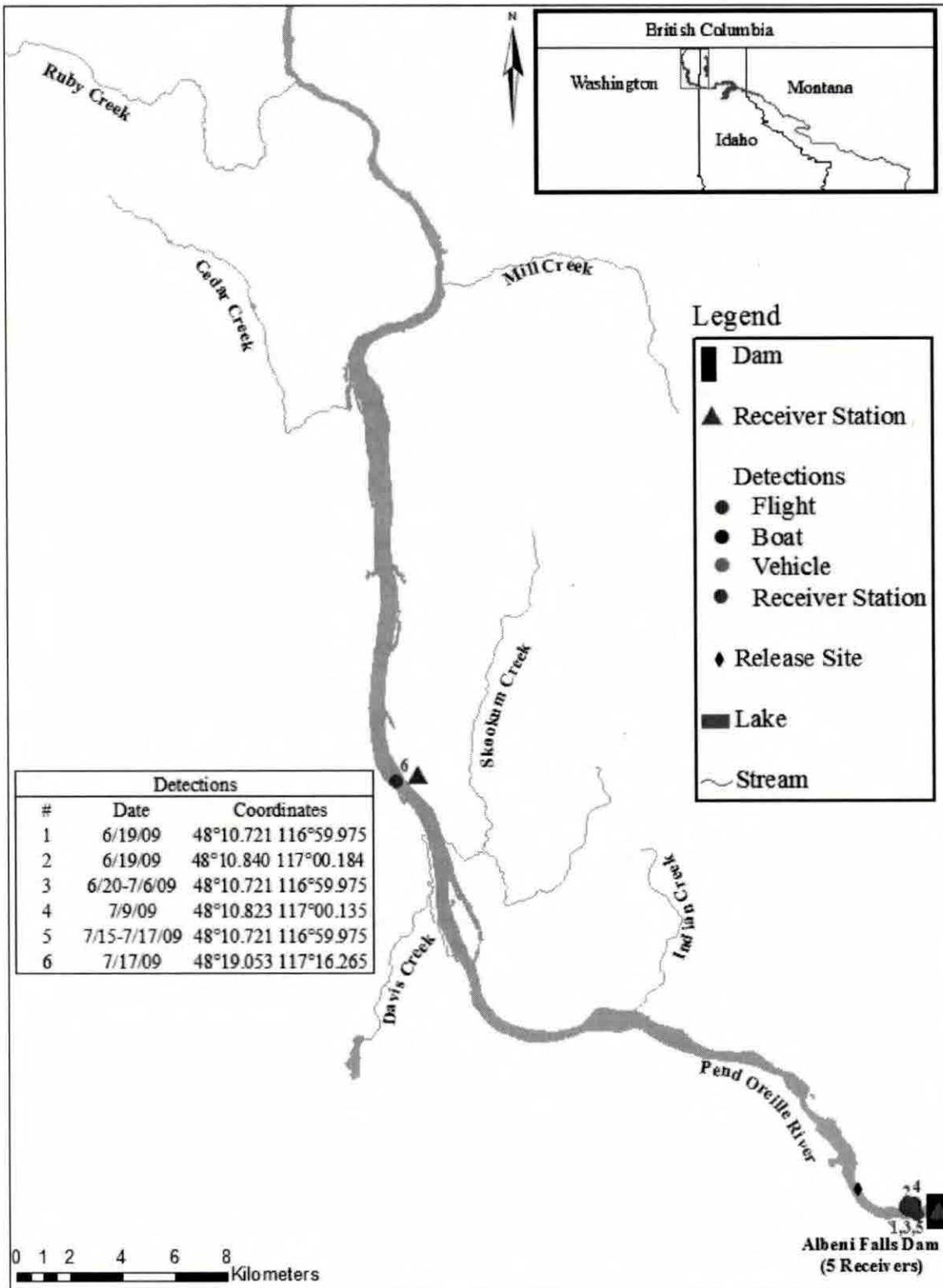


Figure 7. Detection map of Fish #8 (Code 180) downstream from Albeni Falls Dam, 2009.

Discussion

In 2007, EWU, KNRD, and PNNL began a four year study to determine movements and genetic assignments of bull trout in the tailrace of Albeni Falls Dam. The primary objective was to capture bull trout below Albeni Falls Dam in the spring, transport and release them above the dam and monitor their movements to natal tributaries. Radio and acoustic tracking would provide information on movement patterns of bull trout once moved above the dam and allowed to migrate to their natal tributaries in the Pend Oreille sub-basin. Genetic analysis would confirm the identity of their natal tributary, as well as, confirm that their origin was from above Albeni Falls Dam.

In 2009, the primary objective of relocating fish above the dam was postponed. A decision was made by regional stakeholders and the Bonneville Power Administration to leave the bull trout captured in 2009 below the dam as part of the USACE study looking at the fine-scale movements of bull trout below the dam. Biological data was needed to help determine potential placement of a permanent fish passage structure (Bellgraph et al. 2010 in preparation). Four bull trout were collected in 2009 and left below the dam as part of this study.

Information on these fish, as well as, one fish left below the dam in 2008 and bull trout relocated from above the dam, can be found in Bellgraph et al. (2010 in preparation) final report for the USACE.

Three of the four fish tagged in 2008 remained in the study area above the dam and four fish tagged in 2009 were left below the dam. Attempts to locate these fish were made using fixed ground receiver stations and mobile tracking by aircraft, boat, and vehicle.

The tags implanted in three bull trout (Fish #1, #3, and #4) during the 2008 sampling effort were still transmitting in 2009. Only one of these fish was located in Lake Pend Oreille. Fish #1 (Code #126) was located on 30 September and three weeks later on 20 October in the same general area. This fish was not picked up on the radio receiver indicating it was more than 3 meters below the lake surface. The exact location was unable to be determined due to fluctuating signal strength over an area in excess of 1,200 m. This fish was located in an area used by lake trout (*Salvelinus namaycush*) for spawning. This fish may have been attracted to the area by the spawning activity of the lake trout. Locating this fish in the same area three weeks apart could be an indication that this fish was dead. The tag implanted in this fish should continue to transmit into November of 2010. This area will be checked further during boat tracking trips in 2010. After more tracking in 2010 we will be better able to determine if this fish is still active in the study.

Fish #2 was tagged and released on 19 May 2008. This fish entered Lake Pend Oreille on 28 May 2008. Genetic analysis assigned fish to Grouse Creek. The tag from this fish was recovered in Grouse Creek (N48° 27.924 W116° 16.180) on 22 October 2008. This fish is no longer active in the study. Full details on the movements of fish #2 can be found in Paluch et al (2009).

Fish #3 was tagged and released above the dam on 11 June 2008. Fish #3 entered Lake Pend Oreille on 18 June 2008. Results of genetic analysis on fish #3 assigned it to Lightning Creek or tributaries of Lightning Creek. The tag in fish #3 was expected to transmit into the fall of 2009. No further detections are expected for this fish in 2010.

Fish #4 was tagged and released above the dam on 18 June 2008. It entered Lake Pend Oreille on 5 July 2008. Results of genetic analysis on fish #4 assigned it to Rattle Creek, a tributary of Lightning Creek. Neither of these fish was located at a receiver station or during tracking surveys via boat, vehicle, or aircraft. In 2009, the flows in Lightning Creek were similar to those in 2008 during the later part of the summer and early fall. There were several stretches of Lightning Creek where flows were almost entirely subsurface. Upstream passage by migrating fish would have been extremely unlikely if not impossible. The tag in fish #4 should continue to be active into the spring of 2010. Early tracking efforts in 2010 will focus on locating this fish. Figure 8 is a picture taken during a flight following Lightning Creek back to the Clark Fork River.

Fish #5 (Code 148) was captured on 13 May 2009 and released below the dam. This fish remained in the vicinity of the dam for thirty-eight days. Over the next thirty-seven days this fish traveled 20 km between the dam and the East Usk receiver station three times. Once the river temperature reached its maximum, 23°C, this fish remained in the area of Indian and Marshall Creeks. The surface water in these areas exceeded the bull trout's thermal zone of tolerance, but the temperature at the river bottom was below 14°C. We believe this fish was using this area as a cold water refuge. This fish was found dead on the south bank of Indian Creek in a pile of milfoil. This occurred after an aquatic weed harvester clear milfoil from the mouth of Indian Creek. We were unable to determine the cause of death for this fish.

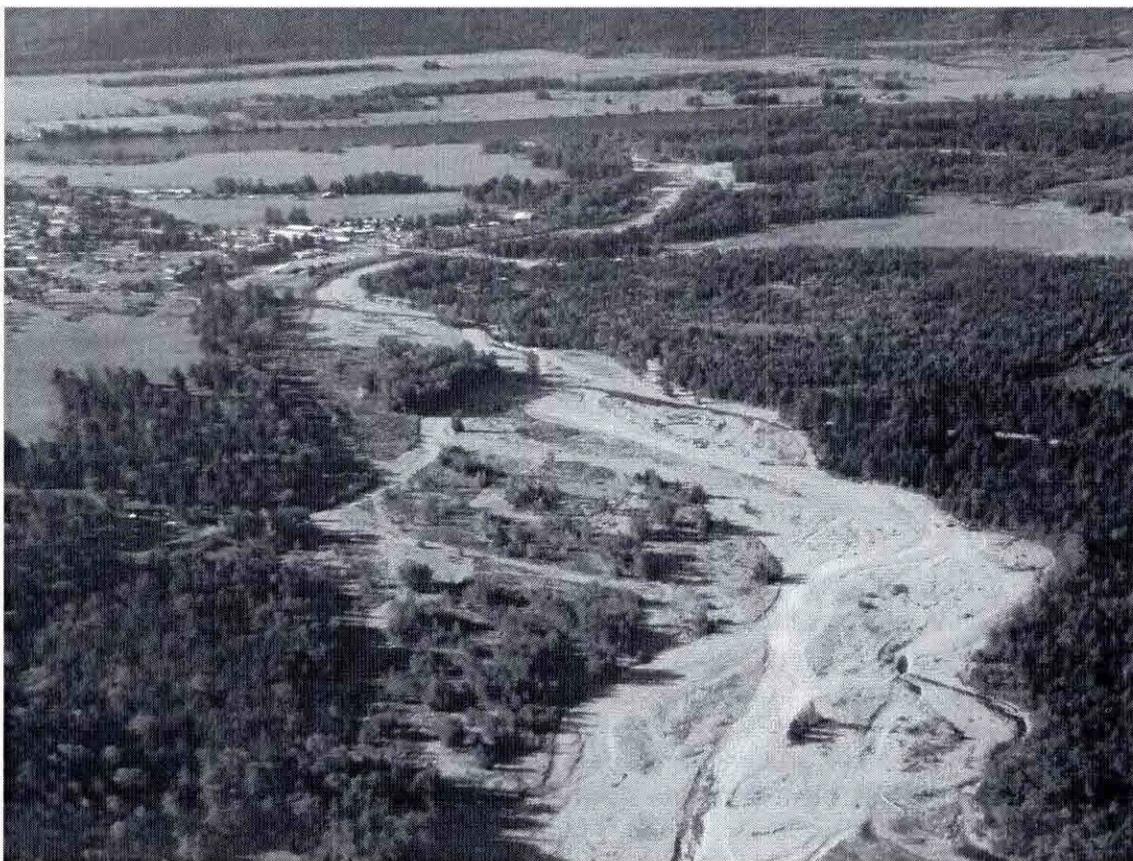


Figure 8. Lightning Creek approximately 2 km upstream from its confluence with the Clark Fork River on 18 September 2009.

Fish #6 (Code 178) was captured and released below the dam on 6 June 2009. This fish remained in the reach of the Pend Oreille River between the Albeni Falls Dam and the East Usk receiver station for eight days. This fish did not approach close enough to the dam to be recorded on the receivers located at the dam. One day after passing the East Usk receiver station, fish #5 was located approximately 20 km downstream from the receiver station, half way between Cedar and Mill Creek. Over the next six days it traveled approximately 13 km and entered Ruby Creek. It was located alive in Ruby Creek on 24 June, 29 June, 8 July, and 21 July 2009. Fish #6 was found dead on 3 August 2009 in Ruby Creek., two weeks after last being confirmed alive.

The carcass of fish #6 was located in a snag of tree branches crossing the creek. This snag of branches was on the upstream side of a large log lying across the creek (Figure 9). The log lying across the creek was about 1.5 m in diameter. There was a large amount of sediment and tree branches built up on the upstream side of this log. There was no ready accessible path for a fish to migrate upstream from this log under the flow conditions observed at the time the fish carcass was found.

The water temperature in Ruby Creek was 9.5°C on 3 August 2009. We believe this fish was using Ruby Creek as a cold water refuge. This creek has the potential to be a

spawning tributary for bull trout if passage at Albeni Falls Dam is established. Bull trout spawn in water of 9°C or cooler. This stream was just above 9 °C during one of the warmest times of the year. During the spawning season this creek would have temperatures within the optimal bull trout spawning threshold. It also has properly sized substrate for bull trout redds.



Figure 9. Snag crossing Ruby Creek (N48°32.923 W117°21.501), circle indicates recovery location of tag #178 on 3 August 2009.

Fish #7 (Code 110) was captured on 11 June 2009 and released below the dam. This fish stayed in the vicinity of the dam for sixteen days. This fish then traveled downstream of the dam over the next eighteen days. It was located mid-river between Davis and Skookum creeks. In late July and Early August the river was isothermal at 23°C in this section of the river. Movements were not detected for this fish after the increase in water temperature. This fish likely died while attempting to find a cold water refuge.

Fish #8 (Code 180) was captured on 17 June 2009 and released below the dam. It was recorded in the vicinity of the dam for two days. No detections of this fish were made until it returned to the dam twelve days later. It stayed in the vicinity of the dam for fifteen days before traveling downstream to past the East Usk station on 17 July 2009. No detections of this fish were recorded after passing the East Usk station. It is possible this fish found a cold water refuge and could return to the dam after the spring freshet. We will continue to look for this fish in 2010.

Three of the bull trout capture in 2009 spent time exploring the dam. Fish mortality began to occur when water temperatures exceeded 16°C, which is similar to what happened in the Geist et al study (2003). Fish #5 found a location, at the mouth of Indian Creek that served as a cold water refuge.

Three of these fish traveled between Albeni Falls Dam and the East Usk receiver station. Travel between these two points was usually completed in less than twenty-four hours. It is likely these fish were searching for a cold water refuge or for a route around the dam.

As of 20 April 2010, the percent of average accumulation of precipitation (Snotel Internet Site, 2009) in the Idaho Northern Panhandle Region, based on 6 of 10 stations reporting, was 79% of normal with a 74% snow water equivalent. In Montana, the percent of average accumulation of precipitation in the Flathead River Basin, based on 15 of 15 stations reporting, was 79% of normal with a 74% snow water equivalent. The Upper Clark Fork River Basin, based on 15 of 15 stations reporting, was 70% of normal with a 72% snow water equivalent. The Bitterroot River Basin, based on 7 of 7 stations reporting, was 61% of normal with a 52% snow water equivalent. The Lower Clark Fork Basin, based on 8 of 8 stations reporting, was 66% of normal with a 55% snow water equivalent. The number of bull trout passing over the dam is theoretically related to the amount and timing of the discharge. The bull trout captured in 2009 were collected during the time period following the peak discharge and prior to the river temperature rising above 16°C. This year's discharge at the Albeni Falls Dam spillway will most likely be less than that of the last two years. We will monitor the discharge and river temperature closely during 2010 and schedule our sampling trips accordingly.

The USACE study will not continue in 2010. In 2010, we will be operating under the objectives established during 2007 and 2008. All of the bull trout in 2010 will be relocated above Albeni Falls Dam.

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**Temporary restoration of bull trout passage at Albeni Falls Dam
and movements of westslope cutthroat trout in the Box Canyon
Reservoir.**

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Bull Trout Report

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Abstract

This study was designed to monitor movements of bull trout that were provided passage above Albeni Falls Dam, Pend Oreille River. Electrofishing and angling were used to collect bull trout below the dam. Tissue samples were collected from each bull trout and sent to the U. S. Fish and Wildlife Service Abernathy Fish Technology Center Conservation Genetics Lab, Washington. The DNA extracted from tissue samples were compared to a catalog of bull trout population DNA from the Priest River drainage, Lake Pend Oreille tributaries, and the Clark Fork drainage to determine the most probable tributary of origin. A combined acoustic radio or radio tag was implanted in each fish prior to being transported and released above the dam. Bull trout relocated above the dam were able to volitionally migrate into their natal tributary, drop back downstream, or migrate upstream to the next dam. A combination of stationary radio receiving stations and tracking via aircraft, boat, and vehicle were used to monitor the movement of tagged fish to determine if the spawning tributary it selected matched the tributary assigned from the genetic analysis. Three bull trout were captured during electrofishing surveys in 2010. Of these three, two were tagged and relocated above the dam. One fish passed by stationary receiver stations leading into Lake Pend Oreille and the other entered Priest River. The fish that entered the lake was later detected in the tributary corresponding with the results of its genetic test. Two bull trout tagged in 2008 were also detected in 2010. One was located in Rattle Creek, which matched its predicted natal tributary, and the other was detected in Lake Pend Oreille.

Introduction

The Pend Oreille and Clark Fork rivers flow 789 km (490 miles) from their source near Butte, Montana, through Pend Oreille Lake, Idaho, to their confluence with the Columbia River in British Columbia, Canada. The construction of Boundary (rkm 27.4), Box Canyon (rkm 55.0), Albeni Falls (rkm 145.0), Cabinet Gorge (rkm 241.2), Noxon Rapids (rkm 273.1), Thompson Falls (rkm 334.7) and Milltown (rkm 586.3) dams have disrupted bull trout (*Salvelinus confluentus*) migration patterns from tributaries located upstream and downstream of Lake Pend Oreille. All of these dams were constructed without fish passage, causing historical migratory corridors used by bull trout to be blocked. Blocking of migratory corridors has resulted in the fragmentation of bull trout habitat and failure of bull trout to return to their natal tributaries (USFWS 2000). The U.S. Fish and Wildlife Service (USFWS) listed bull trout in the Columbia River Basin as threatened in 1998 (USFWS 2000).

Construction of Milltown Dam, located at the confluence of the Blackfoot and Clark Fork rivers, was completed in 1907. Prior to the removal of Milltown Dam in 2008, passage upstream from the dam was blocked. However, during periods of high discharge water was diverted over the spillway allowing fish downstream passage. The North Fork Blackfoot River and Monture Creek are located upstream of Milltown Dam, and are primary spawning grounds for fluvial bull trout (Swanberg 1997).

In a 2000/2001 study by Schmetterling (2003), fourteen bull trout, seven in 2000 and seven in 2001, were collected below the Milltown Dam, implanted with radio transmitters, and relocated above the dam. In 2000, six of the bull trout migrated up the Blackfoot River, three to Monture Creek and three to the North Fork Blackfoot River. One bull trout migrated up the Clark Fork River to Copper Creek. Migration distances averaged 109.3 km. In 2001, four bull trout migrated up the Blackfoot River, one to Monture Creek and the three to the North Fork Blackfoot River. Two bull trout migrated up the Clark Fork River, one to Ranch Creek and one to Hogback Creek. One bull trout died in Milltown Reservoir. The average migration distance was 109.9 km. Eight of the bull trout in this study were located near bull trout redds and presumably spawned there. This study indicated that bull trout collected below the dam originated from tributaries upstream of the dam and would return to their natal tributary to spawn if provided passage above the dam.

Construction of the Cabinet Gorge Dam, located on the Clark Fork River, was completed in 1952. Prior to construction of Cabinet Gorge Dam, large numbers of adfluvial bull trout freely migrated into Lake Pend Oreille for their subadult and adult life stages before returning to their natal tributary to spawn (Pratt and Huston 1993). Jeppson (1954) reported seeing large numbers of bull trout congregating below Cabinet Gorge Dam, although no bull trout redds were observed. A spawning channel was created by Idaho Department of Fish and Game in 1961 in an attempt to mitigate the loss of upstream spawning grounds. Hundreds of bull trout were surveyed near the spawning channel during the mid 1960's. Biologist conducted surveys at the spawning channel from 1984 to 1991, but did not observe any redds. The disruption of the migratory route by the dam resulted in loss of spawning habitat which the spawning channel could not mitigate for.

Migratory bull trout begin their spawning migration at the end of the high flows, in early fall. During this time large bull trout congregate near the spillway of Cabinet Gorge Dam. One hypothesis by Neraas and Spruell's (2001) was that bull trout congregating below Cabinet Gorge Dam may be migratory fish from tributaries upstream of the dam that passed over the dam during their outmigration and are attempting to return to their natal tributary. Neraas and Spruell collected bull trout from locations above the dam, below the dam, and at the dam between 1997 and 1999. Microsatellite DNA analysis was conducted on genetic samples taken from each fish and compared to a genetic data baseline of known bull trout populations to assign probable tributary of origin for each fish. An average of 56% of the fish collected at the dam was assigned to tributaries above the dam. These results supported the hypothesis that bull trout collected below Cabinet Gorge Dam originated from tributaries upstream of the dam.

In 2004 and 2007, Avista biologist collected bull trout below Cabinet Gorge Dam, collected genetic samples, and maintained them in holding tanks awaiting natal tributary assignment from genetic analysis. Genetic samples were analyzed at the Abernathy Fish Technology Center Conservation Genetics Lab (AFTC). Once natal tributaries were assigned, fish were relocated to the region their natal tributary was located. During this period genetic samples were also collected from known bull trout populations and added to the genetic data baseline (DeHaan and Arden 2008). In 2004, fifty-two genetic samples were analyzed at AFTC and assigned natal tributaries. Seventy-nine percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan et al. 2005). In 2007, thirty-five genetic samples were analyzed at AFTC. Seventy-seven percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan and Arden 2007). These studies supported the hypothesis that bull trout congregating below Cabinet Gorge Dam originated from tributaries upstream of the dam.

Construction of Albeni Falls Dam, located on the Pend Oreille River, was completed in 1955, blocking historical migratory bull trout routes between the river and Lake Pend Oreille. Fluvial bull trout that spawn in tributaries of Lake Pend Oreille and migrate downstream to the Pend Oreille River in search of forage can no longer return to their natal streams once passing the dam. The adfluvial life history form, which historically spawned in tributaries of the Box Canyon Reservoir of the Pend Oreille River and migrated upstream to the cold-water refuge of Lake Pend Oreille, can no longer migrate into the lake. Due to these impacts, the USFWS Biological Opinion (USFWS 2000) directed the action agencies to evaluate the feasibility of restoring passage at Albeni Falls Dam (see Reasonable and Prudent Measure 10.A.1.3 and Terms and Conditions 11.A.1.3 of the 2000 USFWS BiOp).

In a 2003 study by Geist et al. (2004), seven bull trout capture below the dam were implanted with radio transmitters and released in the spring effluent to determine their interaction with the dam. Through the use of radio receiver stations on the dam and mobile tracking by boat, six of the tagged bull trout below the dam were found to make repeated forays between a cold-water effluent and the base of the dam. The data collected supported the hypothesis that the bull trout originated from tributaries above the dam.

In a 2004 study by Scholz et al. (2005a, 2005b), two bull trout captured below Albeni Falls Dam were tagged and relocated above the dam to determine if they would migrate

upstream or pass back over the dam. Microsatellite DNA analysis was used to assign the most probable natal tributary of each fish. Tracking was conducted using stationary receiver stations and mobile surveys by aircraft and vehicle. Both fish migrated from their release point into Lake Pend Oreille. One fish entered Lightning Creek and returned to the lake approximately one month later. It is presumed to have spawned in this tributary. The second fish, which was immature at the time of capture, entered Trestle Creek during the spawning season the following year. Both of these fish returned to their genetically assigned natal tributary. The movements of these two fish supported the hypothesis that bull trout captured below Albeni Falls Dam originated from tributaries above the dam.

Genetic samples were taken from the bull trout captured in the Geist et al. (2004) and Scholz et al. (2005a, 2005b) studies. DNA analysis was used to compare the genetic samples with populations from the Priest River and Lake Pend Oreille drainages as well as populations from Clark Fork River tributaries below Cabinet Gorge Dam (DeHaan and Arden 2008). All nine of the fish collected below Albeni Falls Dam were assigned to tributary populations of Lake Pend Oreille or the Clark Fork River below Cabinet Gorge Dam (DeHaan and Arden 2008). The two bull trout released above the dam entered the tributary matching those assigned from genetic analysis.

The USFWS biological opinion (USFWS 2000) noted that, "*Albeni Falls Dam was constructed without fishways to accommodate safe upstream and downstream passage of fish. . . Bull trout were abundant in the Pend Oreille River through 1957, and then abruptly their numbers decreased to the point that individual fish are now noteworthy. This abrupt decline correlates with the commencement of operation of Albeni Falls Dam in 1952. No other abrupt or widespread threat can be identified for this portion of the Pend Oreille River Basin during 1950s. In the absence of passage, migratory bull trout remaining in the Pend Oreille River will continue to be harmed.*" As a result, the USFWS (2000a, 2002b) proposed a recovery plan to address this issue. Page 166 of the recovery plan calls on the Corps of Engineers and other agencies to by October 1, 2008, *Investigate and implement upstream passage at Albeni Falls (USFWS Biological Opinion), ...as needed, to reconnect fragmented core habitat of bull trout with Lake Pend Oreille.* The Recovery Plan emphasizes conserving genetic diversity and providing opportunities for genetic exchange, which is basis of our current study. Captured bull trout in this study that are released 8 km above Albeni Falls Dam can voluntarily move back below the dam, or into the Priest River (or its tributary the East River), tributaries of Pend Oreille Lake, or migrate up the Clark Fork River to the tailrace of Cabinet Gorge Dam.

Prior to construction of Albeni Falls Dam, sustainable populations of bull trout existed in the Pend Oreille River (rkm 55.5-141.5) of the between Metaline Falls and Albeni Falls (Scholz et al. 2008). The upper end of this section of the Pend Oreille River was blocked by the construction of Albeni Falls Dam in 1955 and the lower end was blocked by Box Canyon Dam in 1957, causing the fragmentation and isolation of bull trout populations. The Pend Oreille River, which historically served as ideal habitat during certain life stages of migratory bull trout, was converted into a reservoir adversely affecting the sustainability of bull trout populations within the reach. Bull trout were no longer able to seek cold water refuge in Lake Pend Oreille due to their migratory route being blocked by Albeni Falls Dam. The water temperatures in Box Canyon Reservoir exceed 16°C, the upper limit of bull trout thermal zone of tolerance, during the

summer months. Without access to Lake Pend Oreille, bull trout are forced to seek cold water in a section of river which offers few cold water refuges. Without restoration of the migratory route into Lake Pend Oreille, bull trout in Box Canyon Reservoir are in imminent danger of extinction. There is a scarcity of bull trout in Pend Oreille Basin tributaries located below Albeni Falls Dam (Ashe and Scholz 1992; Scholz et al. 2005a, 2005b). Without access to Lake Pend Oreille, the survival of bull trout entrained below Albeni Falls Dam is remote.

In 2001, Avista Corporation in conjunction with the USFWS, has initiated a program to restore upstream fish passage above Cabinet Gorge Dam on the Clark Fork River. Bull trout captured below Cabinet Gorge Dam are assigned to a natal tributary using “rapid response genetic analysis”. Tributary assignment is used to determine if the fish will be released above or below Cabinet Gorge Dam. The success of the Cabinet Gorge bull trout transportation project has prompted similar efforts at Noxon Rapids and Thompson Falls dams. The recent removal of dams on Big Blackfoot River, a principle tributary of the upper Clark Fork River, and Milltown Dam in the Clark Fork River have restored the Upper Clark Fork and Big Blackfoot rivers to free flowing conditions allowing more natural connectivity of bull trout. The bull trout transportation projects at Cabinet Gorge, Noxon Rapids and Thompson Falls dams provide a temporary solution for bull trout passage at each of these facilities and will likely increase the number of spawning bull trout returning back to their natal tributaries.

In 2007 a five year study was initiated to determine movements and genetics of bull trout captured below Albeni Falls Dam as a first step in assessing bull trout passage at the dam. The objectives of this project were to: (1) relocate bull trout collected below the Albeni Falls Dam to a release site upstream from the dam, (2) use microsatellite DNA analysis to assign the most probable natal tributary of each fish, and (3) determine if genetically assigned natal tributaries match the actual tributary used for spawning. By relocating bull trout captured below Albeni Falls Dam, some measure of fish passage is restored over 734.1 km (93%) of the Pend Oreille/Clark Fork rivers, from Box Canyon Dam (rkm 55.0) to the headwaters of the Clark Fork River (rkm 789.1).

Methods

Study Area

Eastern Washington University (EWU) and Kalispel Tribe Natural Resources Department (KNRD) crews sampled for bull trout in a 14 km reach of the Pend Oreille River between Indian Creek (RKM 131) and Albeni Falls Dam (RKM 145) (Figure 1). Albeni Falls Dam was built by the U.S. Army Corps of Engineers between 1951 and 1955. Over 200 million kilowatt hours of electrical energy is produced annually by three generators at Albeni Falls Dam. Albeni Falls Dam had a mean discharge of 24.3 KCFS from 1960-2009 and a peak discharge of 138.2 KCFS during this period of record. In 2010, the mean discharge was 20.1 KCFS and the peak discharge was 74.8 KCFS (www.nwd-wc.usace.army.mil/perl/dataquery.pl). The average water temperature in 2009-2010 was 11.7°C (Figure 2).

EWU and Pacific Northwest National Laboratories (PNNL) maintained twelve stationary radio tracking stations on and above Albeni Falls Dam on the Pend Oreille River and Pend Oreille Lake. Four stations were setup on Albeni Falls Dam (N 48.179 W 117.000), one at Priest River (Mudhole Campground (N 48.179 W 116.892)), two near the Dover Railroad Bridge (north: N 48.256 W 116.666 and south: N 48.256 W 116.666 stations), and five tributaries to Lake Pend Oreille (Trestle Creek: N 48.285 W 116.342, Lightning Creek: N 48.152 W 116.182, Granite Creek: N 48.084 W 116.422, Gold Creek: N 47.971 W 116.454, and the Pack River: N 48.359 W 116.402).

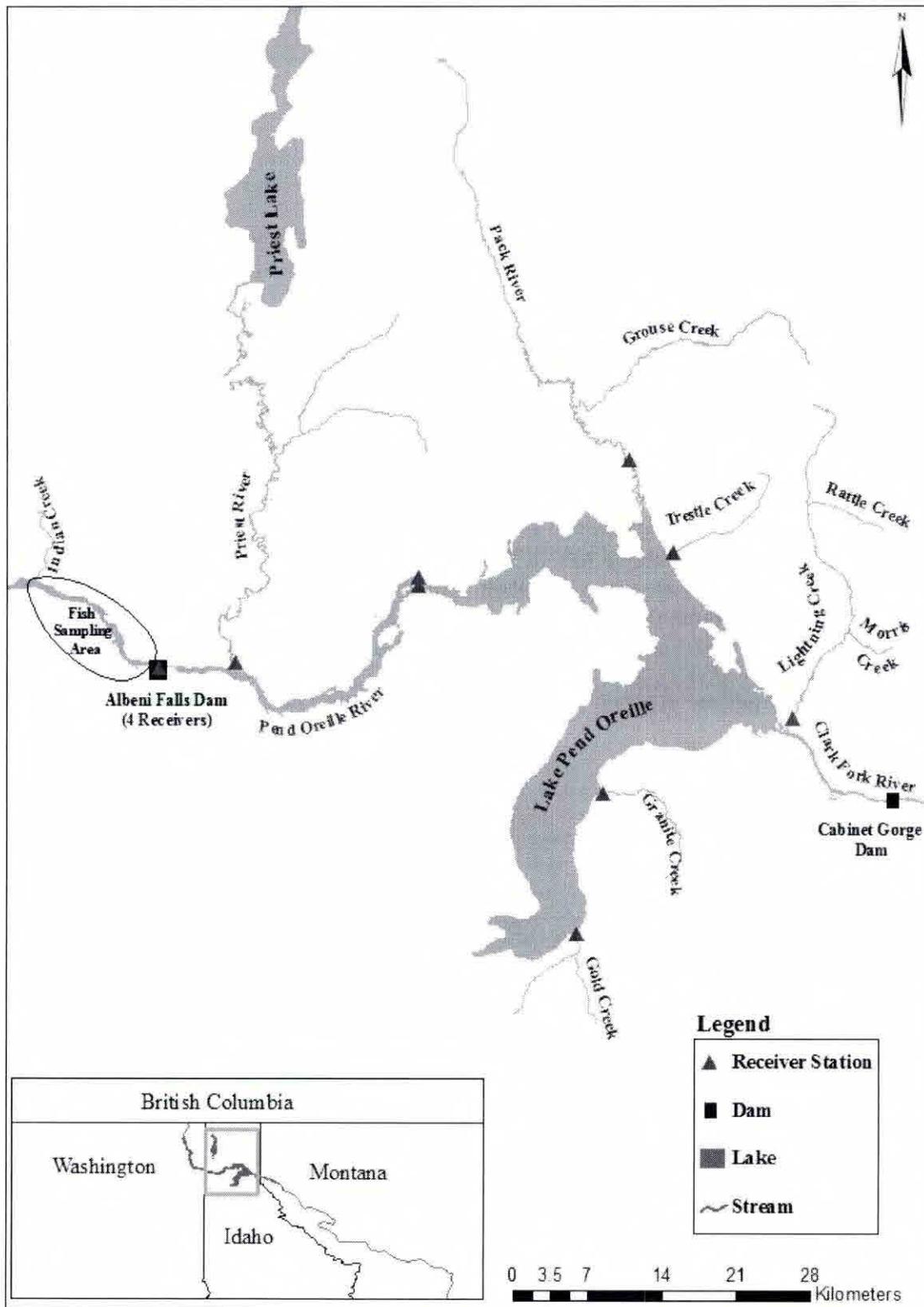


Figure 1. Map of Pend Oreille River and Lake with fisheries surveys area (from Indian Creek to below Albeni Falls Dam) and stationary receiver locations, 2010.

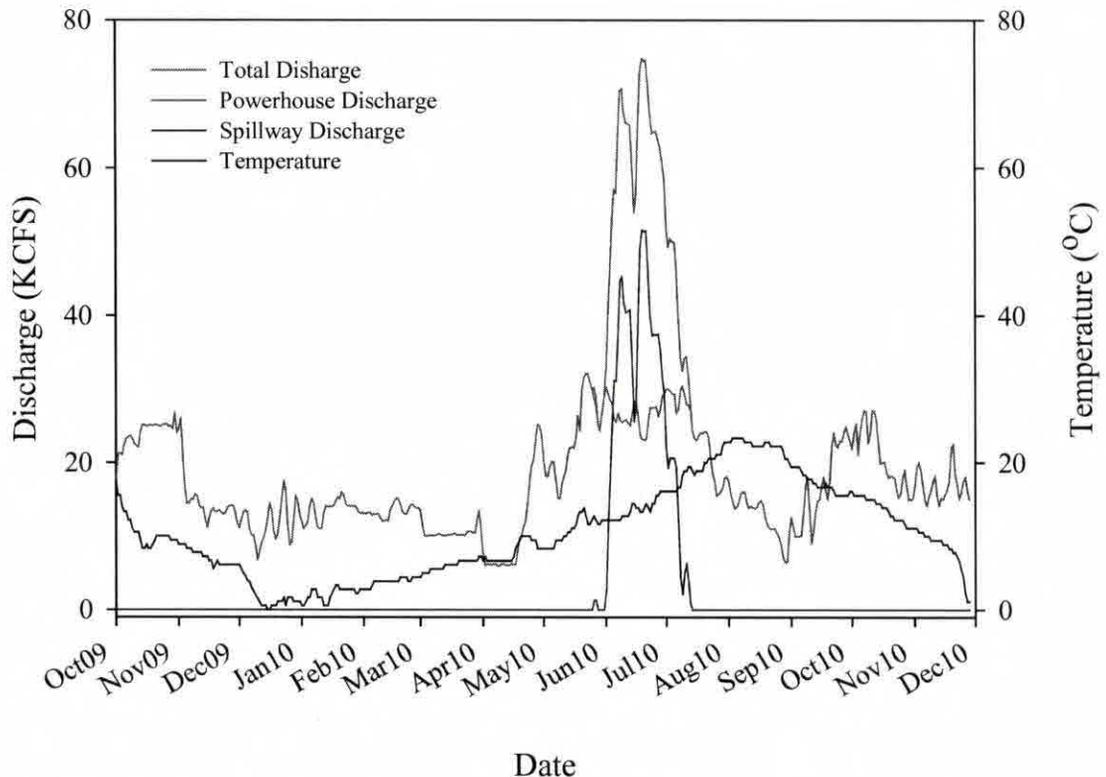


Figure 2. Temperature and discharge data below Albeni Falls Dam, 10/2009-11/2010 (data from www.nwd-wc.usace.army.mil/index.html)

Field Collections

Boat electrofishing, hook and line, and snorkeling methods were employed to capture bull trout from the Pend Oreille River between Indian Creek, Washington (N 48.244 W 117.151) and Albeni Falls Dam, Idaho (N 48.178 W 117.000) in 2010.

Boat electrofishing - Standardized ten minute boat electrofishing surveys (2-4 amps, 250 volts, 120 pps, DC current) were conducted by EWU and KNRD along the north and south shorelines. Sixteen trips were conducted by EWU between 9 April and 29 June 2010 and sixteen trips were conducted by KNRD between 31 March and 12 October 2010. Transects were sampled during both day and night hours.

During sampling all fish were collected and identified to species using dichotomous keys (Wydoski and Whitney 1979, 2003). All fish collected were measured to the nearest mm total length (TL) and released.

Genetic tissue samples were collected from bull trout and cutthroat trout by removing a piece of fin. Samples were preserved in 95% ethanol and sent to the KNRD to be included in

their basin wide microsatellite DNA analysis funded by Bonneville Power Administration (Olson et al. 2004).

Bull Trout Tagging and Relocation

Tagging Procedures – Captured fish were placed in a large cooler (142.5 liters) with fresh water. An oxygen cylinder was used to aerate the water. Ice was used to maintain ambient river temperatures when needed. The lid was kept closed until the fish stabilized and recovered from the capturing stresses. The fish were anesthetized with 70-100 mg/L tricaine methanesulfonate (MS 222). Once the anesthesia took effect (3- 5 minutes) the fish were checked for fin clips and scanned with a PIT tag detector to confirm it had not previously been captured and tagged.

Transmitters were surgically implanted by experienced surgeons using procedures described by McLeod and Clayton (1997) and Brown et al. (1999). The fish were placed in a water soaked foam block with a cut out V-notched cradle. The fish were placed dorsal side down, and water was flushed through the gills using a gravity flow bucket filled with a maintenance solution (40-60 mg/L MS 222). The bucket had a valve at the bottom that was connected to a piece of tubing that was placed into the mouth of the fish. Water was periodically poured over the fishes body during surgery to keep it hydrated. A 2-3 cm longitudinal incision was made three cm anterior to the pelvic fins. A PIT tag (DF TX 1400BE, 12 mm long, 134.KHz) was placed in the body cavity according to standard protocols (CBFWA 1999). A 16-gauge hypodermic needle was inserted through the body wall to the side and posterior to the incision. The transmitter antenna wire was inserted through the hollow needle. Once the needle was removed, the antenna exited the body wall of the fish. The Lotek digitally encoded radio/acoustic transmitter (CART 16_1, 23.8 g, 5 sec burst rate, 663 day tag life or CART 16_2, 31.5 g, 5 sec burst rate, 904 day tag life) operated at a frequency of 151.89 MHz (radio frequency) and 76.8 KHz (acoustic frequency). The Lotek digitally encoded radio transmitters (SR 11-18 8.0g, 5 sec burst rate, 449 day tag life or NTC-6-2, 4.5g, 5 sec burst rate, 441 day tag life) are operating at 151.89 MHz (radio frequency). The decision of which size tag to implant was based on the weight of the fish. Tag weight did not exceed 2% of the fish's weight. The incision was closed using the individual simple sutures method at approximately 1-cm intervals. A veterinary grade liquid Band-Aid (Nexband) was placed over the sutures. The fish were placed in an oxygenated cooler with fresh cold water to recover.

Relocation - The fish were transported by vehicle in an oxygenated cooler to the public boat launch (N 48.176 W 116.904) on the east side of the town of Priest River, Idaho 7.5 km above Albeni Falls Dam. Once the fish has completely recovered, it was released into the water at the boat launch, located on the north bank of the Pend Oreille River about 1 km downstream of its confluence with the Priest River. This location was selected because it is above Albeni Falls Dam, but far enough downstream that it provides an opportunity for the fish to swim up Priest River or continue past towards Lake Pend Oreille.

Tracking

Fish movements were tracked using a combination of fixed receiver ground stations and mobile tracking using; vehicle, aircraft, and boat. The ground receiver stations operated 24 hours a day. A total mobile tracking effort of 135 hours was conducted between 19 May and 18 November 2009. A total of 64 hours of tracking occurred by truck, 15 hours by aircraft, and 56 hours by boat.

Fixed Ground Stations - Twelve radio receiving stations were setup for the study in the spring 2009. Receiver locations and setup were the same as during the 2003 and 2004 study (Geist et al. 2004; Scholz et al. 2005). Sites included: Albeni Falls Dam (4 stations), Mudhole Campground on Priest River (1 station), and the Dover Railroad Bridge (2 stations) approximately 26 km upstream of the Priest River. Five additional stations were set up at the mouths of tributaries to Lake Pend Oreille: Pack River, Trestle, Lightning, Granite, and Gold creeks. Each station consisted of a Lotek SRX-400 or SRX-600 radio receiver connected to aerial Yagi antennas. The receivers were supplied with either AC or DC (12 volt vehicle batteries) power. Solar panels were used to recharge DC power systems. Beacon tags were used at all stationary receiver locations to monitor receiver status. The beacon tags were programmed to transmit a one-minute signal every hour. See Bellgraph and Deters (2007) for a complete summary of installation and details of each station.

EWU worked with landowners to secure access, and to download and maintain stations via hold harmless agreements and/or permission to entry agreements. Agreements were setup with a private landowner at Gold Creek, Idaho Department of Fish and Wildlife at Granite Creek, Idaho Department of Transportation at Lightning Creek, and Idaho Department of Lands at Trestle Creek (\$100 fee for five year agreement).

All fixed receiver stations were inspected and data downloaded April 2010 through early December 2010. Three receivers on the dam, the Mudhole receiver, and South Dover stations were downloaded through March 2011. Data were downloaded using a Lotek *Winhost* program onto a laptop computer, saved and then backed up on a removable thumb drive. After each download, data were examined for active tags, beacon tag signals, and noise. Proper adjustments to the gain were made when necessary. Each station was inspected for damage and repaired if necessary. Beacon and 12 volt batteries were replaced when necessary. Stations were winterized in the middle of December, and then reset at the beginning of March before the April sampling began.

Vehicle Tracking - Tracking by vehicle was conducted 18 times between 6 May and 20 October 2010. A Lotek SRX-600 radio receiver connected to a three element Yagi antenna was used when tracking by truck. The receiver's gain was set at 50 and adjusted as needed. The antenna was attached to the hood of the truck using a Magnetic Roto Antenna Mount manufactured by Midway Telemetry.

Vehicle Route #1- The Priest River was tracked from Idaho S.R. 57 (N 48.180 W116.915) was accessed from US Highway 2. S.R. 57 was followed for about 39 km. The Upper Pack River

Road (N 48.427 W 116.494) was accessed from US Highway 2. The Upper Pack River Road was followed for approximately 31 km. Trestle Creek Road (N 48.283 W 116.349) and Lightning Creek Road (N 48.290 W 116.548) were directly accessed from ID S.R. 200 and used to track Trestle Creek and Lightning Creek for 10- 15 km.

Vehicle Route #2 - The Upper Pack River Road was followed for approximately 31 km. Trestle Creek Road (N 48.283 W 116.349) and Lightning Creek Road (N 48.290 W 116.548) were directly accessed from ID S.R. 200 and used to track Trestle Creek and Lightning Creek for 10- 15 km.

Aircraft Tracking - Tracking by aircraft was conducted using a Cessna C-182 chartered from Northern Air, Inc Bonners Ferry, ID. A Lotek SRX-600 radio receiver connected to a two element Yagi antenna externally mounted under each wing was utilized for aerial tracking. The receiver's gain was set at 50 and adjusted as needed. Five flights were conducted between 13 July and 14 October 2010.

Flight Route #1 – Flights left the Sandpoint Airport, ID at 9:00 am followed the Pend Oreille River downstream to the Priest River (N 48.176 W 116.912). The flight turned up the Priest River to Priest Lake (N 48.415 W 116.923). The Priest River was followed on the return route to the Pend Oreille River, during which the flight branched off to track along the Upper West Branch of the Priest River (N 48.415 W 116.923), East River (N 48.353 W 116.853), North Fork East River (N 48.371 W 116.820) and the Middle Fork East River (N 48.371 W 116.820). Upon returning to the Pend Oreille River, the flight continued up the Pend Oreille River to Lake Pend Oreille (N 48.240 W 116.602). The flight followed along the North shore of Lake Pend Oreille to the mouth of the Pack River (N 48.320 W 116.383). The flight followed the Pack River for approximately 45 km. The Pack River was followed on the return to Lake Pend Oreille. The flight continued along the north shore of Lake Pend Oreille to Lightning Creek (N 48.141 W 116.191). The flight continued approximately 23 km up Lightning Creek, with passes over its tributaries of Rattle Creek (N 48.326 W 116.173) and Morris Creek (N 48.224 W 116.116). The flight returned back down Lightning Creek to Lake Pend Oreille. The flight passed over Lake Pend Oreille on its return to Sandpoint Airport.

Flight Route #2 – Flights left the Sandpoint Airport, ID at 9:00 am followed the Pend Oreille River downstream to the Priest River (N 48.176 W 116.912). The flight turned up the Priest River to Priest Lake (N 48.415 W 116.923). A grid was flown over all the tributaries between Priest Lake and the Pend Oreille River. Upon returning to the Pend Oreille River, the flight continued up the Pend Oreille River to Lake Pend Oreille (N 48.240 W 116.602). The flight followed along the North shore of Lake Pend Oreille to the mouth of the Pack River (N 48.320 W 116.383). The flight followed the Pack River for approximately 45 km. The Pack River was followed on the return to Lake Pend Oreille, with the route branching at Grouse Creek (N 48.402 W 116.478). The flight continued along the north shore of Lake Pend Oreille to Lightning Creek (N 48.141 W 116.191). The flight continued approximately 23 km up Lightning Creek, with passes over its tributaries of Rattle Creek (N 48.326 W 116.173) and Morris Creek (N 48.224 W 116.116). The flight returned back down Lightning Creek to Lake Pend Oreille. The flight passed over Lake Pend Oreille on its return to Sandpoint Airport.

Boat Tracking – Four boat tracking surveys were conducted by PNNL between 20 July and 28 October 2010, EWU assisted on two of these surveys. A Lotek SRX-400 radio receiver was connected to a three element Yagi antenna and a Lotek SRX 600 receiver was connected to a LHP hydrophone during tracking by boat. Complete details of boat tracking can be found in Bellgraph and Ortega (2011).

Genetic Analysis

Rapid Response Genetic Identification - Genetic samples from each bull trout were shipped to the USFW Service Abernathy Fish Technology Center for rapid genetic analysis. Each genetic sample was compared to a genetic baseline data set of 2,020 bull trout from 37 known populations within the Lake Pend Oreille and Clark Fork River system of northern Idaho and northwestern Montana. The watershed is divided into four regions: Region 1 includes tributaries to the Pend Oreille River, Lake Pend Oreille and the Clark Fork River up to Cabinet Gorge Dam, Region 2 contains Clark Fork River tributaries from Cabinet Gorge Dam to Noxon Rapids Dam, Region 3 contains Clark Fork River tributaries from Noxon Rapids Dam to Thompson Falls Dam and Region 4 contains all Clark Fork River tributaries above Thompson Falls Dam (DeHaan and Arden 2008). Baseline allele frequency data for each population was determined by genotyping all fish in 12 highly polymorphic microsatellite loci (DuPont et al. 2007).

A modified Chelex protocol was used to extract DNA from genetic samples (Miller and Kapuscinski 1996). DNA extracted at 12 microsatellite loci; *Omm1070*, *Omm1128*, *Omm1130* (Rexroad et al. 2001), *Sco104*, *Sco105*, *Sco106*, *Sco107*, *Sco200*, *Sco212*, *Sco216*, *Sco218* (DeHaan and Arden 2005) and *Smm22* (Crane et al. 2004) was amplified using polymerase chain reaction (PCR). PCR reactions were carried out in 15 µl volumes containing 2 µl template DNA, 1X polymerase buffer (10mM Tris-HCl, 50mM KCl, 0.1% Triton X-100), 1.5 or 2.0mM MgCl₂, 0.2mM of each dNTP, 0.5µM of each primer and 0.2 units of GoTaq DNA polymerase (Promega Co.) (DeHaan and Arden 2008). Initial denaturation of DNA occurred for 3 minutes at 94 °C, followed by 38 one second cycles at 94 °C, primer specific annealing temperature for 30 seconds and primer extension for 30 seconds at 72°C, and a final extension of 7 minutes at 72°C. Applied Biosystems fluorescent dyes were used to label all forward primers. The loci produced during PCR were pooled into three multiplex sets and run on an AB 3130xl genetic analyzer. *Genemapper v4.0* (Applied Biosystems Inc.) software was used to determine multi-locus genotype of each bull trout. Genotyping error was minimized by running a positive control (a fish with a known genotype), a negative control (a sample containing no DNA), and duplicates of each sample being analyzed (DeHaan and Arden 2008).

Natal Tributary Assignment - Population assignment techniques implemented via the program *Whichrun v4.1* (Banks and Eichert, 2000) were used to determine the first and second most likely population of origin from within the genetic baseline dataset for each individual fish (DeHaan and Arden 2008).

Results

A synoptic list of fish collected during the Pend Oreille River survey in 2010 is summarized (Table 1). In 2010, a total of 2,631 fish were collected via boat electrofishing in the Pend Oreille River, which represented 22 species, during 50.1 total hours of boat electrofishing (Table 2) and 29 hours of angling (Table 3). Three bull trout were collected between 19 May and 26 June 2010. Three fish were implanted with a SR11-18 tag and a PIT tag (Table 4). Two fish implanted with a tracking tag were released at the Priest River boat launch, 7.5 km above Albeni Falls Dam. A summary of the movements of each fish released above the dam are summarized below (Table 5).

Table 1. Synoptic list of fish captured during Pend Oreille River surveys 2010.

Family	Species	Scientific Name
Cyprinidae	Northern pikeminnow	<i>Ptychocheilus oregonensis</i> (Richardson, 1836)
	Peamouth	<i>Mylocheilus caurinus</i> (Richardson, 1836)
	Tench	<i>Tinca tinca</i> (Linnaeus, 1758)
Catostomidae	Largescale sucker	<i>Catostomus macrocheilus</i> (Girard, 1856)
	Longnose sucker	<i>Catostomus catostomus</i> (Forster, 1773)
Ictaluridae	Brown bullhead	<i>Ameiurus nebulosus</i> (Lesueur, 1819)
Esocidae	Northern pike	<i>Esox lucius</i> (Linnaeus, 1758)
Salmonidae	Brook trout	<i>Oncorhynchus fontinalis</i>
	Brown trout	<i>Salmo trutta</i> (Linnaeus, 1758)
	Bull trout	<i>Salvelinus confluentus</i> (Suckley, 1858)
	Cutthroat trout	<i>Oncorhynchus clarki</i> (Richardson, 1836)
	Kokanee	<i>Oncorhynchus nerka</i> (Walbaum, 1792)
	Lake trout	<i>Salvelinus namaycush</i> (Walbaum, 1792)
	Lake whitefish	<i>Coregonus clupeaformis</i> (Mitchell, 1818)
	Mountain whitefish	<i>Prosopium williamsoni</i> (Girard, 1856)
	Rainbow trout	<i>Oncorhynchus mykiss</i> (Walbaum, 1792)
Centrarchidae	Black crappie	<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)
	Largemouth bass	<i>Micropterus salmoides</i> (Lacepède, 1802)
	Pumpkinseed	<i>Lepomis gibbosus</i> (Linnaeus, 1758)
	Smallmouth bass	<i>Micropterus dolomieu</i> (Lacepède, 1802)
Percidae	Walleye	<i>Sander vitreus</i> (Mitchell, 1818)
	Yellow perch	<i>Perca flavescens</i> (Mitchell, 1814)

Table 2. Electrofishing mean total length (mm), range in total length (mm), and relative abundance (RA) of fish captured in the Pend Oreille River, 2010 (effort = 50.1 hrs).

Family	Species	N	RA (%)	Average TL (SD)	Range TL (mm)
Cyprinidae	Northern pikeminnow	284	10.00	293 (151)	220-312
	Peamouth	41	1.56	287 (75)	85-395
	Tench	65	2.47	354 (80)	117-462
Catostomidae	Largescale sucker	379	14.41	462 (76)	60-571
	Longnose sucker	103	3.91	376(125)	32-497
Ictaluridae	Brown bullhead	11	0.42	267 (25)	172-286
Esocidae	Northern pike	13	0.49	564 (188)	325-885
Salmonidae	Brook trout	1	0.04	127 (0)	127
	Bull trout	3	0.11	520 (57)	454-553
	Brown trout	264	10.03	216 (77)	40-643
	Kokanee	6	0.23	203 (41)	135-320
	Lake trout	2	0.08	489 (22)	473-504
	Lake whitefish	12	0.46	450 (53)	295-505
	Mountain whitefish	779	29.61	205 (54)	70-510
	Rainbow trout	43	1.63	393 (128)	134-690
	Westslope cutthroat	26	0.99	365 (65)	210-473
	Centrarchidae	Black crappie	5	0.19	127(12)
Largemouth bass		10	0.38	354 (79)	231-457
Pumpkinseed		15	0.57	117 (13)	90-140
Smallmouth bass		417	15.85	269 (74)	67-492
Percidae	Walleye	12	0.46	446 (116)	300-695
	Yellow perch	161	6.12	168 (49)	56-320
		2,631	100.00		

Table 3. Hook and line fishing mean total length (mm), range in total length(mm), and relative abundance of fish capture in the Pend Oreille River, ID, USA, 2010 (effort=29 hrs)

Family	Species	N	RA (%)	Average TL (SD)	Range TL (mm)
Cyprinidae	Northern pikeminnow	1	10	390	390
Salmonidae	Rainbow trout	1	10	358	358
Centrarchidae	Smallmouth bass	8	80	244 (39)	182-295
		10	100		

Table 4. Capture date, total length (TL), weight (WT), sex, tag type, and tag codes for bull trout captured below Albeni Falls Dam during 2010/2011 via electrofishing.

Fish #	Captured	TL (mm)	WT (g)	Sex	Pit tag #	Radio tag	Code#
BT-3	5/19/10	552	1,402	m	985121010215648	SR 11-18	151
BT-4	3/31/10	553	1,615	u	985121010226514	SR 11-18	166
BT-5	6/29/10	454	857	u	985121002170427	SR 11-18	178

Table 5. Tag code, detection location, date, and current status for bull trout captured in the Pend Oreille River below Albeni Falls Dam during 2008/2009.

Fish #	Code #	Location of last detection	Last Detection	Status
BT-1	126	Lake Pend Oreille halfway between Hope and Clark Fork, ID	6/12/2008	In Lake Pend Oreille
BT-2	108	Lighting Creek Receiver	5/28/2008	Returned to Lake Pend Oreille
BT-3	151	n/a	n/a	Dead
BT-4	166	Pack River Receiver	9/22/2008	In Pack river
BT-5	178	Mudhole Receiver	10/13/2009	In Priest River

Bull Trout #1 (BT-1) - The first bull trout was captured 0.88 km (N 48.177 W 117.010) below the dam on 19 May 2008 by KNRD. It had a total length of 505 mm, weight of 1,178 g, and the sex was undetermined. A CART 16_2s tag (#126) and PIT tag (#985121002196227) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-1 to be Grouse Creek and Trestle Creek was determined to be the secondary possible natal tributary. BT-1 was released on 19 May 2008 at the Priest River boat launch. During the next twenty three days BT-1 traveled 26.5km between its release site and the Dover receiver stations. BT-1 was recorded passing the South Dover station between 11 June 2008 21:14:16 and 12 June 2008 04:04:47 and the North Dover station between 11 June 2008 21:28:58 and 12 June 2008 04:30:41. There is an overlap in the coverage areas of the North and South Dover stations, resulting in simultaneous detections at both stations. BT-1 was detected during boat tracking on 30 September 2009 and 20 October 2009 approximately 4 km west of the Clark Fork River and on 24 August, 13 September, and 27 October 2010 on the west shoreline of Lake Pend Oreille (N 48.186 W 116.375), half way between Clark Fork, ID and Hope, ID (Figure 3). Transmissions for tag #126 were expected to last into November 2010.

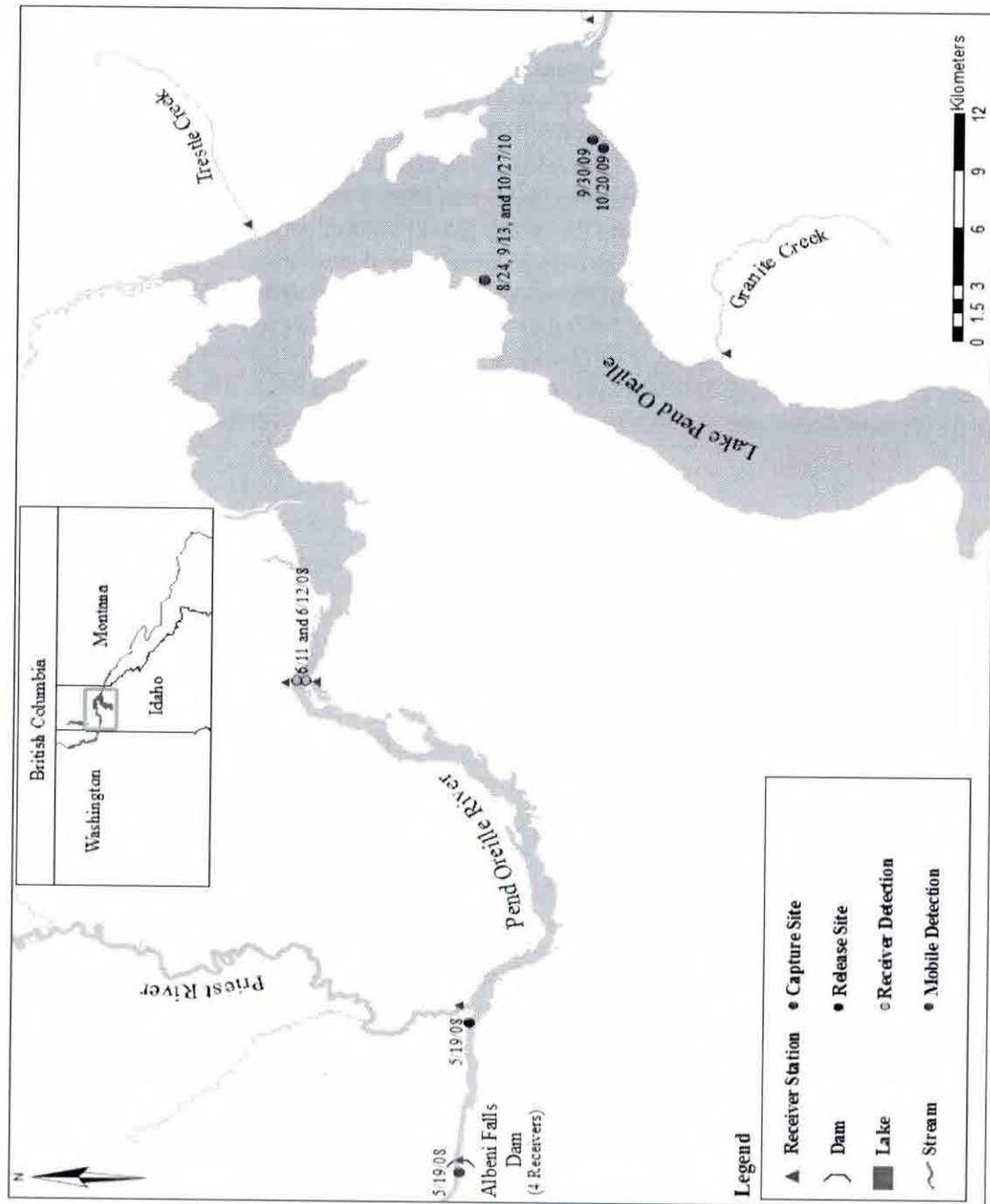


Figure 3. Detection map of BT-1 in Lake Pend Oreille, ID and tributaries of the lake from 2008-2010.

Bull Trout #2 (BT-2) - The second bull trout was captured 4 km (N 48.195 W 116.035) below the dam on 18 June 2008 by EWU. It had a total length of 496 mm, weight of 1,241 g, and the sex was determined to be female. A CART 16_1 tag (#108) and PIT tag (# 985121002194596) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-2 to be Rattle Creek and secondary possible natal tributary was Morris Creek. Both Rattle Creek and Morris Creek are tributaries of Lightning Creek. BT-2 was released on 18 June 2008 at the Priest River boat launch. During the five hours following being released BT-2 traveled 1 km between the boat launch and the Priest River. Detections were recorded on the Mudhole receiver on 18 June 2008 between 20:35:46 and 21:11:22. A second set of detections were recorded at the Mudhole receiver between 4 July 2008 23:22:42 and 5 July 2008 00:22:52. Analysis of detection signal strengths do not indicate BT-2 passed upstream into the Priest River. No detections were recorded for BT-2 during the 16 days between detections at the Mudhole receiver. During the twenty hours following the second set of detections at the Mudhole receiver, BT-2 traveled 25.5 km to the North Dover station. Detections for BT-2 were recorded as the North Dover station was passed on 5 July 2008 between 20:50:36 and 21:20:03. On 22 September 2008 at 15:12 from the Cabinet Gorge Dam approximately 1.6 km downstream of Cabinet Gorge Dam. On 25 September 2008 BT-2 was detected between 9:50 and 21:00 at Cabinet Gorge Dam. On 26 September 2008 detections of BT-2 occurred approximately 4.8 km downstream of Cabinet Gorge Dam. BT-2 was caught in a gill net by Idaho Fish and Game (IDFG) near Bayview, ID (N 47.970 W 116.530) on 25 March 2010. This fish was released in good condition. IDFG measured BT-2 at 575 mm. BT-2 was detected passing the Lightning Creek station on 25 April 2010 at 19:41. BT-2 continued to travel up Lightning Creek over the next fifty-five days. On 18 June 2010 BT-2 was detected in Rattle Creek about 100m upstream of Lightning Creek. On 25 June 2010 BT-2 was detected in Lightning Creek at the mouth of Rattle Creek. On 6 July 2010 BT-2 was detected in Rattle Creek about 150 m upstream of Lightning Creek. On 13 July 2010 BT-2 was detected in Rattle about 300 m upstream of Lightning Creek. Between 3 August 2010 and 14 September 2010 BT-2 was located in Rattle Creek, approximately 1 km upstream from Lightning Creek. On 7 September 2010, BT-2 was located in Rattle with a male bull trout. On 28 September 2010 at 15:45 BT-2 was located in Lightning Creek approximately 3.4 km upstream from the Lightning Creek station and at 21:26 was detected passing the Lightning Creek station moving downstream back into Lake Pend Oreille (Figure 4).

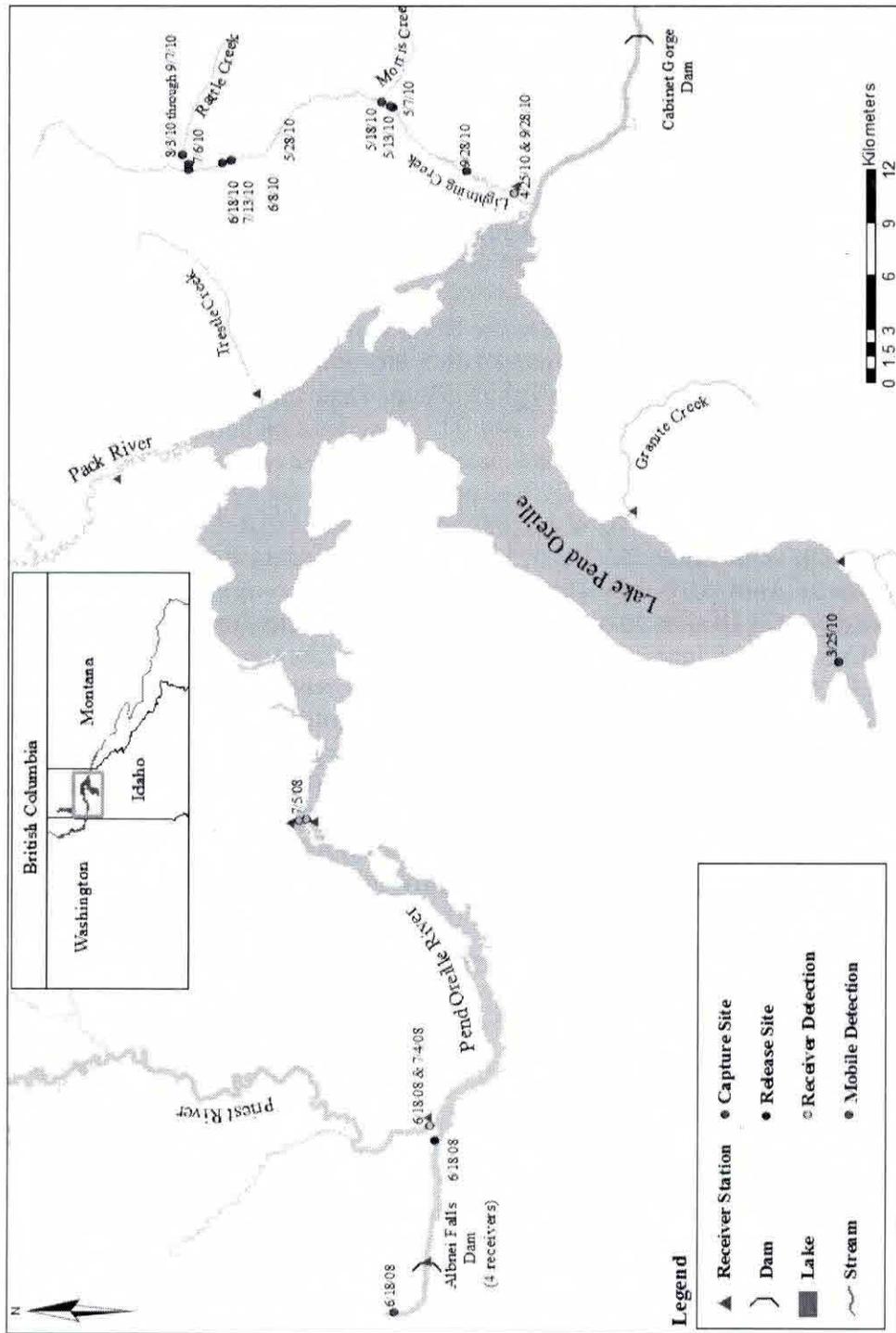


Figure 4. Detection map of BT-2 in Lake Pend Oreille, ID and tributaries of the lake from 2008-2010.

Bull Trout #3 (BT-3) - The third bull trout was captured 1.0 km (N 48.177 W 117.010) below the dam on 31 March 2010 by KNRD. It had a total length of 553 mm, weight of 1,615 g, and the sex was undetermined. A SR 11-18 tag (#166) and PIT tag (#985121010226514) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-3 to be Lightning Creek and the secondary possible natal tributary was Grouse Creek. BT-3 was released on 31 May 2010 at the Priest River boat launch. During the next three days BT-3 traveled 26.5km between its release site and the Dover receiver stations. BT-3 was recorded passing the North and South Dover station on 3 April 2010 between 16:06:08 and 16:20:15. There is an overlap in the coverage areas of the North and South Dover stations, resulting in simultaneous detections at both stations. BT-3 was detected passing the Pack River station on 9 June 2010 at 11:04:34. The next detection occurred during a flight over the Pack River, approximately 28 km (N 48.566 W 116.606) upstream of the Pack River station on 13 July 2010 at 11:16:25. The next two detections of BT-3 occurred during vehicle tracking. The first on 19 July 2010 at 17:05:44 approximately 33 km upstream of the Pack River station (N 48.578 W 116.613) and the second approximately 35.5 km upstream of the receiver station (N 48.595 W 116.633) on 27 July 2010 at 16:09:54. BT-3 was detected during the next two flights over the Pack River. The first occurred approximately 36 km upstream of the Pack River station (N 48.598 W 116.636) on 3 August 2010 at 10:40:06 and the second occurred approximately 29 km upstream of the receiver station (N 48.572 W 116.609) on 7 September 2010 at 11:30:22. BT-3 was detected during vehicle tracking on 20 September 2010 12:35:01 and 28 September 2010 at 12:14:08. Both detections were approximately 29.5 km upstream (N 48.574 W 116.611 and N 48.573 W 116.611) of the Pack River station. On 13 October 2010 at 17:13:42, BT-3 was located in Grouse Creek (N 48.480 W 116.238) approximately 22 km upstream from Pack River. The last detection of BT-3 occurred at the Pack River Station on 20 October 2010 (Figure 5).

Bull Trout #4 (BT-4) - The fourth bull trout was captured 1.50 km (N 48.175 W 117.020) below the dam on 19 May 2010 by KNRD. It had a total length of 552 mm, weight of 1,402 g, and the sex was undetermined. A SR 11-18 tag (#151) and PIT tag (#985121010215648) were implanted in this fish. BT-4 had a large hump on its dorsal side between its head and dorsal fin. BT-4 did not fully recover after the surgery and was unable to right itself in the live well. This fish was kept overnight without any improvement. BT-4 died the next day. An x-ray of this fish showed it had a vertical break in its spine.

Bull Trout #5 (BT-5) - The fifth bull trout was captured 1.0 km (N 48.177 W 117.011) below the dam on 29 June 2010 by EWU. It had a total length of 454 mm, weight of 857 g, and the sex was undetermined. A SR-11-18 tag (#178) and PIT tag (#985121002170427) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-5 to be Morris Creek and East Fork of Lightning Creek was determined to be the secondary possible natal tributary. BT-5 was released on 29 June 2010 at the Priest River boat launch. An hour and eighteen minutes after being released, BT-5 was detected traveling past the Mudhole station at 12:18:50 on 30 June 2010. BT-5 was detected approximately 17 km upstream from the Mudhole station (N 48.268 W 116.858) during a flight over the Priest River on 13 July at 10:38:46. The last detection of BT-5 occurred on the upstream antennas of the Mudhole station on 25 July 2010 at 15:38:27 (Figure 6).

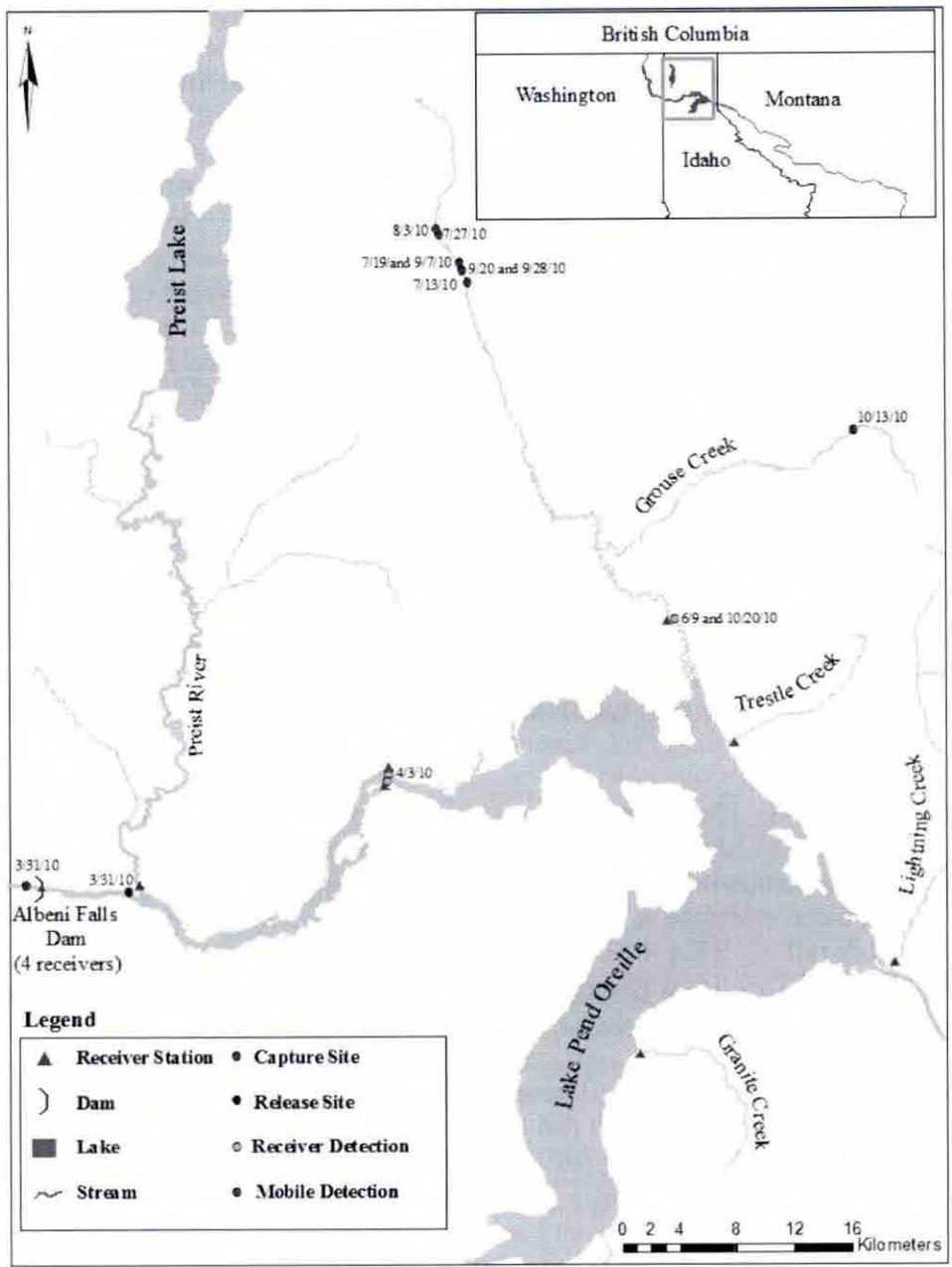


Figure 5. Detection map of BT-3 in Lake Pend Oreille, ID and tributaries of the lake from 2010.

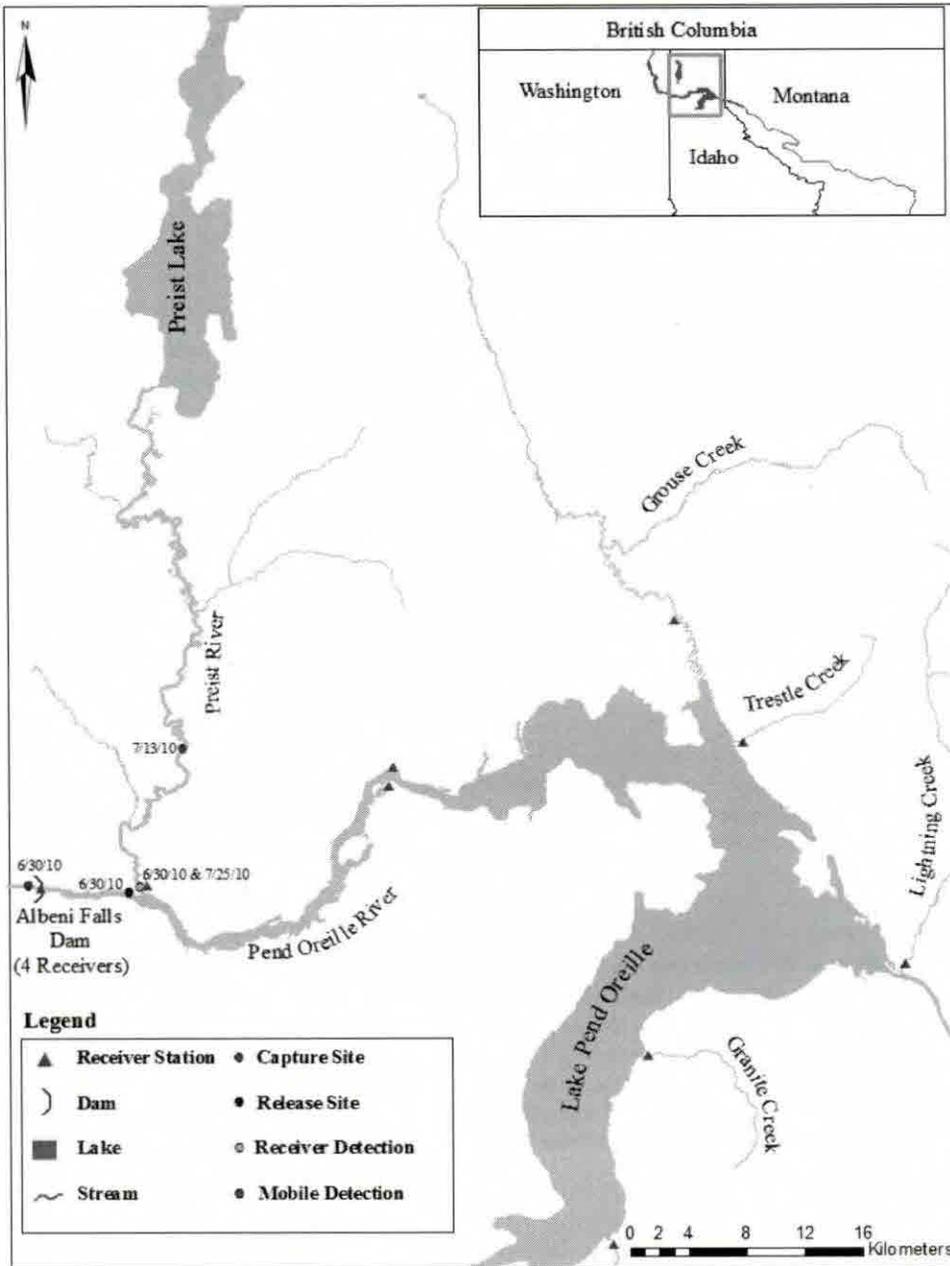


Figure 6. Detection map of BT-5 in Pend Oreille River and Priest River, ID 2010.

Between 2004 and 2010, eight of the ten bull trout captured below Albeni Falls Dam were released above the dam. Of these eight fish, four were detected in the primary genetically predicted natal tributary and one was detected in the secondary predicted natal tributary. Sixty-three percent of the bull trout relocated above Albeni Falls Dam returned to a genetically predicted tributary. Statistical analysis comparing the returns to tributaries found on bull trout released above Milltown Dam by Swanberg (1997) and Schmetterling (2003) and the returns to tributaries in this study indicated no significant difference ($\chi^2_{0.05,2}=5.991$ $\chi^2_c=3.901$ $p=0.192$).

Discussion

In 2007, EWU, KNRD, and PNNL began a four year study to determine movements and genetic assignments of bull trout in the tailrace of Albeni Falls Dam. The primary objective was to capture bull trout below Albeni Falls Dam, transport and release them above the dam and monitor their movements to natal tributaries. Radio and acoustic tracking would provide information on movement patterns of bull trout once moved above the dam and allowed to migrate to their natal tributaries in the Pend Oreille sub-basin. Genetic analysis would confirm the identity of their natal tributary as well as confirm that their origin was from above Albeni Falls Dam.

Two of the four fish tagged in 2008 remained in the study area above the dam and two fish tagged in 2010 were released upstream of the dam. Attempts to locate these fish were made using fixed ground receiver stations and mobile tracking by aircraft, boat, and vehicle.

BT-1 was recorded entering Lake Pend Oreille, but not detected entering any of the tributaries. This fish may not have been sexually mature in the year it was tagged. The sex of BT-1 was unable to be determined. Had BT-1 been sexually mature its sex, it would most like have been identified at the time it was tagged, either by display of secondary sexual characteristics or viewing of reproductive organs during the tagging procedure. In the fall of 2009 BT-1 was detected in Lake Pend Oreille approximately 4 km west of the Clark Fork River. BT-1 remained in this area for about a month. A number of lake trout were detected in this area. This fish may have been feeding in this area or been attracted to lake trout spawning in the area. At the time it was also thought this fish may have died since it remained in the same area for a long period of time. However, this was not the case. BT-1 was detected again in Lake Pend Oreille on the west shoreline half way between Clark Fork, ID and Hope, ID. This location was about 8.9 km west of the detection locations from 2009. Detections occurred at this location for three months. No detections occurred for this fish after the last detection in Lake Pend Oreille.

BT-2 was a sexually mature female. This fish was assigned to Rattle Creek, a tributary of Lightning Creek. Detections of this fish occurred upstream from Lightning Creek, in the Clark Fork River during late September. During flights over Lightning Creek between mid-August through mid-October, it was observed that the mouth of Lightning Creek had insufficient water flow to allow of passage to tributaries located upstream (Figure 7). This fish was located near the Cabinet Gorge Fish Hatchery, which has several cold water springs that enter the river. It is likely this fish was attracted to the cold water flow since passage to its natal tributary was blocked. No detection of this fish occurred in 2009. Fortunately, this tag kept transmitting its signal past the expected expiration date. On 25 March 2010 BT-2 was caught in a gill net by IDFG during a survey in Lake Pend Oreille. BT-2 was in good condition after being captured in the net and was released in the lake. This fish had grown 97 mm since it was implanted with the radio tag. Over the next month, BT-2 traveled approximately 40 km and was recorded passing the Lightning Creek receiver station on 25 April 2010. The progress of BT-2 up Lightning Creek was followed over the next three months. BT-2 was found in Rattle Creek, the primary genetically predicted tributary of this fish, between 3 August 2010 and 14 September 2010. On 7 September 2010, BT-2 was seen in Rattle Creek with a male bull trout (Figure 8). These fish

were found in a pool of water below a small water fall (Figure 9). The water in this pool was 8.5 °C, 10-20 cm deep water, with varying size gravel bedding. There were several spots within this pool that appeared to be redds. Since this was ideal habitat for bull trout spawning and BT-2 was spotted with a male bull trout, it is likely BT-2 spawned in this pool.

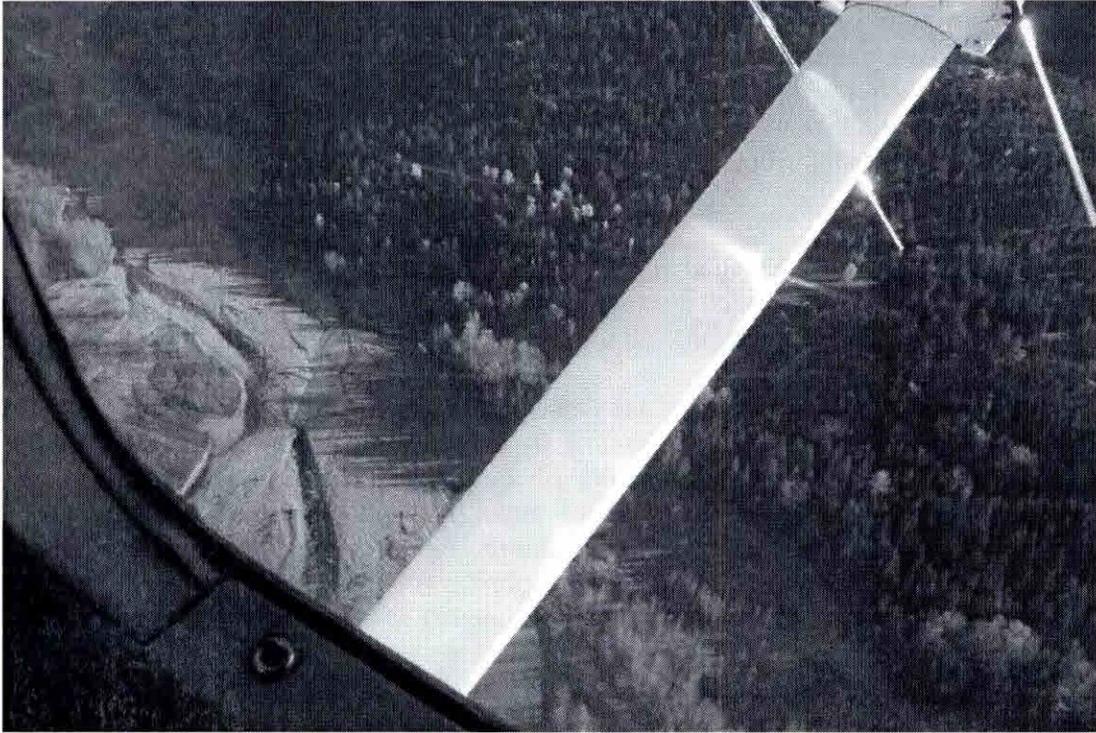


Figure 7. Lightning Creek approximately 1 km upstream from its confluence with Clark Fork River on 9/27/08.



Figure 8.BT-2 located in Rattle Creek on 9/7/2010 with male bull trout.



Figure 9. Pool in Rattle Creek where BT-2 and male bull trout were located, oval indicates location of fish.

Based on its size, BT-3 was an adult fish and would of most like spawned in the fall of the 2010. BT-3 was recorded passing the Pack River station in the late spring. This fish did not enter Grouse Creek and continued upstream in the Pack River. Detection of BT-3 occurred in the Upper Pack River from 19 July through 20 September 2010. BT-3 entered Grouse Creek as it migrated back down the Pack River. On 13 October 2010, BT-3 was detected in Grouse Creek approximately 22 km upstream of the Pack River. Grouse Creek was the secondary natal tributary predicted by genetic analysis. Lightning Creek was the primary predicted tributary. It was 2.49 times more likely to be from Lightning Creek than Grouse Creek. This fish was most likely the offspring of bull trout from Grouse Creek and a bull trout that strayed into Grouse Creek from Lightning Creek. BT-3 was detected on the upstream antennae on the Pack River Station on 20 October 2010. It is uncertain if this fish remained in the Pack River or returned to the Lake Pend Oreille sometime after the Pack River receiver was removed.

BT-4 did not recover after the transmitter tag was surgically implanted. Later examination showed this fish had a broken spine (Figure 10). This type of break to the spine is not consistent with spinal damage due to electrofishing. Damage to the spine from electrofishing often compressed and fractured vertebrae and detached small bones in the area of the injury (Sharber and Caroters 1988; Sharber et al 1994; Ainslie et al 1998; Habera and Strange 1999). Brand marks posterior to the position of a spinal injury from electrofishing are an external indication of damage (Ainslie et al 1998). The x-ray of BT-4 did not show signs of compressed

vertebrae or detached bones. There were no brand marks on BT-4. The hump anterior to the dorsal fin on BT-4 was an indication of an injury. This hump was present at the time BT-4 was netted. Had the injury occurred from the electrofishing, it is unlikely the hump on BT-4's back would have formed in the few seconds that passed between being shocked and netted. BT-4 may have sustained its injury while passing through Albeni Falls Dam.

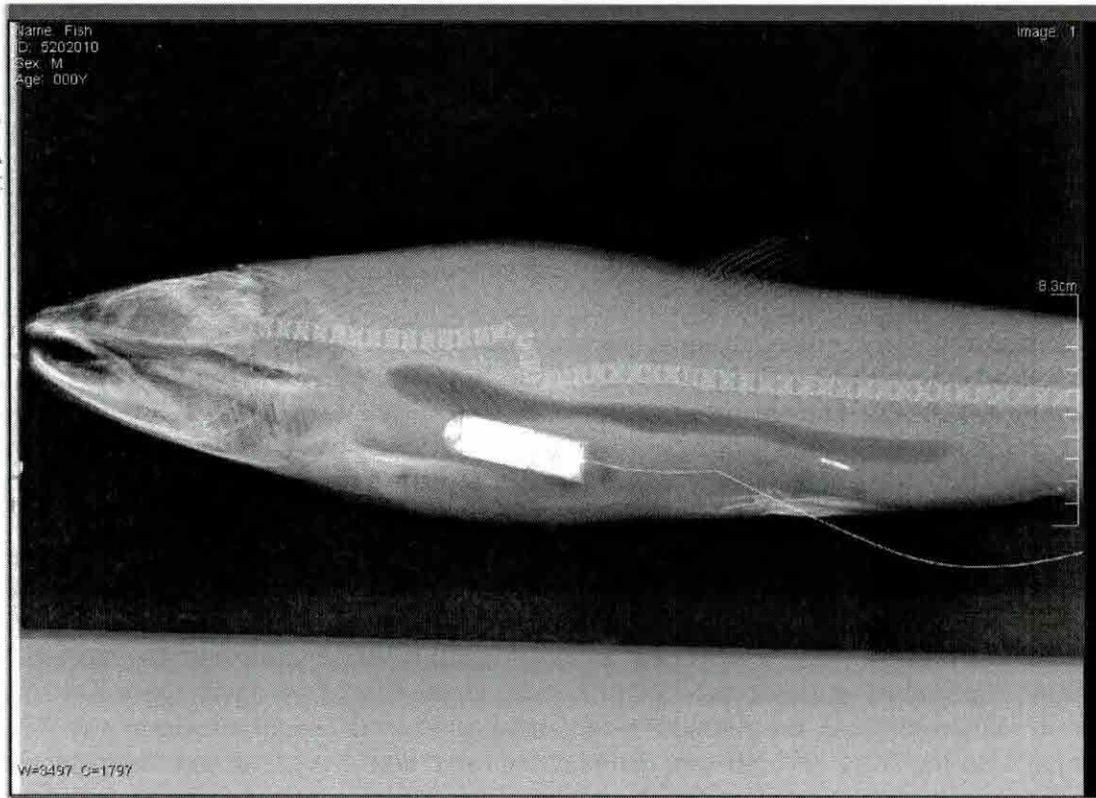


Figure 10. X-ray of BT-4 showing injury to spine.

BT-5 was an adult fish that was captured late in the sampling season. This fish swam past the Mudhole receiver an hour and eighteen minute after being released. The water temperature was just under 16°C. This fish most likely was attracted to cooler water flowing out of the Priest River. This fish was detected 17 km upstream of the Mudhole receiver thirteen days after passing the Mudhole receiver. The last detection occurred twelve days later on the upstream antennae at the Mudhole receiver. It is likely this fish was attempting to return to the Pend Oreille River but encountered waters above its thermal zone of tolerance and did not pass the Mudhole station. Three flights were taken over the Priest River area after the last detection at the Mudhole receiver. All areas of known bull trout population were thoroughly checked during these flights. On the last flight a grid pattern was flown over the whole Priest River area. No detection of this fish occurred. This fish may have found a deep pool of cool water that was too deep to detect during the flights or it may have been lost to the study through predation or poaching. Since it was never recorded passing the Mudhole receiver, even after water temperatures dropped in the whole basin, it is more like to have been lost through predation or poaching.

Five of the eight tagged fish returned to a genetically predicted natal tributary. There was no statistical difference between the 76% return rate reported by Swanberg (1997) and 73 % return rate reported by Schmetterling (2003) and the 63% return rate of the bull trout relocated above Albeni Falls Dam. Three of the tagged bull trout in this study were not detected entering a tributary. BT-1 was detected in Lake Pend Oreille but not in a predicted tributary. It cannot be said for certain that this fish did not enter a tributary. The year that this fish was tagged, there was no receiver on the Pack River. It is possible this fish could have entered and left Grouse Creek between mobile tracking surveys. In 2008, a bull trout (code 172) collected below the dam was immature at time of capture and was not expected to return spawn the year it was tagged. The tag implanted in this fish had stopped transmitting prior to the following years spawning season. Since this fish was not expected to return to a tributary before its tag stopped transmitting, recalculation of the percent of returns to a tributary without this fish is 71%. This return rate matches more closely with those found by Swanberg (1997) and Schmetterling (2003). There is no way to determine if this fish ever entered a tributary. BT-5 is the only fish that most likely did not entered a genetically predicted tributary. This fish likely sought out a cold water refuge after being released above the dam. BT-5 entered the Priest River and was never detected re-entering the Pend Oreille River. Extensive effort was put in to finding this fish after the last detection on the upstream antennae of the Mudhole receiver. It is possible there was a malfunction with the tag. If this was the case BT-5 may have left the Priest River and return to a tributary of Lake Pend Oreille. There is no way to predict for sure what happened to BT-5.

During the 2010 sampling a low number of bull trout were collected. We suspect the number of bull trout passing over the dam is related to the amount and timing of the discharge. The amount of snow in 2010 was below average (Idaho Northern Panhandle Region was 79% of normal, Flathead River Basin was 79% of normal, Upper Clark Fork River Basin was 70% of normal, Bitterroot River Basin was 61% of normal, and Lower Clark Fork Basin was 66% of normal). During 2010, the high flow period did not start until early June and continued until water temperatures exceeded our 16°C sampling temperature cutoff. The snow levels for 2011 are above average. We expect an early high flow this year, which may increase the number of bull trout we are able to collect.

As of 11 April 2011, the percent of average accumulation of precipitation (Snotel Internet Site, 2011) in the Idaho Northern Panhandle Region, based on 6 of 10 stations reporting, was 122% of normal with a 125% snow water equivalent. In Montana, the percent of average accumulation of precipitation in the Flathead River Basin, based on 15 of 16 stations reporting, was 125% of normal with a 140% snow water equivalent. The Upper Clark Fork River Basin, based on 15 of 15 stations reporting, was 112% of normal with a 125% snow water equivalent. The Bitterroot River Basin, based on 7 of 7 stations reporting, was 114% of normal with a 117% snow water equivalent. The Lower Clark Fork Basin, based on 8 of 8 stations reporting, was 124% of normal with a 129% snow water equivalent. The number of bull trout passing over the dam is theoretically related to the amount and timing of the discharge. The bull trout captured in 2010 were collected during the time period following the peak discharge and prior to the river temperature rising above 16°C. This year's discharge at the Albeni Falls Dam spillway will most likely be greater than that of the last two years. We will monitor the discharge and river temperature closely during 2011 and schedule our sampling trips accordingly.

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Temporary restoration of bull trout passage at Albeni Falls Dam.

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Abstract

This study was designed to monitor movements of bull trout that were provided passage above Albeni Falls Dam, Pend Oreille River. Electrofishing, angling, and snorkeling were used to collect bull trout below the dam. Tissue samples were collected from each bull trout and sent to the U. S. Fish and Wildlife Service Abernathy Fish Technology Center Conservation Genetics Lab, Washington. The DNA extracted from tissue samples were compared to a catalog of bull trout population DNA from the Priest River drainage, Lake Pend Oreille tributaries, and the Clark Fork drainage to determine the most probable tributary of origin. A radio tag was implanted in each fish prior to being transported and released above the dam. Bull trout relocated above the dam were able to volitionally migrate into their natal tributary, drop back downstream, or migrate upstream to the next dam. A combination of stationary radio receiving stations and tracking via aircraft and vehicle were used to monitor the movement of tagged fish to determine if the spawning tributary it selected matched the tributary assigned from the genetic analysis. One bull trout tagged in 2010 was detected in its secondary predicted tributary. Another bull trout tagged in 2010 was detected at the Pack River Station, which is on the migratory route of this fish's predicted natal tributary. Seven fish were tagged in 2011. Five of these were bull trout and two were genetically determined to be F-1 bull trout x brook trout hybrids. The two smallest bull trout and one of the hybrids were entrained back below the dam during the high spring flows. One hybrid migrated up the Priest River. Three bull trout returned to Lake Pend Oreille. No additional detections were recorded for one of them. One was detected at the Granite Creek, a tributary that did not match its predicted natal tributary. It was only detected on the downstream antennae of the receiver and never actually passed the upstream of the receiver. This fish was detected for several months downstream of the Granite Creek receiver and in Lake Pend Oreille, in the bay Granite Creek flows into. The last bull trout entered Gold Creek, which was not a predicted natal tributary. It was detected leaving Gold creek five days after being detected entering. The same day it left Gold Creek, it was killed in a gill net being used for the lake trout removal program. Two tagged fish will continue to be tracked in 2012. Over the course of this study, three bull trout were not located in predicted natal tributaries the year they were tagged, but in the following year.

Introduction

The Pend Oreille and Clark Fork rivers flow 789 km (490 miles) from their source near Butte, Montana, through Pend Oreille Lake, Idaho, to their confluence with the Columbia River in British Columbia, Canada. The construction of Boundary (rkm 27.4), Box Canyon (rkm 55.0), Albeni Falls (rkm 145.0), Cabinet Gorge (rkm 241.2), Noxon Rapids (rkm 273.1), Thompson Falls (rkm 334.7) and Milltown (rkm 586.3) dams have disrupted bull trout *Salvelinus confluentus* migration patterns from tributaries located upstream and downstream of Lake Pend Oreille. All of these dams were originally constructed without fish passage, causing historical migratory corridors used by bull trout to be blocked. Blocking of migratory corridors has resulted in the fragmentation of bull trout habitat and failure of bull trout to return to their natal tributaries (USFWS 2000). The U.S. Fish and Wildlife Service (USFWS) listed bull trout in the Columbia River Basin as threatened in 1998 (USFWS 2000). In 2005, Cabinet Gorge Dam began a trap and haul strategy to provide upstream passage of the dam for bull trout genetically determined to have originated from tributaries upstream of the dam. In 2008, Milltown Dam was breached restoring passage through this section of the river. In 2010, construction of a fish ladder at Thompson Falls was completed, restoring upstream passage from the dam.

Bull trout hybridization with brook trout *S. fontinalis* is a major threat to bull trout populations (Buktenica 1997; Leary et al 1993). One example is in the South Fork of Lolo Creek in the Bitterfoot River Drainage, MT. Brook trout were initially detected in this creek in the late 1970s. A survey conducted in 1982 to determine the percent of bull trout, brook trout, and hybrids. Bull trout were the most abundant (43.6%), followed by hybrids (35.9%), and brook trout (20.5%). The proportion changed drastically by 1990. In 1990, brook trout became the most abundant (64.7%), followed by bull trout (23.5%), and hybrids (11.8%) (Leary et al 1993).

Displacement of bull trout in areas where brook trout have been introduced can occur for several reasons: 1) Bull trout reproductive effort is diminished by the production of hybrids. 2) Bull trout become displaced due to competition. Brook trout have a shorter life cycle, more varied habitat preference, and tendency to overpopulate small streams (Scoot and Crossman 1973; Naohisa et al 2002).

Construction of Milltown Dam, located at the confluence of the Blackfoot and Clark Fork rivers, was completed in 1907. Prior to the removal of Milltown Dam in 2008, passage upstream from the dam was blocked. However, during periods of high discharge water was diverted over the spillway allowing fish downstream passage. The North Fork Blackfoot River and Monture Creek are located upstream of Milltown Dam, and are primary spawning grounds for fluvial bull trout (Swanberg 1997).

In a 2000/2001 study by Schmetterling (2003), fourteen bull trout, seven in 2000 and seven in 2001, were collected below the Milltown Dam, implanted with radio transmitters, and relocated above the dam. In 2000, six of the bull trout migrated up the Blackfoot River, three to Monture Creek and three to the North Fork Blackfoot River. One bull trout migrated up the Clark Fork River to Copper Creek. Migration distances averaged 109.3 km. In 2001, four bull trout migrated up the Blackfoot River, one to Monture Creek and the three to the North Fork

Blackfoot River. Two bull trout migrated up the Clark Fork River, one to Ranch Creek and one to Hogback Creek. One bull trout died in Milltown Reservoir. The average migration distance was 109.9 km. Eight of the bull trout in this study were located near bull trout redds and presumably spawned there. This study indicated that bull trout collected below the dam originated from tributaries upstream of the dam and would return to their natal tributary to spawn if provided passage above the dam.

Construction of the Cabinet Gorge Dam, located on the Clark Fork River, was completed in 1952. Prior to construction of Cabinet Gorge Dam, large numbers of adfluvial bull trout freely migrated into Lake Pend Oreille for their subadult and adult life stages before returning to their natal tributary to spawn (Pratt and Huston 1993). Jeppson (1954) reported seeing large numbers of bull trout congregating below Cabinet Gorge Dam, although no bull trout redds were observed. A spawning channel was created by Idaho Department of Fish and Game in 1961 in an attempt to mitigate the loss of upstream spawning grounds. Hundreds of bull trout were surveyed near the spawning channel during the mid 1960's. Biologist conducted surveys at the spawning channel from 1984 to 1991, but did not observe any redds. The disruption of the migratory route by the dam resulted in loss of spawning habitat which the spawning channel could not mitigate.

Migratory bull trout begin their spawning migration at the end of the high flows, in early fall. During this time large bull trout congregate near the spillway of Cabinet Gorge Dam. One hypothesis by Neraas and Spruell's (2001) was that bull trout congregating below Cabinet Gorge Dam may be migratory fish from tributaries upstream of the dam that passed over the dam during their outmigration and are attempting to return to their natal tributary. Neraas and Spruell collected bull trout from locations above the dam, below the dam, and at the dam between 1997 and 1999. Microsatellite DNA analysis was conducted on genetic samples taken from each fish and compared to a genetic data baseline of known bull trout populations to assign probable tributary of origin for each fish. An average of 56% of the fish collected at the dam were assigned to tributaries above the dam. These results supported the hypothesis that bull trout collected below Cabinet Gorge Dam originated from tributaries upstream of the dam.

In 2004 and 2007, Avista biologist collected bull trout below Cabinet Gorge Dam, collected genetic samples, and maintained them in holding tanks awaiting natal tributary assignment from genetic analysis. Genetic samples were analyzed at the Abernathy Fish Technology Center Conservation Genetics Lab (AFTC). Once natal tributaries were assigned, fish were relocated to the region their natal tributary was located. During this period genetic samples were also collected from known bull trout populations and added to the genetic data baseline (DeHaan and Arden 2008). In 2004, fifty-two genetic samples were analyzed at AFTC and assigned natal tributaries. Seventy-nine percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan et al. 2005). In 2007, thirty-five genetic samples were analyzed at AFTC. Seventy-seven percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan and Arden 2007). These studies supported the hypothesis that bull trout congregating below Cabinet Gorge Dam originated from tributaries upstream of the dam.

Construction of Albeni Falls Dam, located on the Pend Oreille River, was completed in 1955, blocking historical migratory bull trout routes between the river and Lake Pend Oreille. Fluvial bull trout that spawn in tributaries of Lake Pend Oreille and migrate downstream to the

Pend Oreille River in search of forage can no longer return to their natal streams once passing the dam. The adfluvial life history form, which historically spawned in tributaries of the Box Canyon Reservoir of the Pend Oreille River and migrated upstream to the cold-water refuge of Lake Pend Oreille, can no longer migrate into the lake. Due to these impacts, the USFWS Biological Opinion (USFWS 2000) directed the action agencies to evaluate the feasibility of restoring passage at Albeni Falls Dam (see Reasonable and Prudent Measure 10.A.1.3 and Terms and Conditions 11.A.1.3 of the 2000 USFWS BiOp).

In a 2003 study by Geist et al. (2004), seven bull trout captured below the dam were implanted with radio transmitters and released in a cold spring effluent to determine their interaction with the dam. Through the use of radio receiver stations on the dam and mobile tracking by boat, six of the tagged bull trout below the dam were found to make repeated forays between the cold-water effluent and the base of the dam. The data collected supported the hypothesis that the bull trout originated from tributaries above the dam.

In a 2004 study by Scholz et al. (2005a, 2005b), two bull trout captured below Albeni Falls Dam were tagged and relocated above the dam to determine if they would migrate upstream or pass back over the dam. Microsatellite DNA analysis was used to assign the most probable natal tributary of each fish. Tracking was conducted using stationary receiver stations and mobile surveys by aircraft and vehicle. Both fish migrated from their release point into Lake Pend Oreille. One fish entered Lightning Creek and returned to the lake approximately one month later. It is presumed to have spawned in this tributary. The second fish, which was immature at the time of capture, entered Trestle Creek during the spawning season the following year. Both of these fish returned to their genetically assigned natal tributary. The movements of these two fish supported the hypothesis that bull trout captured below Albeni Falls Dam originated from tributaries above the dam.

Genetic samples were taken from the bull trout captured in the Geist et al. (2004) and Scholz et al. (2005a, 2005b) studies. DNA analysis was used to compare the genetic samples with populations from the Priest River and Lake Pend Oreille drainages as well as populations from Clark Fork River tributaries below Cabinet Gorge Dam (DeHaan and Arden 2008). All nine of the fish collected below Albeni Falls Dam were assigned to tributary populations of Lake Pend Oreille or the Clark Fork River below Cabinet Gorge Dam (DeHaan and Arden 2008). The two bull trout released above the dam entered the tributary matching those assigned from genetic analysis.

Varied spawning migration strategies are used by bull trout within the Lake Pend Oreille Basin. Spawning tributaries are entered by some sexually mature bull trout in May or June, 3-4 months prior to peak spawning in September and early October. Early migrations are a critical life history adaptation allowing access to spawning tributaries with intermittent reaches of elevated water temperature during the summer and fall months (Anderson 1971; Pratt 1985; Pratt and Huston 1993; PBTTAT 1998). Due to the geology of this basin many of the streams have influent reaches that are above the water table level. During peak flows water is maintained in the channel but can drop below ground during low flows. Early migrations are a local adaptation allowing bull trout to access natal tributaries before low flow makes them inaccessible.

A late summer/early fall spawning migration also occurs from Lake Pend Oreille into the Clark Fork River and tributaries entering along the Clark Fork (Jeppson 1960; Pratt 1985; Pratt and Huston 1993; PBTAT 1998; Scholz et al. 2005a, 2005b). A portion of the spawning population in Lightning Creek enters in August and September. Late summer or fall migration is potentially advantageous in terms of reproductive fitness because the fish remains in a more productive environment continuing to feed for a longer period, and converting more energy into gamete production. The downside of a later spawning migration is that intermittent stream reaches may block migration into home tributaries and increase the probability of straying. This is not necessarily a bad strategy, as it could potentially promote some genetic exchange between populations. Both early migrating and late migrating adult bull trout have been reported in Lightning Creek (Anderson 1971; Scholz et al. 2005a, 2005b). These behavioral differences may reflect some of the genetic diversity observed by Spruell et al. (1999) and illustrates why it is important to maintain genetic diversity among these populations. The potential of Albeni Falls Dam preventing bull trout from returning to natal tributaries above the dam to spawn and preventing those of tributaries below the dam from completing their life cycle has been documented in recent studies (Dupont and Horner 2004; Geist et al. 2004; Scholz et al. 2005a, 2005b, Scholz et al. 2008; Dupont et al. 2007).

The USFWS biological opinion (USFWS 2000) noted that, "*Albeni Falls Dam was constructed without fishways to accommodate safe upstream and downstream passage of fish. . . Bull trout were abundant in the Pend Oreille River through 1957, and then abruptly their numbers decreased to the point that individual fish are now noteworthy. This abrupt decline correlates with the commencement of operation of Albeni Falls Dam in 1952. No other abrupt or widespread threat can be identified for this portion of the Pend Oreille River Basin during 1950s. In the absence of passage, migratory bull trout remaining in the Pend Oreille River will continue to be harmed.*" As a result, the USFWS (2000a, 2002b) proposed a recovery plan to address this issue. Page 166 of the recovery plan calls on the Corps of Engineers and other agencies to by October 1, 2008, *Investigate and implement upstream passage at Albeni Falls (USFWS Biological Opinion), ...as needed, to reconnect fragmented core habitat of bull trout with Lake Pend Oreille.* The Recovery Plan emphasizes conserving genetic diversity and providing opportunities for genetic exchange, which is basis of our current study. Captured bull trout in this study that are released 8 km above Albeni Falls Dam can voluntarily move back below the dam, or into the Priest River (or it's tributary the East River), tributaries of Pend Oreille Lake, or migrate up the Clark Fork River to the tailrace of Cabinet Gorge Dam.

Prior to construction of Albeni Falls Dam, sustainable populations of bull trout existed in the Pend Oreille River (rkm 55.5-141.5) between Metaline Falls and Albeni Falls (Scholz et al. 2008). The upper end of this section of the Pend Oreille River was blocked by the construction of Albeni Falls Dam in 1955 and the lower end was blocked by Box Canyon Dam in 1957, causing the fragmentation and isolation of bull trout populations. The Pend Oreille River, which historically served as ideal habitat during certain life stages of migratory bull trout, was converted into a reservoir adversely affecting the sustainability of bull trout populations within the reach. Bull trout were no longer able to seek cold water refuge in Lake Pend Oreille due to their migratory route being blocked by Albeni Falls Dam. The water temperatures in Box Canyon Reservoir exceed 16°C, the upper limit of bull trout thermal zone of tolerance, during the summer months. Without access to Lake Pend Oreille, bull trout are forced to seek cold water in

a section of river which offers few cold water refuges. Without restoration of the migratory route into Lake Pend Oreille, bull trout in Box Canyon Reservoir are in imminent danger of extinction. There is a scarcity of bull trout in Pend Oreille Basin tributaries located below Albeni Falls Dam (Ashe and Scholz 1992; Scholz et al. 2005a, 2005b). Without access to Lake Pend Oreille, the survival of bull trout entrained below Albeni Falls Dam is remote.

In 2001, Avista Corporation in conjunction with the USFWS, initiated a program to restore upstream fish passage above Cabinet Gorge Dam on the Clark Fork River. Bull trout captured below Cabinet Gorge Dam were assigned to a natal tributary using “rapid response genetic analysis”. Tributary assignment was used to determine if the fish was released above or below Cabinet Gorge Dam. The success of the Cabinet Gorge bull trout transportation project has prompted similar effort at Noxon Rapids and construction of a fish ladder at Thompson Falls dams. The recent removal of dams on Big Blackfoot River, a principle tributary of the upper Clark Fork River, and Milltown Dam in the Clark Fork River have restored the Upper Clark Fork and Big Blackfoot rivers to free flowing conditions allowing more natural connectivity of bull trout. The bull trout transportation projects at Cabinet Gorge, Noxon Rapids and fish ladder at Thompson Falls dams provide a means of passage for bull trout at each of these facilities and will likely increase the number of spawning bull trout returning back to their natal tributaries.

In 2007 this study was initiated to determine movements and genetics of bull trout captured below Albeni Falls Dam as a first step in assessing bull trout passage at the dam. The objectives of this project were to: (1) relocate bull trout collected below Albeni Falls Dam to a release site upstream of the dam, (2) use microsatellite DNA analysis to assign the most probable natal tributary of each fish, and (3) determine if genetically assigned natal tributaries match the actual tributary used for spawning. By relocating bull trout captured below Albeni Falls Dam, some measure of fish passage is restored.

Methods

Study Area

Eastern Washington University (EWU) and Kalispel Tribe Natural Resources Department (KNRD) crews sampled for bull trout in a 14 km reach of the Pend Oreille River between Indian Creek, WA (RKM 131) and Albeni Falls Dam, ID (RKM 145) (Figure 1). Albeni Falls Dam was built by the U.S. Army Corps of Engineers between 1951 and 1955. Over 200 million kilowatt hours of electrical energy is produced annually by three generators. Albeni Falls Dam has had a mean discharge of 24.4 KCFS from 1960-2011 and a peak discharge of 138.2 KCFS during this period of record. In 2011, the mean discharge was 36.9 KCFS and the peak discharge was 120.1 KCFS (www.nwd-wc.usace.army.mil/perl/dataquery.pl). The water temperature in 2011 ranged from 0.5 °C and 29.4 °C with an average temperature of 9.8°C (Figure 2).

EWU and Pacific Northwest National Laboratories (PNNL) maintained twelve stationary radio tracking stations on and above Albeni Falls Dam on the Pend Oreille River and Pend Oreille Lake. Three stations were attached to Albeni Falls Dam (N 48.179 W 117.000), one at confluence of the Priest River (Mudhole Campground (N 48.179 W 116.892)), two near the Dover Railroad Bridge (north: N 48.256 W 116.666 and south: N 48.256 W 116.666 stations), and five tributaries to Lake Pend Oreille (Trestle Creek: N 48.285 W 116.342, Lightning Creek: N 48.152 W 116.182, Granite Creek: N 48.084 W 116.422, Gold Creek: N 47.971 W 116.454, and the Pack River: N 48.359 W 116.402).

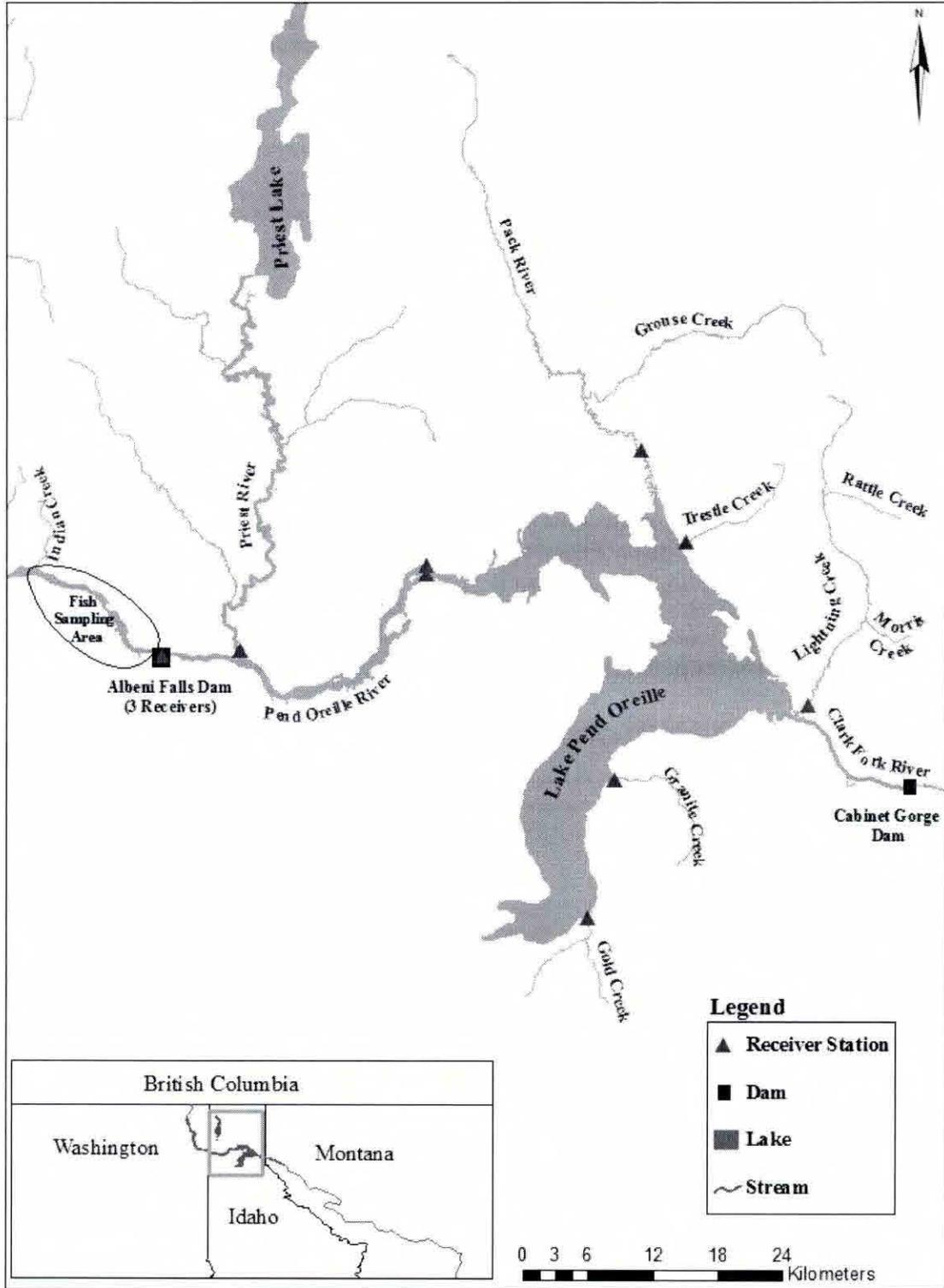


Figure 1. Map of Pend Oreille River and Lake with fisheries surveys area (from Indian Creek to below Albeni Falls Dam) and stationary receiver locations, 2011.

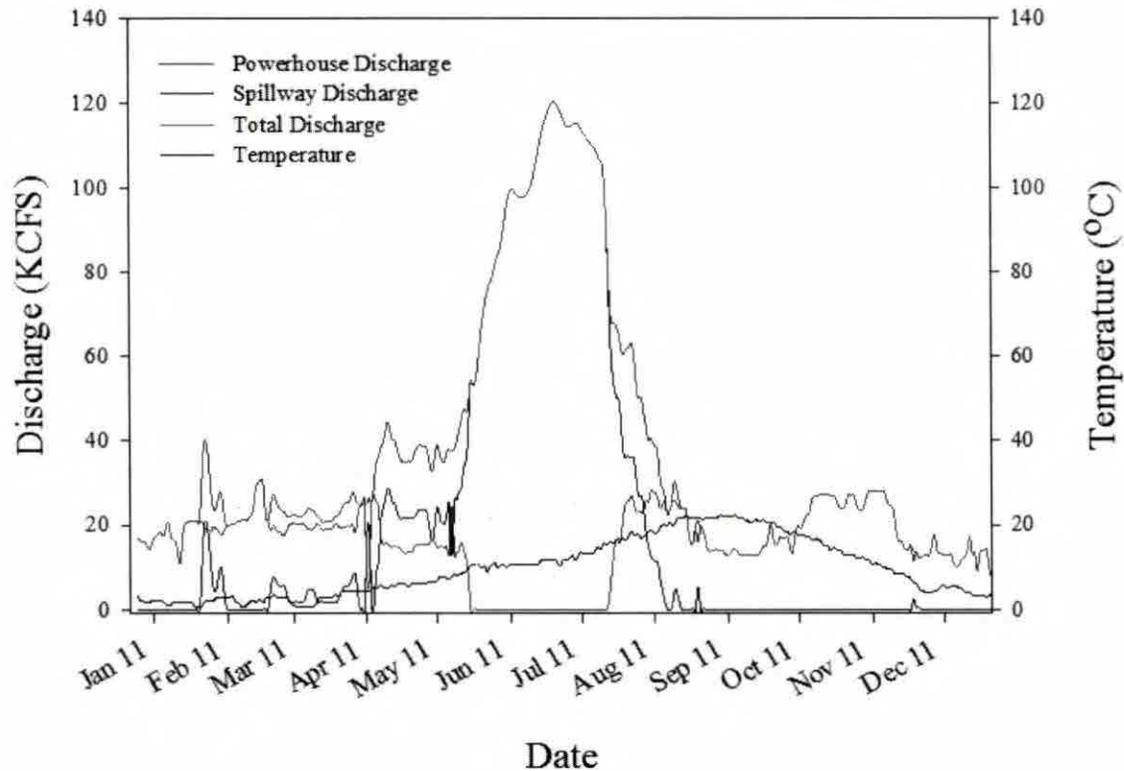


Figure 2. Temperature and discharge data below Albeni Falls Dam, 12/2010-12/2011 (data from www.nwd-wc.usace.army.mil/index.html)

Field Collections

Boat electrofishing, hook and line, and snorkeling methods were employed to capture bull trout from the Pend Oreille River between Indian Creek, WA (N 48.244 W 117.151) and Albeni Falls Dam, ID (N 48.178 W 117.000) in 2011.

Boat electrofishing - Standardized ten minute boat electrofishing surveys (2-4 amps, 250 volts, 120 pps, DC current) were conducted by EWU and KNRD along the north and south shorelines. Sixteen trips were conducted by EWU between 9 April and 29 June 2010 and sixteen trips were conducted by KNRD between 2 May and 18 October 2011. Transects were sampled during both daylight and after sunset.

During sampling all fish were collected and identified to species using dichotomous keys (Wydoski and Whitney 1979, 2003; Scholz and McLellan 2009, 2010). All fish collected were measured to the nearest mm total length (TL) and released.

Genetic tissue samples were collected from bull trout and cutthroat trout by taking a small tissue sample (3mm²) from the dorsal or adipose fin. Samples were preserved in 95%

ethanol and sent to the KNRD. Cutthroat trout samples were archived locally, while bull trout samples were sent analyzed and produce natal tributary assignments. These samples will also be included in the basin wide microsatellite DNA catalog funded by Bonneville Power Administration (Olson et al. 2004).

Bull Trout Tagging and Relocation

Tagging Procedures – Captured fish were placed in a large cooler (142.5 liters) with fresh water. An oxygen cylinder was used to aerate the water. Ice was used to maintain ambient river temperatures when needed. The lid was kept closed until the fish stabilized and recovered from the capturing stresses. The fish were anesthetized with 70-100 mg/L tricaine methanesulfonate (MS 222). Once the anesthesia took effect (3- 5 minutes) the fish were checked for fin clips and scanned with a PIT tag detector to confirm it had not previously been captured and tagged.

Transmitters were surgically implanted by experienced surgeons using procedures described by McLeod and Clayton (1997) and Brown et al. (1999). The fish were placed in a water soaked foam block with a cut out V-notched cradle. The fish were placed dorsal side down, and water was flushed through the gills using a gravity flow bucket filled with a maintenance solution (40-60 mg/L MS 222). The bucket had a valve at the bottom that was connected to a piece of tubing that was placed into the mouth of the fish. Water was periodically poured over the fishes body during surgery to keep it hydrated. A 2-3 cm longitudinal incision was made three cm anterior to the pelvic fins. A PIT tag (DF TX 1400BE, 12 mm long, 134.KHz) was placed in the body cavity according to standard protocols (CBFWA 1999). A 16-gauge hypodermic needle was inserted through the body wall to the side and posterior to the incision. The transmitter antenna wire was inserted through the hollow needle. Once the needle was removed, the antenna exited the body wall of the fish. The Lotek digitally encoded radio/acoustic transmitter (CART 16_1, 23.8 g, 5 sec burst rate, 663 day tag life or CART 16_2, 31.5 g, 5 sec burst rate, 904 day tag life) operated at a frequency of 151.89 MHz (radio frequency) and 76.8 KHz (acoustic frequency). The Lotek digitally encoded radio transmitters (SR 11-18 8.0g, 5 sec burst rate, 449 day tag life; NTC-6-2, 4.5g, 5 sec burst rate, 441 day tag life; or NTC-4-2L, 2.1g, 5 sec burst rate, 162 day tag life) are operating at 151.89 MHz (radio frequency). The decision of which size tag to implant was based on the weight of the fish. Tag weight did not exceed 2% of the fish's weight. The incision was closed using the individual simple sutures method at approximately 1-cm intervals. A veterinary grade liquid Band-Aid (Nexband) was placed over the sutures. The fish were placed in an oxygenated cooler with fresh cold water to recover.

Relocation - The fish were transported by vehicle in an oxygenated cooler to the public boat launch (N 48.176 W 116.904) on the east side of the town of Priest River, Idaho 7.5 km above Albeni Falls Dam. Once the fish had completely recovered, it was released into the water at the boat launch, located on the north bank of the Pend Oreille River about 1 km downstream of its confluence with the Priest River. This location was selected because it is far enough above Albeni Falls Dam to prevent fall back, but downstream of the Priest River, the first bull trout

tributary upstream of the dam, giving the fish the opportunity to enter or continue past towards Lake Pend Oreille.

Tracking

Fixed Ground Stations - Eleven radio receiving stations were setup for the study in the spring 2009. Receiver locations and setup were the same as during the 2003 and 2004 study (Geist et al. 2004; Scholz et al. 2005). Sites included: Albeni Falls Dam (3 stations), Mudhole Campground on Priest River (1 station), and the Dover Railroad Bridge (2 stations) approximately 26 km upstream of the Priest River. Five additional stations were set up at the mouths of tributaries to Lake Pend Oreille: Pack River, Trestle, Lightning, Granite, and Gold creeks. Each station consisted of a Lotek SRX-400 or SRX-600 radio receiver connected to aerial Yagi antennas. The ground receiver stations operated 24 hours a day. The receivers were supplied with either AC or DC (12 volt vehicle batteries) power. Solar panels were used to recharge DC power systems. Beacon tags were used at all stationary receiver locations to monitor receiver status. The beacon tags were programmed to transmit a one-minute signal every hour. See Bellgraph and Deters (2007) for a complete summary of installation and details of each station.

EWU worked with landowners to secure access, and to download and maintain stations via hold harmless agreements and/or permission to entry agreements. Agreements were setup with a private landowner at Gold Creek, Idaho Department of Fish and Wildlife at Granite Creek, Idaho Department of Transportation at Lightning Creek, and Idaho Department of Lands at Trestle Creek (\$100 fee for five year agreement).

All fixed receiver stations were inspected and data downloaded April 2011 through mid November 2011. Three receivers on the dam, the Mudhole receiver, and South Dover stations were downloaded through March 2011. Data were downloaded using a Lotek *Winhost* program onto a laptop computer, saved and then backed up on a removable thumb drive. After each download, data were examined for active tags, beacon tag signals, and noise. Proper adjustments to the gain were made when necessary. Each station was inspected for damage and repaired if necessary. Beacon and 12 volt batteries were replaced when necessary. Stations were winterized in the middle of November, and then reset at the beginning of March before the April sampling began.

Vehicle Tracking - Weekly tracking between 23 June and 26 September 2011 was conducted below Albeni Falls Dam and along the Priest River. Every other week additional tracking was conducted along the Pend Oreille River, between the Priest River and Lake Pend Oreille. Vehicle tracking was conducted six times along Lightning Creek and its tributaries between 4 August and 16 September 2011. Vehicle tracking along Granite Creek was conducted four times between 2 September and 11 October 2011.

Aircraft Tracking - Tracking by aircraft was completed using a Cessna C-182 chartered from Felts Field Aviation, Spokane, WA. A Lotek SRX-600 radio receiver connected to single two element Yagi antenna externally mounted under the right wing was utilized for aerial tracking. The

receiver's gain was set at 50 and adjusted as needed. Four flights were conducted between 1 August and 10 November 2011.

Flights were conducted with an emphasis on tracking paths along Lightning Creek and its tributaries, Granite Creek, and Gold Creek. These areas were flown during each flight. Secondary emphasis was placed on the Priest River, Pack River, and Grouse Creek. The Priest River was flown during two flights and the Pack River and Grouse Creek were checked during the last flight.

Genetic Analysis

Rapid Response Genetic Identification - Genetic samples from each bull trout were shipped to the USFW Service Abernathy Fish Technology Center for rapid genetic analysis. Each genetic sample was compared to a genetic baseline data set of 2,020 bull trout from 37 known populations within the Lake Pend Oreille and Clark Fork River system of northern Idaho and northwestern Montana. The watershed is divided into four regions: Region 1 includes tributaries to the Pend Oreille River, Lake Pend Oreille and the Clark Fork River up to Cabinet Gorge Dam, Region 2 contains Clark Fork River tributaries from Cabinet Gorge Dam to Noxon Rapids Dam, Region 3 contains Clark Fork River tributaries from Noxon Rapids Dam to Thompson Falls Dam and Region 4 contains all Clark Fork River tributaries above Thompson Falls Dam (DeHaan and Arden 2008). Baseline allele frequency data for each population was determined by genotyping all fish in 12 highly polymorphic microsatellite loci (DuPont et al. 2007).

A modified Chelex protocol was used to extract DNA from genetic samples (Miller and Kapuscinski 1996). DNA extracted at 12 microsatellite loci; *Omm1070*, *Omm1128*, *Omm1130* (Rexroad et al. 2001), *Sco104*, *Sco105*, *Sco106*, *Sco107*, *Sco200*, *Sco212*, *Sco216*, *Sco218* (DeHaan and Arden 2005) and *Smm22* (Crane et al. 2004) was amplified using polymerase chain reaction (PCR). PCR reactions were carried out in 15 µl volumes containing 2 µl template DNA, 1X polymerase buffer (10mM Tris-HCl, 50mM KCl, 0.1% Triton X-100), 1.5 or 2.0mM MgCl₂, 0.2mM of each dNTP, 0.5µM of each primer and 0.2 units of GoTaq DNA polymerase (Promega Co.) (DeHaan and Arden 2008). Initial denaturation of DNA occurred for 3 minutes at 94 °C, followed by 38 one second cycles at 94 °C, primer specific annealing temperature for 30 seconds and primer extension for 30 seconds at 72 °C, and a final extension of 7 minutes at 72 °C. Applied Biosystems fluorescent dyes were used to label all forward primers. The loci produced during PCR were pooled into three multiplex sets and run on an AB 3130xl genetic analyzer. *Genemapper v4.0* (Applied Biosystems Inc.) software was used to determine multi-locus genotype of each bull trout. Genotyping error was minimized by running a positive control (a fish with a known genotype), a negative control (a sample containing no DNA), and duplicates of each sample being analyzed (DeHaan and Arden 2008).

Natal Tributary Assignment - Population assignment techniques implemented via the program *Whichrun v4.1* (Banks and Eichert, 2000) were used to determine the first and second most likely population of origin from within the genetic baseline dataset for each individual fish (DeHaan and Arden 2008).

Results

A synoptic list of fish collected during the Pend Oreille River survey in 2011 is summarized (Table 1). In 2011, a total of 2,073 fish were collected via boat electrofishing in the Pend Oreille River, which represented 22 species, during 50 total hours of boat electrofishing (Table 2) and 9.5 hours of angling (Table 3). Seven bull trout were collected between 22 June and 9 August 2010. Two were determined to be F-1 hybrid. All seven fish were implanted with a Lotek tag and a PIT tag (Table 4). Six were released at the Priest River boat launch and one was released at the Trestle Creek boat launch because of elevated water temperatures in the Pend Oreille River. A summary of the movements of each fish released above the dam are summarized below (Table 5).

Table 1. Synoptic list of fish captured during Pend Oreille River surveys 2011.

Family	Species	Scientific Name
Cyprinidae	Northern pikeminnow	<i>Ptychocheilus oregonensis</i> (Richardson, 1836)
	Peamouth	<i>Mylocheilus caurinus</i> (Richardson, 1836)
	Tench	<i>Tinca tinca</i> (Linnaeus, 1758)
Catostomidae	Largescale sucker	<i>Catostomus macrocheilus</i> (Girard, 1856)
	Longnose sucker	<i>Catostomus catostomus</i> (Forster, 1773)
Ictaluridae	Brown bullhead	<i>Ameiurus nebulosus</i> (Lesueur, 1819)
Esocidae	Northern pike	<i>Esox lucius</i> (Linnaeus, 1758)
Salmonidae	Brook trout	<i>Salvelinus fontinalis</i> (Mitchell, 1814)
	Brown trout	<i>Salmo trutta</i> (Linnaeus, 1758)
	Bull trout	<i>Salvelinus confluentus</i> (Suckley, 1858)
	Bull trout x brook trout	<i>Salvelinus confluentus</i> x <i>Salvelinus fontinalis</i>
	Cutthroat trout	<i>Oncorhynchus clarki</i> (Richardson, 1836)
	Kokanee	<i>Oncorhynchus nerka</i> (Walbaum, 1792)
	Lake trout	<i>Salvelinus namaycush</i> (Walbaum, 1792)
	Lake whitefish	<i>Coregonus clupeaformis</i> (Mitchell, 1818)
	Mountain whitefish	<i>Prosopium williamsoni</i> (Girard, 1856)
	Rainbow trout	<i>Oncorhynchus mykiss</i> (Walbaum, 1792)
Centrarchidae	Black crappie	<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)
	Largemouth bass	<i>Micropterus salmoides</i> (Lacepède, 1802)
	Pumpkinseed	<i>Lepomis gibbosus</i> (Linnaeus, 1758)
	Smallmouth bass	<i>Micropterus dolomieu</i> (Lacepède, 1802)
Percidae	Walleye	<i>Sander vitreus</i> (Mitchell, 1818)
	Yellow perch	<i>Perca flavescens</i> (Mitchell, 1814)

Table 2. Electrofishing mean total length (mm), range in total length (mm), and relative abundance (RA) of fish captured in the Pend Oreille River, 2011 (effort = 50 hrs).

Family	Species	N	RA (%)	Average TL (SD)	Range TL (mm)
Cyprinidae	Northern pikeminnow	184	8.88	328 (125)	90-610
	Peamouth	85	4.10	242 (67)	85-395
	Tench	26	1.25	352 (93)	180-475
Catostomidae	Largescale sucker	203	9.79	475 (62)	110-583
	Longnose sucker	46	2.22	388(118)	32-541
Ictaluridae	Brown bullhead	7	0.34	257 (40)	196-300
Esocidae	Northern pike	9	0.43	662 (120)	490-885
Salmonidae	Brook trout	2	0.10	292 (137)	195-389
	Bull trout	5	0.24	443 (149)	259-658
	Bull trout x brook trout hybrid	3	0.14	350(96)	283-460
	Brown trout	318	15.34	366 (97)	95-643
	Kokanee	157	7.57	178 (39)	95-321
	Lake trout	1	0.05	473 (0)	473
	Lake whitefish	40	1.93	424 (53)	295-523
	Mountain whitefish	369	17.80	269 (67)	70-472
	Rainbow trout	147	7.09	323 (126)	35-775
	Westslope cutthroat	67	3.23	360 (61)	139-473
Centrarchidae	Black crappie	4	0.19	154(22)	124-178
	Largemouth bass	12	0.58	354 (98)	180-466
	Pumpkinseed	9	0.43	120 (20)	86-152
	Smallmouth bass	136	6.56	265 (87)	58-450
Percidae	Walleye	19	0.92	496 (142)	375-745
	Yellow perch	224	10.81	136 (41)	51-281
		2,073	100.00		

Table 3. Hook and line fishing (effort 9.5 hrs) mean total length (mm), range in total length(mm), and relative abundance of fish capture in the Pend Oreille River, ID, USA, 2011

Family	Species	N	RA (%)	Average TL (SD)	Range TL (mm)
Salmonidae	Brown Trout	3	60.0	420(25)	392-442
	Bull Trout	1	20.0	248	248
Centrarchidae	Smallmouth bass	1	20.0	227	227
		5	100		

Table 4. Capture date, total length (TL), weight (WT), sex, tag type, and tag codes for bull trout captured below Albeni Falls Dam during 2010/2011 via electrofishing angling, and snorkeling tracked during 2011.

Fish #	Captured	TL (mm)	WT (g)	Pit tag #	Radio tag	Code#
BT-1	3/31/10	553	1,615	985121010226514	SR 11-18	166
BT-2	6/29/10	454	857	985121002170427	SR 11-18	178
BT-3	6/22/11	486	965	985121002159392	CART-1	49
BT-4	6/22/11	460	813	985121002189636	CART-1	47
BT-5	6/23/11	360	418	985121002179114	SR 11-18	175
BT-6	6/27/11	259	157	985121010207443	NTC-6-2	56
BT-7	6/29/11	309	289	985121000253045	NTC-6-2	59
BT-8	7/18/11	248	163	985121011711871	NTC-4-2I	16
BT-9	8/9/11	658	2,751	n/a	CART-1	46

Table 5. Tag code, detection location, date, and current status for bull trout captured in the Pend Oreille River below Albeni Falls Dam during 2011.

Fish #	Code #	Location of last detection	Last Detection	Status
BT-1	166	Pack River Receiver	10/19/11	In Pack River
BT-2	178	East fork of Lightning Creek	10/25/11	In Lightning Creek
BT-3	49	Lake Pend Oreille/Granite Creek	11/10/11	In Lake Pend Oreille
BT-4	47	Albeni Falls Dam	7/23/11	Downstream of Albeni Falls Dam
BT-5	175	North Dover receiver	7/10/11	In Lake Pend Oreille
BT-6	56	Boundary Dam	1/11/11	Downstream of Boundary Dam
BT-7	59	Priest River	9/26/11	In Priest River
BT-8	16	Pend Oreille River near Kelly Island	8/28/11	Dead in muskrat hole downstream of the dam
BT-9	46	Lake Pend Oreille south of Lakeview	10/13/11	Killed in gill net Lake Pend Oreille

Bull Trout #1 (BT-1) - BT-1 was captured last year approximately 1.0 km (N 48.177 W 117.010) below the dam on 31 March 2010 by KNRD. It had a total length of 553 mm, weight of 1,615 g, and the sex was undetermined. A SR 11-18 tag (#166) and PIT tag (#985121010226514) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-1 to be Lightning Creek and the secondary possible natal tributary was Grouse Creek. BT-1 was released on 31 March 2010 at the Priest River boat launch. During the next three days BT-1 traveled 26.5km between its release site and the Dover receiver stations. BT-3 was recorded passing the North and South Dover station on 3 April 2010. There is an overlap in the coverage areas of the North and South Dover stations, resulting in simultaneous detections at both stations. BT-1 was detected passing the Pack River station on 9 June 2010. The next detection occurred during a flight over the Pack River, approximately 28 km (N 48.566 W 116.606) upstream of the Pack River station on 13 July 2010. The next two detections of BT-1 occurred during vehicle tacking. The first on 19 July 2010 approximately 33 km upstream of the Pack River station (N 48.578 W 116.613) and the second approximately 35.5 km upstream of the receiver station (N 48.595 W 116.633) on 27 July 2010 at 16:09:54. BT-1 was detected during the next two flights over the Pack River. The first occurred approximately 36 km upstream of the Pack River station (N 48.598 W 116.636) on 3 August 2010 and the second occurred approximately 29 km upstream of the receiver station (N 48.572 W 116.609) on 7 September 2010. BT-3 was detected during vehicle tracking on 20 September 2010 and 28 September 2010. Both detections were approximately 29.5 km upstream (N 48.574 W 116.611 and N 48.573 W 116.611) of the Pack River station. On 13 October 2010, BT-1 was located in Grouse Creek (N 48.480 W 116.238) approximately 22 km upstream from Pack River. BT-1 was detected at the Pack River Station on 20 October 2010. The last detection of BT-1 was at the Pack river station on 19 October 2011 (Figure 3).

Bull Trout #2 (BT-2) - BT-2 was captured last year approximately 1.0 km (N 48.177 W 117.011) below the dam on 29 June 2010 by EWU. It had a total length of 454 mm, weight of 857 g, and the sex was undetermined. A SR-11-18 tag (#178) and PIT tag (#985121002170427) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-2 to be Morris Creek and East Fork of Lightning Creek was determined to be the secondary possible natal tributary. BT-2 was released on 29 June 2010 at the Priest River boat launch. An hour and eighteen minutes after being released, BT-2 was detected traveling past the Mudhole station on 30 June 2010. BT-2 was detected approximately 17 km upstream from the Mudhole station (N 48.268 W 116.858) during a flight over the Priest River on 13 July at 10:38:46. Detections of BT-2 occurred on the upstream antennas of the Mudhole station on 25 July 2010. BT-2 was captured by AVISTA staff below Cabinet Gorge Dam on 7 July 2011. On 10 July 2011, BT-2 was detected passing the Lightning Creek Station. Detections of BT-2 occurred during seven days of mobile tracking in the East Fork of Lightning Creek between 4 August 2011 and 25 October 2011. The East Fork of Lightning Creek was determined to be the most likely secondary natal tributary of this fish. BT-2 was physically spotted in East Fork on 16 September 2011. Other bull trout were also spotted in the general area BT-2 was located. BT-2 most likely spawned in this tributary (Figure 4).

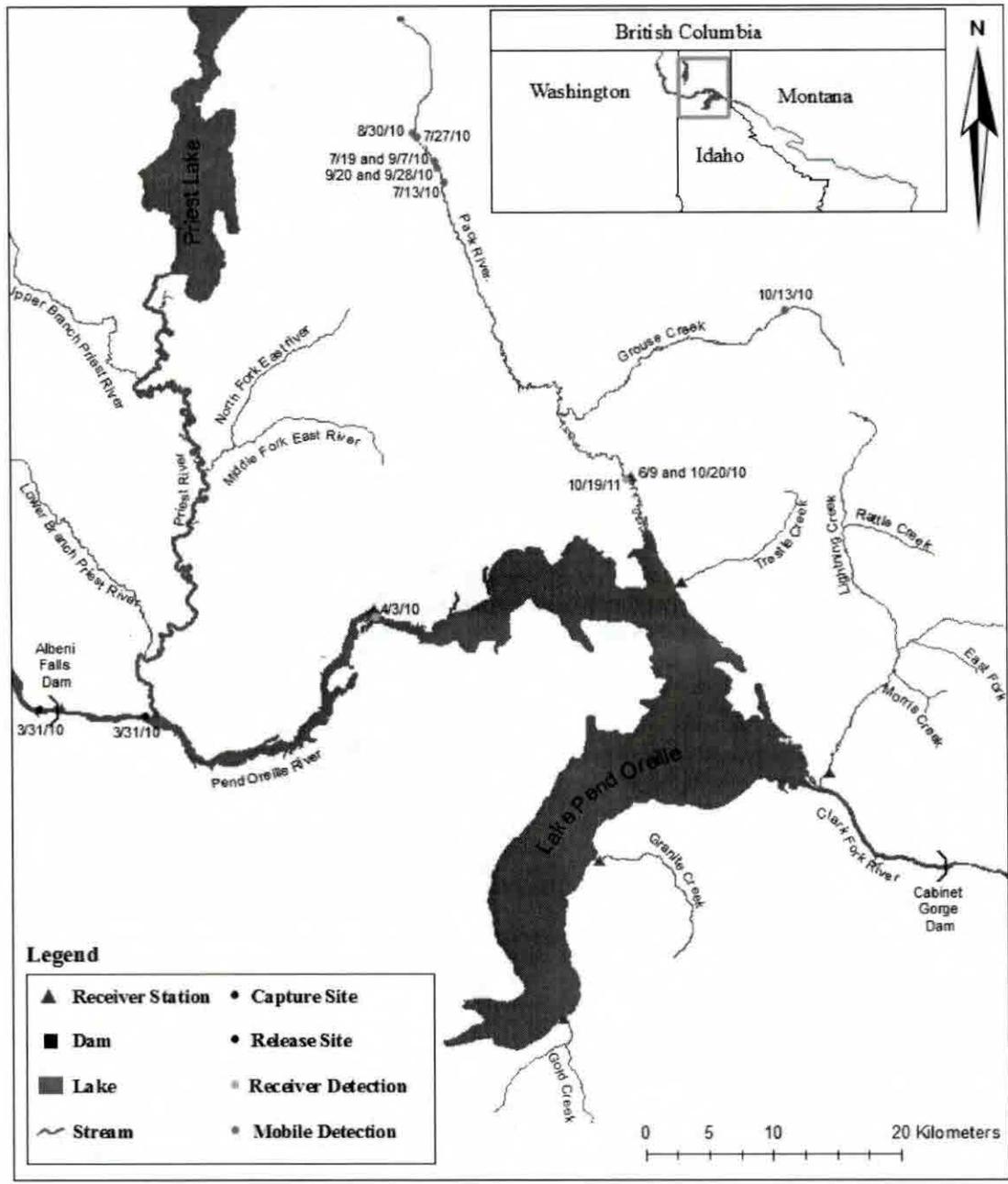


Figure 3. Detection history of BT-1 (Code 166) in Pend Oreille River watershed, 2011.

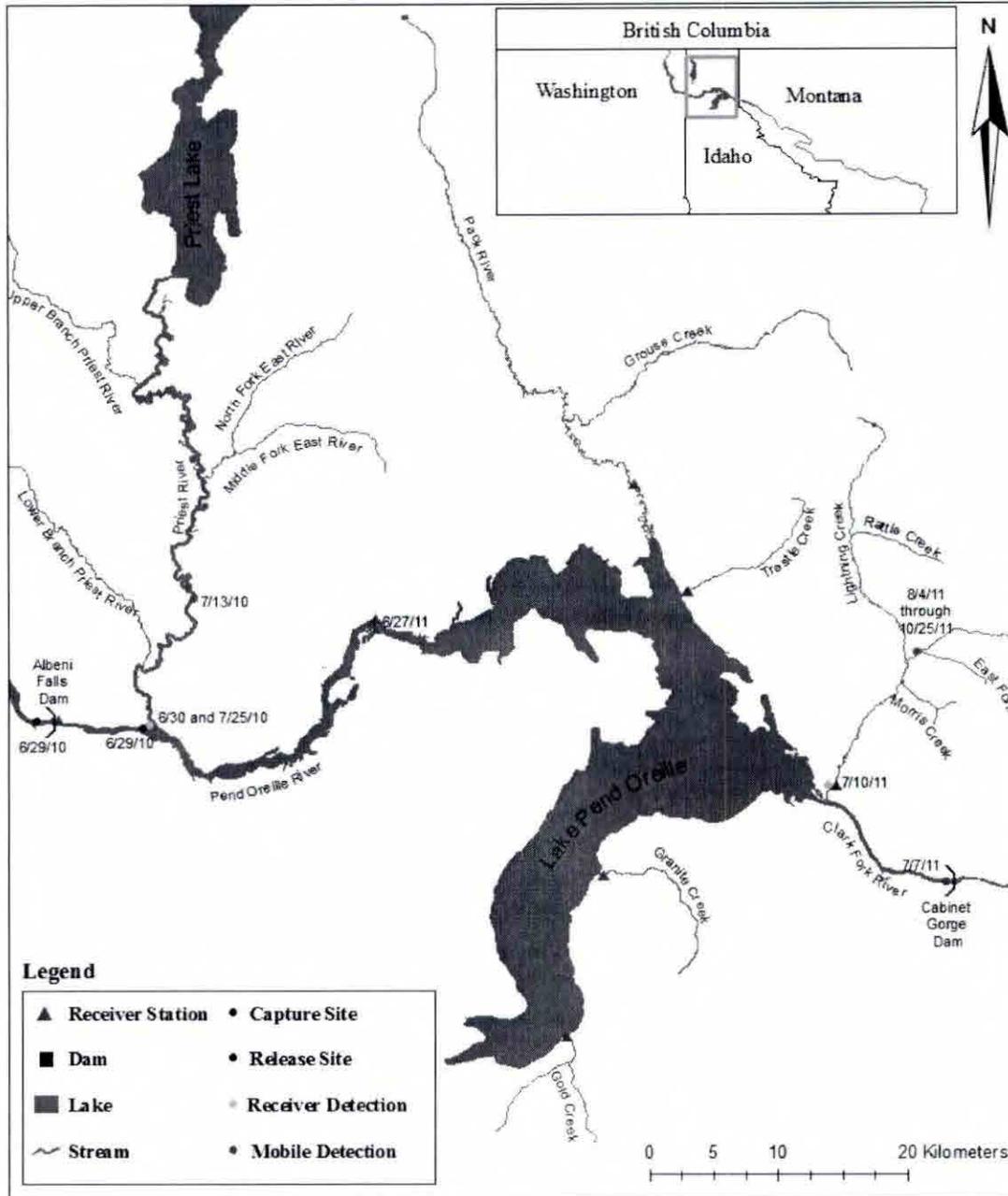


Figure 4. Detection history of BT-2 (Code 178) in Pend Oreille River watershed, 2011.

Bull Trout #3 (BT-3) - The first bull trout captured in 2011 occurred on 22 June approximately 1.2 km below the dam. It had a total length of 486mm, weight of 965 g, and the sex was undetermined. A CART-1 tag (#49) and PIT tag (#985121002159392) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-2 to be Morris Creek and Lightning Creek was determined to be the secondary possible natal tributary. BT-3 was released at the Priest River boat launch on 22 June 2011. This fish was next detected during mobile tracking in the general area it was released on 23 June 2011. From 24 June through 26 June 2011, BT-3 was detected near the mouth of the Priest River on the Mudhole receiver (N 48.268 W 116.858). The next detection occurred 28.5 km upstream from the Mudhole station at the N Dover Station on 27 June 2011. This distance was traveled in approximate 14.5 hours. BT-3 was detected consistently on the downstream antennae of the Granite Creek station between 19 July and 4 October 2011. Additional detection of this fish occurred during tracking flights on 14 October, 25 October, and 10 November 2011. These detections occurred in the bay of Lake Pend Oreille leading to Granite Creek. The tag in this fish is expected to continue transmitting into April 2013 (Figure 5).

Bull Trout #4 (BT-4) - The second bull trout captured in 2011 occurred on 22 June approximately 350 m below the dam. It had a total length of 460mm, weight of 813 g, and the sex was undetermined. A CART-1 tag (#47) and PIT tag (#985121002189636) was implanted in this fish. Results of the genetic assignment determined this fish to be an F-1 hybrid (bull trout x brook trout) and it was not assigned a possible natal tributary. BT-4 was released at the Priest River boat launch on 22 June 2011. This fish was next detected during mobile tracking in the general area it was released on 23 June 2011. BT-4 was detected on the receivers at Albeni Falls Dam on 25 June 2011. All detections after 25 June occurred on the receivers with antennas pointing downstream of the dam, indicating this fish passed over the dam sometime on 25th of June. Detections on the receivers at the dam occurred during three time periods: 25 June through 26 June; 10 July through 16 July; and 21 July through 23 July 2011. The tag in this fish is expected to continue transmitting into April 2013 (Figure 6).

Bull Trout #5 (BT-5) - The third bull trout captured in 2011 occurred on 23 June approximately 200 m below the dam. It had a total length of 360 mm, weight of 418 g, and the sex was undetermined. A SR-11-18 tag (#175) and PIT tag (#985121002179114) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-5 to be Granite Creek and Porcupine Creek (a tributary of Lightning Creek) was determined to be the secondary possible natal tributary. BT-5 was released at the Priest River boat launch on 23 June 2011. BT-5 was detected in the Pend Oreille River during mobile tracking on 6 July approximately 2 km downstream of the Priest River. On 8 July, BT-5 was detected at the mouth of the Priest River on the Mudhole receiver. The next detection occurred on 10 July as BT-5 traveled past the N Dover station. No additional detection occurred after BT-6 entered Lake Pend Oreille. The tag in this fish is expected to continue transmitting into September 2012 (Figure 7).

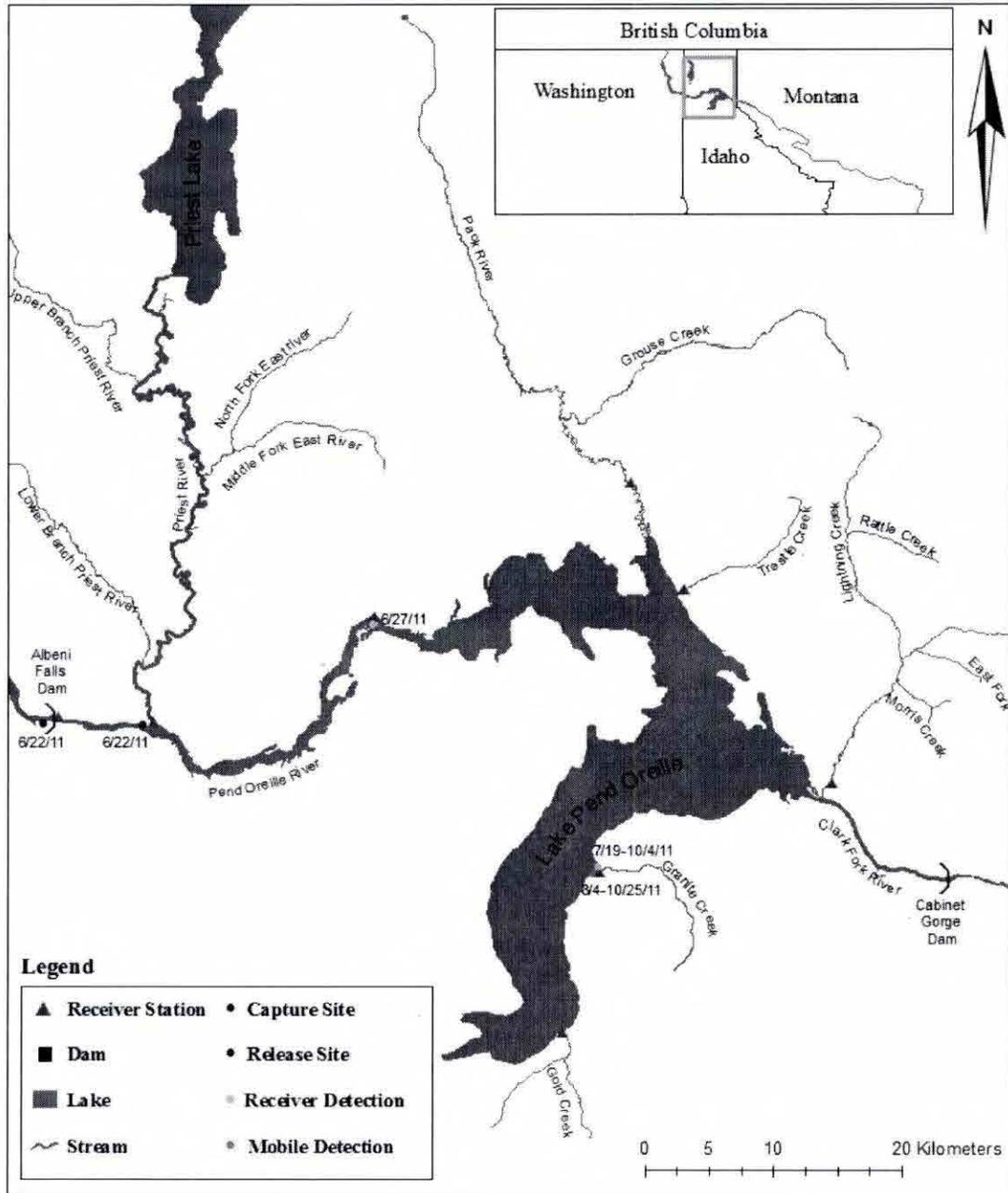


Figure 5. Detection history of BT-3 (Code 49) in Pend Oreille River watershed, 2011.

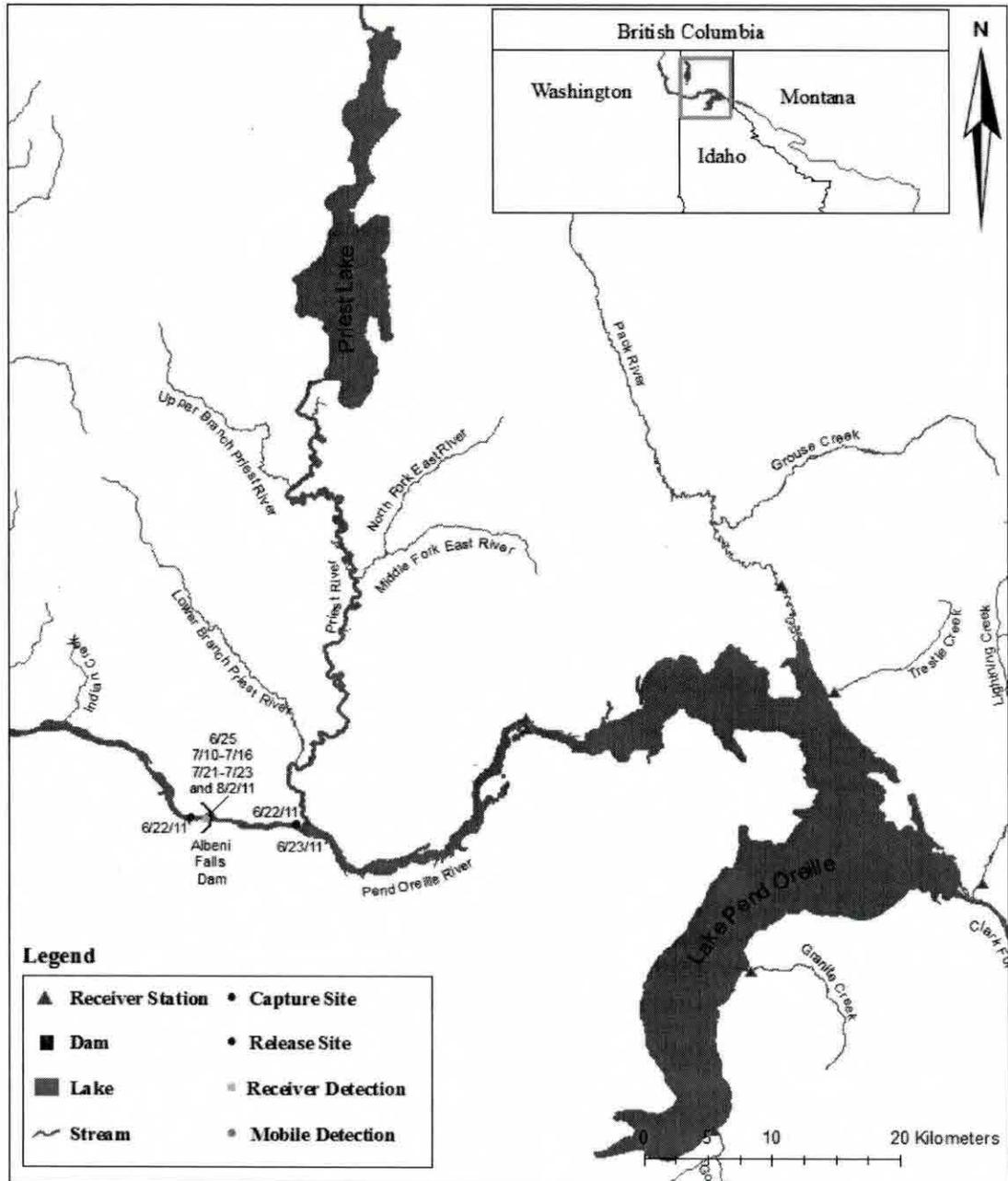


Figure 6. Detection history of BT-4 (Code 47) in Pend Oreille River watershed, 2011.

Bull Trout #6 (BT-6) - The fourth bull trout captured in 2011 occurred on 27 June approximately 2 km below the dam. It had a total length of 259 mm, weight of 157 g, and the sex was undetermined. A NTC-6-2 tag (#56) and PIT tag (#985121010207443) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-6 to be Granite Creek and Lightning Creek was determined to be the secondary possible natal tributary. BT-5 was released at the Priest River boat launch on 27 June 2011. BT-6 was entrained below Albeni Falls Dam on 28 June 2011. During mobile tracking below Albeni Falls Dam, BT-6 was detected in front of Miltner Slough on 11 July. Additional mobile detections below Albeni Falls Dam occurred on 18 and 27 July near Pioneer Park. BT-6 was entrained below Boundary Dam and detected by Seattle City light in the tailrace of Boundary Dam on 1 November 2011. The tag in this fish is expected to continue transmitting into September 2012 (Figure 8).

Bull Trout #7 (BT-7) - The fifth bull trout captured in 2011 occurred on 29 June approximately 1.2 km below the dam. It had a total length of 309 mm, weight of 289 g, and the sex was undetermined. A NTC-6-2 tag (#59) and PIT tag (#985121000253045) was implanted in this fish. Results of the genetic assignment determined this fish to be an F-1 hybrid (bull trout x brook trout) and it was not assigned a possible natal tributary. BT-7 was released at the Priest River boat launch on 29 June 2011. BT-7 entered the Priest River and was detected passing the Mudhole receiver on 3 July 2011. During mobile tracking, BT-7 was detected upstream of the Mudhole station. The first detection occurred approximately 1.5 km upstream of the Mudhole station. The next detection occurred in the Lower Branch of the Priest River from 18 July through 28 August. The last detection occurred on 26 September 2011 in the Priest River approximately 21 km upstream of the Mudhole station. The tag in this fish is expected to continue transmitting into September 2012 (Figure 9).

Bull Trout #8 (BT-8) - The sixth bull trout captured in 2011 occurred on 18 July approximately 650 m below the dam. It had a total length of 248 mm, weight of 163 g, and the sex was undetermined. A NTC-4-21 tag (#16) and PIT tag (#985121011711871) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-8 to be Middle Fork East River and Lightning Creek was determined to be the secondary possible natal tributary. BT-8 was released at the Priest River boat launch on 18 July 2011. BT-8 was detected on 19 July at Albeni Falls Dam. The next detection occurred near Kelly Island on 27 July during mobile tracking downstream of the dam. BT-8 was detected in the same area on 2 and 28 August. The last detection was in a dry muskrat hole (Figure 10).

Bull Trout #9 (BT-9) - The seventh bull trout captured in 2011 occurred on 9 August 2011 approximately 1.4 km below the dam. It had a total length of 658 mm, weight of 2751 g, and the sex was undetermined. A CART-1 tag (#46) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-9 to be Granite Creek and Lightning Creek was determined to be the secondary possible natal tributary. BT-9 was released at the Trestle Creek boat launch at Lake Pend Oreille on 9 August 2011. On 5 and 6 November, BT-9 was detected passing the N Dover receiver. BT-9 was detected in Gold Creek from 8 October through 13 October. BT-9 was killed on 13 October in a gill net south of Lakeview shortly after leaving Gold Creek (Figure 11).

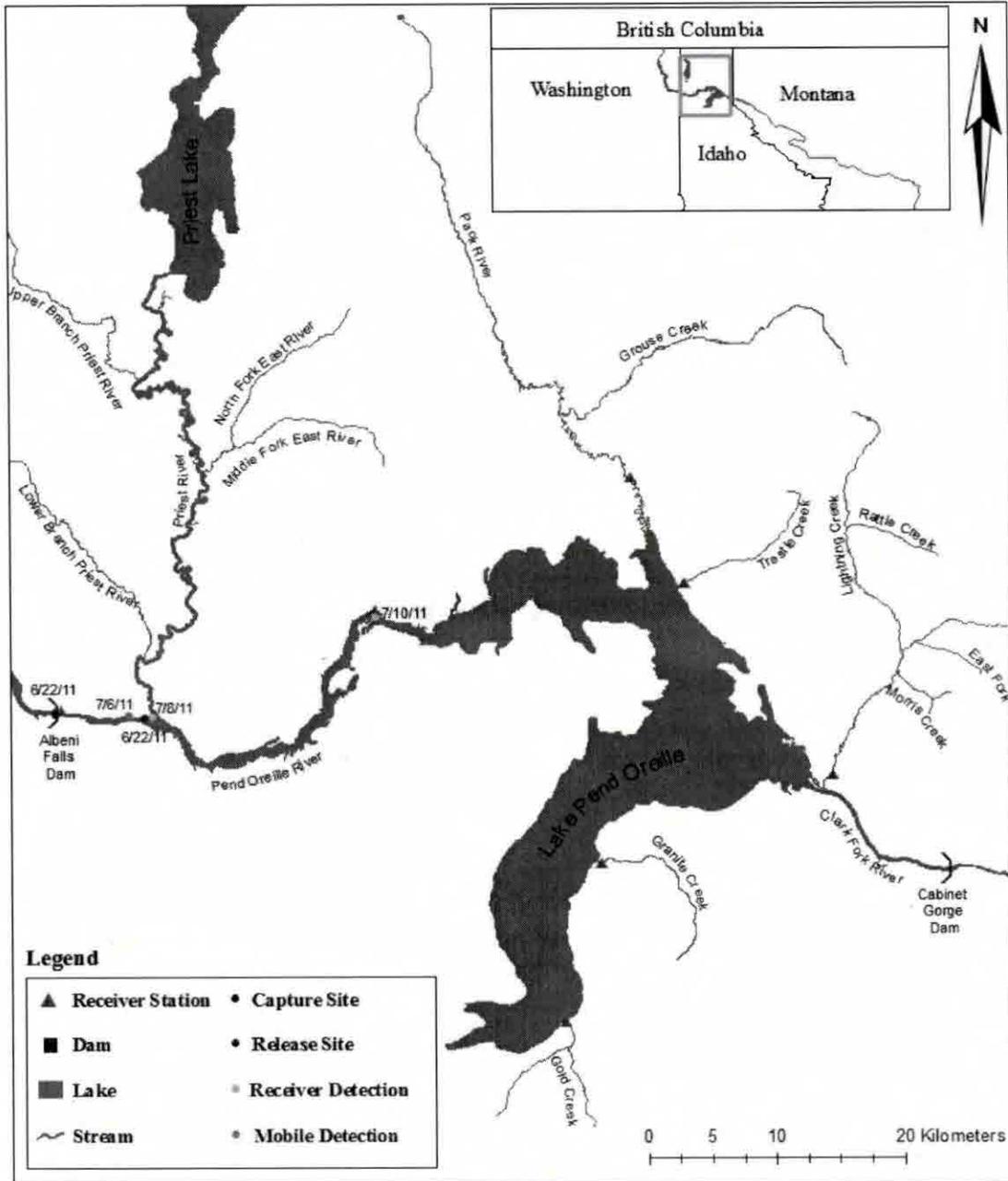


Figure 7. Detection history of BT-5 (Code 175) in Pend Oreille River watershed, 2011.

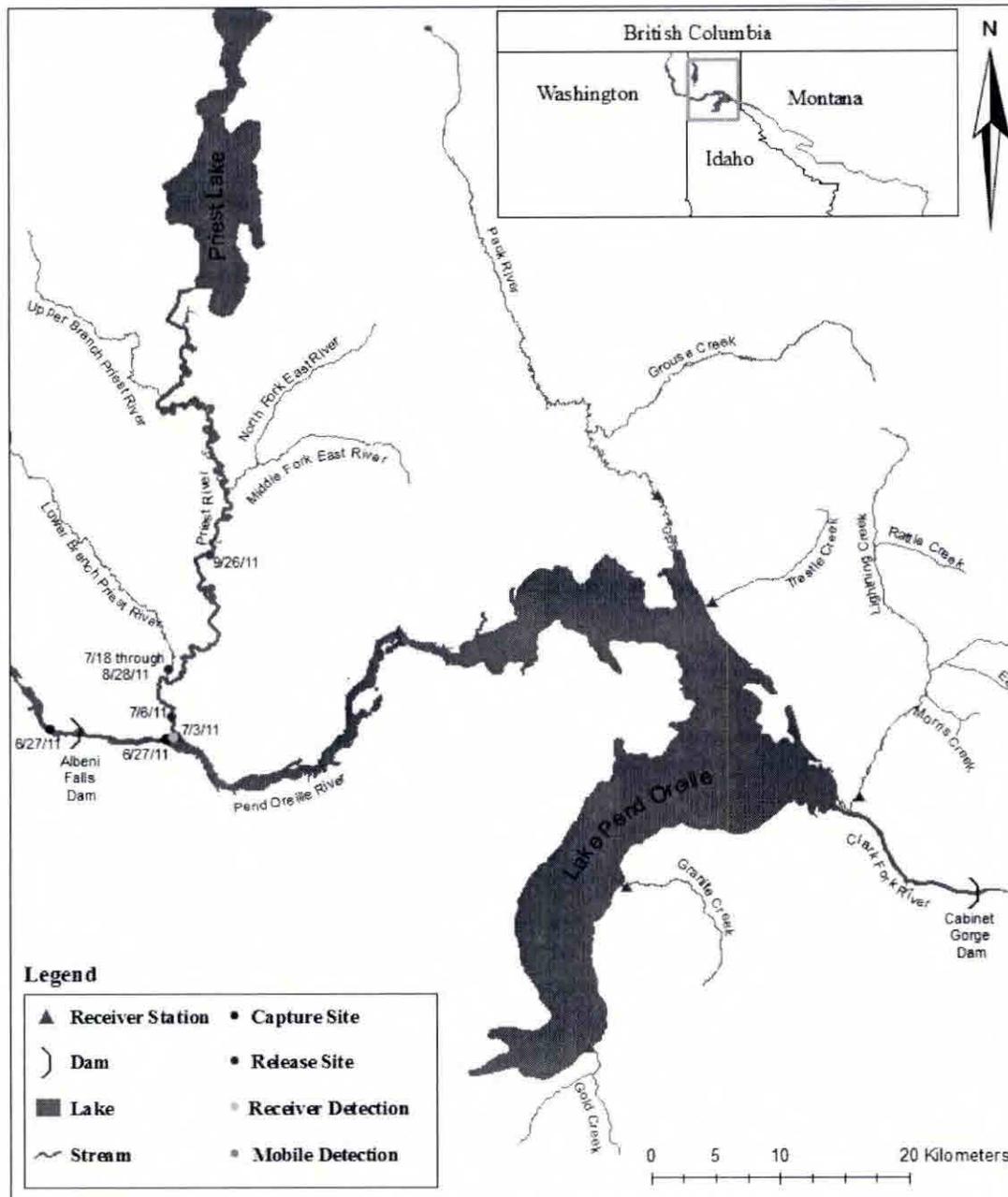


Figure 8. Detection history of BT-6 (Code 56) in Pend Oreille River watershed, 2011.

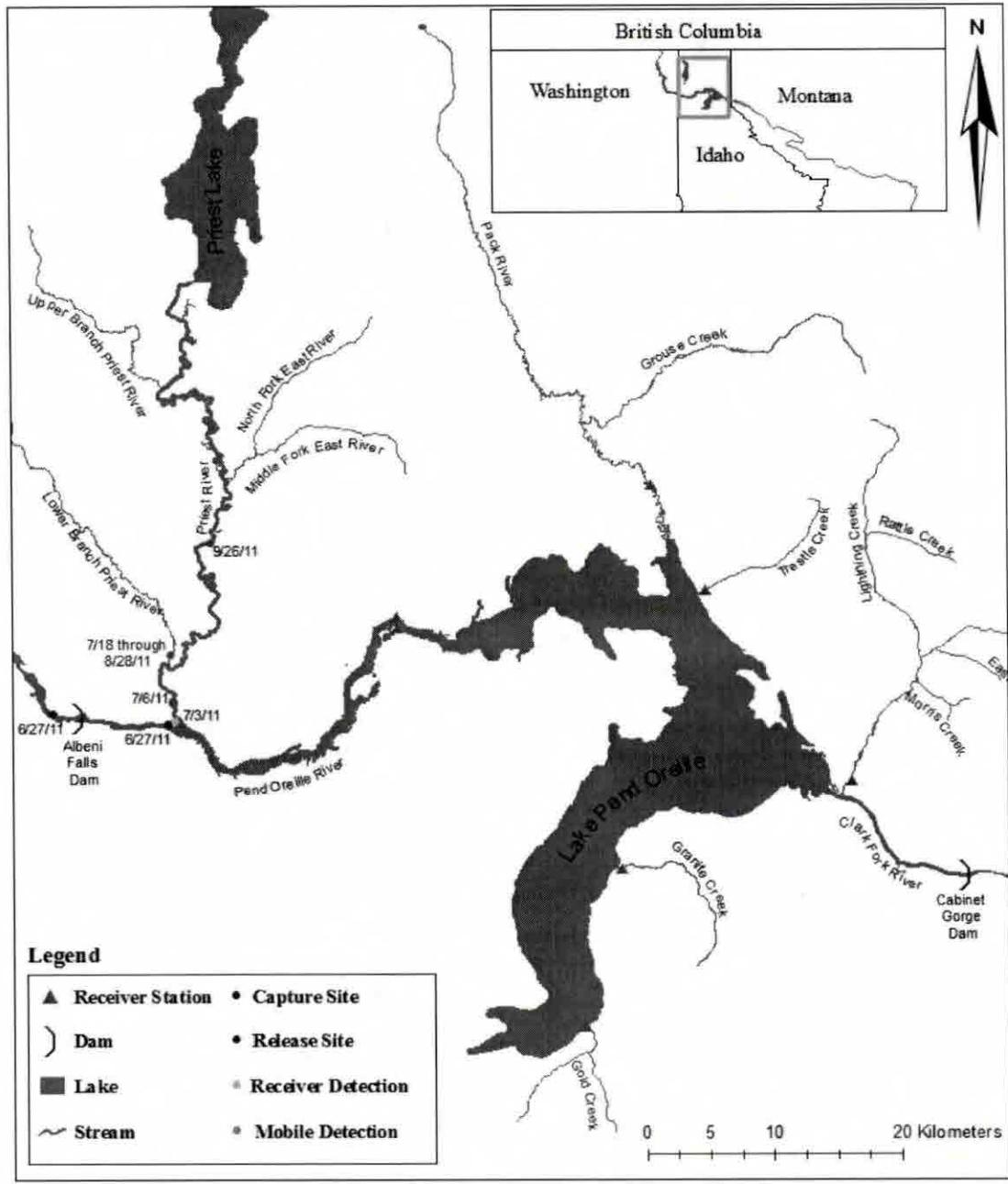


Figure 9. Detection history of BT-7 (Code 59) in Pend Oreille River watershed, 2011.

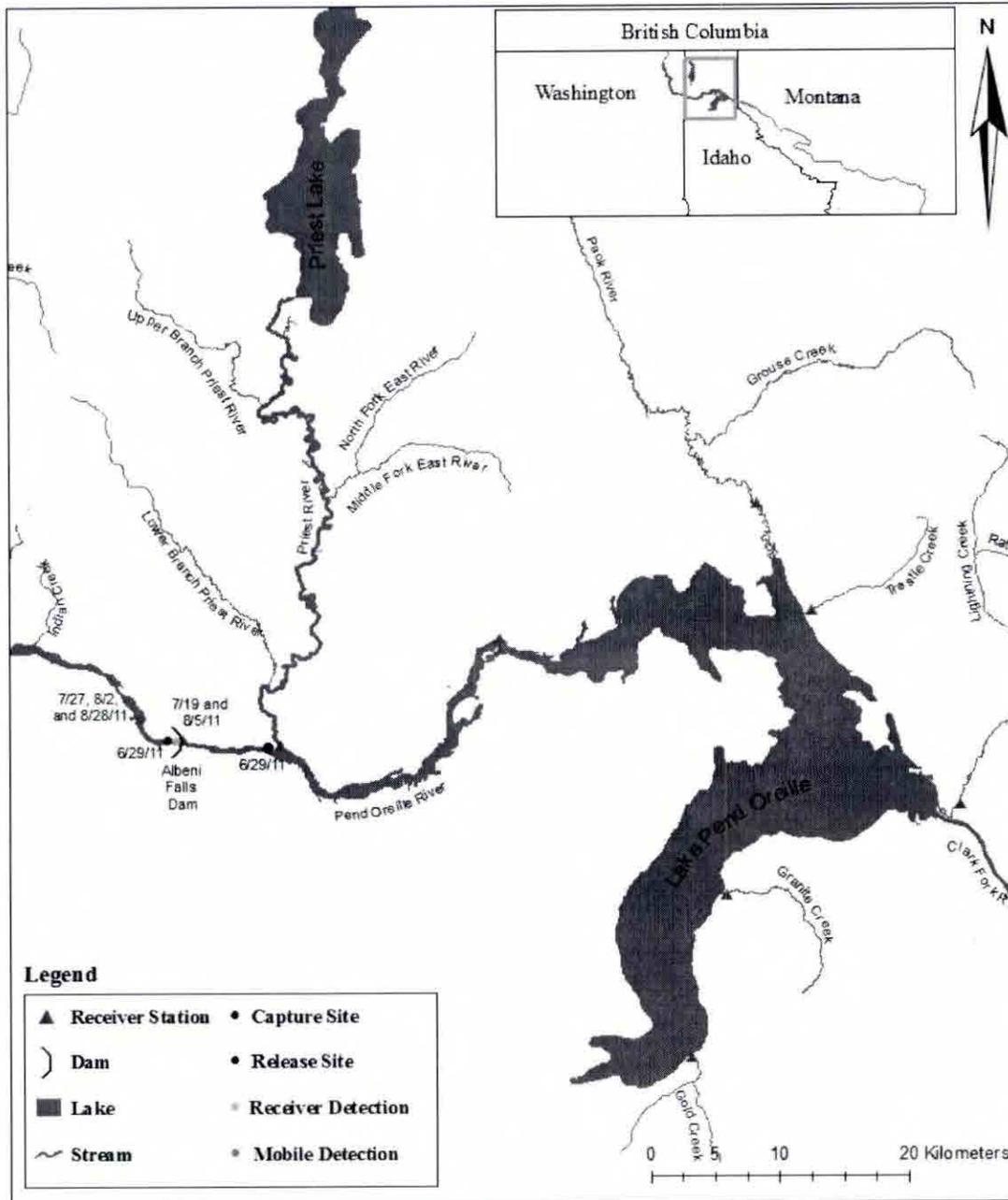


Figure 10. Detection history of BT-8 (Code 16) in Pend Oreille River watershed, 2011.

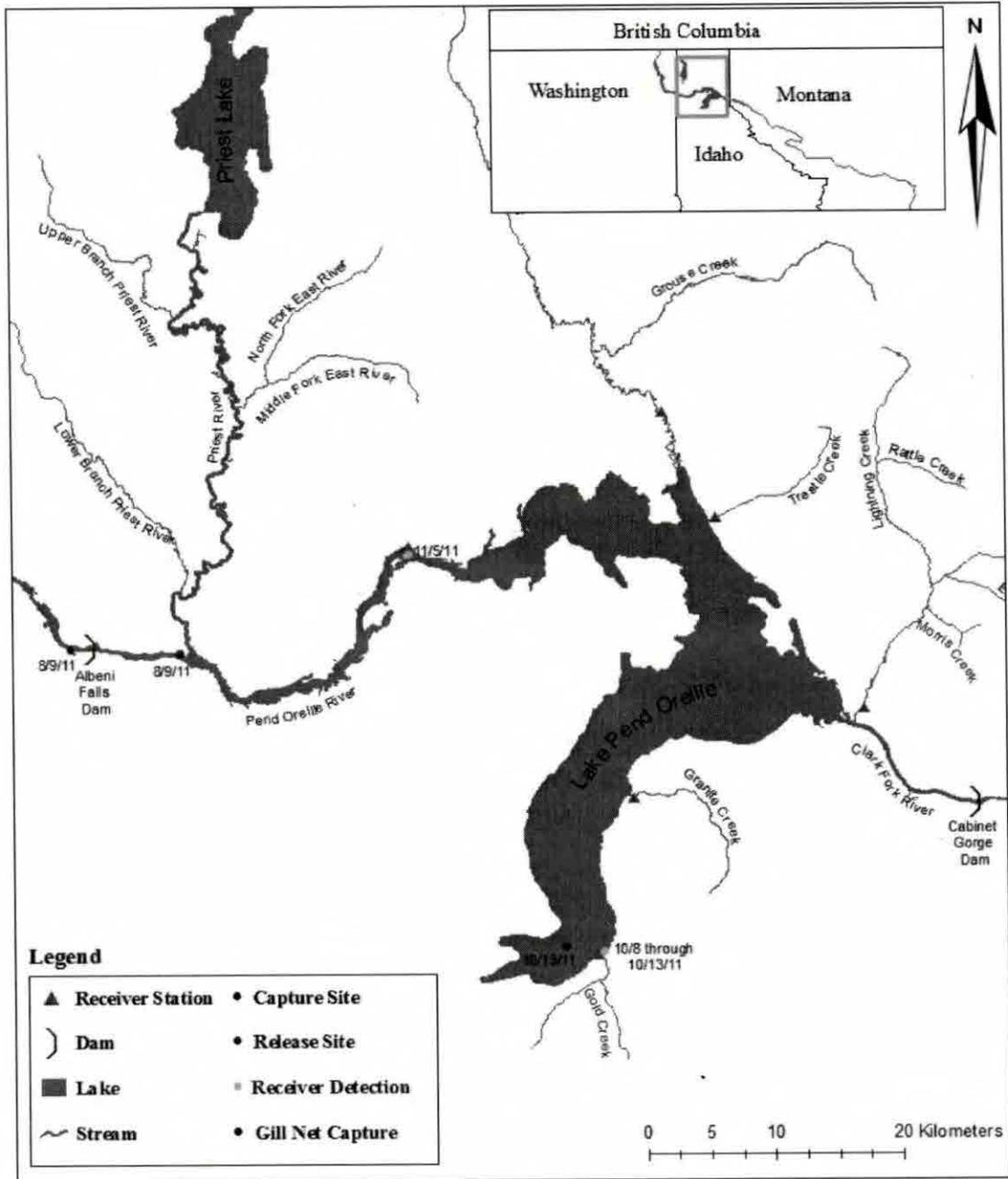


Figure 11. Detection history of BT-9 (Code 46) in Pend Oreille River watershed, 2011.

Discussion

In 2007, EWU, KNRD, and PNNL began a study to determine movements and genetic assignments of bull trout in the tailrace of Albeni Falls Dam. The primary objective was to capture bull trout below Albeni Falls Dam, transport and release them above the dam and monitor their movements to natal tributaries. Radio and acoustic tracking would provide information on movement patterns of bull trout once moved above the dam and allowed to migrate to their natal tributaries in the Pend Oreille sub-basin. Genetic analysis would confirm the identity of their natal tributary as well as confirm that their origin was from above Albeni Falls Dam.

Since 2004, two bull trout were relocated upstream of Albeni Falls Dam (Scholz et al 2005a). Since 2007, eleven bull trout have been tagged and relocated upstream of Albeni Falls Dam. Of these thirteen fish, eleven have migrated in to Lake Pend Oreille and two were entrained downstream of Albeni Falls Dam. Of the fish returning to the lake, four were detected in their primary genetically predicted natal tributary and two detected in their secondary genetically predicted natal tributary. Two of the remaining four fish have tags that are still active (one through September 2012 and one through March 2013). Both of these fish have Lightning Creek or one of its tributaries as a genetically predicted natal tributary. Over the course of this study, three bull trout have been detected returning to Lightning Creek or one of its tributaries. Two of these did not return in the year they were tagged, but did in the following year. Based on the observed migratory pattern during this study and the migratory pattern of bull trout in Trestle Creek (Paluch et al 2011; Downs et al 2006; Scholz et al 2005a), it is possible the two remaining bull trout could be detected in a genetically predicted tributary next fall.

BT-1 was tagged in March 2010. In the fall of 2010, BT-1 was detected passing the Pack River receiver and later detected in its secondary predicted natal tributary, Grouse Creek (Paluch et al 2011). In the fall of 2011, BT-1 was detected on the Pack River receiver. Aerial tracking was conducted in the Pack River and Grouse Creek area after the detection at the Pack River station. No additional detections occurred during aerial tracking. The detection at the Pack River receiver occurred after the expected tag-failure date. It is likely this tag only transmitting intermediately at the time aerial tracking occurred. The detections at the Pack River receiver occurred around the same time this fish was detected in its predicted natal tributary the previous year. Based on the facts that bull trout are iteroparous (Downs et al 2006), spawn in the fall, and this fish was detected along its spawning migration route, it is likely this fish was returning to its natal tributary to spawn.

BT-2 was tagged in June 2010 and was detected in the Priest River (Paluch et al 2011). This fish was never detected entering Lake Pend Oreille in 2010, but was detected in tributaries of Lake Pend Oreille in 2011. There are two possible explanations as to why this fish was not detected entering the lake. First, there may have been a malfunction with the tag. After this fish was detected in the Priest River, extensive tracking effort was conducted to relocate this fish without any success. A malfunctioning tag could be a reasonable explanation why this fish was not detected during mobile tracking or migrating past the Dover receivers. Second, this fish may have been in an area outside of where tracking effort occurred and may have passed into the lake after the N Dover station was pulled out for the winter. The S Dover receiver was operating all

year, but this fish could have passed on the north side of the river and missed being detected due to being outside of the S Dover receivers range. This fish was captured by AVISTA in the Clark Fork River in early July 2011 and was detected three days after being released, passing the Lightning Creek receiver. This fish was consistently detected in its secondary predicted natal tributary, East Fork of Lightning Creek, from early August through late October. In mid September, BT-2 was physically seen swimming in the East Fork of Lightning Creek. Additional bull trout were seen in the general area BT-2 was spotted.

BT-2 detections matched a pattern seen in a bull trout previously tagged during this study. In 2008, a bull trout (tag #108) was tagged and released upstream of Albeni Falls Dam. This fish did not enter a known spawning tributary in 2008 (Paluch et al 2009). However, it was detected in its predicted natal tributary in 2009, where it was consistently detected for several months and was physically spotted with another bull trout (Paluch et al 2010).

Based on the timing of BT-2 upstream migration, the consistent detection in a known tributary used by bull trout for spawning throughout their typical spawning period, and the presence of other bull trout in the area suggests BT-2 spawned in its predicted natal tributary.

BT-3 was not detected in either of its predicted natal tributaries. It was detected consistently on the downstream antennae at Granite Creek from mid July through early October. There was no indication this fish ever past the Granite Creek receiver. It is possible this fish strayed from its predicted natal tributaries and found a spawning area downstream of the Granite Creek receiver. BT-3 was detected during aerial flights from mid October through early November in the bay of Lake Pend Oreille that Granite Creek flows into.

BT-4 was entrained below Albeni Falls Dam the day after it was released at the Priest River boat launch. This fish was released during the high flows in the Pend Oreille River; discharge at Albeni Falls was 114 KCFS. BT-4 was determined to be an F-1 hybrid. Being an F-1 hybrid, it is possible this fish was sterile and may not have had reason to return to its natal tributary. This may have been exploring downstream of where it was released at the Priest river boat launch and followed the high flows, resulting in it becoming entrained below the dam.

BT-5 was detected entering Lake Pend Oreille in mid July. This fish was not detected in any of the known tributaries with spawning bull trout populations. The tag in this fish is expected to continue transmitting through March 2013. Since bull trout have been known to spawn in alternating years (Downs et al 2006), it is possible this fish will be detected during the 2012 spawning season. Both of the predicted natal tributaries for this fish are tributaries of Lightning Creek. Since population of Lightning Creek tributaries are known to make early migrations to spawning grounds, tracking efforts will be focused in the Lightning Creek area from early summer through the end of the spawning season.

BT-6 was entrained below Albeni Falls Dam the day after it was released at the Priest River boat launch. This fish was released during high flows in the Pend Oreille River; discharge at Albeni Falls was 115 KCFS. This fish was only 259 mm and likely immature. Since this fish was not likely to spawn during this fall, it is possible that this fish followed the high flows instead of migrating back to the lake, resulting in its entrainment below the dam.

BT-7 was genetically determined to be a F-1 hybrid. This fish entered the Priest River four days after being tagged. Where it remained and was last detected in the fall. F-1 hybrids are not all sterile (Naohisa et al, 2011). There are known spawning populations of bull trout in the Priest River tributaries. It is possible this fish was homing to its natal tributary.

BT-8 was entrained below Albeni Falls Dam the day after it was released at the Priest River boat launch. Flow through Albeni Falls Dam was at 63 KCFS when this fish was released upstream of the dam. This fish was 248mm, similar in size to BT-6. It was unlikely to reach maturity before the fall. This fish mostly like followed the flow of the river instead of heading back to the lake resulting in its entrainment below the dam.

BT-6 and BT-8 were both most likely immature at the time they were tagged. Bull trout are known to migrate long distances to and from their natal tributaries. Studies in the Clark Fork Basin have reported bull trout migrating an average of 109 km back to their natal tributaries (Schmetterling 2003). Tagged bull trout in the Peace River, Canada, were caught by anglers over 200 km from their natal tributaries (McPhail and Baxter 1996). Over the course of this study, bull trout have migrated an average distance of 81 km back to their natal tributaries. It is possible these fish were simply migrating downstream of the natal tributaries and passed the dam on their own volition.

BT-9 was detected in Gold Creek in mid October. This tributary of Lake Pend Oreille is located south of BT-9 predicted natal tributary, Granite Creek. This fish was in Gold creek for approximately 5 days. Gold Creek is a known bull trout spawning tributary. It is possible this fish strayed into Gold Creek and spawned. BT-9 was caught and killed in a gill net the same day in returned to the lake from Gold Creek. It is also possible this fish may have entered into Gold Creek and was returning to the lake to home to its natal tributary. However it was caught in a gill net that was part of the lake trout removal program. This was the second tagged bull trout from this study to be caught in a gill net of the lake trout removal program.

Over the course of this study nine tagged bull trout have returned to Lake Pend Oreille. Twenty-two percent of these fish have been captured in gill nets used in the lake trout removal program. One fish survived being captured and returned to its predicted natal tributary that year, the other did not survive being captured. This percentage is fairly high due to small number of fish in the study group.

Another area of concern is hybridization between bull trout and brook trout, since hybridization of bull trout and brook trout can result in the displacement of bull trout (Leary et al 1993). Over the course of this study, thirteen bull trout, six brook trout, and six F-1 hybrid trout have been collected. Only one tagged hybrid was tracked upstream of the dam. This fish entered the Priest River shortly after being tagged and was never detected leaving the Priest River. Since we do not have a genetic data base of hybrid bull trout, we have no way of predicting which tributary they are originating from. It is possible this fish was not sterile and was returning to tributary of the Priest River to attempt to spawn.

Two hybrids were mistakenly identified as bull trout and relocated upstream of Albeni Falls Dam in 2011. Additional training was given to field technicians on how to identify bull trout x brook trout hybrids. Examination of dorsal fin markings, dorsal vermiculations, dorsal fin shape, fin stripes, and lateral spot color can be used to identify bull trout hybrids (Popowich et al 2011). Fish captured in the future will be closely examined. If there is any question that it is not a bull trout, it will not be relocated upstream of Albeni falls Dam.

Two of the bull trout tagged in 2011 have tags that will continue to transmit through the 2012 tracking season. Over the course of this study, we have had several fish return to natal tributaries the following year. Tracking these fish will be a priority in 2012.

As of 18 April 2012, the percent of average accumulation of precipitation (Snotel Internet Site, 2012) in the Idaho Northern Panhandle Region, based on 7 of 10 stations reporting, was 110% of normal with a 133% snow water equivalent. In Montana, the percent of average accumulation of precipitation in the Flathead River Basin, based on 15 of 16 stations reporting, was 107% of normal with a 106% snow water equivalent. The Upper Clark Fork River Basin, based on 15 of 15 stations reporting, was 102% of normal with a 96% snow water equivalent. The Bitterroot River Basin, based on 7 of 7 stations reporting, was 101% of normal with a 104% snow water equivalent. The Lower Clark Fork Basin, based on 8 of 8 stations reporting, was 105% of normal with a 109% snow water equivalent.

The number of bull trout passing over the dam is theoretically related to the amount and timing of the discharge. The bull trout captured in 2011 were collected during the time period of peak discharge and following the peak discharge. This year's discharge at the Albeni Falls Dam spillway will likely be above average due to an above average snowpack. An increased discharge could result in more fish being entrained at the dam and water temperatures increasing later in the season. We will monitor the discharge and river temperature closely during 2012 and schedule our sampling trips accordingly.

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**Temporary restoration of bull trout passage at Albeni Falls Dam.
Annual Progress Report
May 2012 – April 2013**

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Collection of threatened bull trout and other fish species were authorized under scientific collectors permits issued to EWU in 2010 by the USFWS (Recovery Permit No. TE-068143-3) and WDFW (Permit No. 12-009). Fish collections in Idaho were authorized under a scientific collectors permit issued to the Kalispel Tribe (Permit No. F-04-03). This project was approved by the Eastern Washington University Institutional Animal Care and Use Committee.

Abstract

This study was designed to monitor movements of bull trout that were provided passage above Albeni Falls Dam, Pend Oreille River. Electrofishing, angling, and snorkeling were used to collect bull trout below the dam. Tissue samples were collected from each bull trout and sent to the U. S. Fish and Wildlife Service Abernathy Fish Technology Center Conservation Genetics Lab, Washington. The DNA extracted from tissue samples were compared to a catalog of bull trout population DNA from the Priest River drainage, Lake Pend Oreille tributaries, and the Clark Fork drainage to determine the most probable tributary of origin. A radio tag was implanted in each fish prior to being transported and released above the dam. Bull trout relocated above the dam were able to volitionally migrate into their natal tributary, drop back downstream, or migrate upstream to the next dam. A combination of stationary radio receiving stations and tracking via aircraft and vehicle were used to monitor the movement of tagged fish to determine if the spawning tributary it selected matched the tributary assigned from the genetic analysis. Six bull trout were collected in 2012. Three of these fish were implanted with radio transmitters. All three migrated into Lake Pend Oreille. One bull trout entered a tributary of Lightning Creek and most likely spawned there. The genetically predicted tributaries of this fish were Lightning Creek or Savage Creek (a tributary of the East Fork of Lightning Creek). This fish spent a majority of its time in Rattle Creek (a tributary of Lightning Creek) during the spawning season. Six bull trout/brook trout hybrids were also collected in 2012. Five of these fish were radio tagged and released downstream of Albeni Falls Dam. Four of these five fish were detected numerous times in the tailrace of Albeni Falls Dam.

Introduction

The Pend Oreille and Clark Fork rivers flow 789 km (490 miles) from their source near Butte, Montana, through Pend Oreille Lake, Idaho, to their confluence with the Columbia River in British Columbia, Canada. The construction of Waneta (RKM 0.8), Seven Mile (RKM 9.7), Boundary (RKM 27.4), Box Canyon (RKM 55.5), Albeni Falls (RKM 145.0), Cabinet Gorge (RKM 241.2), Noxon Rapids (RKM 273.1), Thompson Falls (RKM 334.7) and Milltown (RKM 586.3) dams have disrupted bull trout *Salvelinus confluentus* migration patterns from tributaries located upstream and downstream of Lake Pend Oreille. All of these dams were originally constructed without fish passage, causing historical migratory corridors used by bull trout to be blocked. Blocking of migratory corridors has resulted in the fragmentation of bull trout habitat and failure of bull trout to return to their natal tributaries (USFWS 2000). The U.S. Fish and Wildlife Service (USFWS) listed bull trout in the Columbia River Basin as threatened in 1998 (USFWS 2000). In 2005, Cabinet Gorge Dam began a trap and haul strategy to provide upstream passage of the dam for bull trout genetically determined to have originated from tributaries upstream of the dam. In 2008, Milltown Dam was breached, restoring passage through this section of the river. In 2010, construction of a fish ladder at Thompson Falls was completed, restoring upstream passage at the dam.

Bull trout hybridization with brook trout *S. fontinalis* is a major threat to bull trout populations (Buktenica 1997; Leary et al 1993). One example is in the South Fork of Lolo Creek in the Bitterfoot River Drainage, MT. Brook trout were initially detected in this creek in the late 1970s. A survey was conducted in 1982 to determine the percent of bull trout, brook trout, and hybrids. Bull trout were the most abundant (43.6%), followed by hybrids (35.9%), and brook trout (20.5%). The proportion changed drastically by 1990, when brook trout became the most abundant species (64.7%), followed by bull trout (23.5%), and hybrids (11.8%) (Leary et al 1993).

Displacement of bull trout can occur in areas where brook trout have been introduced for the following reasons: 1) Bull trout reproductive effort is diminished by the production of hybrids. 2) Bull trout become displaced due to competition. Brook trout have a shorter life cycle, more varied habitat preference, and tendency to overpopulate small streams (Scot and Crossman 1973; Naohisa et al 2002).

Construction of Milltown Dam, located at the confluence of the Blackfoot and Clark Fork rivers, was completed in 1907. Prior to the removal of Milltown Dam in 2008, passage upstream from the dam was blocked. However, during periods of high discharge water was diverted over the spillway allowing fish downstream passage. The North Fork Blackfoot River and Monture Creek are located upstream of Milltown Dam, and are primary spawning grounds for fluvial bull trout (Swanberg 1997).

In a 2000/2001 study by Schmetterling (2003), fourteen bull trout, seven in 2000 and seven in 2001, were collected below the Milltown Dam, implanted with radio transmitters, and relocated above the dam. In 2000, six of the bull trout migrated up the Blackfoot River, three to Monture Creek and three to the North Fork Blackfoot River. One bull trout migrated up the

Clark Fork River to Copper Creek. Migration distances averaged 109.3 km. In 2001, four bull trout migrated up the Blackfoot River, one to Monture Creek and the three to the North Fork Blackfoot River. Two bull trout migrated up the Clark Fork River, one to Ranch Creek and one to Hogback Creek. One bull trout died in Milltown Reservoir. The average migration distance was 109.9 km. Eight of the bull trout in this study were located near bull trout redds and presumably spawned there. This study indicated that bull trout collected below the dam originated from tributaries upstream of the dam and would return to their natal tributary to spawn if provided passage above the dam.

Construction of the Cabinet Gorge Dam, located on the Clark Fork River, was completed in 1952. Prior to construction of Cabinet Gorge Dam, large numbers of adfluvial bull trout freely migrated into Lake Pend Oreille for their subadult and adult life stages before returning to their natal tributary to spawn (Pratt and Huston 1993). Jeppson (1954) reported seeing large numbers of bull trout congregating below Cabinet Gorge Dam, although no bull trout redds were observed. A spawning channel was created by Idaho Department of Fish and Game in 1961 in an attempt to mitigate the loss of upstream spawning grounds. Hundreds of bull trout were surveyed near the spawning channel during the mid 1960's. Biologists conducted surveys at the spawning channel from 1984 to 1991, but did not observe any redds. The disruption of the migratory route by the dam resulted in loss of spawning habitat which the spawning channel could not mitigate.

Migratory bull trout begin their spawning migration at the end of the high flows, in early fall. During this time large bull trout congregate near the spillway of Cabinet Gorge Dam. One hypothesis by Neraas and Spruell's (2001) was that bull trout congregating below Cabinet Gorge Dam may be migratory fish from tributaries upstream of the dam that passed over the dam during their outmigration and are attempting to return to their natal tributary. Neraas and Spruell (2001) collected bull trout from locations above the dam, below the dam, and at the dam between 1997 and 1999. Microsatellite DNA analysis was conducted on genetic samples taken from each fish and compared to a genetic data baseline of known bull trout populations to assign probable tributary of origin for each fish. An average of 56% of the fish collected at the dam were assigned to tributaries above the dam. These results supported the hypothesis that bull trout collected below Cabinet Gorge Dam originated from tributaries upstream of the dam.

In 2001, Avista Corporation in conjunction with the USFWS, initiated a program to restore upstream fish passage above Cabinet Gorge Dam on the Clark Fork River. Bull trout captured below Cabinet Gorge Dam were assigned to a natal tributary using "rapid response genetic analysis". Tributary assignment was used to determine if the fish was released above or below Cabinet Gorge Dam. The success of the Cabinet Gorge bull trout transportation project has prompted similar efforts at Noxon Rapids and construction of a fish ladder at Thompson Falls Dam. The recent removal of dams on Big Blackfoot River, a principle tributary of the upper Clark Fork River, and Milltown Dam in the Clark Fork River have restored the Upper Clark Fork and Big Blackfoot rivers to free flowing conditions allowing more natural connectivity of bull trout. The bull trout passage projects at Cabinet Gorge, Noxon Rapids and fish ladder at Thompson Falls dams provide a means of passage for bull trout at each of these facilities and will likely increase the number of spawning bull trout returning back to their natal tributaries.

In 2004 and 2007, Avista biologists collected bull trout below Cabinet Gorge Dam, collected genetic samples, and maintained them in holding tanks awaiting natal tributary assignment from genetic analysis. Genetic samples were analyzed at the Abernathy Fish Technology Center Conservation Genetics Lab (AFTC). Once natal tributaries were assigned, fish were relocated to the region their natal tributary was located. During this period genetic samples were also collected from known bull trout populations and added to the genetic data baseline (DeHaan and Arden 2008). In 2004, fifty-two genetic samples were analyzed at AFTC and assigned natal tributaries. Seventy-nine percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan et al. 2005). In 2007, thirty-five genetic samples were analyzed at AFTC. Seventy-seven percent were assigned to tributaries upstream of Cabinet Gorge Dam (DeHaan and Arden 2007). These studies supported the hypothesis that bull trout congregating below Cabinet Gorge Dam originated from tributaries upstream of the dam.

Construction of Albeni Falls Dam, located on the Pend Oreille River, was completed in 1955, blocking historical migratory bull trout routes between the lower river and Lake Pend Oreille. Fluvial bull trout that spawn in tributaries of Lake Pend Oreille and migrate downstream to the Pend Oreille River in search of forage can no longer return to their natal streams once passing the dam. The adfluvial life history form, which historically spawned in tributaries of the Box Canyon Reservoir of the Pend Oreille River and migrated upstream to the cold-water refuge of Lake Pend Oreille, can no longer migrate into the lake. Due to these impacts, the USFWS Biological Opinion (USFWS 2000) directed the action agencies to evaluate the feasibility of restoring passage at Albeni Falls Dam (see Reasonable and Prudent Measure 10.A.1.3 and Terms and Conditions 11.A.1.3 of the 2000 USFWS BiOp).

In a 2003 study by Geist et al. (2004), seven bull trout captured below the dam were implanted with radio transmitters and released in a cold spring effluent to determine their interaction with the dam. Through the use of radio receiver stations on the dam and mobile tracking via boat, six of the tagged bull trout below the dam were found to make repeated forays between the cold-water effluent and the base of the dam. The data collected supported the hypothesis that the bull trout originated from tributaries above the dam.

In a 2004 study by Scholz et al. (2005a, 2005b), two bull trout captured below Albeni Falls Dam were tagged and relocated above the dam to determine if they would migrate upstream or pass back over the dam. Microsatellite DNA analysis was used to assign the most probable natal tributary of each fish. Tracking was conducted using stationary receiver stations and mobile surveys via aircraft and vehicle. Both fish migrated from their release point into Lake Pend Oreille. One fish entered Lightning Creek and returned to the lake approximately one month later. It is presumed to have spawned in this tributary. The second fish, which was immature at the time of capture, entered Trestle Creek during the spawning season the following year. Both of these fish returned to their genetically assigned natal tributary. The movements of these two fish supported the hypothesis that bull trout captured below Albeni Falls Dam originated from tributaries above the dam.

Genetic samples were taken from the bull trout captured in the Geist et al. (2004) and Scholz et al. (2005a, 2005b) studies. DNA analysis was used to compare the genetic samples with populations from the Priest River and Lake Pend Oreille drainages as well as populations

from Clark Fork River tributaries below Cabinet Gorge Dam (DeHaan and Arden 2008). All nine of the fish collected below Albeni Falls Dam were assigned to tributary populations of Lake Pend Oreille or the Clark Fork River below Cabinet Gorge Dam (DeHaan and Arden 2008). The two bull trout released above the dam entered the tributary matching those assigned from genetic analysis.

Varied spawning migration strategies are used by bull trout within the Lake Pend Oreille Basin. Spawning tributaries are entered by some sexually mature bull trout in May or June, 3-4 months prior to peak spawning in September and early October. Early migrations are a critical life history adaptation allowing access to spawning tributaries with intermittent reaches of elevated water temperature during the summer and fall months (Anderson 1971; Pratt 1985; Pratt and Huston 1993; PBTAT 1998). Due to the geology of this basin many of the streams have influent reaches that are above the water table level. During peak flows water is maintained in the channel but can drop below ground during low flows. Early migrations are a local adaptation allowing bull trout to access natal tributaries before low flow makes them inaccessible.

A late summer/early fall spawning migration also occurs from Lake Pend Oreille into the Clark Fork River and tributaries entering along the Clark Fork (Jeppson 1960; Pratt 1985; Pratt and Huston 1993; PBTAT 1998; Scholz et al. 2005a, 2005b). A portion of the spawning population in Lightning Creek enters in August and September. Late summer or fall migration is potentially advantageous in terms of reproductive fitness because the fish remains in a more productive environment continuing to feed for a longer period, and converting more energy into gamete production. The downside of a later spawning migration is that intermittent stream reaches may block migration into home tributaries and increase the probability of straying. This is not necessarily a bad strategy, as it could potentially promote some genetic exchange between populations. Both early migrating and late migrating adult bull trout have been reported in Lightning Creek (Anderson 1971; Scholz et al. 2005a, 2005b). These behavioral differences may reflect some of the genetic diversity observed by Spruell et al. (1999) and illustrates why it is important to maintain genetic diversity among these populations. The potential of Albeni Falls Dam preventing bull trout from returning to natal tributaries above the dam to spawn and preventing those of tributaries below the dam from completing their life cycle has been documented in recent studies (Dupont and Horner 2004; Geist et al. 2004; Scholz et al. 2005a, 2005b, Scholz et al. 2008; Dupont et al. 2007).

The USFWS biological opinion (USFWS 2000) noted that, "*Albeni Falls Dam was constructed without fishways to accommodate safe upstream and downstream passage of fish. . . Bull trout were abundant in the Pend Oreille River through 1957, and then abruptly their numbers decreased to the point that individual fish are now noteworthy. This abrupt decline correlates with the commencement of operation of Albeni Falls Dam in 1952. No other abrupt or widespread threat can be identified for this portion of the Pend Oreille River Basin during 1950s. In the absence of passage, migratory bull trout remaining in the Pend Oreille River will continue to be harmed.*" As a result, the USFWS (2000a, 2002b) proposed a recovery plan to address this issue. Page 166 of the recovery plan calls on the Corps of Engineers and other agencies to by October 1, 2008, *Investigate and implement upstream passage at Albeni Falls (USFWS Biological Opinion), ...as needed, to reconnect fragmented core habitat of bull trout with Lake Pend Oreille.* The Recovery Plan emphasizes conserving genetic diversity and

providing opportunities for genetic exchange, which is basis of our current study. Captured bull trout in this study that are released 8 km above Albeni Falls Dam can voluntarily move back below the dam, or into the Priest River (or it's tributary the East River), tributaries of Pend Oreille Lake, or migrate up the Clark Fork River to the tailrace of Cabinet Gorge Dam.

Prior to construction of Albeni Falls Dam, sustainable populations of bull trout existed in the Pend Oreille River (RKM 55.5-141.5) between Metaline Falls and Albeni Falls (Scholz et al. 2008). The upper end of this section of the Pend Oreille River was blocked by the construction of Albeni Falls Dam in 1955 and the lower end was blocked by Box Canyon Dam in 1957, causing the fragmentation and isolation of bull trout populations. The Pend Oreille River, which historically served as ideal habitat during certain life stages of migratory bull trout, was converted into a reservoir adversely affecting the sustainability of bull trout populations within the reach. Bull trout were no longer able to seek cold water refuge in Lake Pend Oreille due to their migratory route being blocked by Albeni Falls Dam. The water temperatures in Box Canyon Reservoir exceed 16°C, the upper limit of bull trout thermal zone of tolerance, during the summer months. Without access to Lake Pend Oreille, bull trout are forced to seek cold water in a section of river which offers few cold water refuges. Without restoration of the migratory route into Lake Pend Oreille, bull trout in Box Canyon Reservoir are in imminent danger of extinction. There is a scarcity of bull trout in Pend Oreille Basin tributaries located below Albeni Falls Dam (Ashe and Scholz 1992; Scholz et al. 2005a, 2005b). Without access to Lake Pend Oreille, the survival of bull trout entrained below Albeni Falls Dam is remote.

In 2007 this study was initiated to determine movements and genetics of bull trout captured below Albeni Falls Dam as a first step in assessing bull trout passage at the dam. The objectives of this project were to: (1) relocate bull trout collected below Albeni Falls Dam to a release site upstream of the dam, (2) use microsatellite DNA analysis to assign the most probable natal tributary of each fish, and (3) determine if genetically assigned natal tributaries match the actual tributary used for spawning. By relocating bull trout captured below Albeni Falls Dam, some measure of fish passage is restored.

Methods

Study Area

Eastern Washington University (EWU) and Kalispel Tribe Natural Resources Department (KNRD) crews sampled for bull trout in a 14 km reach of the Pend Oreille River between Indian Creek, WA (RKM 131) and Albeni Falls Dam, ID (RKM 145) (Figure 1). Albeni Falls Dam was built by the U.S. Army Corps of Engineers between 1951 and 1955. Over 200 million kilowatt hours of electrical energy is produced annually by three generators. Albeni Falls Dam has had a mean discharge of 24.6 KCFS from 1960-2012 and a peak discharge of 138.2 KCFS during this period of record. In 2012, the mean discharge was 30.7 KCFS and the peak discharge was 95.6 KCFS (www.nwd-wc.usace.army.mil/perl/dataquery.pl). The water temperature in 2012 ranged from 1.1 °C and 23.9 °C with an average temperature of 10.7°C (Figure 2).

EWU and Pacific Northwest National Laboratories (PNNL) maintained twelve stationary radio tracking stations on and above Albeni Falls Dam on the Pend Oreille River and Lake Pend Oreille. Three stations were attached to Albeni Falls Dam (N 48.179 W 117.000), one at confluence of the Priest River (Mudhole Campground (N 48.179 W 116.892)), two near the Dover Railroad Bridge (north: N 48.256 W 116.666 and south: N 48.256 W 116.666 stations), and five tributaries to Lake Pend Oreille (Trestle Creek: N 48.285 W 116.342, Lightning Creek: N 48.152 W 116.182, Granite Creek: N 48.084 W 116.422, Gold Creek: N 47.971 W 116.454, and the Pack River: N 48.359 W 116.402) (Figure 1).

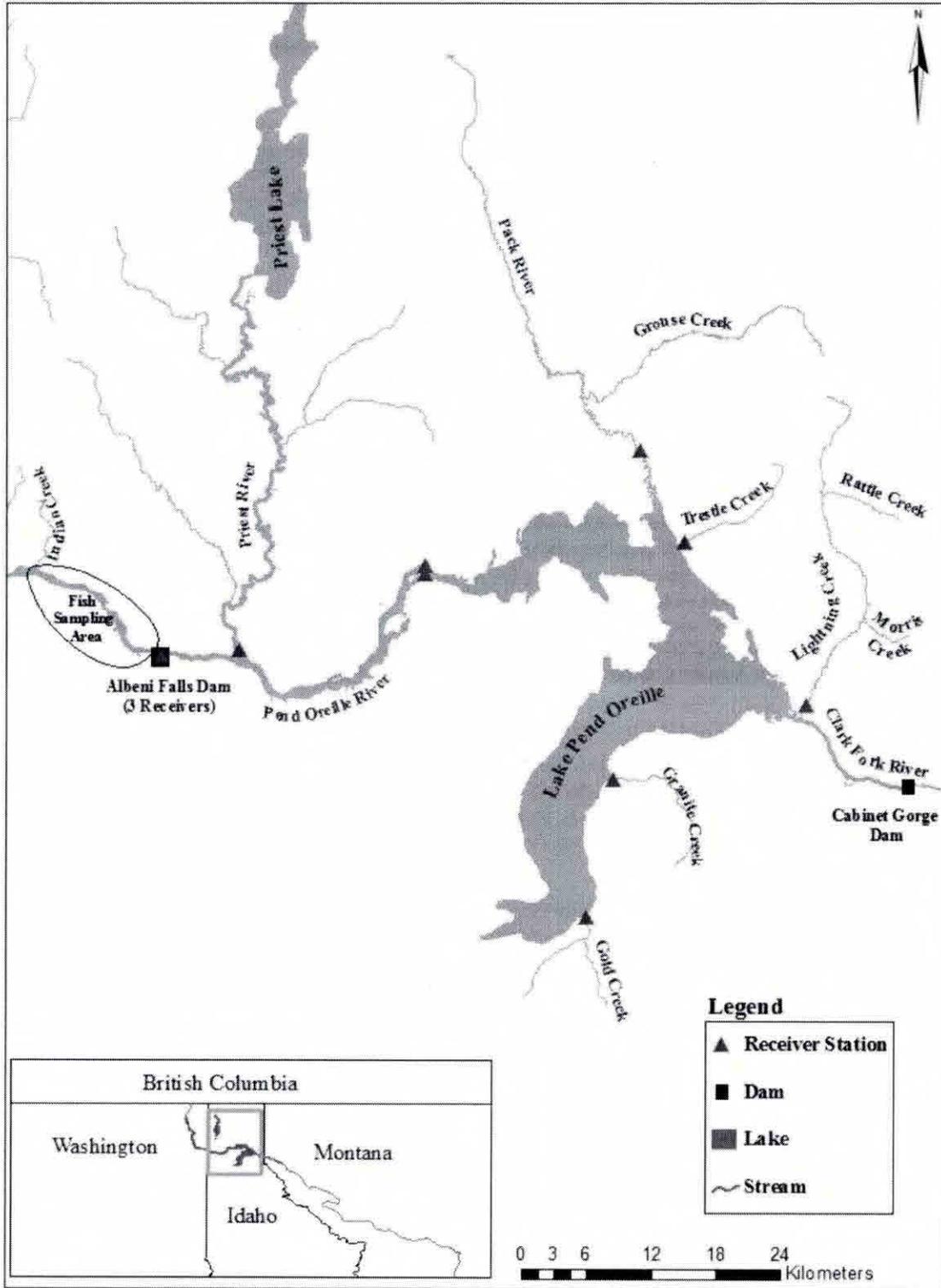


Figure 1. Map of Pend Oreille River and Lake with fisheries surveys area (from Indian Creek to below Albeni Falls Dam) and stationary receiver locations, 2012.

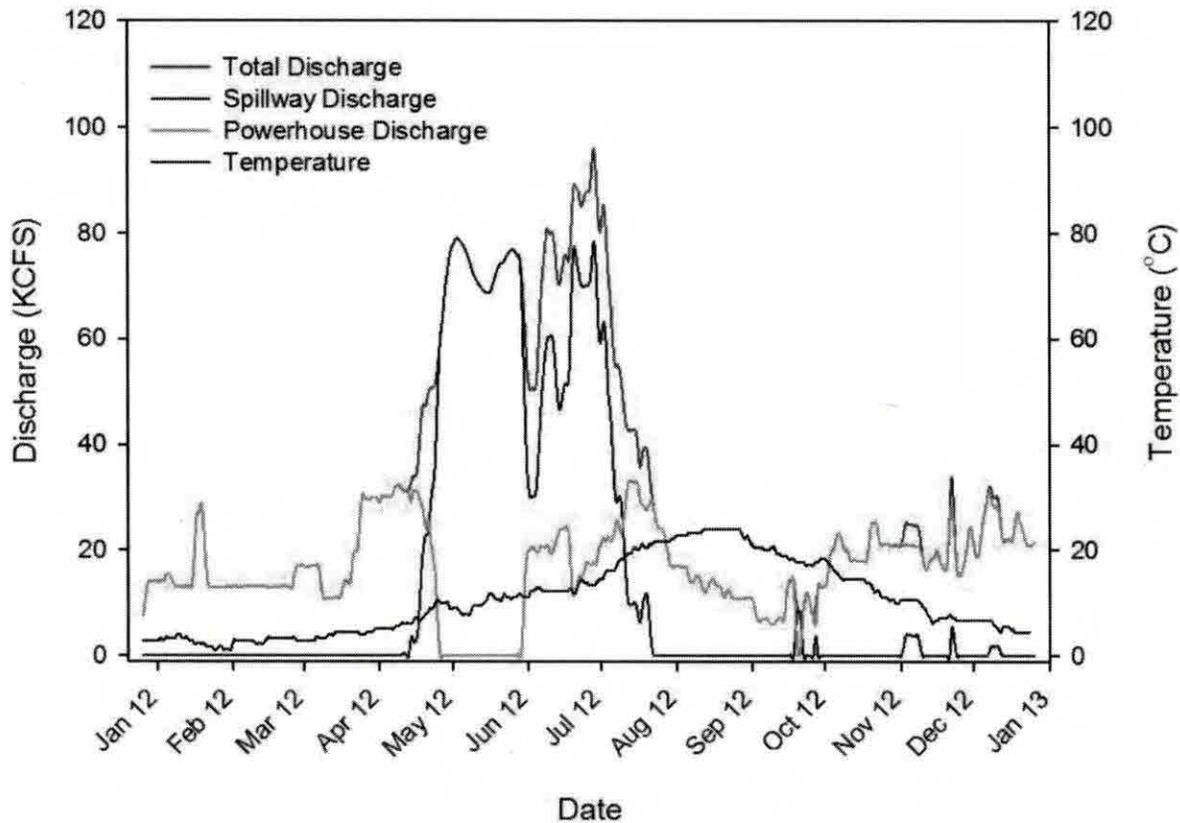


Figure 2. Temperature and discharge data below Albeni Falls Dam, Jan/2012-Jan/2013 (data from www.nwd-wc.usace.army.mil/index.html)

Field Collections

Boat electrofishing, hook and line, and snorkeling methods were employed to capture bull trout from the Pend Oreille River between Indian Creek, WA (N 48.244 W 117.151) and Albeni Falls Dam, ID (N 48.178 W 117.000) in 2012.

Boat electrofishing - Standardized ten minute boat electrofishing surveys (2-4 amps, 250 volts, 120 pps, DC current) were conducted by EWU and KNRD along the north and south shorelines. Sixteen trips were conducted by EWU between 24 April and 6 July 2012 and fifteen trips were conducted by KNRD between 13 March and 9 October 2012. Transects were sampled during both daylight and after sunset.

Snorkel surveys - Snorkel surveys were conducted in a culvert (N 48° 10.614 W 117° 01.137), on the south shore of the Pend Oreille River approximately 1.5 km downstream of Albeni Falls Dam, when water elevations permitted at least 15 cm of breathing room. Cold

spring water feeds the culvert from the south side of the culvert, as well as through a hole in the middle of the culvert. The direction of water flow (in or out) of the culvert depended on the elevation of the water in the river. In previous years, bull trout were captured at this cold-water refuge during the summer months (Geist et al. 2004). Surveys took place on 1 August and 7 August 2012 during the day. Each end of the culvert was blocked using a block net. Surveys were conducted with one individual moving in one direction through the culvert using an underwater flashlight to spot fish. After one direction was completed, a sweep the other direction was completed.

During sampling all fish were collected and identified to species using dichotomous keys (Wydoski and Whitney 1979, 2003; Scholz and McLellan 2009, 2010). All fish collected were measured to the nearest mm total length (TL) and released.

Genetic tissue samples were collected from bull trout and cutthroat trout by taking a small tissue sample (3mm²) from the dorsal or adipose fin. Samples were preserved in 95% ethanol and sent to the KNRD. Cutthroat trout samples were archived locally, while bull trout samples were sent to the USFWS Abernathy Fish Technology Center for rapid genetic analysis and natal tributary assignments. These samples will also be included in the basin wide microsatellite DNA catalog funded by Bonneville Power Administration (Olson et al. 2004).

Bull Trout Tagging and Relocation

Tagging Procedures – Captured fish were placed in a large cooler (142.5 liters) with fresh water. An oxygen cylinder was used to aerate the water. Ice was used to maintain ambient river temperatures when needed. The lid was kept closed until the fish stabilized and recovered from the capturing stresses. The fish were anesthetized with 70-100 mg/L tricaine methanesulfonate (MS-222). Once the anesthesia took effect (3- 5 minutes) the fish were checked for fin clips and scanned with a PIT tag detector to confirm it had not previously been captured and tagged.

Transmitters were surgically implanted by experienced surgeons using procedures described by McLeod and Clayton (1997) and Brown et al. (1999). The fish were placed in a water soaked foam block with a cut out V-notched cradle. The fish were placed dorsal side down, and water was flushed through the gills using a gravity flow bucket filled with a maintenance solution (40-60 mg/L MS 222). The bucket had a valve at the bottom that was connected to a piece of tubing that was placed into the mouth of the fish. Water was periodically poured over the fishes body during surgery to keep it hydrated. A 2-3 cm longitudinal incision was made three cm anterior to the pelvic fins. A PIT tag (DF TX 1400BE, 12 mm long, 134.KHz) was placed in the body cavity according to standard protocols (CBFWA 1999). A 16-gauge hypodermic needle was inserted through the body wall to the side and posterior to the incision. The transmitter antenna wire was inserted through the hollow needle. Once the needle was removed, the antenna exited the body wall of the fish. The Lotek digitally encoded radio/acoustic transmitter (CART 16_1, 23.8 g, 5 sec burst rate, 663 day tag life or CART 16_2, 31.5 g, 5 sec burst rate, 904 day tag life) operated at a frequency of 151.89 MHz (radio frequency) and 76.8 KHz (acoustic frequency). The Lotek digitally encoded radio transmitters (SR 11-18

8.0g, 5 sec burst rate, 449 day tag life; NTC-6-2, 4.5g, 5 sec burst rate, 441 day tag life; or NTC-4-2L, 2.1g, 5 sec burst rate, 162 day tag life) are operating at 151.89 MHz (radio frequency). The decision of which size tag to implant was based on the weight of the fish. Tag weight did not exceed 2% of the fish's weight. The incision was closed using the individual simple sutures method at approximately 1-cm intervals. A veterinary grade liquid Band-Aid (Nexband) was placed over the sutures. The fish were placed in an oxygenated cooler with fresh cold water to recover.

Relocation - The fish were transported by vehicle in an oxygenated cooler to the public boat launch (N 48.176 W 116.904) on the east side of the town of Priest River, Idaho 7.5 km upstream of Albeni Falls Dam. Once the fish had completely recovered, it was released into the water at the boat launch, located on the north bank of the Pend Oreille River about 1 km downstream of its confluence with the Priest River. This location was selected because it is far enough above Albeni Falls Dam to prevent fall back, but downstream of the Priest River, the first bull trout tributary upstream of the dam, giving the fish the opportunity to enter or continue past towards Lake Pend Oreille.

Fish collected after water temperatures in the Pend Oreille River exceeded 16.0 °C were transported and released at the Trestle Creek boat launch (N 48.27908 W 116.34895) directly into Lake Pend Oreille.

Tracking

Fixed Ground Stations - Eleven radio receiving stations were setup for the study in the spring 2009. Receiver locations and setup were the same as during the 2003 and 2004 study (Geist et al. 2004; Scholz et al. 2005). Sites included: Albeni Falls Dam (3 stations), Mudhole Campground on Priest River (1 station), and the Dover Railroad Bridge (2 stations) approximately 26 km upstream of the Priest River. Five additional stations were set up at the mouths of tributaries to Lake Pend Oreille: Pack River, Trestle, Lightning, Granite, and Gold creeks. Each station consisted of a Lotek SRX-400 or SRX-600 radio receiver connected to aerial Yagi antennas. The ground receiver stations operated 24 hours a day. The receivers were supplied with either AC or DC (12 volt vehicle batteries) power. Solar panels were used to recharge DC power systems. Beacon tags were used at all stationary receiver locations to monitor receiver status. The beacon tags were programmed to transmit a one-minute signal every hour. See Bellgraph and Deters (2007) for a complete summary of installation and details of each station.

EWU worked with landowners to secure access, and to download and maintain stations via hold harmless agreements and/or permission to entry agreements. Agreements were setup with a private landowner at Gold Creek, Idaho Department of Fish and Wildlife at Granite Creek, Idaho Department of Transportation at Lightning Creek, and Idaho Department of Lands at Trestle Creek (\$100 fee for five year agreement).

All fixed receiver stations were inspected and data downloaded April 2012 through mid November 2012. Three receivers on the dam, the Mudhole receiver, and South Dover stations were downloaded through April 2013. Data were downloaded using a Lotek *Winhost* program onto a laptop computer, saved and then backed up on a removable thumb drive. After each

download, data were examined for active tags, beacon tag signals, and noise. Proper adjustments to the gain were made when necessary. Each station was inspected for damage and repaired if necessary. Beacon and 12 volt batteries were replaced when necessary. Stations were winterized in the middle of November, and then reset at the beginning of March before the April sampling began.

Vehicle Tracking - Weekly tracking between 1 May and 25 September 2012 was conducted below Albeni Falls Dam and along the Priest River. Vehicle tracking was conducted nine times along Lightning Creek and its tributaries between 28 June and 24 September 2012. Vehicle tracking along Granite Creek was conducted two times on 16 August 11 September 2012.

Aircraft Tracking - Tracking by aircraft was completed using a Cessna C-182 chartered from Felts Field Aviation, Spokane, WA. A Lotek SRX-600 radio receiver connected to single two element Yagi antenna externally mounted under the right wing was utilized for aerial tracking. The receiver's gain was set at 50 and adjusted as needed. One flight was conducted on 3 October 2012. The flight was conducted with an emphasis on tracking paths along Lightning Creek and its tributaries, Granite Creek, and Pend Oreille River.

Genetic Analysis

Rapid Response Genetic Identification - Genetic samples from each bull trout were shipped to the USFWS Service Abernathy Fish Technology Center for rapid genetic analysis. Each genetic sample was compared to a genetic baseline data set of 2,020 bull trout from 37 known populations within the Lake Pend Oreille and Clark Fork River system of northern Idaho and northwestern Montana. The watershed is divided into four regions: Region 1 includes tributaries to the Pend Oreille River, Lake Pend Oreille and the Clark Fork River up to Cabinet Gorge Dam, Region 2 contains Clark Fork River tributaries from Cabinet Gorge Dam to Noxon Rapids Dam, Region 3 contains Clark Fork River tributaries from Noxon Rapids Dam to Thompson Falls Dam and Region 4 contains all Clark Fork River tributaries above Thompson Falls Dam (DeHaan and Arden 2008). Baseline allele frequency data for each population was determined by genotyping all fish in 12 highly polymorphic microsatellite loci (DuPont et al. 2007).

A modified Chelex protocol was used to extract DNA from genetic samples (Miller and Kapuscinski 1996). DNA extracted at 12 microsatellite loci; *Omm1070*, *Omm1128*, *Omm1130* (Rexroad et al. 2001), *Sco104*, *Sco105*, *Sco106*, *Sco107*, *Sco200*, *Sco212*, *Sco216*, *Sco218* (DeHaan and Arden 2005) and *Smm22* (Crane et al. 2004) was amplified using polymerase chain reaction (PCR). PCR reactions were carried out in 15 μ l volumes containing 2 μ l template DNA, 1X polymerase buffer (10mM Tris-HCl, 50mM KCl, 0.1% Triton X-100), 1.5 or 2.0mM MgCl₂, 0.2mM of each dNTP, 0.5 μ M of each primer and 0.2 units of GoTaq DNA polymerase (Promega Co.) (DeHaan and Arden 2008). Initial denaturation of DNA occurred for 3 minutes at 94 °C, followed by 38 one second cycles at 94 °C, primer specific annealing temperature for 30 seconds and primer extension for 30 seconds at 72 °C, and a final extension of 7 minutes at 72 °C. Applied Biosystems fluorescent dyes were used to label all forward primers. The loci produced during PCR were pooled into three multiplex sets and run on an AB 3130xl genetic analyzer.

Genemapper v4.0 (Applied Biosystems Inc.) software was used to determine multi-locus genotype of each bull trout. Genotyping error was minimized by running a positive control (a fish with a known genotype), a negative control (a sample containing no DNA), and duplicates of each sample being analyzed (DeHaan and Arden 2008).

Natal Tributary Assignment - Population assignment techniques implemented via the program *Whichrun v4.1* (Banks and Eichert, 2000) were used to determine the first and second most likely population of origin from within the genetic baseline dataset for each individual fish (DeHaan and Arden 2008).

Results

A synoptic list of fish collected during the Pend Oreille River survey in 2012 is summarized (Table 1). In 2012, a total of 2,639 fish were collected via boat electrofishing in the Pend Oreille River, which represented 23 species, during 42 total hours of boat electrofishing (Table 2) and 9.5 hours of angling (Table 3). Six bull trout and six F-1 bull trout/brook trout hybrids were collected between 13 March and 9 October 2012. Three bull trout were implanted with Lotek tag and released at the Priest River boat launch upstream of Albeni Falls Dam. Three bull trout were released, without being radio tagged, at the Trestle Creek boat launch due to elevated water temperatures in the Pend Oreille River (Table 4). Five hybrids were tagged and released at the Old Town boat launch downstream of Albeni Falls Dam (Table 5).

Table 1. Synoptic list of fish captured during Pend Oreille River surveys 2012.

Family	Species	Scientific Name
Cyprinidae	Northern pikeminnow	<i>Ptychocheilus oregonensis</i> (Richardson, 1836)
	Peamouth	<i>Mylocheilus caurinus</i> (Richardson, 1836)
	Tench	<i>Tinca tinca</i> (Linnaeus, 1758)
Catostomidae	Largescale sucker	<i>Catostomus macrocheilus</i> (Girard, 1856)
	Longnose sucker	<i>Catostomus catostomus</i> (Forster, 1773)
Ictaluridae	Brown bullhead	<i>Ameiurus nebulosus</i> (Lesueur, 1819)
Esocidae	Northern pike	<i>Esox lucius</i> (Linnaeus, 1758)
Salmonidae	Brook trout	<i>Salvelinus fontinalis</i> (Mitchell, 1814)
	Brown trout	<i>Salmo trutta</i> (Linnaeus, 1758)
	Bull trout	<i>Salvelinus confluentus</i> (Suckley, 1858)
	Bull x brook trout	<i>Salvelinus confluentus</i> x <i>Salvelinus fontinalis</i>
	Westslope cutthroat trout	<i>Oncorhynchus clarki</i> (Richardson, 1836)
	Cutthroat x rainbow trout	<i>Oncorhynchus clarki</i> x <i>Oncorhynchus mykiss</i>
	Kokanee	<i>Oncorhynchus nerka</i> (Walbaum, 1792)
	Lake trout	<i>Salvelinus namaycush</i> (Walbaum, 1792)
	Lake whitefish	<i>Coregonus clupeaformis</i> (Mitchell, 1818)
	Mountain whitefish	<i>Prosopium williamsoni</i> (Girard, 1856)
	Rainbow trout	<i>Oncorhynchus mykiss</i> (Walbaum, 1792)
Rainbow x cutthroat trout	<i>Oncorhynchus mykiss</i> x <i>Oncorhynchus clarki</i>	
Centrarchidae	Black crappie	<i>Pomoxis nigromaculatus</i> (Lesueur, 1829)
	Largemouth bass	<i>Micropterus salmoides</i> (Lacepède, 1802)
	Pumpkinseed	<i>Lepomis gibbosus</i> (Linnaeus, 1758)
	Smallmouth bass	<i>Micropterus dolomieu</i> (Lacepède, 1802)
Percidae	Walleye	<i>Sander vitreus</i> (Mitchell, 1818)
	Yellow perch	<i>Perca flavescens</i> (Mitchell, 1814)

Table 2. Electrofishing mean total length (mm), range in total length (mm), and relative abundance (RA) of fish captured in the Pend Oreille River, 2012 (effort = 42 hrs).

Family	Species	N	RA (%)	Average TL (SD)	Range TL (mm)
Cyprinidae	Northern pikeminnow	118	4.47	326 (129)	98-620
	Peamouth	31	1.17	276 (52)	186-368
	Tench	25	0.95	391 (78)	185-470
Catostomidae	Largescale sucker	221	8.37	473 (71)	74-591
	Longnose sucker	68	2.58	391(103)	60-640
Ictaluridae	Brown bullhead	4	0.15	270 (36)	220-300
Esocidae	Northern pike	1	0.04	403	403
Salmonidae	Brook trout	4	0.15	309 (11)	298-321
	Bull trout	6	0.23	405 (174)	225-678
	Bull trout x brook trout hybrid	6	0.23	299(49)	247-365
	Brown trout	274	10.38	376 (84)	136-575
	Kokanee	330	12.50	155 (42)	85-326
	Lake trout	7	0.27	457 (75)	360-537
	Lake whitefish	88	3.33	391(61)	191-515
	Mountain whitefish	869	32.93	236 (67)	34-466
	Rainbow trout	183	6.93	327 (94)	110-669
	Westslope cutthroat	110	4.17	340 (78)	78-492
	Westslope cutthroat x rainbow	2	0.08	355 (60)	312-355
	Centrarchidae	Black crappie	2	0.08	152(6)
Largemouth bass		5	0.19	346 (152)	108-470
Pumpkinseed		1	0.04	82	82
Smallmouth bass		170	6.44	273 (71)	85-480
Percidae	Walleye	8	0.30	489(116)	380-726
	Yellow perch	106	4.02	155 (34)	72-310
		2,639	100.00		

Table 3. Hook and line fishing (effort 15.75 hrs) mean total length (mm), range in total length (mm), and relative abundance of fish capture in the Pend Oreille River, ID, USA, 2012.

Family	Species	N	RA (%)	Average TL (SD)	Range TL (mm)
Cyprinidae	Northern pikeminnow	1	11.11	413	413
Salmonidae	Brown trout	1	11.11	440	440
	Rainbow trout	1	11.11	410	410
Centrarchidae	Smallmouth bass	6	66.67	293(37)	257-360
		9	100		

Table 4. Capture date, total length (TL), weight (WT), sex, tag type, and tag codes for bull trout captured below Albeni Falls Dam during 2011/2012 via electrofishing angling, and snorkeling tracked during 2012.

Fish #	Captured	TL (mm)	WT (g)	Pit tag #	Radio tag	Code#
BT-1	5/29/2012	678	>3000	985121002195507	CART 16-2	135
BT-2	5/29/2012	508	1064	985121002238396	SR 11-18	164
BT-3	6/7/2012	458	940	985121002194306	SR 11-18	50
BT-4	8/1/2012	255	107	985171010206927	n/a	n/a
BT-5	8/1/2012	280	172	985121011713016	n/a	n/a
BT-6	8/7/2012	282	161	985121010208288	n/a	n/a

Table 5. Capture date, total length (TL), weight (WT), sex, tag type, and tag codes for bull trout hybrids captured below Albeni Falls Dam during 2012/2013 via electrofishing angling, and snorkeling tracked during 2012.

Fish #	Captured	TL (mm)	WT (g)	Pit tag #	Radio tag	Code#
BTH-1	4/4/12	247	157	n/a	n/a	n/a
BTH-2	4/24/12	332	375	985121002184056	SR 11-18	162
BTH-3	4/24/12	365	466	985121002168678	SR 11-18	54
BTH-4	7/5/12	281	198	N/A	NTC 6-2	173
BTH-5	7/5/12	270	203	N/A	NTC 6-2	179
BTH-6	7/5/12	337	398	N/A	NTC 6-2	58

Bull Trout #1 (BT-1) - BT-1 was captured in the tailrace of the Albeni Falls Dam powerhouse on 29 May 2012 by EWU. It had a total length of 678 mm, weight of >3,000 g, and the sex was undetermined. A CART 16-2 tag (#135) and PIT tag (#985121002195507) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-1 to be Lightning Creek and Savage Creek (a tributary of Lightning Creek) was determined to be the secondary possible natal tributary. BT-1 was released on 29 May 2012 at the Priest River boat launch. On 31 May 2012, BT-1 was detected traveling past the Mudhole station into the Priest River. BT-1 was detected on the Mudhole station between 14 & 15 June 2012 on its way back to the Pend Oreille River. On 15 June 2012, BT-2 was detected traveling past the North Dover station. BT-1 was detected passing the Lightning Creek station on 24 June 2012. Between 28 June 2012 and 10 August 2012, BT-2 was detected traveling upstream in Lightning Creek. BT-2 was detected in Rattle Creek on 23 August 2012, approximately 1.5 km upstream of Lightning Creek. The last detection in Rattle Creek occurred on 3 October 2012

during mobile tracking via aircraft. BT-1 was detected on the Lightning Creek receiver on 16 October 2012. This tag is expected to continue transmitting into March of 2014 (Figure 3).

Bull Trout #2 (BT-2) - BT-2 was captured in the tailrace of the Albeni Falls Dam powerhouse on 29 May 2012 by EWU. It had a total length of 508 mm, weight of 1,064 g, and the sex was undetermined. A SR 11-18 tag (#164) and PIT tag (#985121002238396) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-2 to be the East Fork of Lightning Creek and Morris Creek (tributary of Lightning Creek) was determined to be the secondary possible natal tributary. BT-2 was released on 29 May 2012 at the Priest River boat launch. BT-2 was detected passing the Mudhole receiver on 30 May 2012. On 4 June 2012, BT-2 was detected passing by the Mudhole receiver on its way back to the Pend Oreille River. This fish was detected passing the North and South Dover stations on 5 June 2012. No further detections occurred after this fish entered the lake. The tag implanted in BT-2 is expected to continue transmitting into August 2013 (Figure 4).

Bull Trout #3 (BT-3) - BT-3 was captured near the logchute of Albeni Falls Dam on 7 June 2012 by EWU. It had a total length of 458 mm, weight of 940 g, and the sex was undetermined. A SR 11-18 (#50) and PIT tag (#985121002194306) were implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-3 to be Granite Creek and Porcupine Creek (tributary of Lightning Creek) was determined to be the secondary possible natal tributary. BT-3 was released on 7 June 2012 at the Priest River boat launch. Between 12 June and 29 June BT-3 was detected on the Mudhole receiver. This fish was also detected near the mouth of the Priest River during mobile tracking via vehicle on 13, 21, and 26 June. On 1 July, BT-3 was detected passing the North and South Dover stations. No further detections occurred after this fish entered the lake. The tag implanted in BT-3 is expected to continue transmitting into August 2013. (Figure 5).

Bull Trout #4 (BT-4) – BT-4 was captured at the mouth of the culvert located approximately 1.5 km downstream of Albeni Falls Dam on 1 August 2012 by KNRD. It had a total length of 255 mm, weight of 107 g, and the sex was undetermined. A PIT tag (#985121010205927) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-4 to be Middle Fork East River and Uleda Creek (tributary of Middle Fork East River) was determined to be the secondary possible natal tributary. BT-4 was released on 1 August 2012 at the Trestle Creek boat launch (Figure 6).

Bull Trout #5 (BT-5) – BT-5 was captured at the mouth of the culvert located approximately 1.5 km downstream of Albeni Falls Dam on 1 August 2012 by KNRD. It had a total length of 280 mm, weight of 172 g, and the sex was undetermined. A PIT tag (#985121011713016) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-5 to be Middle Fork East River and Uleda Creek (tributary of Middle Fork East River) was determined to be the secondary possible natal tributary. BT-5 was released on 1 August 2012 at the Trestle Creek boat launch (Figure 6).

Bull Trout #6 (BT-6) – BT-6 was captured in the culvert located approximately 1.5 km downstream of Albeni Falls Dam on 7 August 2012 by KNRD. It had a total length of 282 mm, weight of 161 g, and the sex was undetermined. A PIT tag (#985121010208288) was implanted in this fish. Results of the genetic assignment determined the most likely natal tributary for BT-6 to be Middle Fork East River and Uleda Creek (tributary of Middle Fork East River) was determined to be the secondary possible natal tributary. BT-6 was released on 7 August 2012 at the Trestle Creek boat launch (Figure 6).

Bull Trout Hybrid #1 (BTH-1) – BTH-1 was captured near the culvert located approximately 1.5 km downstream of Albeni Falls Dam on 4 April 2012 by KNRD. It had a total length of 247 mm, weight of 157 g, and the sex was undetermined. This fish was not tagged and was released at the Oldtown boat launch, approximately 2.8 km downstream of Albeni Falls Dam (Figure 7).

Bull Trout Hybrid #2 (BTH-2) - BTH-2 was captured on the south side of the Pend Oreille River approximately 2.1 km downstream of Albeni Falls Dam on 24 April 2012 by EWU. It had a total length of 332 mm, weight of 375 g, and the sex was undetermined. A SR 11-18 (#162) and PIT tag (#985121002184056) were implanted in this fish. This fish was released at the Oldtown boat launch, approximately 2.8 km downstream of Albeni Falls Dam. BTH-2 was consistently detected on the receivers at Albeni Falls Dam between 4 June and 18 June, 22 June, 20 July through 28 September, 1 October through 8 October, 14 October through 8 December, and 12 December through 7 January. This fish was detected during mobile tracking approximately 9.2 km downstream of Albeni Falls Dam on 1 May, 9 May, and 15 May. Mobile detections were also recorded at Albeni Falls Dam on 1 August, 4 September, 25 September, and 3 October. This tag is expected to continue to transmit into July of 2013 (Figure 8).

Bull Trout Hybrid #3 (BTH-3) – BTH-3 was captured on the south side of the Pend Oreille River approximately 800 m downstream of Albeni Falls Dam on 24 April 2012 by EWU. It had a total length of 365 mm, weight of 466 g, and the sex was undetermined. A SR 11-18 (#54) and PIT tag (#985121002168678) were implanted in this fish. This fish was released at the Oldtown boat launch, approximately 2.8 km downstream of Albeni Falls Dam. BTH-3 was consistently detected on the receivers at Albeni Falls Dam between 9 May and 15 May. During mobile tracking this was detected downstream of Albeni Falls Dam approximately 3.1 km on 1 May, 7.8 km on 15 May, 13 km on 21 May, and 13.9 km between 29 May and 26 June. This tag is expected to continue to transmit into July of 2013 (Figure 9).

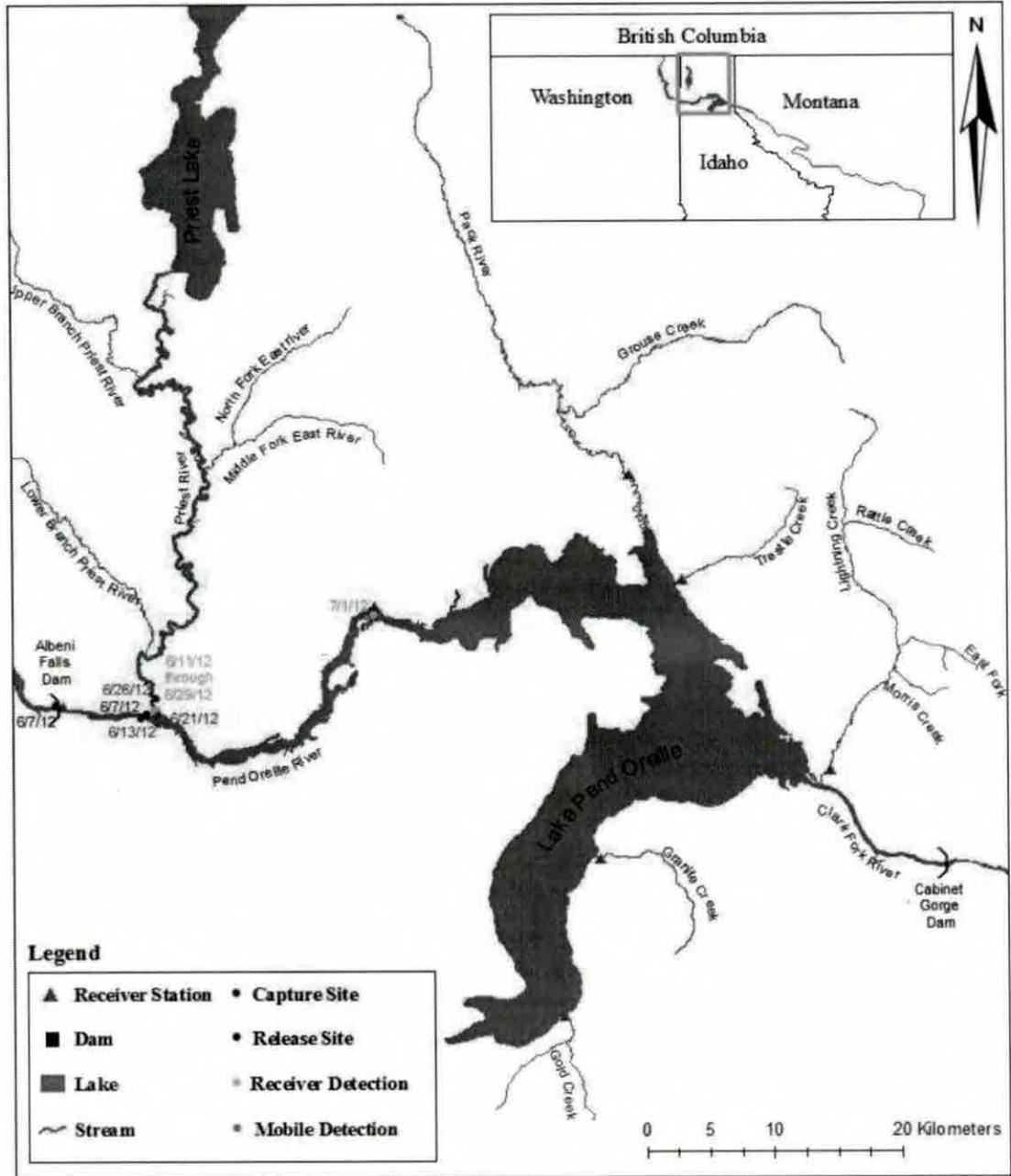


Figure 5. Detection history of BT-3 (Code 50) in Pend Oreille River watershed, 2012.

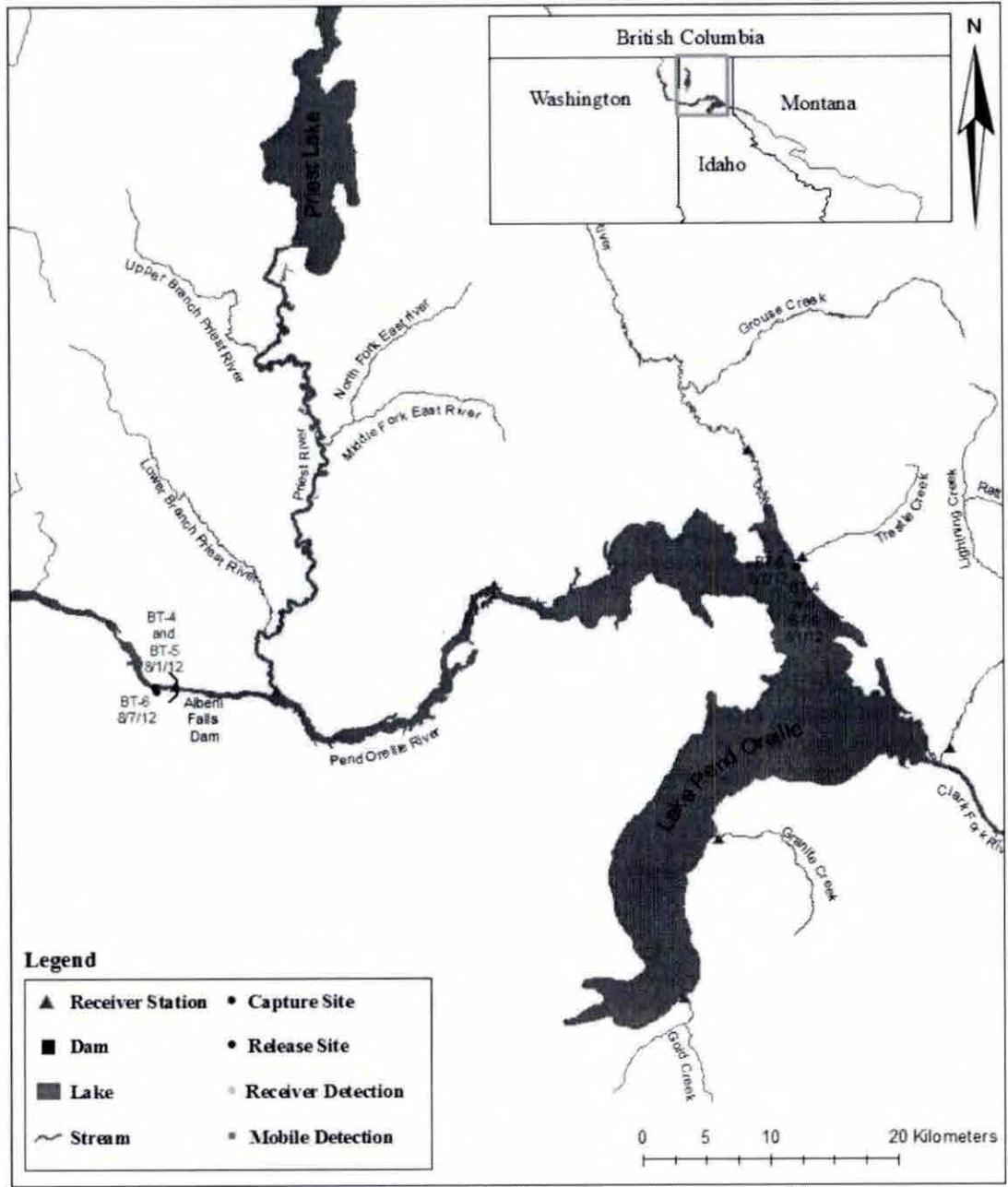


Figure 6. Collection and release sites for BT-4, BT-5, and BT-6 in Pend Oreille River watershed, 2012.

Bull Trout Hybrid #4 (BTH-4) – BTH-4 was captured on the south side of the Pend Oreille River approximately 1.2 km downstream of Albeni Falls Dam on 5 July 2012 by EWU. It had a total length of 281 mm, weight of 198 g, and the sex was undetermined. A NTC 6-2 (#173) was implanted in this fish. This fish was released at the Oldtown boat launch, approximately 2.8 km downstream of Albeni Falls Dam. No detections were recorded for this fish at the dam or during mobile tracking. This tag is expected to continue transmitting into September of 2013 (Figure 10).

Bull Trout Hybrid #5 (BTH-5) - BTH-5 was captured on the south side of the Pend Oreille River approximately 700 m downstream of Albeni Falls Dam on 5 July 2012 by EWU. It had a total length of 270 mm, weight of 203 g, and the sex was undetermined. A NTC 6-2 (#179) was implanted in this fish. This fish was released at the Oldtown boat launch, approximately 2.8 km downstream of Albeni Falls Dam. BTH-5 was consistently detected on the receivers at Albeni Falls Dam between 6 July and 11 July. This tag is expected to continue to transmit into July of 2013 (Figure 11).

Bull Trout Hybrid #6 (BTH-6) - BTH-6 was captured on the south side of the Pend Oreille River approximately 800 m downstream of Albeni Falls Dam on 5 July 2012 by EWU. It had a total length of 337 mm, weight of 398 g, and the sex was undetermined. A NTC 6-2 (#58) was implanted in this fish. This fish was released at the Oldtown boat launch, approximately 2.8 km downstream of Albeni Falls Dam. BTH-6 was detected on the receivers at Albeni Falls Dam on 7 July, 16 October, 29 October, and sporadically between 7 November and 18 November. This tag is expected to continue to transmit into July of 2013 (Figure 12).

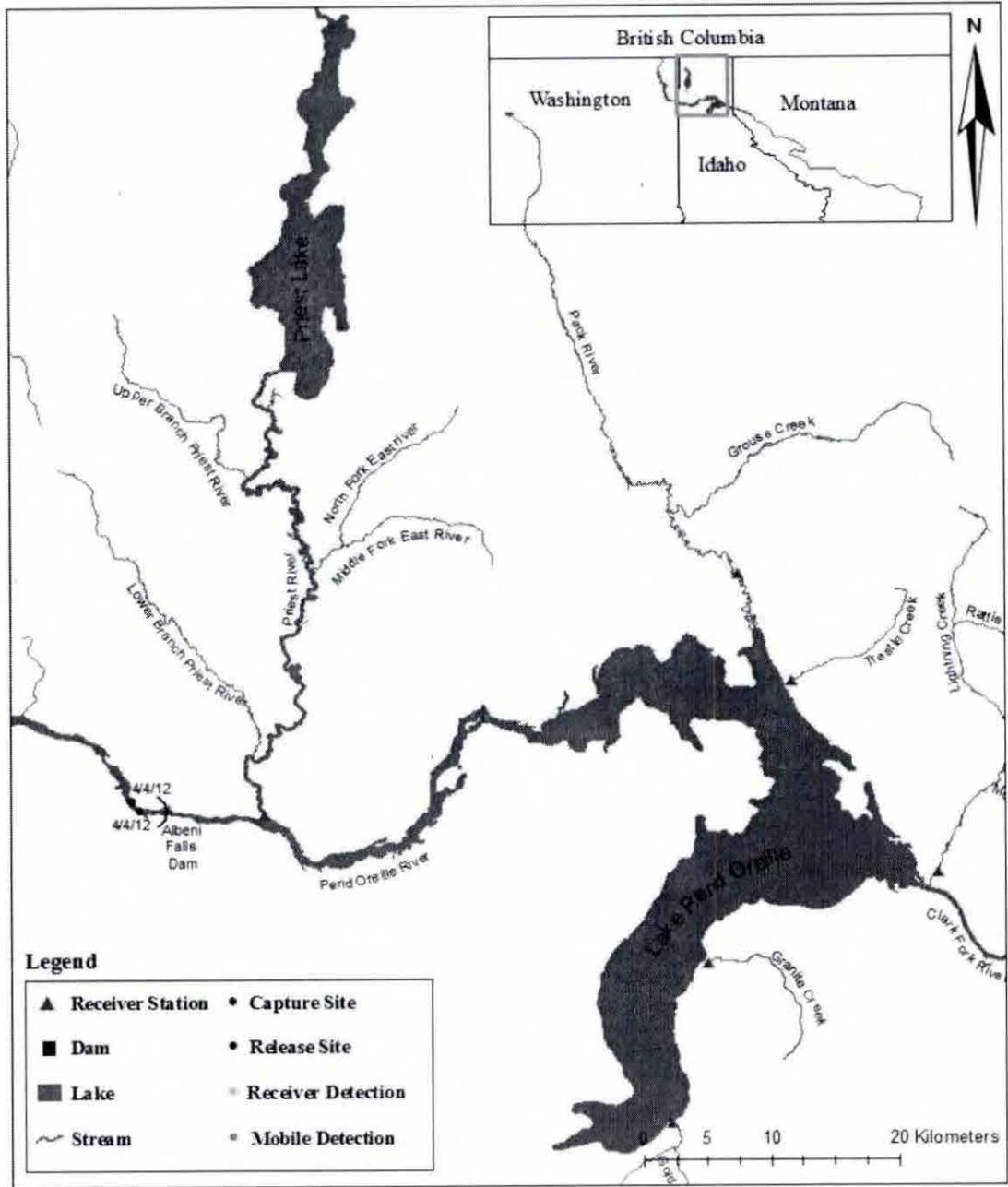


Figure 7. Detection history of BTH-1 in Pend Oreille River watershed, 2012.

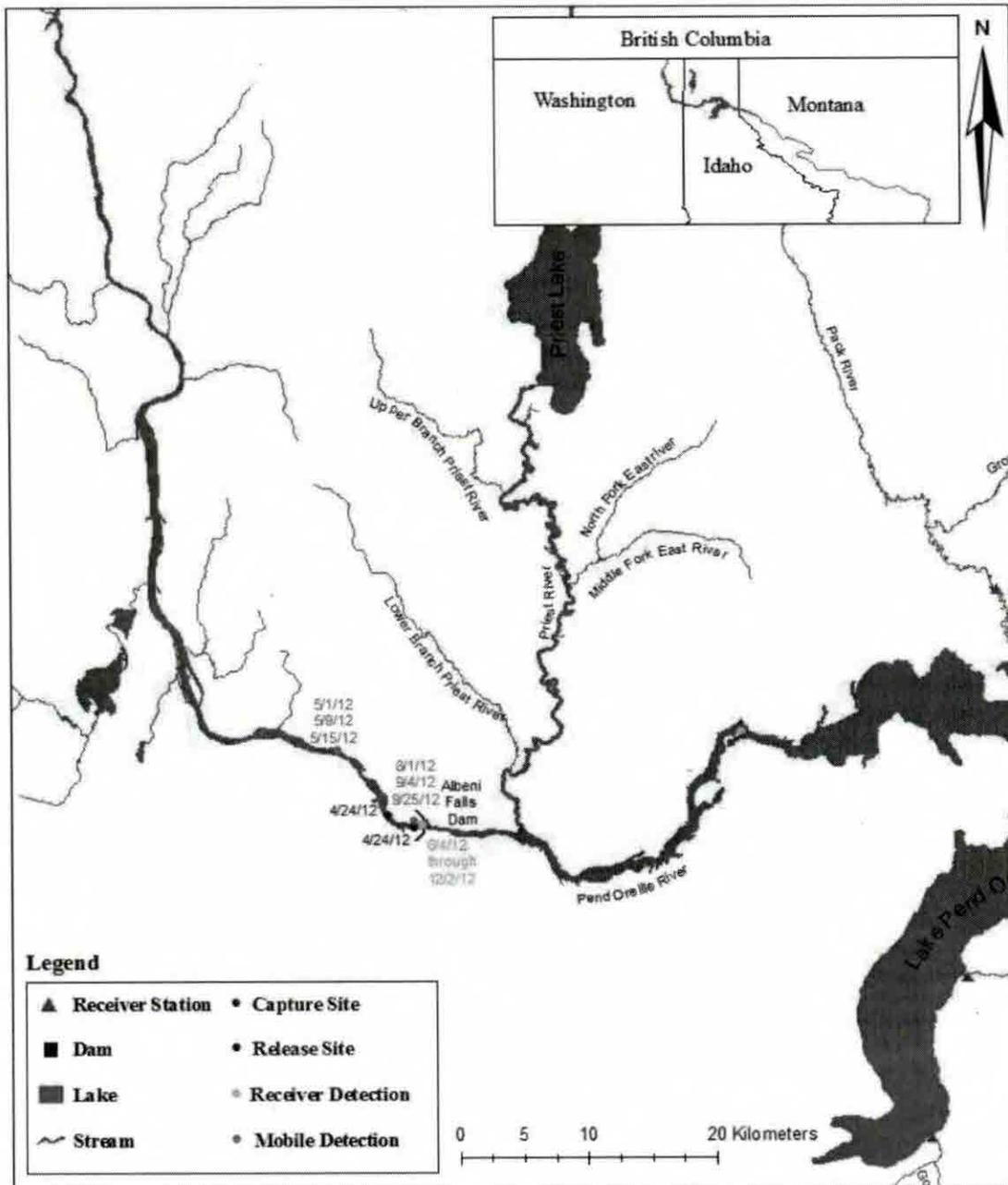


Figure 8. Detection history of BTH-2 (Code 162) in Pend Oreille River watershed, 2012.

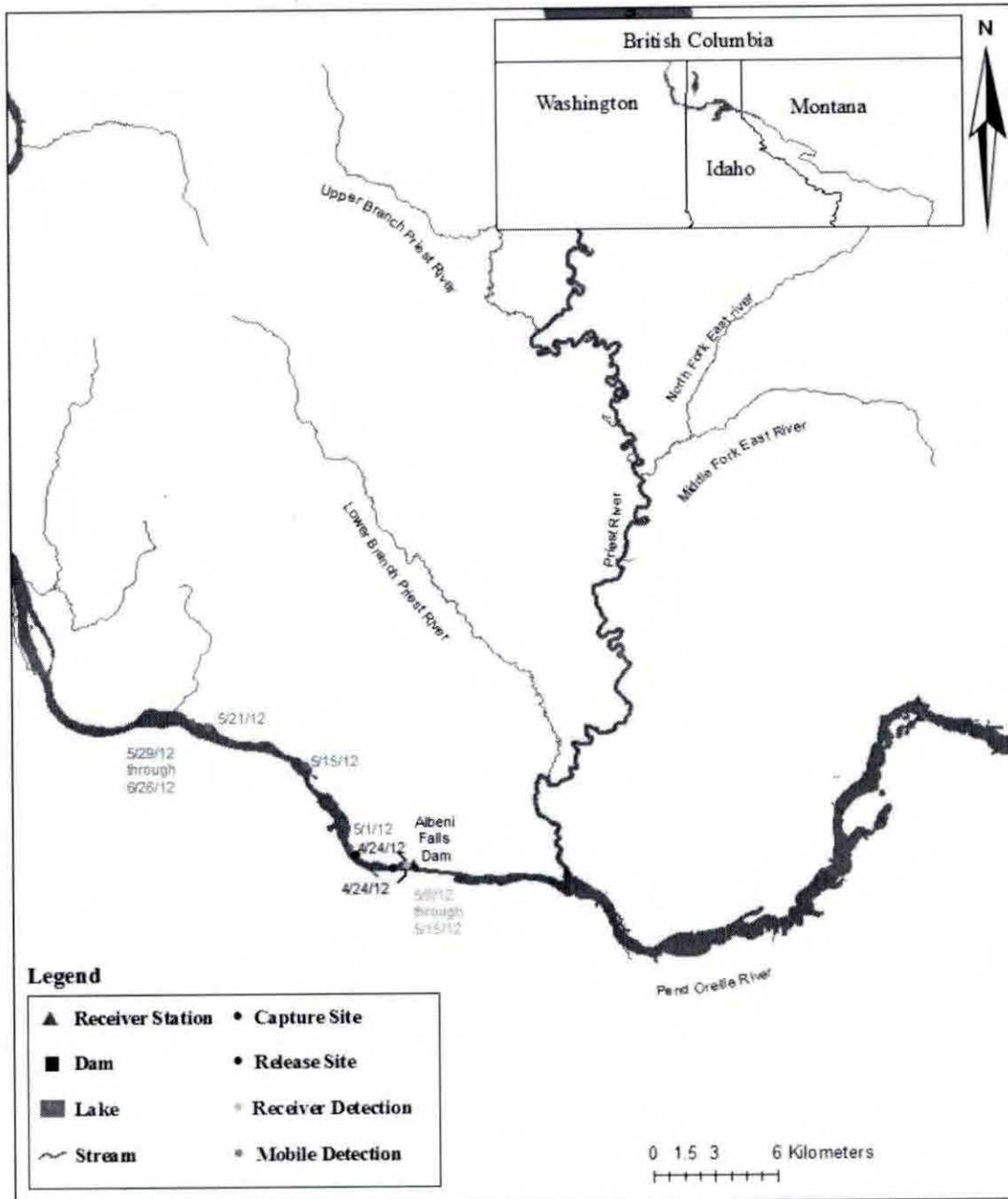


Figure 9. Detection history of BTH-3 (Code 54) in Pend Oreille River watershed, 2012.

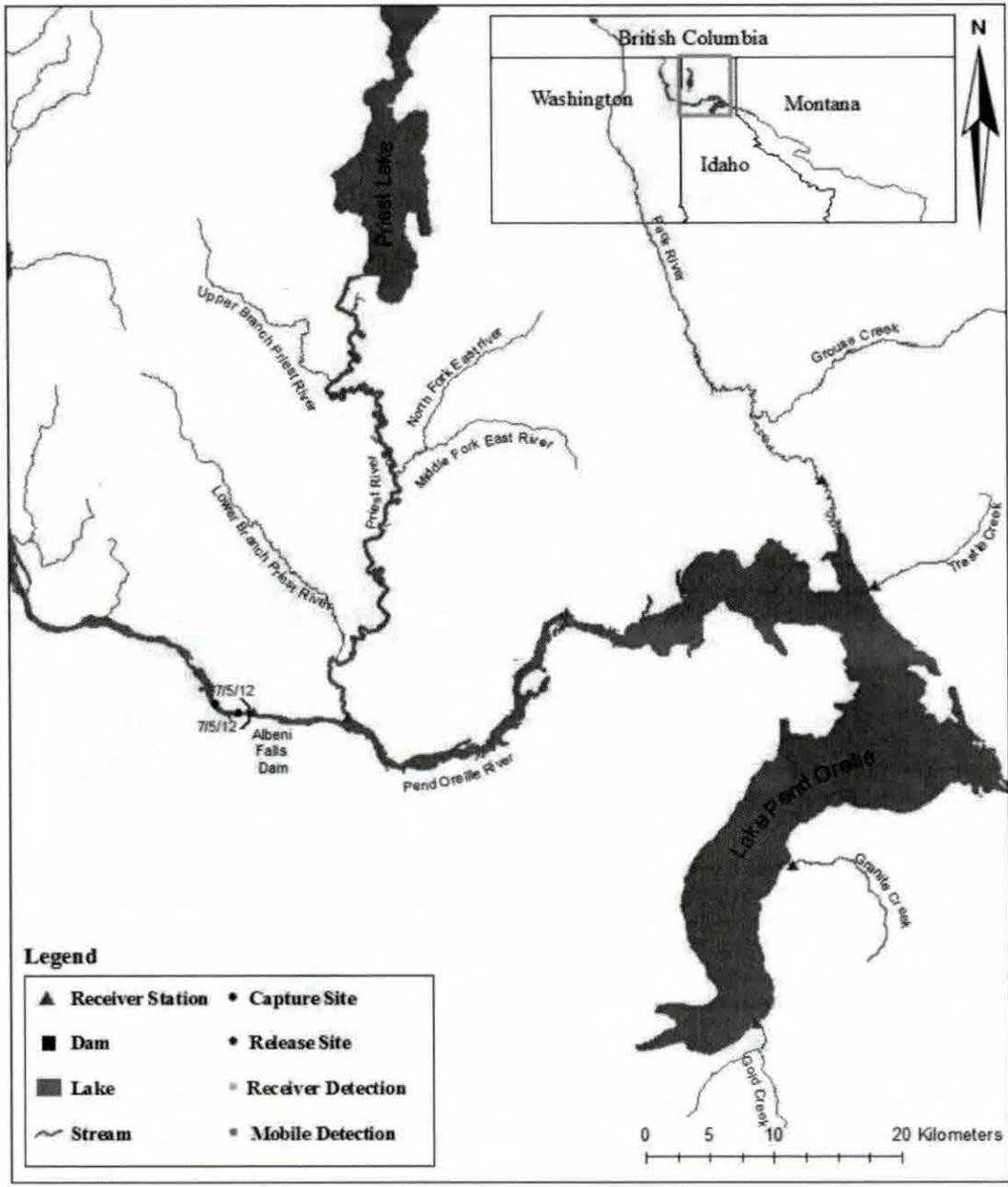


Figure 10. Detection history of BTH-4 (Code 173) in Pend Oreille River watershed, 2012.

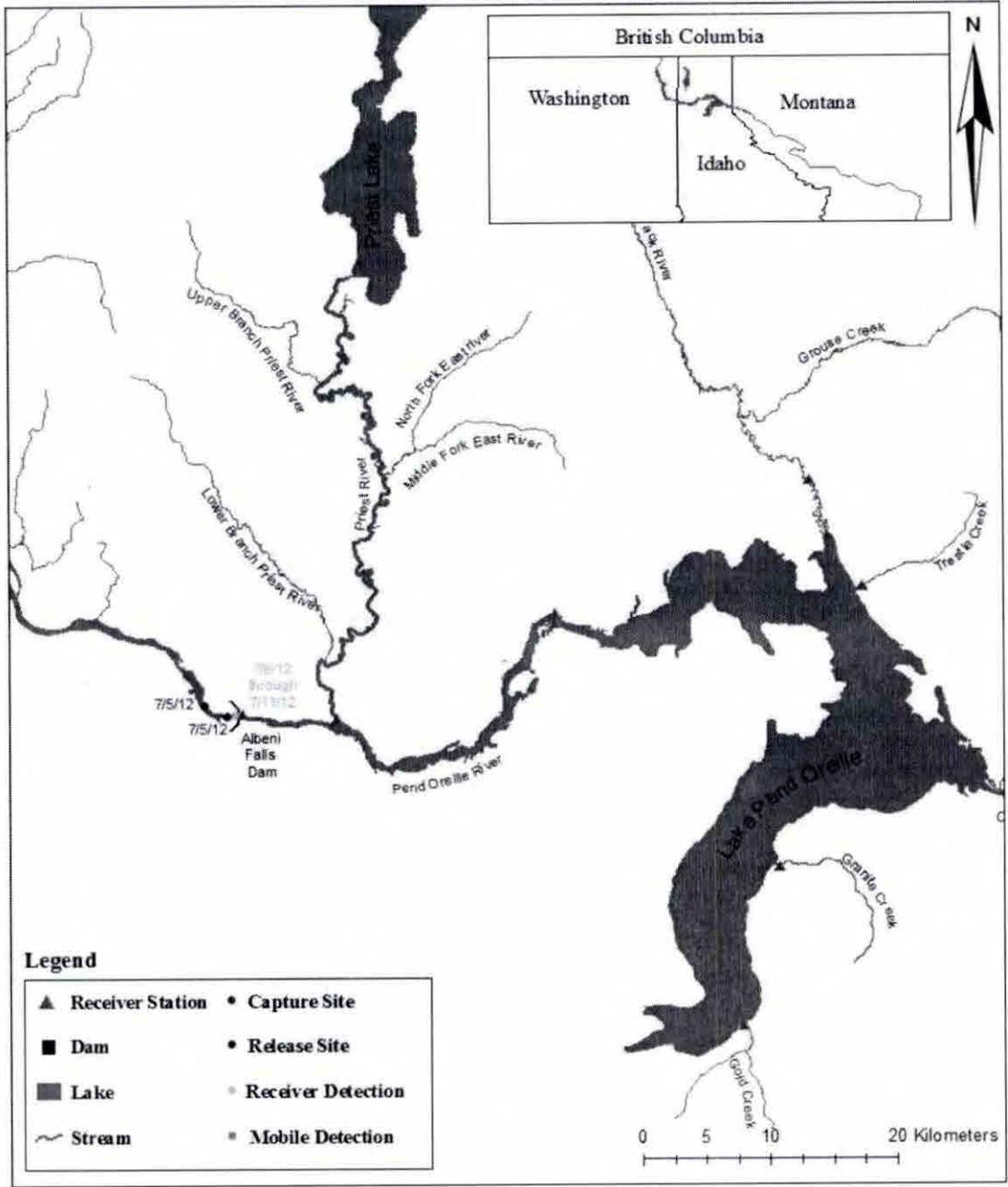


Figure 11. Detection history of BTH-5 (Code 179) in Pend Oreille River watershed, 2012.

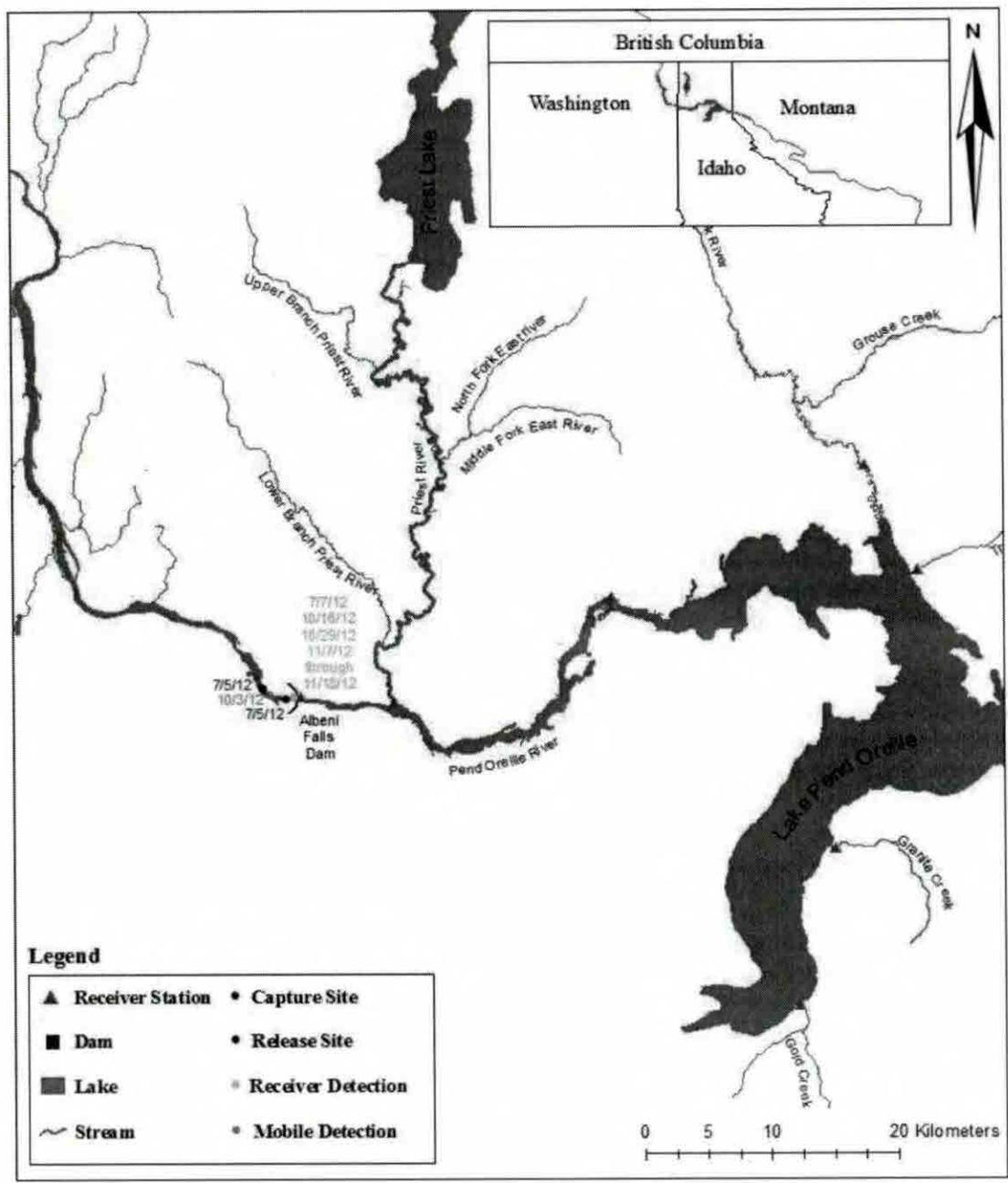


Figure 12. Detection History BTH-6 (Code 58) in Pend Oreille River watershed, 2012.

Discussion

In 2007, EWU, KNRD, and PNNL began a study to determine if bull trout collected downstream of Albeni Falls Dam originated from tributaries upstream of the dam. The primary objective was to capture bull trout below Albeni Falls Dam, transport and release them above the dam and monitor their movements to natal tributaries. Radio and acoustic tracking would provide information on movement patterns of bull trout relocated above the dam and allowed to migrate to their natal tributaries in the Pend Oreille sub-basin. Genetic analysis would confirm the identity of their natal tributary as well as confirm that their origin was from above Albeni Falls Dam.

In a study conducted in 2004, two bull trout were relocated upstream of Albeni Falls Dam (Scholz et al 2005a). Since 2007, fourteen bull trout have been tagged and relocated upstream of Albeni Falls Dam. Of these sixteen fish, fourteen have migrated into Lake Pend Oreille and two were entrained downstream of Albeni Falls Dam. Of the fish returning to the lake, four were detected in their primary genetically predicted natal tributary, two were detected in their secondary genetically predicted natal tributary, and three have been detected in non-genetically predicted tributaries. Of the three bull trout not detected in a genetically predicted tributary, two were detected in a tributary that was in relatively close proximity (one less than 2 km and one approximately 13 km) of the primary predicted natal tributaries. The other bull trout not detected in a genetically predicted tributary was located in tributary more than 30 km from its primary predicted tributary. Five fish have not been detected entering any tributaries of Lake Pend Oreille. Two of these fish have tags that are still active (through August 2013). Based on the observed migratory pattern during this study and the migratory pattern of bull trout in Trestle Creek (Paluch et al 2011; Downs et al 2006; Scholz et al 2005a), it is possible the two remaining bull trout could be detected in a genetically predicted tributary before the battery life on their tags expire.

BT-1 followed a similar spawning migration pattern to a bull trout returning to Rattle Creek to spawn in 2010 (Paluch et al 2011). BT-1 entered Lightning Creek in late June, several months prior to the spawning season. From mid-September through the end of September, BT-1 was located in Rattle with other bull trout. Redds were visible in the areas these fish were detected. BT-1 was last detected in Rattle Creek in early October and was detected leaving Lightning Creek in mid-October. Based on the amount of time spent in Rattle Creek, the other bull trout sighted in the creek at the same time, and the visible redds it in most likely BT-1 spawned in Rattle Creek.

Rattle Creek was not one of the predicted natal tributaries for BT-1. The primary predicted tributary for BT-1 was Lightning Creek followed by Savage (a tributary of the East Fork of Lightning Creek), and Porcupine (a tributary of Lightning Creek). There are several possibilities that could account for BT-1 not returning to a predicted natal tributary.

The genetic assignment could have been inaccurate. Genetic assignment of bull trout in the Pend Oreille and Clark Fork River system is highly accurate when genetically assigning a fish to a region. Genetic assignment is less accurate when assigning a fish to a specific natal tributary (DeHann et al 2011), due to varying sample sizes from all the possible natal tributaries

used to establish the genetic data base. Rattle Creek, Savage Creek, and Porcupine Creek are all within 13 km of each other. The close proximity of these creeks would be conducive to gene flow between populations. The likelihood of Lightning Creek being the natal tributary was 4.9 more likely than Savage Creek and 5.1 times more likely than Porcupine Creek. Savage Creek was 1.0 time more likely to be the natal tributary than Porcupine Creek. A bull trout tagged in 2008 was genetically assigned to Grouse Creek as the primary natal tributary and Rattle Creek was secondary prediction. Grouse Creek was 2.6×10^7 time more likely than Rattle Creek to be natal tributary of this fish. This fish did return to Grouse Creek (Paluch et al, 2009).

Since there are multiple tributaries in close proximity to one another flowing into Lightning Creek and it is not uncommon for fish to stray into a non-natal tributary to spawn, the genetic assignment in the Lightning Creek tributaries is less accurate than for fish assigned to tributaries that are a long distance away from any other potential natal tributary.

Another possibility is the genetic assignment was correct and this fish simply strayed into tributary that was not its natal tributary. Assuming the genetic prediction was correct, this fish may have missed the chemical cues from its natal tributary and swam past. It may have been attracted to Rattle Creek from migratory movement and spawning activity of other bull trout in this creek.

It is also possible this fish could have spawned in Lightning Creek, its primary detected tributary. Although it is likely BT-1 spawned in Rattle Creek, this fish was not physically examined. It is possible this fish did not spawn in Rattle Creek. This fish was not detected for almost two weeks after it was last detected in Rattle Creek. It is possible this fish could have spawned in any of predicted natal tributaries which would have traveled in or past as BT-1 out-migrated back into Lake Pend Oreille.

BT-2 and BT-3 were detected passing the North and South Dover stations on their migration back into Lake Pend Oreille. Neither fish was detected in a tributary during the 2012 spawning season. It is not uncommon for bull trout in the Pend Oreille basin to spawn in alternating years. A study by Downs et al (2006) found a proportion of tagged bull trout returned to spawn in alternating years. A bull trout tagged by Scholz et al (2005a) did not return to Trestle Creek the year it was tagged but did return the following year. BT-2 and BT-3 both entered into the Priest River prior to migrating to Lake Pend Oreille. In previous years of this study, two of the tagged bull trout that returned to tributaries of Lightning Creek did not return in the year they were tagged but did in the following year. Both of these fish were recorded entering the Priest River prior to returning to the lake (Paluch et al, 2010; Paluch et al, 2011). BT-2 and BT-3 were tagged in 2012 and could potentially follow the same pattern, returning to a spawning tributary in 2013.

BT-4 and BT-5 were collect at the mouth of the culvert located 1.5 km downstream of Albeni Falls Dam. BT-6 was collected inside the culvert. The water temperature of the river was greater than 22°C when these fish were collected. Since the water temperature of the river exceeded 16°C, these fish were transported to Lake Pend Oreille and released near the Trestle Creek boat launch. All of these fish were least than 300 mm. Due to their size it was determined these fish were not mature and it was unlikely they would return to a tributary during the 2012 spawning season. These fish were PIT tagged but did not have radio transmitters implanted. If these fish would have been tagged the smallest size transmitters would have to have been used. The battery life on these transmitters would not have last into the 2013 spawning season. Due to

the fish's age, their release into the lake, and limited battery life on the small size transmitter, it was determined that tagging these fish would not have contributed substantive data pertaining to the objectives of this study.

Five of the six bull trout/brook trout hybrids were radio tagged and released below Albeni Falls Dam. There are two receivers operating at the dam with antennas that point downstream of the dam. The data collected on these receivers and mobile tracking downstream of the dam was used to determine movements of these fish on the downstream side of the dam. Four of the five tagged hybrids were detected on the downstream receivers at Albeni Falls Dam.

BTH-2 was first detected during mobile tracking 9.2 km downstream of Albeni Falls Dam seven days after being tagged. It remained in this area for two weeks. This fish was detected at the dam for the first time 42 days after being tagged. Between 4 June 2012 and 7 January 2013, this fish was detected on the receivers at the dam during six different time periods. It was detected on the tailrace receiver and the logchute receiver.

BTH-3 was first detected during mobile tracking 3.1 km downstream of Albeni Falls Dam seven days after being tagged. This fish was detected at the dam for the first time 15 days after being tagged. It remained at the dam for six days and was detected on both the tailrace and logchute receivers. This fish was last detected 13.9 km downstream of the dam 42 days after it was last detected at the dam.

BTH-4 was not detected at the dam or during mobile tracking. This fish was released during high flows. It is possible this fish traveled with the flows and never approached the dam. It was also never detected during mobile tracking. It may have entered a tributary downstream of the dam and was outside of the detection range during mobile tracking. Another possibility is that there could have been a tag failure. Several of the other hybrids tagged this year were of similar or smaller size than BTH-4. They were all able to swim against the flow and explore the face of the dam. If this fish followed the flows downstream it could have been entrained at Box Canyon Dam. There was no record of this fish entraining at Box Canyon Dam. Mobile tracking via vehicle occurred on a regular basis downstream of the dam. There was also a tracking flight taken downstream of the dam. This fish was never detected during mobile tracking. All of the other hybrids tagged this year were detected at the dam and half of them were detected downstream of the dam. It is possible the tag in this fish failed to properly transmit its signal.

BTH-5 was detected on the receivers at the dam the day after it was tagged. It remained at the dam for five days. No further detections of the fish were recorded.

BTH-6 was detected on the receivers at the dam the two days after it was tagged. It was recorded at the dam during three other time periods after the first detection.

The study by Geist et al (2004) reported bull trout tagged below Albeni Falls Dam made repeated forays between the dam and downstream of the dam. These repeated movements to gain passage upstream of the dam supported the hypothesis that the bull trout collected below Albeni Falls Dam originated from upstream of the dam. Since 2004, fourteen of sixteen tagged bull trout relocated upstream of Albeni Falls Dam have returned to Lake Pend Oreille (Scholz et al 2005a;

Paluch et al 2009; Paluch et al 2010; Paluch et al 2011; Paluch et al 2012). These returns support the hypothesis that the bull trout collected below Albeni Falls Dam originated upstream of the dam. The movements of the hybrids tagged in 2012 were similar to those of fish previously tagged below the dam (Geist et al 2004; Bellgraph et al 2010; Paluch et al 2010, Paluch et al 2011). The amount of time these fish spent exploring the downstream side of the dam and repeated forays between the dam and downstream suggest these fish originate from tributaries upstream of the dam.

The number of hybrids collected this year is an area of concern. It is not known which tributaries these fish are originating from. Based on their movements below the dam it is likely they originated upstream of Albeni Falls Dam. Brook trout are known to displace bull trout in areas they are introduced (Scoot and Crossman 1973; Naohisa et al 2002). The increased number of hybrids collected this year may be an indication of bull trout displacement in tributaries of Lake Pend Oreille.

As of 24 April 2013, the percent of average accumulation of precipitation (Snotel Internet Site, 2012) in the Idaho Northern Panhandle Region, based on 10 of 10 stations reporting, was 115% of normal with a 112% snow water equivalent. In Montana, the percent of average accumulation of precipitation in the Flathead River Basin, based on 14 of 16 stations reporting, was 118% of normal with a 116% snow water equivalent. The Upper Clark Fork River Basin, based on 15 of 15 stations reporting, was 93% of normal with a 97% snow water equivalent. The Bitterroot River Basin, based on 7 of 7 stations reporting, was 99% of normal with a 100% snow water equivalent. The Lower Clark Fork Basin, based on 8 of 8 stations reporting, was 108% of normal with a 108% snow water equivalent.

The number of bull trout passing over the dam is theoretically related to the amount and timing of the discharge. Three bull trout captured in 2012 were collected during the time period of peak discharge. Three bull trout were also collected after spillway gates were closed and the only discharge was through the powerhouse. These fish were collected at the culvert after river temperatures exceeded 16°C. They were most likely seeking thermal refuge at this location. This year's discharge at the Albeni Falls Dam spillway will most likely be slightly above average based on this year's snowpack. We will monitor the discharge and river temperature closely during 2013 and schedule our sampling trips accordingly.

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From: Bettin, Scott W (BPA) - KEWR-4
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To: Harwood, Holly C (BPA) - PGB-5; Barco III, John W (BPA) - A-7; Berry, William A (BPA) - PGSP-5; Norris, Tony (BPA) - PGPO-5; Swedo, Robert L (BPA) - DKR-SPOKANE; Sweet, Jason C (BPA) - KEWR-4
Subject: FW: Pend Oreille Basin Commission presentation
Attachments: Pend Oreille spawning ecology_POBC meeting_Dec 2013.ppsx

This one is worth flipping through. Andy Dux did a great job pulling this research together. -si

From: Dux, Andy [mailto:andy.dux@idfg.idaho.gov]
Sent: Thursday, December 12, 2013 11:36 AM
To: Brown, Cecilia K (BPA) - KEWM-4; Bettin, Scott W (BPA) - KEWR-4
Subject: Pend Oreille Basin Commission presentation

Scott, Cecilia:

Attached is the presentation that I'll be giving tomorrow at the Pend Oreille Basin Commission meeting. This summarizes the project we just completed to evaluate kokanee spawning and recruitment in response to water level management. It is a huge file, so hoping it goes through okay.

I have no idea who else should receive this, so I'll ask that you please forward it to other BPA folks as you see fit.

I'm finishing up another quick presentation on the current status of the LPO fishery. I'll also be giving that tomorrow and will send it when I'm done.

Andy

Andy Dux
Principal Fisheries Research Biologist
Idaho Department of Fish and Game
2885 W. Kathleen Ave.
Coeur d'Alene, ID 83815
(208) 769-1414 (main office)
(208) 770-3760 (direct line)
andy.dux@idfg.idaho.gov

Norris,Tony (BPA) - PGPO-5

From: Bettin,Scott W (BPA) - KEWR-4
Sent: Thursday, December 19, 2013 9:41 AM
To: Berry,William A (BPA) - PGSP-5; Kerns,Steven R (BPA) - PGSP-5; Bartlett,Kristine L (BPA) - PGSP-5; Norris,Tony (BPA) - PGPO-5
Subject: Fw: Lake Pend Oreille kokanee spawning status

A little flexibility at ALF through the end of the month. A conversation with Seattle is in order to see what this means for operations?

From: Dux,Andy [mailto:andy.dux@idfg.idaho.gov]
Sent: Thursday, December 19, 2013 09:25 AM
To: Bettin,Scott W (BPA) - KEWR-4; Fenolio, Joel M NWS <Joel.M.Fenolio@usace.army.mil>
Cc: Brown,Cecilia K (BPA) - KEWM-4; Corsi,Charles <charles.corsi@idfg.idaho.gov>
Subject: Lake Pend Oreille kokanee spawning status

Scott, Joel:

My crew has been out this week conducting a lakewide shoreline spawning survey. I visited with them yesterday about the status of spawning. We have a lot of spawners this year and there likely will be some activity occurring through the rest of the month. However, we are well past the peak and activity is quickly diminishing. Our assessment is that switching from the current six inch operating range to the one foot range will not pose any risk to spawners. I understand that because of FWPO being in play this year that the operating range really will be going to the full four feet. Based on the weather forecast from now until the end of December and the limited amount of filling that is anticipated, we also do not believe there will be any meaningful risk to spawners by starting that process.

When we get together after the New Year to discuss our latest research relative to lake level management, we should discuss how to handle the December operations in coming years. With better information about kokanee spawning needs and FWPO now in place it would be timely to think about whether the existing protocol is sufficient or if it should be modified.

If you have questions, let me know.

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Norris, Tony (BPA) - PGPO-5

From: Oliver, Stephen R (BPA) - PG-5
Sent: Thursday, January 05, 2012 4:41 PM
To: Norris, Tony (BPA) - PGB-5
Subject: FW: Pend Oreille, Priest Lake Basin Commission meeting

Stephen R. Oliver
Vice President, Generation Asset Management
Bonneville Power Administration
Ph: (503) 230-7503 or (503) 230-4090
FAX: (503) 230-3986

From: George Eskridge [mailto:geskridge@coldreams.com]
Sent: Friday, December 09, 2011 4:57 PM
To: Williams, John J (BPA) - DKR-BOISE
Cc: Oliver, Stephen R (BPA) - PG-5
Subject: Pend Oreille, Priest Lake Basin Commission meeting

John, the following are questions that I heard the participants in today's meeting ask that BPA and the COE might want to be ready to respond to in next week's public meeting:

- 1) Did the Clark Fork Technical Management team make recommendation re. to the flexible operation in the EA?
- 2) Is the funding (3+ \$million) new dollars or money taken from another mitigation resource? (Chip answered this in part I think by saying it would go from land acquisition to erosion study/control)
- 3) Will there be accountability of the operation relative to impacts of the operation; that is will damage to lands and private property (docks, etc.) be investigated, documented and operations stopped if necessary?
- 4) Why can't wind be utilized instead of fluctuating the lake level?
- 5) Is the lake at 2051 this year at the F&G request or at Bonneville's request?
- 6) Has the COE looked at other areas where levels were down to the degree that floating docks became lodged in the sand or soil and then refloated as levels were increased? The concern here is that with a fluctuating level docks that were imbedded in sand/soil, then released then imbedded again on a continuous scale would be damaged.
- 7) Has the COE/BPA addressed the problem of increasing the spread of "flowering rush" because of the releasing of root structures of the plant when the soil is dewatered?
- 8) Will the F&G and tribes be given the flexibility to use the mitigation money (3+ \$million) in the manner needed to mitigate the erosion that might occur?
- 9) What is the amount of generation that will be obtained from the flexible operation and how much value in dollars will be obtained?
- 10) What is the anticipated operation this winter with the flexibility scenario implemented and when will the flexible operation begin?
- 11) What will be the lake level next year and the year after and at what agency's request. (Chip Corsi indicated that in the third year F&G wants the level lower to do on the ground work in the Clark Fork Delta. You need to be sure to point out this is a F&G request, not BPA if this is true)
- 12) I think I heard the Chairman of the Commission ask if some funding for the commission could be a part of the mitigation settlement for the flexible operation. He of course asked this because we had to cut funding for the commission to 0, but they are operating on a one time funding basis obtained from Avista.

There was also conversation initiated by the representative from the Idaho Conservation League that F&G and others have estimated a total mitigation need for erosion control, etc. of about \$16 million dollars. The comment was then made by one of the commission members that the \$3+ million would only be a "drop in the bucket" of the amount needed.

Chip Corsi also indicated that the EA stated that most of the erosion occurred at high water levels because of wave action although some occurred at low water. He then stated that not all the reasons for erosion was understood. (Is this an area that needs to be brought up in the meeting, i.e. that recreation usage in terms of jet skiis, boats and other recreational activities also create erosion problems?)

Finally it might be well at the meeting to discuss the operational characteristics as a result of flood control and that power is a secondary or even a third priority in the operation regime. The point here is that regardless of power needs the lake is going to be drawn down to accomodate spring run-off to prevent flooding. I didn't hear this brought out today.

Also keep in mind that the commission members would hope operations won't commence until after the BPA/COE meeting next week, followed by them getting together by a phone meeting to establish a commission position that they could forward to BPA, COE and the Idaho Governor.

I didn't get the impression that they were looking at a long period of time, possibly a week after the public meeting to get their position statement agreed upon.

Anyway my thoughts on the meeting for whatever they are worth.

George Eskridge

12)

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Norris, Tony (BPA) - PGPO-5

From: Williams, John J (BPA) - DKR-BOISE
Sent: Thursday, December 13, 2012 1:31 PM
To: Cogswell, Peter (BPA) - DKR-7; Norris, Tony (BPA) - PGPO-5; Harwood, Holly C (BPA) - PGB-5; Shank, Bob (BPA) - DKT-SPOKANE; Zimmer, Pat R (BPA) - DKR-7
Subject: Fw: FYI: Draft NEWS RELEASE on AFD Water Temperature (UNCLASSIFIED)
Attachments: PR 121213 AFD Water Qual Study v1.docx

John

----- Original Message -----

From: Wickstrom, Leah J NWS [mailto:Leah.J.Wickstrom@usace.army.mil]
Sent: Thursday, December 13, 2012 12:21 PM
To: Kassover Stacy J NWS <Stacy.E.Johnson@usace.army.mil>; Reillo, Chiara NWS <Chiara.V.Reillo@usace.army.mil>; Maroney, Joe <jmaroney@kalispeltribe.com>; Merrill, Ken <kmerrill@knrd.org>; Williams, John J (BPA) - DKR-BOISE; 'Ray Entz' <rentz@kalispeltribe.com>; Peters, Rock D NWD <Rock.D.Peters@usace.army.mil>; Maslen, Bill (BPA) - KEW-4; Brengle, Craig S NWS <Craig.S.Brengle@usace.army.mil>; Linehan, Ryne NWS <Ryne.J.Linehan@usace.army.mil>; Reese, Amy R NWS <Amy.R.Reese@usace.army.mil>; Schneider, Michael L NWP <Michael.L.Schneider@usace.army.mil>; Easthouse, Kent B NWS <Kent.B.Easthouse@usace.army.mil>
Cc: Lawrence, Aaron S NWS <Aaron.S.Lawrence@usace.army.mil>
Subject: RE: FYI: Draft NEWS RELEASE on AFD Water Temperature (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

All,

Attached is the Draft News Release for your review. Please have all comments to me by noon on Monday. Let me know if this isn't feasible.

Thanks!

Leah

-----Original Message-----

From: Wickstrom, Leah J NWS
Sent: Wednesday, December 12, 2012 4:12 PM
To: Kassover Stacy J NWS; Reillo, Chiara NWS; Maroney, Joe; Merrill, Ken; Williams, John J (BPA) - DKR-BOISE; 'Ray Entz'; Peters, Rock D NWD; Maslen, Bill (BPA) - KEW-4; Brengle, Craig S NWS; Linehan, Ryne NWS; Reese, Amy R NWS; Schneider, Michael L NWP; Easthouse, Kent B NWS
Cc: Lawrence, Aaron S NWS
Subject: FYI: Draft NEWS RELEASE on AFD Water Temperature (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Hi All,

Just wanted to keep everyone posted on some public outreach that will be occurring on the AFD Water Temperature project. Craig Brengle, Joe Maroney, Ray Entz, John Williams and I chatted yesterday to de-brief on the Lake Pend Oreille Basin Commission meeting that occurred in mid-November. It is apparent to us that there is a need for a News Release that clarifies the scope of the AFD Water Temperature project. We have a lot of concerned stakeholders in the area and some incorrect information making its way around.

I called Erin Mader of the POBC today and left a voicemail indicating that we were going to be putting out a News Release on this project and inviting her to call me with any questions she may have. I let her know that I was unavailable to call into the POBC conference call tomorrow. I haven't heard back from her at this point.

This is just a heads-up that you will be seeing a draft News Release sometime tomorrow. I know this is an important and somewhat sensitive project to all of our agencies, so wanted to provide folks an opportunity to comment on the News Release before it goes public. I'd like to get it out as soon as possible, so will probably ask for a quick turn-around (Friday COB, if possible).

Please review the folks in this email chain and let me know if I have missed anyone in your agency that you think would like the opportunity to see this. Email me individually with folks that you'd like me to include.

Thanks everyone!

Leah Wickstrom, EIT
Project Manager | Civil Works Branch
U.S. Army Corps of Engineers | Seattle District
206.764.3652 | leah.l.wickstrom@usace.army.mil

Classification: UNCLASSIFIED
Caveats: NONE

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