Department of Energy

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

FREEDOM OF INFORMATION ACT/PRIVACY PROGRAM

August 2, 2021

In reply refer to: FOIA #BPA-2021-00773-F

Andrew Missel
Advocates for the West
3701 SE Milwaukie Avenue, Suite B
Portland OR 97202
Email: amissel@advocateswest.org

Dear Mr. Missel,

This communication concerns your records request submitted to the Bonneville Power Administration (BPA), made under the Freedom of Information Act, 5 U.S.C. § 552 (FOIA). Your request was originally submitted to the Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA) on March 29, 2021. The DOC assigned a tracking number of FOIA DOC-2021-001245. Under DOC regulations at 15 C.F.R. § 4.5(b), your request was transferred from DOC to BPA on June 2, 2021. BPA accepted transfer on June 3, 2021, along with 128 responsive records sent from NOAA.

Request

"…records… concerning the National Marine Fisheries Service's ("NMFS") relationship with Kintama Research Services ("Kintama") and/or its CEO, Dr. David Welch [including]:

1. Any and all contracts and receipts of payment between NMFS and Kintama and/or Dr. Welch from the start of the year 2000 through the date of search.
2. All communications between NMFS and Kintama and/or Welch from the start of the year 2000 through the date of search.
3. All records from the start of the year 2000 through the search date that document, memorialize, or refer to any meetings, conversations, or other communications between NMFS and Kintama and/or Welch.
4. All communications between NMFS and the Bonneville Power Administration ("BPA") from the start of the year 2000 through the date of search that make reference to or discuss Kintama and/or Welch.
5. All records from the start of the year 2000 through the search date that document, memorialize, or refer to any meetings, conversations, or other communications between NMFS and BPA concerning Kintama and/or Welch.
6. All annual budgets and other periodic fiscal summaries and outlooks from 2010 through the search date for NMFS's West Coast Regional Office."

Response
NOAA transferred 128 pages to BPA for internal review and release to the requester. Of the 128 pages provided, 112 pages accompany this communication, released in full with no redactions applied; 8 pages accompany this communication with redactions applied under 5 U.S.C. § 552(b)(2) (Exemption 2); and 10 pages accompany this communication with redactions applied under 5 U.S.C. § 552(b)(6) (Exemption 6). Please note that the page counts will not total the overall number of pages. A more detailed explanation of the applied exemptions follows.

Explanation of Exemptions
The FOIA generally requires the release of all agency records upon request. However, the FOIA permits or requires withholding certain limited information that falls under one or more of nine statutory exemptions (5 U.S.C. §§ 552(b)(1-9)). Further, section (b) of the FOIA, which contains the FOIA's nine statutory exemptions, also directs agencies to publicly release any reasonably segregable, non-exempt information that is contained in those records.

Exemption 2
Exemption 2 permits withholding of agency information "related solely to the internal personnel rules and practices of an agency." BPA relies on Exemption 2 here to protect internet portals, telephonic meeting call-in numbers and related passwords and passcodes found on the subject responsive records. Records protected by Exemption 2 may be discretionarily released. BPA considered a discretionary release and determined that the subject information should not be discretionarily released because a public release would hinder BPA internal procedures and policies.

Exemption 6
Exemption 6 serves to protect Personally Identifiable Information (PII) contained in agency records when no overriding public interest in the information exists. BPA does not find an overriding public interest in a release of the information redacted under Exemption 6—specifically, cellular telephone numbers. This information sheds no light on the executive functions of the agency and BPA finds no overriding pubic interest in its release. BPA cannot waive these redactions, as the protections afforded by Exemption 6 belong to individuals and not to the agency.

Lastly, as required by 5 U.S.C. § 552(a)(8)(A), information has been withheld only in instances where (1) disclosure is prohibited by statute, or (2) BPA foresees that disclosure would harm an interest protected by the exemption cited for the record. When full disclosure of a record is not possible, the FOIA statute further requires that BPA take reasonable steps to segregate and release nonexempt information. The agency has determined that in certain instances partial disclosure is possible, and has accordingly segregated the records into exempt and non-exempt portions.

Fees
There are no fees associated with processing your FOIA request.

Certification
Pursuant to 10 C.F.R. § 1004.7(b)(2), I am the individual responsible for the records search, redaction decisions, and records release described above. Your FOIA request, BPA-2021-00773-F is now closed with the responsive agency information provided.

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

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

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

Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows:

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

Questions about this communication may be directed to the FOIA Public Liaison Jason Taylor at jetaylor@bpa.gov or 503-230-3537. Questions may also be directed to Thanh Knudson, Flux Resources, LLP, at etknudson@bpa.gov or 503-230-5221. Thank you for your interest in the Bonneville Power Administration.

Sincerely,

Candice D. Palen
Freedom of Information/Privacy Act Officer

Responsive agency information accompanies this communication.

From: McNary,Sarah R (BPA) - A-7 <srmcnary@bpa.gov>
Sent: Monday, September 9, 2013 4:14 PM
To: 'Ritchie.Graves@noaa.gov'
Subject: Fw: Reply to Haeseker
Attachments: Reply to Haeseker PNAS 8.13.pdf; Haeseker Letter PNAS 8.7.2013.pdf

FYI

From: Bodi,Lorri (BPA) - KE-4
Sent: Monday, September 09, 2013 12:49 PM Pacific Standard Time
To: Maslen,Bill (BPA) - KEW-4; McNary,Sarah R (BPA) - A-7; Sweet,Jason C (BPA) - KEWR-4
Subject: FW: Reply to Haeseker

FYI. See attachments. I forgot about the Hilborne comment also.

From: Petersen,Christine H (BPA) - KEWR-4
Sent: Monday, September 09, 2013 12:19 PM
To: Norris,Tony (BPA) - PGPO-5; Bettin,Scott W (BPA) - KEWR-4; Pendergrass,Richard M (BPA) - PGP-5; Bodi,Lorri (BPA) - KE-4; Harwood,Holly C (BPA) - TEP-TPP-3; Geiselman,Jim (BPA) - KEWR-4
Cc: Doumbia,Julie A (BPA) - KEWR-4
Subject: FW: Reply to Haeseker

Hi,
We brought this up in the meeting earlier today.
There was an interesting exchange of letters in PNAS (a rather high ranked journal) where Steve Haeseker (USFWS) from the CSS study had critiqued the Kintama ocean survival study using VEMCO tags which BPA funded. They addressed several relevant questions including the 'delayed mortality' hypothesis relating to powerhouse passage, seasonality of outmigration, and differential mortality due to barging (they published the last part of the study in a second paper in Nature). http://www.cbbulletin.com/421217.aspx?wb48617274=EE67B226

Erin Rechisky got her response printed as well, with a bit of a heated tone. Both are attached.

Christine

From: Doumbia,Julie A (BPA) - KEWR-4
Sent: Friday, September 06, 2013 10:04 AM
To: Sweet,Jason C (BPA) - KEWR-4; Petersen,Christine H (BPA) - KEWR-4
Subject: FW: Your research request: Reply to Haeseker

FYI Rechisky et al. response to Haeseker's critique of their work they backed up the study with additional data, it's a good response but gets a bit heated at the end… e.g.:

As Hilborn noted in his commentary on our report (5), no amount of data are likely to resolve the gulf between ecologists arguing for a major delayed effect of Columbia River dams on ocean survival and those who do not. Many in the Columbia River Basin blame poor ocean survival on prior exposure to dams in freshwater; however, Chinook populations from undammed areas in British Columbia and Alaska have declined in recent years as well (1). Psychological studies repeatedly show that individuals and like minded groups preferentially select those facts favoring their prior prejudices when presented with complex data capable of multiple interpretations (6), such as those in the correlation analyses cited by Haeseker (2).

From: Burke,Libby (CONTR) - NHT-1
Sent: Friday, September 06, 2013 9:41 AM
To: Doumbia,Julie A (BPA) - KEWR-4
Cc: Library - BPA HQ
Subject: Your research request: Reply to Haeseker

Hi Julie,

This finally came. Sorry for the delay. This completes your research request.

Thank you for contacting BPA Library Services.

Have a great weekend,

Libby

The BPA Library Services has increased my ability to perform my job responsibilities.
Yes ____ N/A ____ No ____

Comments: _____

Libby Burke, MLIS, CA
UNiSYS
Bonneville Power Administration Library Researcher
Mail Stop: Library – 1
(503) 230-4027

Nonrepresentative fish and ocean migration assumptions confound inferences in Rechisky et al.

Close examination of the methods, assumptions, and results of Rechisky et al. (1) indicate that their results are confounded by nonrepresentative tagging, rearing, and release factors, and that critical assumptions are inconsistent with available data. Thus, the authors' conclusions regarding hydrosystem-related delayed mortality are overreaching and unsupportable.

Nonrepresentative fish with acoustic tags were 10–20 mm longer, were released 21–83 d later, and were released 55–249 rkm further downriver than their corresponding hatchery populations of inference. Length at tagging, timing of release (2), and migration distance have all been shown to influence survival rates of Chinook salmon at multiple life stages. Any of these factors alone confound comparisons with the populations of inference, let alone the combination of all three.

Rechisky et al. (1) report that estimation of detection probabilities for the Lippy Point subarray was not possible because of too few detections of tagged smolts at the distant Alaska subarray. This assumption weakens the reliability of survival estimates used to draw conclusions concerning delayed mortality. The sensitivity analysis used to explore the effects of alternative assumptions is narrow in view of the large uncertainty in detection probability.

Rechisky et al. (1) assume that all fish migrated North on the continental shelf at depths shallower than 200 m and through the Lippy Point subarray. If this assumption is not valid, the reported survival estimates will be biased low. Studies by McMichael et al. (3) and Schreck et al. (4) indicate that this assumption is likely violated. The degree of bias is unknown.

Contrary to Rechisky et al. (1), in-river survival varies between 25% and 83% and is influenced by hydrosystem conditions (2). Ocean survival rates and smolt-to-adult survival rates are also influenced by hydrosystem conditions (2, 5). These studies demonstrate that hydrosystem management actions influence survival at multiple life stages.

Rechisky et al. (1) found no evidence that Snake River hatchery Chinook smolts experienced lower survival rates in the early ocean than those from the Yakima River that migrated through fewer dams. The authors acknowledge these estimates represented tagged groups whose size, holding, and timing of release had been significantly manipulated to accommodate acoustic tags. As a result, tagged fish were not representative of the hatchery populations of inference. Similarly, the size-distribution of the hatchery study fish was larger than all but a small fraction of the wild individuals, concurrent with differences in migration timing between study fish and wild fish. The study was short term (3 y) and the migration conditions that study fish experienced were different from migration conditions experienced by most wild and hatchery fish. Because of low sample sizes and poor detection efficiency, untested, critical assumptions about detection probabilities and ocean migration patterns were required. Thus, the findings of Rechisky et al. on delayed hydrosystem mortality for wild or hatchery fish are highly questionable.

Steven Haeseker[1]

US Fish and Wildlife Service, Columbia River Fisheries Program Office, Vancouver, WA 98683

1 Rechisky EL, Welch DW, Porter AD, Jacobs-Scott MC, Winchell PM (2013) Influence of multiple dam passage on survival of juvenile Chinook salmon in the Columbia River estuary and coastal ocean. *Proc Natl Acad Sci USA* 110(17):6883–6888.

2 Haeseker SL, McCann JA, Tuomikoski J, Chockley B (2012) Assessing freshwater and marine environmental influences on life-stage-specific survival rates of Snake River spring-summer Chinook salmon and steelhead. *Trans Am Fish Soc* 141(1):121–138.

3 McMichael GA, et al. (2011) *Migratory Behavior and Survival of Juvenile Salmonids in the Lower Columbia River, Estuary, and Plume in 2010. PNNL-20443* (Pacific Northwest National Laboratory, Richland, WA).

4 Schreck CB, Karnowski MD, Clemens BJ (2005) *Evaluation of Post-Release Losses and Barging Strategies that Minimize Post-Release Mortality.* DACW68-00-C-0028 (Oregon Cooperative Fish and Wildlife Research Unit, Corvals, OR).

5 Petrosky CE, Schaller HA (2010) Influence of river conditions during seaward migration and ocean conditions on survival rates of Snake River Chinook salmon and steelhead. *Ecol Freshwat Fish* 19(4):520–536.

Author contributions: S.H. analyzed data and wrote the paper.

The author declares no conflict of interest.

[1]E-mail: steve_haeseker@fws.gov.

Reply to Haeseker: Value of controlled scientific experiments to resolve critical uncertainties regarding Snake River salmon survival

In our report (1), we set out to explicitly control for the ecological differences Haeseker (2) cites so that we could assess the effect of a critical policy issue: whether Snake River dam passage results in poorer early marine survival of juvenile Snake River spring Chinook salmon. Thus, we selected smolts of common size and manipulated release times to ensure smolts from the two populations were as similar as possible, apart from the number of dams that they passed (1). We agree with Haeseker that ecological differences between the populations used in our study existed and may have influenced ocean survival; however, their net effect needed to be a 3.4 fold difference in survival to result in the nearly identical rates of apparent survival that we found.

We have since repeated the experiment on salmon collected and tagged at Snake and Columbia River dams and compared their postrelease survival (3). The findings were consistent with the results reported in our article in PNAS (1): Snake River spring Chinook salmon ≥130 mm fork length did not have lower survival relative to salmon originating elsewhere. (It is now technically possible to repeat these tests on smaller wild smolts if policy makers deem it sufficiently important).

Haeseker's (2) claim concerning the ocean distribution of salmon smolts is likely unfounded: long term ocean surveys have consistently captured juvenile Columbia River spring Chinook almost exclusively on the continental shelf north of the Columbia River (4). Furthermore, the cross shelf distribution plots we report (figure S2 in ref. 1) demonstrate that both of the populations used in our study were shelf limited at Lippy Point. The survival models we use thus accounted for individuals temporarily carried south or off shelf in the Columbia River plume. Finally, because our study estimates relative survival, precise estimation of detection probability is not critical unless enough of the Yakima population migrated offshore to reduce the number detected to equal that of the Snake River smolts.

As Hilborn noted in his commentary on our report (5), no amount of data are likely to resolve the gulf between ecologists arguing for a major delayed effect of Columbia River dams on ocean survival and those who do not. Many in the Columbia River Basin blame poor ocean survival on prior exposure to dams in freshwater; however, Chinook populations from undammed areas in British Columbia and Alaska have declined in recent years as well (1). Psychological studies repeatedly show that individuals and like minded groups preferentially select those facts favoring their prior prejudices when presented with complex data capable of multiple interpretations (6), such as those in the correlation analyses cited by Haeseker (2). Without carefully designed scientific experiments that test specific variables, it may not be possible to break out of this dilemma. In other scientific fields, formal experimental tests of theories historically resulted in very rapid scientific progress. The stakes are high in the Columbia River region; the window for resolving the salmon conservation problem is likely closing fast, given the large predicted changes in future climate and poor ocean survival of salmon that will likely ensue.

Erin L. Rechisky[1], *David W. Welch, and Aswea D. Porter*
Kintama Research Services, Nanaimo, BC, Canada V9S 3B3

1 Rechisky EL, Welch DW, Porter AD, Jacobs Scott MC, Winchell PM (2013) Influence of multiple dam passage on survival of juvenile Chinook salmon in the Columbia River estuary and coastal ocean *Proc Natl Acad Sci USA* 110(17): 6883 6888
2 Haeseker S (2013) Nonrepresentative fish and ocean migration assumptions confound inferences in Rechisky et al *Proc Natl Acad Sci USA*, 10 1073/pnas 1309087110
3 Porter AD, et al (2012) Marine and freshwater measurement of delayed and differential delayed mortality of Columbia & Snake River yearling Chinook smolts using a continental scale acoustic telemetry array, 2011 *Report to the Bonneville Power Administration by Kintama Research Services Ltd , Contract No 46389, Project No 2003 114 00* Available at: http://pisces bpa gov/release/documents/documentviewer aspx?doc P127340
4 Fisher J, et al (2007) Comparisons of the coastal distributions and abundances of juvenile Pacific salmon from central California to the northern Gulf of Alaska *American Fisheries Society Symposium 57 Ecology of Juvenile Salmon in the Northeast Pacific Ocean Regional Comparisons*, eds Grimes C, Brodeur R, Haldorson L, McKinnell SM (American Fisheries Society, Bethesda), pp 31 80
5 Hilborn R (2013) Ocean and dam influences on salmon survival *Proc Natl Acad Sci USA* 110(17):6618 6619
6 Trivers R (2011) *The Folly of Fools The Logic of Deceit and Self Deception in Human Life* (Basic Books, New York), p 395

Author contributions: E.L.R., D.W.W., and A.D.P. wrote the paper.
The authors declare no conflict of interest.

[1]To whom correspondence should be addressed. E mail: erin.rechisky@kintama.com.

From: McNary,Sarah R (BPA) - A-7 <srmcnary@bpa.gov>
Sent: Tuesday, January 28, 2014 6:03 PM
To: 'Rock.D.Peters@usace.army.mil'; 'bruce.suzumoto@noaa.gov'; 'Ritchie.Graves@noaa.gov'
Cc: 'KPuckett@usbr.gov'
Subject: Fw: FPC review of BPA/COE January 17, 2014 presentation for ISAB Spill Study Review

You are aware - yes?

From: Sweet,Jason C (BPA) - KEWR-4
Sent: Tuesday, January 28, 2014 04:38 PM Pacific Standard Time
To: Bodi,Lorri (BPA) - KE-4; Maslen,Bill (BPA) - KEW-4; McNary,Sarah R (BPA) - A-7; Harwood,Holly C (BPA) - PGB-5
Subject: FW: FPC review of BPA/COE January 17, 2014 presentation for ISAB Spill Study Review

More incoming...

From: Merrill, Erik [mailto:emerrill@nwcouncil.org]
Sent: Tuesday, January 28, 2014 4:23 PM
To: Merrill, Erik; Ruff, Jim; 'Scott, Teresa L (DFW)'; 'Michele Dehart'; Sweet,Jason C (BPA) - KEWR-4; Grover, Tony; 'Bill Tweit'; 'Tom Rien'; 'Robert Naiman'; 'Greg Ruggerone'; 'Rich Alldredg (b) (6) '; 'Rock.D.Peters@nwd01.usace.army.mil'; 'Graves, Ritchie'; Ruff, Jim; 'Mike.Ford@noaa.gov'; 'ROGP@critfc.org'; F&W State Staff; F&W Plus; 'Al Giorgi'; Foster,Marchelle M (BPA) - KEWR-4
Subject: FPC review of BPA/COE January 17, 2014 presentation for ISAB Spill Study Review

All,

Attached is a memo from Michele DeHart, FPC, to Tom Rien, ODFW, providing the FPC's review of the BPA/COE/Skalski presentation to the Independent Scientific Advisory Board on January 17, 2014. See also Tom Rien's email message to the ISAB below describing the memo's purpose.

In addition to the FPC memo, the ISAB received information on TDG studies at Libby Dam and papers related to hydrosystem and ocean survival (Welch, Haeseker, PNAS articles and response). These papers are available on the Council's drop box at http://dropbox.nwcouncil.org/ISAB%20Spill%20Study%20Review%20Materials. See folders "3_Action Agency.." and "5_Total dissolved gas."

The ISAB appreciates the additional information and is on course to complete the review before the end of February.

Thank you,

Erik

From: Tom Rien [mailto:tom.a.rien@state.or.us]
Sent: Tuesday, January 28, 2014 3:55 PM
To: Merrill, Erik
Cc: ed.bowles@state.or.us; Weist, Karl; mdehart@fpc.org; Anthony Nigro
Subject: Review of the January 17 presentation by BPA and USACE to the ISAB

Hi Erik:

At the request of Oregon Department of Fish and Wildlife, the Fish Passage Center and Comparative Survival Study Oversight Committee reviewed and developed comments on the Corps of Engineer/ Bonneville Power Administration (AA; in part) Power Point presentation delivered to the Independent Scientific Advisory Board (ISAB) on January 17, 2014. The review can be found in a memorandum titled "*Review of BPA/COE/Skalski presentation to the Independent Scientific Advisory Board on January 17, 2014*" (http://www.fpc.org/documents/FPC_memos.html). The memorandum describes areas of agreement and disagreement as comments associated with specific slides presented by the AA. It is my understanding that this material will be made available to members of the ISAB to use in their consideration of Experimental Spill Management that was requested by the Northwest Power and Conservation Council.

The AA and 2014 Supplemental Biological Opinion infers an opportunity to "stay the course", however spill planning referenced in RPA 29, Table 2 would amount to a reduction in fish protections from those rolled over since 2006. Oregon continues to endorse the finding of Comparative Survival Study analyses and continue to support full consideration of Experimental Spill Management. Oregon continues to stand ready to collaborate with the AA to meet regional goals as they relate to successful recovery efforts of listed species in the Columbia River Basin.

Thanks for your consideration.

Tom Rien
971.673.6061

From: Merrill, Erik
Sent: Friday, January 17, 2014 10:22 AM
To: Merrill, Erik; Ruff, Jim; 'Scott, Teresa L (DFW)'; 'Michele Dehart'; 'Sweet,Jason C (BPA) - KEWR-4'; Grover, Tony; 'Bill Tweit'; 'Tom Rien'; 'Robert Naiman'; 'Greg Ruggerone'; 'Rich Alldredg (b) (6) 'Rock.D.Peters@nwd01.usace.army.mil'; 'Graves, Ritchie'; Ruff, Jim; 'Mike.Ford@noaa.gov'; 'ROGP@critfc.org'; F&W State Staff; F&W Plus; 'Al Giorgi'
Subject: BPA/COE presentation for ISAB Spill Study Review - materials and January 17, 2014 briefing - with the attachment

The presentation is attached and is available on the drop box site, in the "2_Spill Proposal…" subfolder.

From: Merrill, Erik
Sent: Friday, January 17, 2014 10:13 AM
To: Merrill, Erik; Ruff, Jim; 'Scott, Teresa L (DFW)'; 'Michele Dehart'; 'Sweet,Jason C (BPA) - KEWR-4'; Grover, Tony; 'Bill Tweit'; 'Tom Rien'; 'Robert Naiman'; 'Greg Ruggerone'; 'Rich Alldredg (b) (6) '; 'Rock.D.Peters@nwd01.usace.army.mil'; 'Graves, Ritchie'; Ruff, Jim; 'Mike.Ford@noaa.gov'; 'ROGP@critfc.org'; F&W State Staff; F&W Plus; 'Al Giorgi'
Subject: BPA/COE presentation for ISAB Spill Study Review - materials and January 17, 2014 briefing

BPA and the Corps' presentation to the ISAB is attached. They are giving the presentation now in the Council's large conference room.

Conference Line Toll-Free Access Number: 1.800.786.1922 Participant Code (b) (2)
To follow the meeting on the Web, we've reserved GoTo meeting, follow the instructions at:
(b) (2) Meeting ID (b) (2)

From: Merrill, Erik
Sent: Thursday, January 16, 2014 10:38 AM
To: Merrill, Erik; Ruff, Jim; 'Scott, Teresa L (DFW)'; 'Michele Dehart'; 'Sweet,Jason C (BPA) - KEWR-4'; Grover, Tony; 'Bill Tweit'; 'Tom Rien'; 'Robert Naiman'; 'Greg Ruggerone'; 'Rich Alldredg (b) (6) '; 'Rock.D.Peters@nwd01.usace.army.mil'; 'Graves, Ritchie'; Ruff, Jim; 'Mike.Ford@noaa.gov'; 'ROGP@critfc.org'; F&W State Staff; F&W Plus
Subject: WDFW/WDOE information for ISAB Spill Study Review - materials and January 17, 2014 briefing

All,

WDFW provided the attached two literature review papers, available on the Washington Ecology TDG web page, that explore effects of TDG on a broad selection of species.

Thanks,

Erik

From: Merrill, Erik
Sent: Wednesday, January 15, 2014 4:33 PM
To: Merrill, Erik; Ruff, Jim; 'Scott, Teresa L (DFW)'; 'Michele Dehart'; 'Sweet,Jason C (BPA) - KEWR-4'; Grover, Tony; 'Bill Tweit'; 'Tom Rien'; 'Robert Naiman'; 'Greg Ruggerone'; 'Rich Alldredg (b) (6))'; 'Rock.D.Peters@nwd01.usace.army.mil'; 'Graves, Ritchie'; Ruff, Jim; 'Mike.Ford@noaa.gov'; 'ROGP@critfc.org'; F&W State Staff; F&W Plus
Subject: NOAA information for ISAB Spill Study Review - materials and January 17, 2014 briefing

All,

Please find attached an excerpt from the soon to be released 2014 FCRPS Supplemental Biological Opinion, which shares NOAA Fisheries' current thoughts (within the framework of the ESA Section 7 consultation) on the proposed spill experiment. NOAA Fisheries provided this excerpt to aid the ISAB in their review.

Thanks, Erik

From: Merrill, Erik
Sent: Monday, January 13, 2014 4:22 PM
To: Merrill, Erik; Ruff, Jim; 'Scott, Teresa L (DFW)'; 'Michele Dehart'; 'Sweet,Jason C (BPA) - KEWR-4'
Cc: Grover, Tony; 'Bill Tweit'; 'Tom Rien'; 'Robert Naiman'; 'Greg Ruggerone'; 'Rich Alldredge (b) (6))'; 'Rock.D.Peters@nwd01.usace.army.mil'; 'Graves, Ritchie'; Ruff, Jim; 'Mike.Ford@noaa.gov'; 'ROGP@critfc.org'; F&W State Staff; F&W Plus
Subject: RE: ISAB Spill Study Review - materials and January 17, 2014 briefing

All,

The attached publication was added to the ISAB's list of review materials and to inform the upcoming meeting on January 17, 2014 regarding the discussions regarding spill experimentation.

Thanks, Erik

Evaluating river management during seaward migration to recover Columbia River stream-type Chinook salmon considering the variation in marine conditions

Howard A. Schaller, Charles E. Petrosky, and Eric S. Tinus

Abstract: Evidence suggests Snake River stream-type Chinook salmon (Oncorhynchus tshawytscha) experience substantial delayed mortality in the marine environment as a result of their outmigration experience through the Federal Columbia River Power System (FCRPS). We analyzed mortality patterns using methods that incorporated downriver reference populations passing fewer dams, and temporal approaches that were independent of reference populations. Our results from the alternative spatial and temporal methods consistently corroborated with spawner recruit residuals and smolt-to-adult survival rate data sets, indicating that Snake River salmon survived about one quarter as well as the reference populations. Temporal analysis indicated that a high percentage (76%) of Snake River juvenile salmon that survived the FCRPS subsequently died in the marine environment as a result of their outmigration experience. Through this and previous studies, it is evident that delayed hydrosystem mortality increases with the number of powerhouse passages and decreases with the speed of outmigration. Therefore, a promising conservation approach would be to explore management experiments that evaluate these relationships by increasing managed spill levels at the dams during the spring migration period.

From: Merrill, Erik
Sent: Friday, January 10, 2014 4:27 PM
To: Ruff, Jim; 'Scott, Teresa L (DFW)'; 'Michele Dehart'; 'Sweet,Jason C (BPA) - KEWR-4'
Cc: Grover, Tony; 'Bill Tweit'; 'Tom Rien'; 'Robert Naiman'; 'Greg Ruggerone'; 'Rich Alldredge (b) (6) 'Rock.D.Peters@nwd01.usace.army.mil'; 'Graves, Ritchie'; Ruff, Jim; 'Mike.Ford@noaa.gov'; 'ROGP@critfc.org'
Subject: ISAB Spill Study Review - materials and January 17, 2014 briefing

All,

Thank you for your assistance in providing materials for the ISAB's review of the spill experiment proposed by the State of Oregon, the Nez Perce Tribe, and others for inclusion in the Council's Fish and Wildlife Program. The ISAB and Council have received some requests to see and access the materials that the ISAB will use in the review. These materials are compiled and available on the Council's drop box at http://dropbox.nwcouncil.org/ISAB%20Spill%20Study%20Review%20Materials.

The materials are extensive, but please let us know if we are missing any critical recent documents related specifically to the proposed spill experiment. See below for a general list of the materials.

The ISAB received a briefing from the CSS team on the spill experiment at its November 15, 2013 meeting. To provide ISAB members, especially new members, with additional context for the review, the Bonneville Power Administration, U.S. Army Corps of Engineers, and potentially NOAA Fisheries are scheduled to brief the ISAB on the status of current spill operations, studies, and study results.

You are welcome to attend or participate on the phone/GoTo meeting. Please share this email as needed.

ISAB Meeting Agenda, Friday, January 17, 2014
Large Conference Room, Council Offices, Portland, Oregon
851 SW 6th Ave, Ste. 1100 (800-452-5161)

Conference Line Toll-Free Access Number: 1.800.786.1922 Participant Code (b) (2)
To follow the meeting on the Web, we've reserved GoTo meeting, follow the instructions at:
(b) (2) Meeting ID (b) (2)

10:15-Noon	Context for the ISAB's review of the proposed spill experiment: briefing and discussion with Bonneville Power Administration, U.S. Army Corps of Engineers, and potentially NOAA Fisheries on the status of current spill operations, studies, and study results

Materials for ISAB review of the proposed spill experiment

See the Council's request letter: "Council spill review request to ISAB 16Dec13.pdf"

1. Jim Ruff's memo to the Council summarizes the Experimental Spill Management Proposal
2. Supporting biological reference materials are available in the "2_Spill Proposal…" subfolder)
   - presentations from the CSS annual meeting held in Vancouver, Washington, April 30, 2013, (http://www.fpc.org/documents/CSS/Presentations%20from%20the%202013%20CSS%20Annua l%20Meeting.pdf); and b) a presentation by Dr. S. L. Haeseker and Dr. M. Filardo at a meeting of the Northwest Power and Conservation Council held in Coeur d'Alene, Idaho, on September 10, 2013, (http://www.nwcouncil.org/media/6877229/2.pdf). [Schaller presented to the ISAB, the PPT is included in the subfolder.]
   - Haeseker, S. L., J.A. McCann, J. Tuomikoski, B. Chockley. 2012. Assessing Freshwater and Marine Environmental Influences on Life-Stage-Specific Survival Rates of Snake River Spring Summer Chinook Salmon and Steelhead. Transactions of the American Fisheries Society 141(1):121-138.
   - Hall, A. and D. Marmorek. 2013. Comparative Survival Study (CSS) 2013 Workshop Report. Prepared by ESSA Technologies Ltd., Vancouver, B.C. for the Fish Passage Center (Portland OR) and U.S. Fish and Wildlife Service (Vancouver WA). 47 pp. + Appendices.
   - Marmorek, D., Hall, A., and M. Porter. 2011. Comparative Survival Study (CSS) Workshop Report. Prepared by ESSA Technologies Ltd., Vancouver, B.C. for the Fish Passage Center (Portland OR) and U.S. Fish and Wildlife Service (Vancouver WA), 147 pp.
   - Petrosky, C.E., and H.A. Schaller. 2010. Influence of river conditions during seaward migration and ocean conditions on survival rates of Snake River Chinook salmon and steelhead. Ecology of Freshwater Fish 10:520-536.
   - Tuomikoski, J. and eleven co-authors. 2012. Comparative Survival Study (CSS) of PIT-tagged Spring/Summer Chinook and Summer Steelhead 2012 Annual Report. Prepared by the Fish Passage Center, BPA Contract #19960200, 392 pp.
   - Also see the Marmorek 2011 CSS Workshop summary and Hall and Marmorek 2013 CSS Workshop Summary
   - The FPC and CSS also comment on others' comments
3. For context, see the Action Agencies', NOAA's, and Skalski's comments on CSS findings and the spill experiment. Also see the Action Agencies' general description of current operations/studies/results in the "dam aerial…" pdfs, Progress Report, and Citizen Guide. These documents are in the subfolder "3_Action Agency NOAA…"
4. Grant County also provided some comments on the spill proposal, see "4_Grant County…"
5. One of the issues with the proposal is TDG standards, there are a couple of documents in the "5_Total dissolved gas" subfolder
6. The ISAB has conducted many reviews related to spill over the past 17 years and also some on dissolved gas. These reviews should provide useful context. For the most recent relevant review see ISAB 2010-2 in the subfolder "6_ISAB Docs on Spill TDG"

Have a great weekend,

Erik

Erik Merrill
Manager, Independent Scientific Review Program
Northwest Power and Conservation Council
851 SW 6th Avenue, Suite 1100
Portland, Oregon 97204
503-222-5161
800-452-5161 (toll-free)

[1] Participant Star Commands: Pressing *4 will increase/decrease the volume. Pressing *6 will mute/unmute your line
[1] Participant Star Commands: Pressing *4 will increase/decrease the volume. Pressing *6 will mute/unmute your line

FISH PASSAGE CENTER

847 NE 19th Ave., Suite 250, Portland, OR 97232
Phone: (503) 833-3900 Fax: (503) 232-1259
http://www.fpc.org/
e-mail us at fpcstaff@fpc.org

MEMORANDUM

TO: Tom Rien, ODFW

FROM: Michele DeHart

DATE: January 27, 2014

RE: Review of BPA/COE/Skalski presentation to the Independent Scientific Advisory Board on January 17, 2014

In response to your request the Fish Passage Center staff and the Comparative Survival Study Oversight Committee developed the following comments on the COE/BPA Power Point presentation to the ISAB. Members of the Fish Passage Center staff and Oversight Committee representatives attended the presentation. The COE/BPA/Skalski presentation (Presentation) focused on three primary themes. First, the BPA and COE reviewed implementation of actions in the 2008 Biological Opinion (BiOp) and stated that progress is being made and that they deserve a chance to continue on the same course. Second, they criticize the CSS analyses which indicate that higher SAR would result from higher spill for fish passage. Third, they assert that the CSS monitoring program ignores all elements of proper study design and is incapable of evaluating the effects of higher spill levels. The presentation is misleading and includes inaccurate statements. The following discussion outlines summary review concerns and specific comments on each presentation slide.

Theme 1: Hydro actions are being implemented and progress is going well.

Hydro actions are being implemented as described in the Presentation. In addition, extensive monitoring and analyses have taken place concurrently with the implementation of these actions. Significant data, analyses, new knowledge and technical concerns have emerged that are not presented by BPA and COE in their presentation to stay with the present course. The large body of scientific work that has emerged indicates that spill continues to be identified as an important factor affecting smolt-to-adult survival. The CSS evaluation of spill for fish passage is based on many years of monitoring and analyses which have been repeatedly subject to scientific review.

Theme 2: Criticism of the CSS analyses

The criticisms of the CSS analyses in the Presentation are addressed directly in specific comments on each slide. Many of the critical statements directed at the CSS are misinformed. The BPA and COE mistakenly state that the CSS analysis utilizes oversimplified parameters such as percent of the river spilled. This is simply not true as explained in the following discussion. The implementation and operation of surface passage structures and available acoustic tag data have all been incorporated into the CSS analyses spill metric. This methodology has been presented to the region at the 2012 and 2013 CSS Annual Review Meetings and is available to the public. Subsequent to the Presentation, FPC staff met with NOAA representatives, reviewed the publicly available data and analyses, and reached agreement that the CSS analyses do incorporate telemetry data and the operation and implementation of surface passage structures.

Theme 3: The CSS monitoring program ignores all elements of proper study design and is incapable of evaluating the effects of higher spill levels.

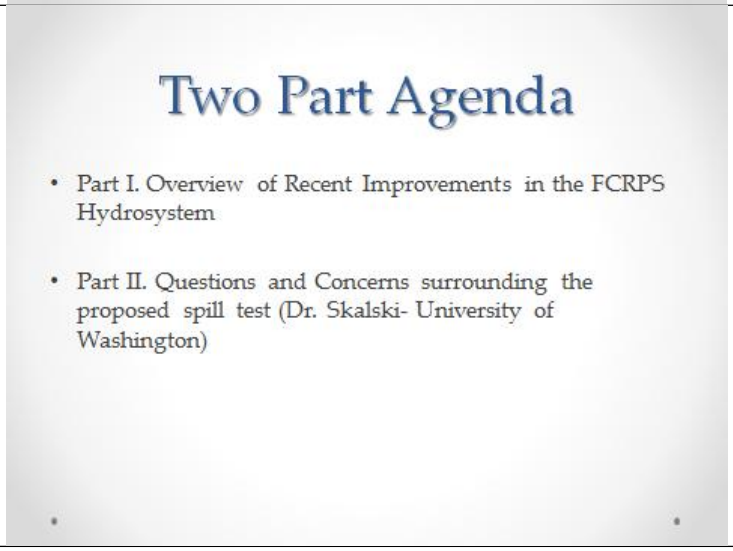
The BPA and COE and John Skalski of the University of Washington assert in their presentations that the CSS monitoring program ignores all elements of proper study design and is incapable of evaluating the effects of higher spill levels on Chinook salmon and steelhead. These criticisms are not valid and do not advance progress on improving the management and monitoring of Columbia River Basin salmonids. In addition they do not advance efforts toward improving evaluations of the effects of increases in voluntary spill and spillway passage structures in relation to the NPCC SAR goals.

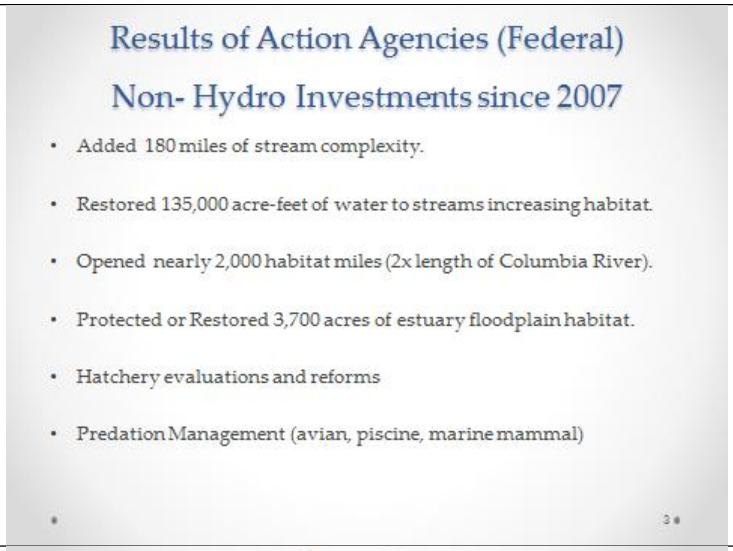
In response to regional guidance, scientific reviews, and requests for analyses, the CSS has led efforts to improve estimation and monitoring of salmon and steelhead throughout the Columbia River Basin and improve understanding of the factors that influence salmon and steelhead over their life-cycle. The Presentation does not recognize that the CSS study provides a proven, established, adaptive management experimental framework, implemented and tested over the years to evaluate the effects of higher spill levels, while accounting for the additional factors that influence survival and migration rates. The CSS life-cycle monitoring study has a rigorous study design that meets the requirements of both effectiveness monitoring and validation monitoring (Roni et al. 2005) in evaluations of adaptive management experimental actions, including the experimental increase in voluntary spill that has been proposed.

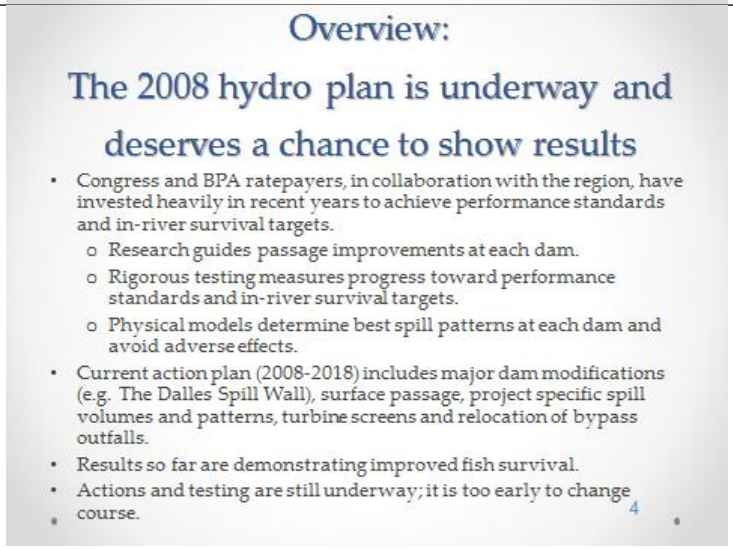
The CSS has been implemented and reviewed in the Columbia Basin for nearly two decades, demonstrating that the experimental design can isolate signals from background noise through temporal and spatial analyses. These analyses have led to the development of models that identify the primary factors that influence SARs, ocean survival rates, freshwater survival rates, and freshwater migration rates. Application of these models has indicated that increases in voluntary spill are expected to improve survival and migration rates at several life stages and result in higher SARs. Those expected improvements were presented to the region at the 2013 CSS Annual Review following the detailed discussions and reviews among leading scientists at the 2013 CSS Workshop (Hall and Marmorek 2013). The CSS has established a successful structure for data collection, data management and data analyses. All of the CSS data are available to the public. The CSS study design, data, and analyses are a proven adaptive management experimental framework that forms the foundation for evaluating the effects of the higher spill levels that have been proposed.

Starting with the existing CSS framework, design, structure, and analyses that have been conducted to date, the CSS Oversight Committee is capable of providing additional details and analyses if requested to do so. The advantage of the existing CSS framework is that is has been subject to scientific review throughout implementation, and the CSS has been conducted in a transparent framework with all data and analyses available to the public. The CSS remains committed to advancing understanding, improving monitoring, and responding to regional reviews and requests. Additional details and analyses on candidate spill proposals could include summaries of expected responses to increases in voluntary spill, analyses of the statistical power to detect changes in SARs, ocean survival rates, freshwater survival rates, or freshwater migration rates, analyses of the effects of various study durations, or evaluations of the size of mark groups.

Specific Comments on Presentation Slides



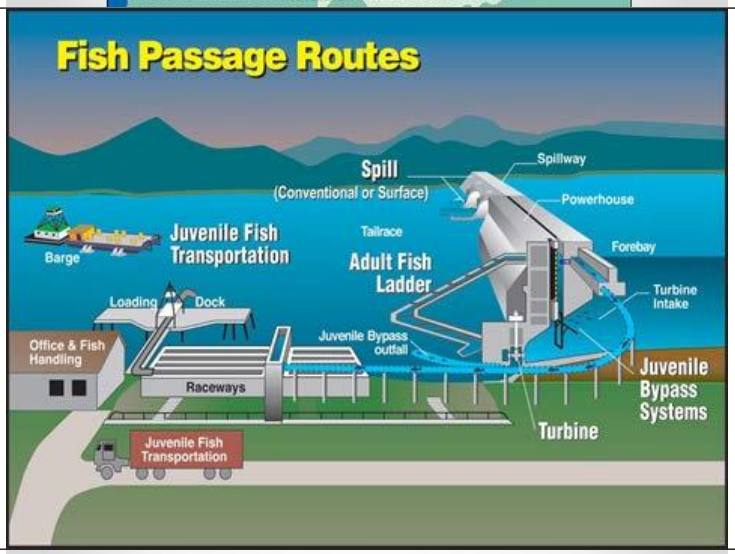




The last bullet is misleading, as it implies that recent actions and testing have been conducted under spill levels prescribed by the 2008 BiOp. However, the 2008 BiOp has never been fully implemented. Since 2006, the FCRPS has essentially been operated under a continued roll-over of the Court Ordered spill program. While many of the instantaneous spill volumes are the same between the Court Ordered spill program and the 2008 BiOp, the 2008 BiOp calls for an overall reduction in spill. Spill is reduced under the 2008 BiOp primarily through later initiation of spill, earlier transition between spring and summer spill volumes, and the cessation of spill in early August.

Data collected for the CSS include all of the hydro system improvements described by BPA and COE, with complete SARs through MY 2010. Improvements in juvenile survivals and SARs since 2006 have varied and are not showing consistent improvement due to meeting performance standards.

There is an extensive body of technical comments, reviews, and concerns with both methods and analyses relative to performance standard testing and their management application. The BPA and COE have yet to recognize or address these concerns.

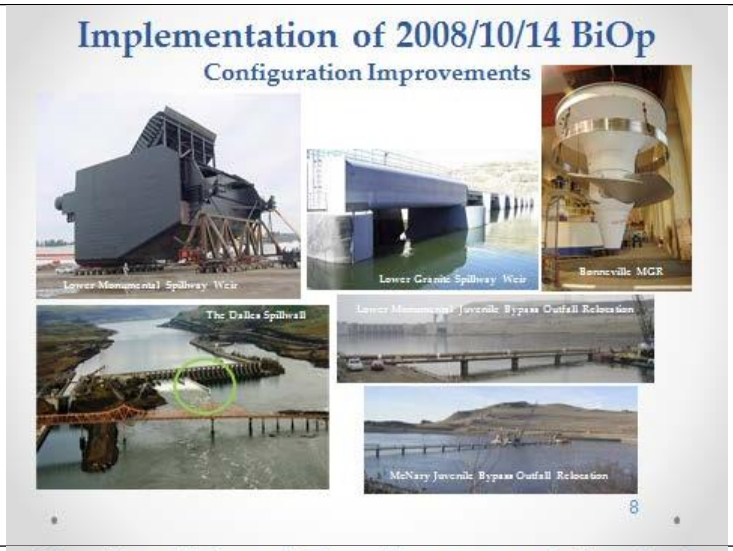


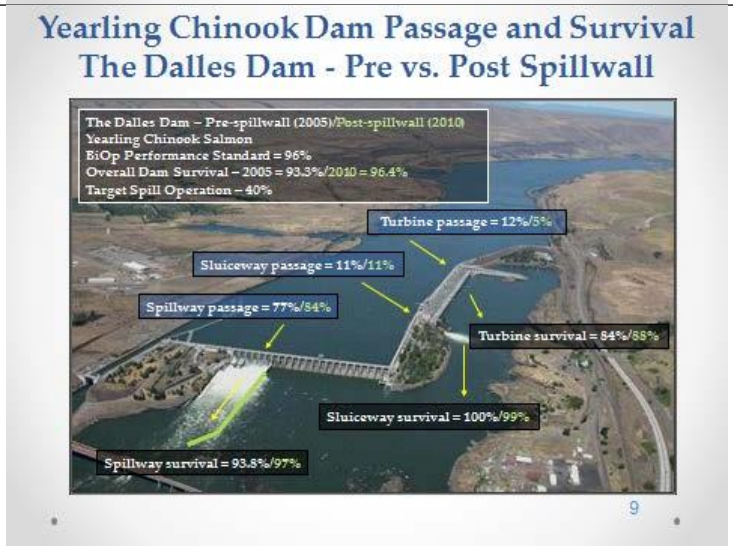
Implementation of 2008/10/14 BiOp

Configuration Improvements

- Hydropower Strategy 2 – Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival
  - Numerous configuration improvements to increase fish survival have been completed since 2007 and include:
    - Minimum gap runner turbines at Bonneville Dam Powerhouse I
    - Adult fish ladder improvements at John Day Dam
    - Juvenile screened bypass system improvements and/or outfall relocation at Bonneville, McNary, Lower Monumental, and Little Goose dams
    - Juvenile screened bypass system full-flow PIT detection at Bonneville, John Day, Lower Monumental, and Little Goose dams
    - Tailrace avian wire arrays at The Dalles and John Day dams
    - Spillway flow deflectors at John Day (spillbay 20) and Little Goose (spillbays 1 and 8) dams
    - Extended-length spillwall at The Dalles Dam
    - Conversion of the Bonneville Dam Powerhouse I ice and trash sluiceway to a surface passage route
    - Spillway weirs at John Day, McNary, Lower Monumental, and Little Goose dams

7

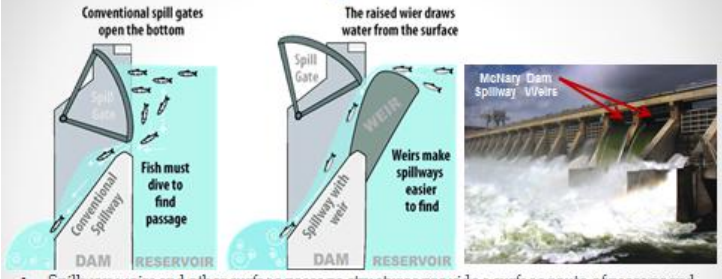




It is worth noting that the rejection rate (for inclusion in the tag experimental group) for yearling Chinook for the 2010 performance standard test at The Dalles was approximately 12%, which was among the highest rejection rates. In fact, concerns about rejection rates of this magnitude, and the resulting distortion of survival estimates, caused a revision in the criteria used for smolt selection for 2011, 2012, test groups and future performance testing.

Performance standard testing does not provide a robust foundation for management decisions. This slide was presented by the BPA and COE without any discussion of the considerable body of technical concerns regarding the applicability of performance standards testing results.

Surface Passage Characteristics



- Spillway weirs and other surface passage structures provide a surface route of passage and allow fish to pass dams at depths where they naturally migrate
  - Easier for fish to find; reduce migration delay and minimize exposure to predation near dams
  - Generally provide the highest survival of all passage routes at dams; consistently at or near 100 percent survival
  - Pass the most fish relative to the volume of water, making them the most effective passage route
  - Increase spill passage efficiency (% of fish that pass through spill); as many as 4-times the percent of fish pass the dam through spill bays equipped with spillway weirs
  - Reduces the number of fish that pass through turbines
- Surface passage routes currently exist at all 8 dams

10

Implementation of 2008/10/14 BiOp

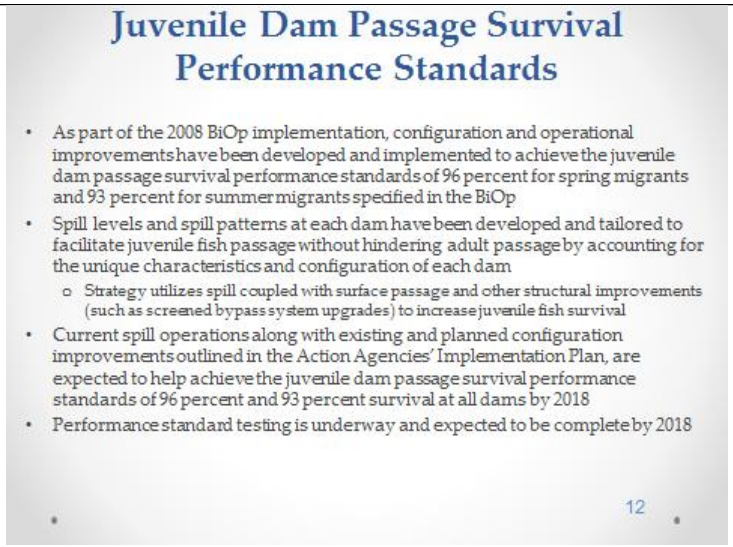
Operational Improvements

- Hydropower Strategy 3 – Implement Spill and Juvenile Transportation Improvements at Columbia and Snake River Dams
  - Spill operations coupled with configuration improvements completed at each dam are a key component of BiOp implementation to increase fish survival as they migrate through the hydrosystem
  - 24-hour spill operations occur at all eight dams from early April through August
  - Planned spring spill operations for 2014-18 are specified below

Project	Spring Spill Levels	Spring Planning Dates
Bonneville	100 kcfs	4/10 - 6/15
The Dalles	40% of total river flow	4/10 - 6/15
John Day	April 10-April 27: 30% of total river flow April 27-June 15: 30% and 40% of total river flow	4/10 - 6/15
McNary	40% of total river flow	4/10 - 6/15
Ice Harbor	April 3-April 28: 45 kcfs/Gas Cap April 28-May 31: 30% of total river flow and 45 kcfs/Gas Cap	4/3 - 5/31
Lower Monumental	Gas Cap (~27 kcfs) (bulk pattern)	4/3 - 5/31
Little Goose	30% of total river flow	4/3 - 5/31
Lower Granite	20 kcfs	4/3 - 5/31

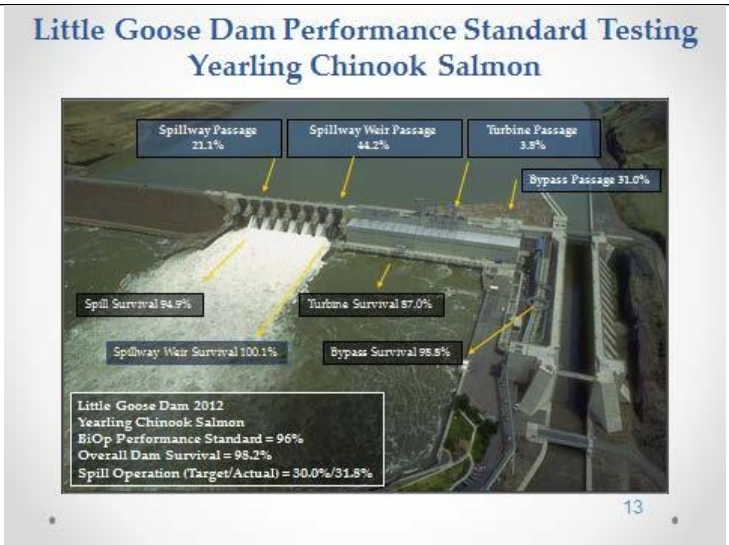
11

The spill schedule in this table represents a reduction in spill from the present implementation of the Court Ordered spill program. This is not “staying the course,” this is reducing spill for fish passage by making spring/summer transition earlier than what has been provided since 2006.



Performance standards testing continues to be conducted while ignoring the many concerns and comments regarding their applicability to management of the FCRPS. The FPC has completed several memoranda regarding the myriad of problems and technical issues existing with the performance standards tests and the interpretation of their results (FPC Memoranda: 6/24/09; 7/29/2010; 10/6/2010; 2/16/2011; 3/24/2011; 6/21/2011; 2/15/2012; 3/16/2012; 3/23/2012; 1/4/2013; 2/11/2013; 3/19/2013; and 10/7/2013). Below is a brief summary of the primary problems revealed by these reviews.

- Smolts used in performance testing do not represent the run-at-large. Smolts that fall outside of size requirements or exhibit physical conditions such as disease, injury, or descaling are not included. Rejection rates range from 3.7% to 18%, depending on the year, species, and location.
- The use of multiple release groups in the Virtual-Paired Release design generates the possibility of artificial inflation of survival estimates. High predation rates in the tailrace, as have been observed (Petersen 1994, Ward et al. 1995), will depress survival of the control group, and inflate the ratio of survivals used to calculate overall dam passage beyond the single-release estimates.
- Performance tests are designed to measure mortality that occurs at the dam, these estimates do not address the mortality that results from passage through powerhouses that occurs downstream of the project, in the estuary, or in the ocean. However, passage through turbines or juvenile bypass systems during the freshwater outmigration has been shown to significantly reduce smolt-to-adult returns (SARs), while smolts that pass through the spillway have higher SARs. The singular focus on at-dam survival estimates generated by performance tests is misleading because these performance standards result in underestimating the adverse effect of powerhouse passage by excluding important data which indicates that freshwater passage history affects estuary and marine survival later in the salmon life-cycle.



BPA and the COE continue to ignore the growing body of technical issues and concerns regarding the performance standards testing and its applicability to management of the FCRPS. The route-specific survivals that are presented in this slide were not made available to the region for review. Without an opportunity to review these data we have no way of knowing if and/or to what degree these estimates may be inflated. While the overall release estimate that was presented by the BPA and COE (98.2%) meets the 96% performance standard, the single release estimate from this study (95.8%) did not. This is an example of artificial inflation of survival estimates (as discussed above), one of the ongoing methodological concerns of performance testing (Beeman et al. 2011), and has repeatedly led to the suggestion of using single release estimates as an alternative for the virtual-paired release design.

The COE's representative presented the concern of adult delays at LGS at spill levels above 30%. The perception that spill at LGS should be capped at 30% dates back to a delay in adult Chinook passage that occurred when summer spill began in 2005, which was the result of unique powerhouse operations. Since the initial problem in 2005, the FPC has conducted several analyses that have demonstrated that there was no effect on travel time or conversion rates from spill levels of greater than 30% (up to at least 40%) of instantaneous flow at LGS (see FPC memos from 7/7/2005; 11/6/2009, and 12/9/2011).

Furthermore, analyses show that LGS spill patterns and TSW operations at low flows may have a more significant effect on adult Chinook passage at LGS than spill percent. Tests in 2008 revealed that uniform spill minimized eddies in the LGS tailrace and resulted in the fastest adult travel times. Special operations in 2009 (during high flows) and 2010 (during low flows) suggest that TSW operation in low flows may cause delay in adult Chinook. This is because in low flows, operation of the TSW (prioritizing spillbay 1) results in a bulk spill pattern, that may increase the production of eddies in the LGS tailrace.

Recent Passage and Survival Estimates

Acquired From Performance Standard Testing

Yearling Chinook Route Passage (%) and Survival (%)

Project	Spill		Surface Route		Spill and Surface	Screened Bypass		Turbine		Overall	Spill Operation	Year
	Passage	Survival	Passage	Survival	Passage	Passage	Survival	Passage	Survival	Dam Survival		
Bonneville	58.1	95.7	8.3	99.3[1], 96.9[2]	66.4	4.3	98.2	28.3	94.7[3], 96.8[4]	95.69	100 kcfs	2011
The Dalles	65.8	96.1	17.3	99.1	83.1	na	Na	16.9	93	96.0	40%	2011
John Day	39.9	97.4	23.8	95.8	63.7	24.8	99.3	11.5	91	96.66 (30% spill)	30 and 40%	2011
McNary	64.3	97.1	8.3	97.6	72.6	24.2	93.6	3.2	95.5	96.16	40%	2012
Ice Harbor	22.1	98	51.3	94.7	73.4	19.1	98.3	7.5	Na	96.1 (30% spill)	30% and 45 kcfs/Gas Cap	2006
Lower Monumental	16.6	94.6	62.3	99.8	79.1	15.9	100	5.3	93.2	98.68	Gas Cap	2012
Little Goose	21.1	94.9	44.2	100.1	65.3	31	98.8	3.8	87	98.22	30%	2012
Lower Granite	-	-	-	-	-	-	-	-	-	-	-	-

1 - Corner Collector, 2 - BI Sluiceway, 3 - BII, 4 - BI

Steelhead Route Passage (%) and Survival (%)

Project	Spill		Surface Route		Spill and Surface	Screened Bypass		Turbine		Overall	Spill Operation	Year
	Passage	Survival	Passage	Survival	Passage	Passage	Survival	Passage	Survival	Dam Survival		
Bonneville	56	96.5	17.2	98.8[1], 98.3[2]	73.2	1.7	93.8	25.1	91.9[3], 93.6[4]	97.55	100 kcfs	2011
The Dalles	75.4	100.4	13.8	101	89.2	na	na	10.9	91.9	99.52	40%	2011
John Day	30.5	99	32.3	98.9	62.8	33.2	100.3	4	79.7	98.36 (30% spill)	30 and 40%	2011
McNary	59.9	99.4	23.3	97.6	83.2	14.5	100	2.3	83.1	99.08	40%	2012
Ice Harbor	23.9	101.9	37.5	101.7	61.4	36.6	99.7	2	na	100.7 (30% spill)	30% and 45 kcfs/Gas Cap	2006
Lower Monumental	12.6	98.3	53.2	99.1	65.8	30.7	99.1	3.5	81.4	98.26	Gas Cap	2012
Little Goose	15.7	99.2	40.4	100.1	56.1	41.9	99.7	2	80.5	99.48	30%	2012
Lower Granite	-	-	-	-	-	-	-	-	-	-	-	-

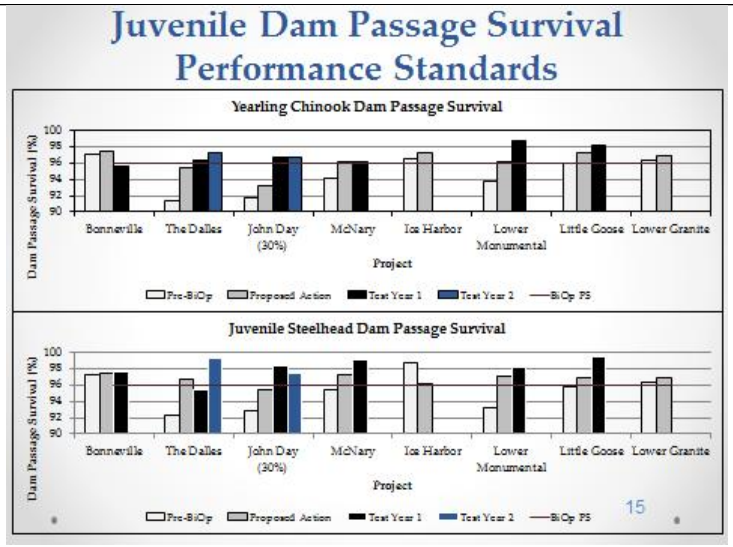
1 - Corner Collector, 2 - BI Sluiceway, 3 - BII, 4 - BI

14

These tables are extremely misleading because they display prescribed operations rather than operations that actually occurred. The "Spill Operations" that are displayed in the table are simply what is prescribed in the BiOp, not what actually occurred during the performance standards testing (see 12/3/2013 FPC memo). In fact, due to high river flows that occurred during test years, the actual spill levels during testing that produced the performance standard estimates were much higher than what the BiOp would provide and, in some cases, as high as what has been proposed under the 125% TDG scenario of the Experimental Spill Management modeling efforts.

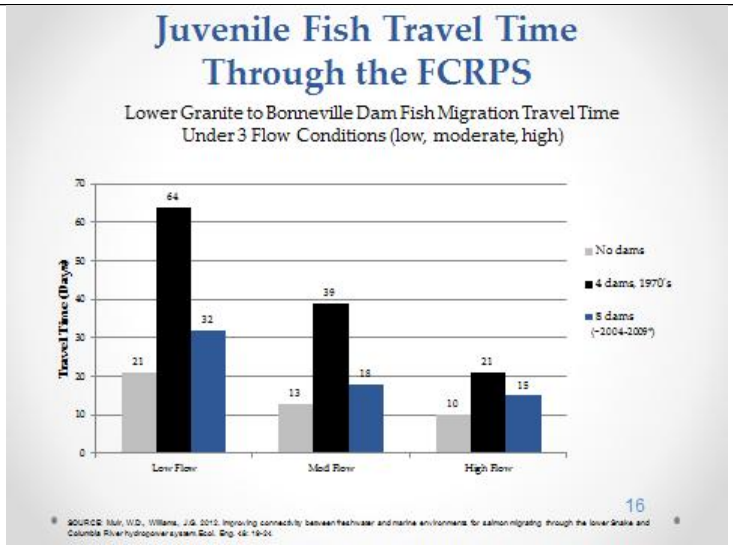
The BPA and COE neglected to include any results from performance standards testing for subyearling Chinook that indicate the performance standard of 93% is not being met at some projects. Nor is there any explanation for a lower standard for summer migrants than spring migrants. The Ice Harbor results presented for 2006 were not part of performance standards testing and have not been reviewed by the COE Studies Review Work Group (SRWG) for consideration. Furthermore, methodologies used in 2006 for other purposes than testing performance standards were entirely different from current performance standards testing methodologies.

BPA and COE continue to ignore the growing body of technical issues and concerns regarding the performance standards testing and it's applicability to management of the FCRPS.



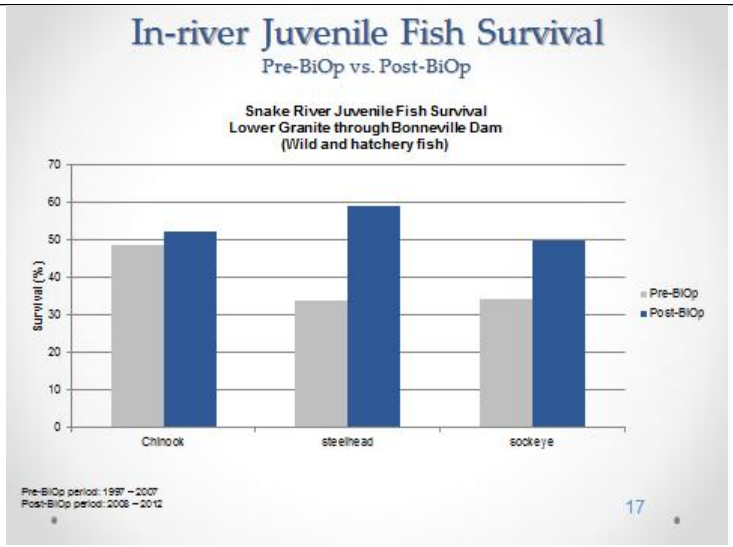
These data are inconsistent with the performance standard data that were presented in the previous slide. The slides provide no explanation of their "Pre-BiOp" and "Proposed Action" reference.

BPA and COE continue to ignore the growing body of technical issues and concerns regarding the performance standards testing and it's applicability to management of the FCRPS. There is no indication that meeting dam passage performance standards, as displayed in this graph, will lead to meeting SARs that translate to improvements in adult returns.



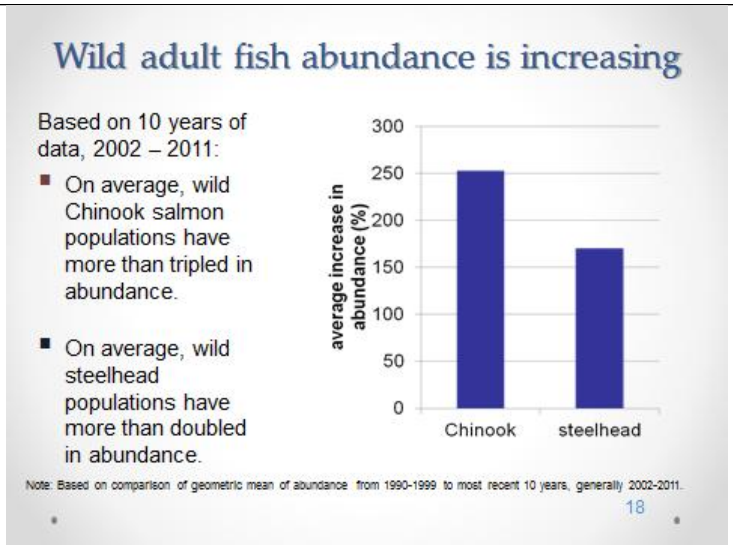
After reviewing the calculations that generated the fish travel time estimates for "No dams" and "4 Dams" we conclude that they are not valid and based upon far reaching assumptions. Furthermore, Muir and Williams (2012) continually cites "operational changes" as being the leading cause of decreased fish travel times under the "8 Dam" period. However, the major operational change that occurred during this time was the provision of increased spill levels, 24-hours per day, as a result of the Federal Court Order. Spill has been shown to reduce fish travel times by reducing forebay residence time.

We agree with the primary conclusion of Muir and Williams (2012) that, under the present hydro system configuration, meeting pre-dam fish travel times cannot be achieved.

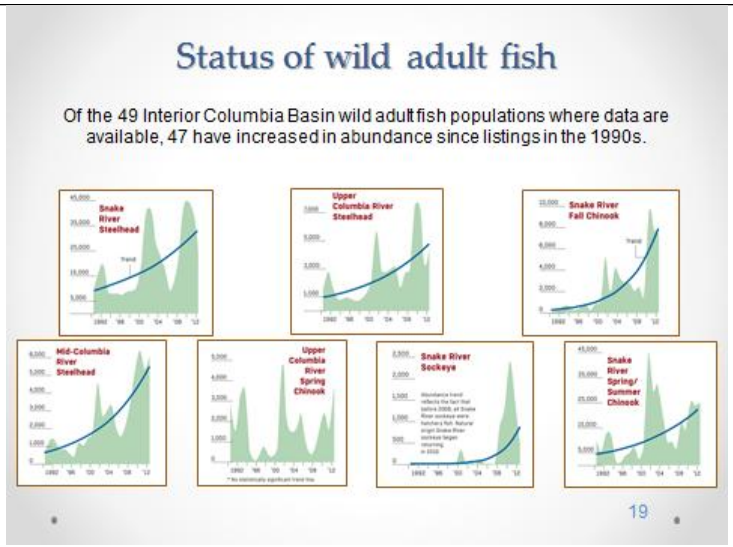


This slide is misleading as it implies that operations in the Post-BiOp Period (2008 2012) are what the 2008 BiOp prescribes. However, as we explained in our comments from Slide #4, this is not the case, as the FCRPS has been operated under a roll-over of the Court Ordered spill program since 2006. While many of the instantaneous spill volumes are the same between the Court Ordered spill program and the 2008 BiOp, the 2008 BiOp calls for an overall reduction in spill. Spill is reduced under the 2008 BiOp primarily through later initiation of spill, earlier transition between spring and summer spill volumes, and the cessation of spill in early August. It is unclear why the BPA and COE chose the time periods reported and why they call them pre- and post-BiOp, when the 2008 BiOp has never been fully implemented.

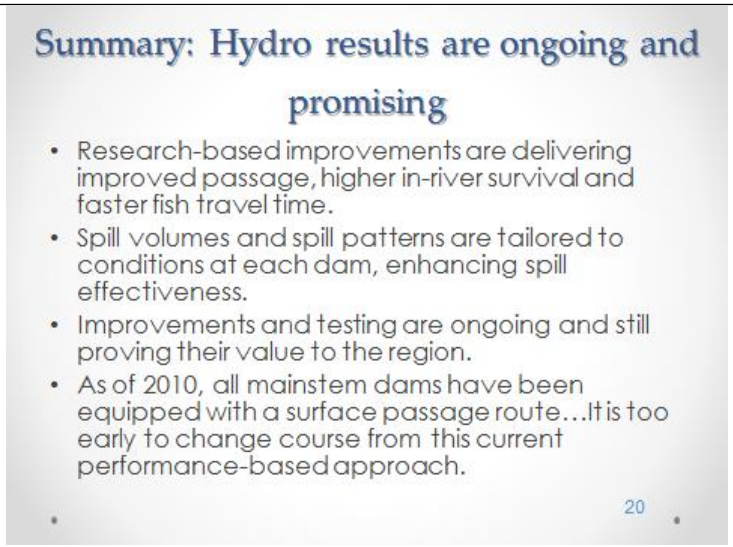
Furthermore, the average runoff volume for the pre-BiOp period is less than that for the post BiOp period. Consequently, there is more uncontrolled higher spill in the post-BiOp estimates. The pre-BiOp includes 2001 with extremely low flow, almost no spill, and low in-river survivals. The inclusion of 2001 biases the survival estimates low for the pre-BiOp period. There are no pre-BiOp survival estimates for Chinook for 1997 and 1998, for steelhead there are no survival estimates for 2004 and 2005, and for sockeye there are no survival estimates for 1997 and 2004-2005. Additionally, few sockeye were marked prior to the transport experiments initiated in 2009, so pre-BiOp estimates are based on small sample sizes with wide confidence intervals. Finally, improvements in steelhead survivals in recent years are likely a result of increasing juvenile survival due to increased number of in-river migrating juveniles resulting from increased spill volumes and the delayed start of smolt transportation in recent years.



The specific data defining "Wild" utilized to generate the data presented in this slide is not identified. Presumably, this slide is using dam counts to estimate abundance of "wild" adults. Only adipose fin clip information can be used at counting stations to categorize returning adults as hatchery or "wild." This is an important point when unclipped hatchery origin fish are present. Because hatchery spring Chinook are much more abundant than wild spring Chinook, a small hatchery mis-clip or unclip rate can inflate the estimate of numbers of wild origin fish. Where supplementation hatchery programs produce unclipped salmon and steelhead, the wild adults cannot be precisely distinguished in the window counts. A large portion of Snake River hatchery fall Chinook and steelhead are released unclipped. Therefore, any unclipped hatchery fall Chinook that return and are counted as adults will be incorrectly identified as being "wild." Thus, the wild abundance for Chinook is likely inflated, particularly for recent years where hatchery fall Chinook production has increased.

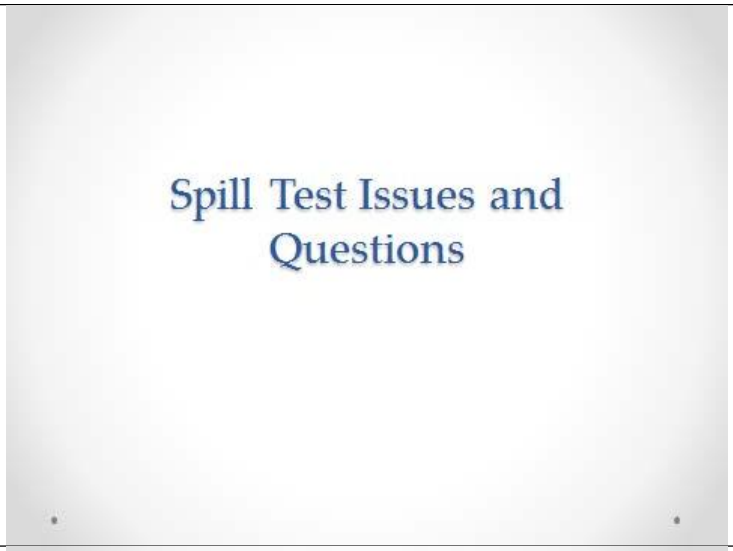


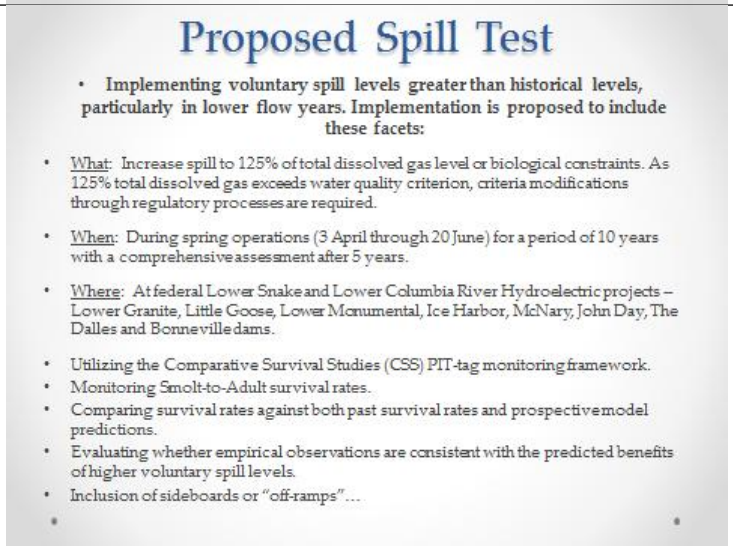
The slide shows the adult returns for the period 1990 2012. The implication is that there has been an increase in abundance since the initiation of listing of stocks. This is not an appropriate way to assess improvement, since the time period selected is constrained and the trend line is largely driven by a few high return years and the extremely low returns in the early 1990s. It is more appropriate to look at SARs and consider these relative to regional goals, such as the NPCC's 2 6% SAR goal.



We disagree; hydro results are not promising and are cause for concern. Under current conditions, SARs are being maintained in the undesirable range of under 1%. The additions of RSWs and TSWs have not benefited spring Chinook as originally anticipated.

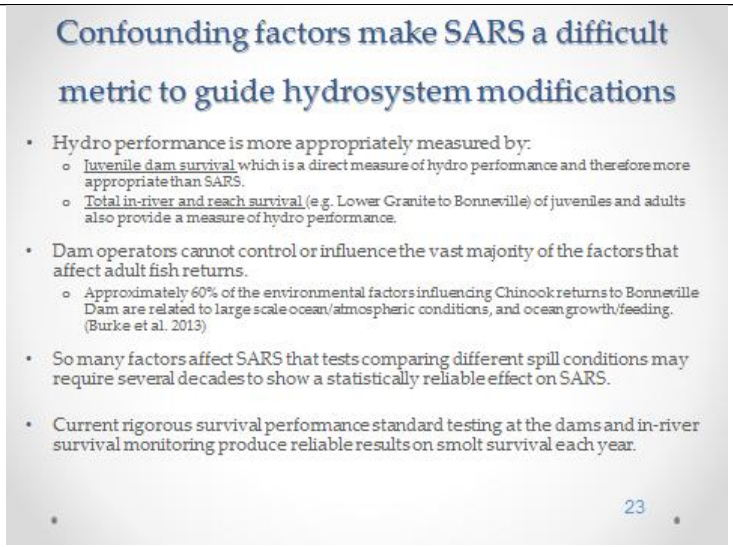
It is important to note that the performance-based approach referenced in this slide does not include any smolt-to-adult return rate performance criteria and the juvenile performance-based approach was established without any reference to survival to returning adult.



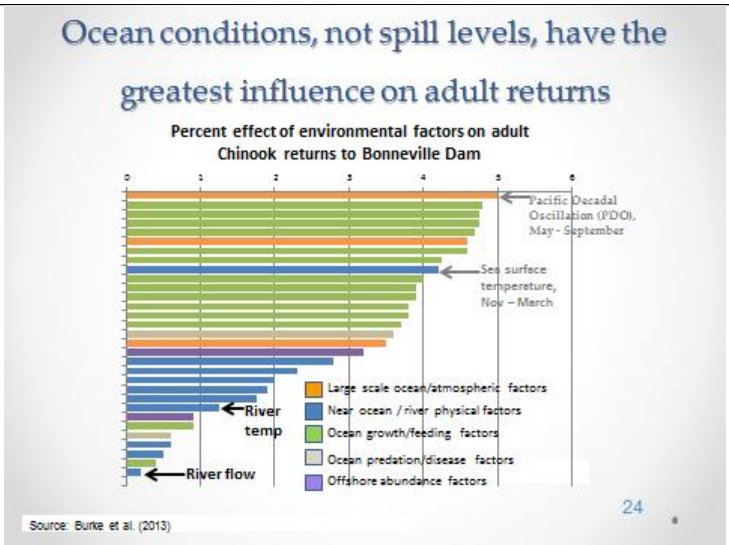


The CSS provides an experimental adaptive management framework capable of providing the region with a real opportunity to determine if SARs can be improved under the present configuration of the hydro system. In addition to measurements of SARs, the experimental adaptive management framework also will be measuring in-river survival, fish travel time, and ocean survival rates to monitor the effects of increased spill levels on both yearling Chinook and steelhead. Additional details on the analyses that have been conducted are available, and additional analyses could be provided if the CSS is requested to do so.

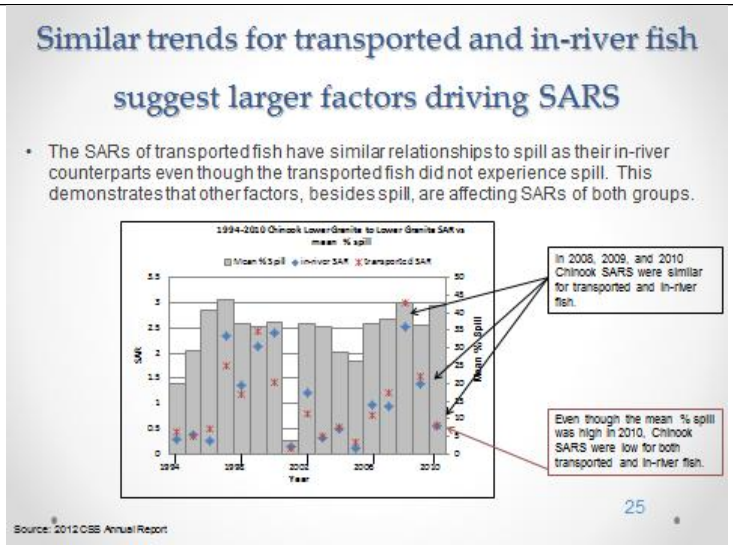
What the CSS presented was a synthesis of many years of monitoring data that showed consistently low SARs in an undesirable range. Multiple lines of evidence indicate that delayed mortality relative to passage through the hydro system contributes to these undesirable SARs. When accounting for variability in ocean conditions and river flows, results from these analyses consistently indicate that increased spill levels are correlated with increased SARs. Since there are no management actions available to affect ocean conditions and limited ability to affect flow, spill remains the most useful and effective tool available to fisheries and river managers for increasing adult returns.



We disagree; the impacts of hydroelectric operations are not limited to juvenile dam survival or reach survivals. The BPA and COE presentation ignores recent peer reviewed papers by Schaller et al. (2014), Petrosky and Schaller (2010), Schaller and Petrosky (2007), Haeseker et al. (2012), and recent CSS analyses (Tuomikoski et al., 2013) that show freshwater conditions affect smolt-to-adult returns when ocean indices are taken into account. A growing body of data and analyses, relative to delayed mortality, indicate that freshwater passage history and early ocean survival are not independent. The emerging relationship between freshwater passage and early ocean survival indicates that performance standards of dam survival are not appropriate and do not capture the full effect of the hydro system on the full life-cycle survival. Furthermore, performance standard testing is not consistently done at each dam each year. In all years, most dams are unmonitored with unknown effects of the operations that were implemented.

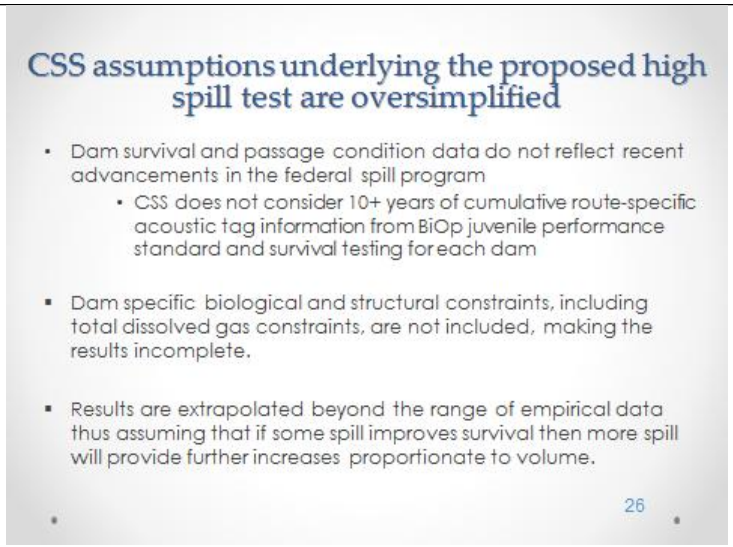


The BPA and COE are misleading in their presentation of Burke et al. (2013). Burke et al. (2013) did not include spill as a variable in their analysis. Spill cannot be shown to have an influence on adult returns if it is not included in the analysis. In addition, Burke et al. (2013) used annual adult counts at Bonneville Dam. Annual adult counts contain multiple juvenile year classes and multiple ESUs that experience various levels of hydro system impacts. Therefore, adult counts at Bonneville Dam cannot be used to assess any effect of juvenile passage conditions. Therefore, Burke et al. (2013) cannot be used to assess the influence of freshwater conditions on survival to adult. The most effective way to test the impacts of environmental factors throughout the life-cycle is to utilize PIT tags and estimates of SARs.



The figure in this slide incorrectly uses a T_0 SAR for year 2001 of 0.14 (identical to that for in-river fish), which greatly increases the correlation between T_0 SARs and spill proportion. For example, including the erroneous value of 0.14 for 2001, the T_0 SAR correlation to the estimate of average spill used was 0.54. However, when the correct T_0 value of 1.28 was used, the correlation dropped to 0.29. The correlation between in-river C_0 SARs and the average spill value presented was 0.57, nearly double that of the T_0 group (when the correct 2001 value is used). Their argument is not supported by the correct data in Tuomikoski et al. (2012).

Further, using mean spill percent on an annual basis is not really informative, since it doesn't indicate spill levels that fish actually encountered. The CSS model does not use annual average spill measures or annual SARs. The CSS model uses 2-week cohorts and incorporates spill efficiency metrics for each cohort as they out-migrate. SARs are also estimated for each 2-week cohort.



The three bullets on this slide are not true. The CSS model is based on empirical data reflecting the actual conditions that occurred, including the implementation and operation of surface passage structures and hydro-actions operations implemented by the BPA and COE through 2011. In response to specific requests from NOAA Fisheries at the 2011 CSS Workshop, the spill metric used in CSS model analysis was modified to incorporate the implementation and operation of surface passage structures at each of the projects based on available acoustic tag data. The development of the new spill metric, including methodology and supporting data, was presented to the region and the public (including representatives of the BPA and COE) at the 2013 CSS Annual review in the April 2013 meeting and in written reports (Hall and Marmorek 2013)

Contrary to the BPA, COE, and Skalski assertion, the results from the CSS model are not extrapolated beyond the range of the empirical data. The CSS model was built from empirical data under actual conditions with total dissolved gas levels as high as 128% for an individual cohort at a project, and a daily maximum TDG of 133%. Consequently, the scenarios proposed (up to 125% Gas Cap) are within the range of empirical data.

Statistical Design & Analysis Considerations Regarding a Proposed Spill Study

John R. Skalski
University of Washington

27

Properties of Scientific Experiments

Fisher (1947)

- Replication
- Randomization
- Error control
- Treatment contrasts

Cox (1958)

- Elimination of confounding factors
- Precision
- Useful range of validity
- Simplicity
- Ability to estimate error variance

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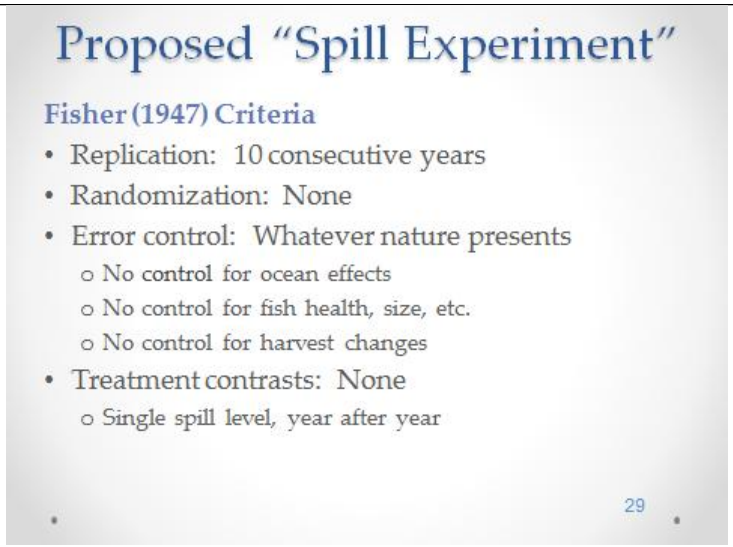
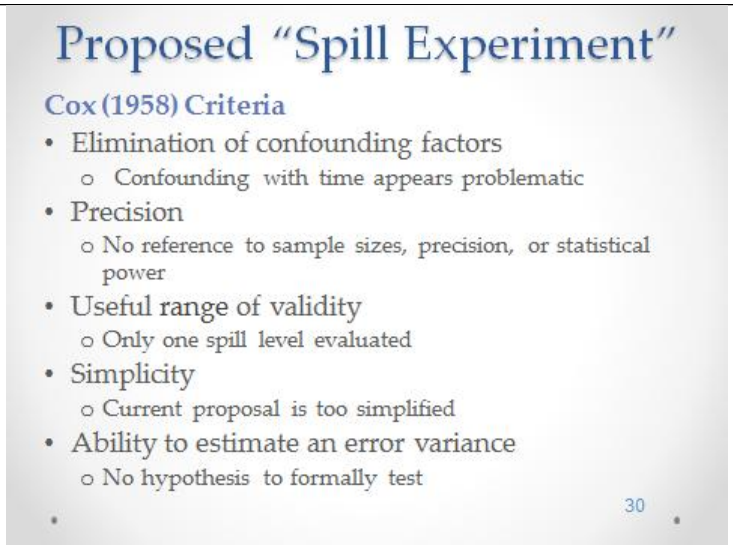


The CSS provides an experimental adaptive management framework capable of providing the region with a real opportunity to determine if SARs can be improved under the present configuration of the hydro system. In addition to measurements of SARs, the experimental adaptive management framework provided by the CSS is capable of measuring in-river survival, fish travel time, and ocean survival rates to monitor the effects of increased spill levels on both yearling Chinook and steelhead if implemented. Additional details on the analyses that have been conducted are available, and additional analyses could be provided if the CSS is requested to do so. The CSS presented a synthesis of many years of monitoring data that showed consistently low SARs in an undesirable range. There are multiple lines of evidence indicating that delayed mortality relative to passage through the hydro system contributes to these undesirable SARs. When accounting for variability in ocean conditions and flows, results from these analyses consistently indicate that increased spill levels are correlated with increased SARs. Since there are no management actions available to affect ocean conditions and limited availability to affect flow, spill remains the most useful and effective tool available to fisheries managers for increasing adult returns.

The CSS model includes a high degree of replication: 10 years, four cohorts/year, and four response variables resulting in 160 expected observations for each species (yearling Chinook and steelhead). Randomization at the individual level is accomplished through upstream releases of PIT-tagged fish, with their random entry into the 2-week cohorts. Error control will be achieved through accounting for the freshwater and ocean factors that have been shown to influence survival at each life stage. There is little harvest prior to detection at BON, where PIT-tagged adults are enumerated. Finally, the 125% TDG level has a high degree of contrast against the last 14 years of observations under the BiOp and Court Order spill levels that have been implemented.



The CSS model properly accounts for confounding factors of water transit time, seasonal effects, and ocean conditions. Each of the four response variables has a high degree of precision. The 125% TDG level provides the greatest contrast over the historical BiOp and Court Order spill levels and is expected to provide the greatest improvement in fish survival and migration rates. The CSS model accounts for all the major factors that have been shown to influence survival and migration rates. Therefore, there is no basis for increasing complexity by adding new variables.

The hypotheses that will be evaluated center on whether there is a change in the response variables relative to the time series of responses that have been measured under the historical BiOp and Court Order spill levels. In addition, responses under Experimental Spill Management will be compared to the expected responses based on the models that have been developed to determine whether they are consistent or require revision.

Other Study Considerations

1. No formal selection of response variable(s)

Possible Response Variable ($\hat{\theta}$)	Precision	Confounding Factor	Biological Relevance
Inriver survival	1	1	3
SAR	2	2	2
Adult returns	3	3	1

- Choice will influence how success or failure is measured
- Need *a priori* prioritization of response variables to measure success

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The 2013 CSS Workshop Report describes each of the four response variables that will be measured. This report can be found on the FPC website. Skalski does not present any data or analysis that support the conclusions in this slide. We believe Skalski is mistaken.

Other Study Considerations (Cont.)

2. No formal tests of hypotheses

- Possible candidates mentioned:

A. Test of Means

$$H_O: \hat{\theta}_{Before} \geq \hat{\theta}_{Test}$$
$$H_a: \hat{\theta}_{Before} < \hat{\theta}_{Test}$$

Difficulties

- Confounded with time
- No error control – very noisy

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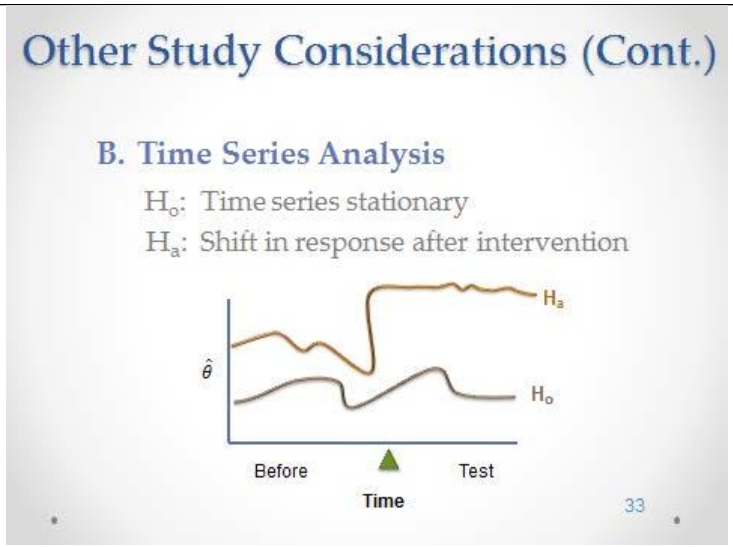
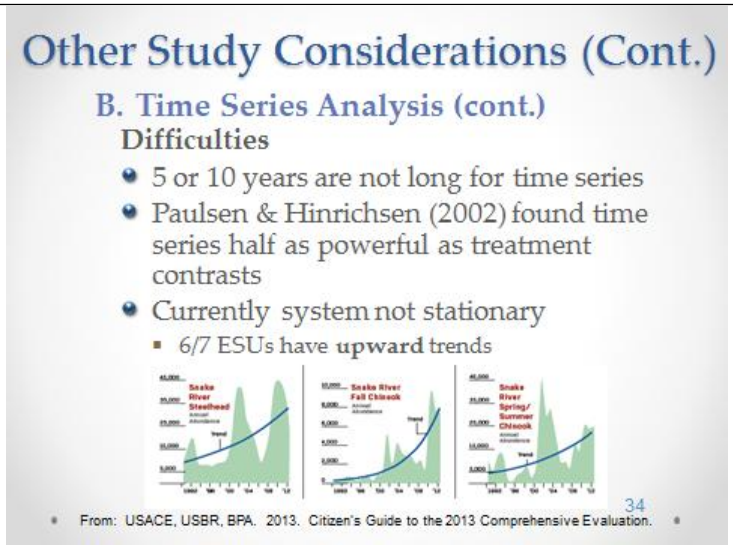
The Experimental Spill Management framework is capable of comparing responses under the 125% spill level to responses under the historical BiOp and Court Order spill levels. There are 14 years of observations under the historical spill operations. The models that have been developed can account for any variables that change over time. While there is some unaccounted for variability in each of the response variables, the expected magnitude of change is relatively large, which will increase the likelihood of detecting a response.



See previous comments.



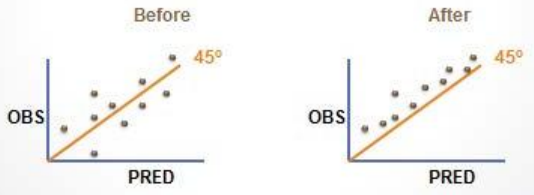
Each year the study is conducted, 16 response measurements can be collected for each species (i.e., four response variables and four cohorts per year). After 5 years there will be 80 response measurements and after 10 years there will be 160 response measurements for each species. These observations can be compared to the 14 years of observations that have been collected under the historical BiOp and Court Order spill levels that have been implemented. The Experimental Spill Management framework does not utilize abundance trends that are confounded by changes in smolt production. The SARs and other metrics that have been collected do not show strong temporal trends over the 1998 2011 time series.

Other Study Considerations (Cont.)

C. Observed vs. Modeled Predictions

H_0: $\hat{\hat{\theta}}_{OBS} \leq \hat{\hat{\theta}}_{PRED}$

H_a: $\hat{\hat{\theta}}_{OBS} > \hat{\hat{\theta}}_{PRED}$



35

The expectation under the null is that observations will match the model predictions. Models can be refined as new observations are obtained. It would also be possible to generate predictions of what would have occurred if historical spill levels had been implemented instead of the Experimental Spill Management levels.

Other Study Considerations (Cont.)

C. Observed vs. Modeled Predictions (cont.)

Difficulties

- Model must be selected *a priori*
- Predictive model needs to be reasonably accurate (i.e., unbiased) and precise
- Predictive model must be calibrated beyond current range of spill
- Currently, predictions of adult returns fairly poor

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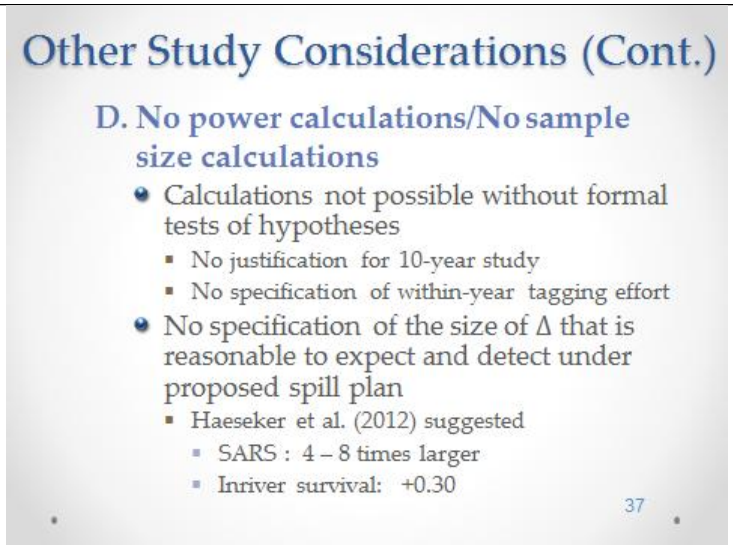
This slide and several previous slides have comments on statistical analysis and design. However, this has very little utility within the context of the CSS data, analyses, and modeling results, that are all available to the public on the FPC website.

The CSS has already identified and fit highly accurate models for each of the response variables, and new observations will allow for future calibrations. Currently, all models perform well and are accurate.



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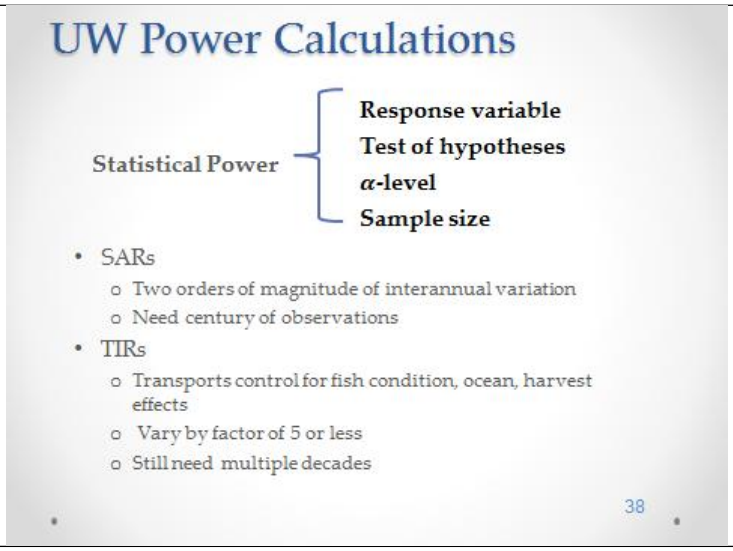
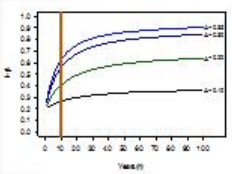
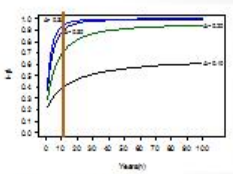


UW Power Calculations (cont.)

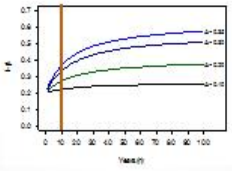
Hatchery spring Chinook (2001 omitted)



Wild steelhead (2001 omitted)



Hatchery summer Chinook (2001 omitted)



α = 0.10, one-tailed test

39

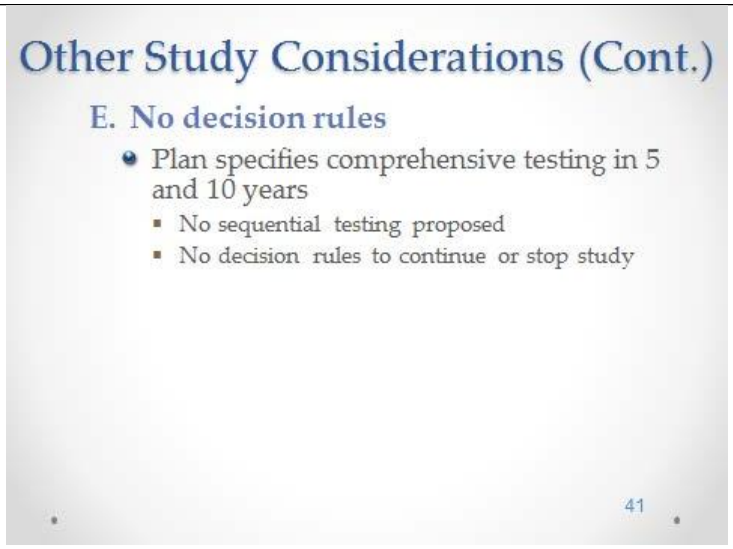
Other Study Considerations (Cont.)

D. No ancillary studies of extraneous effects

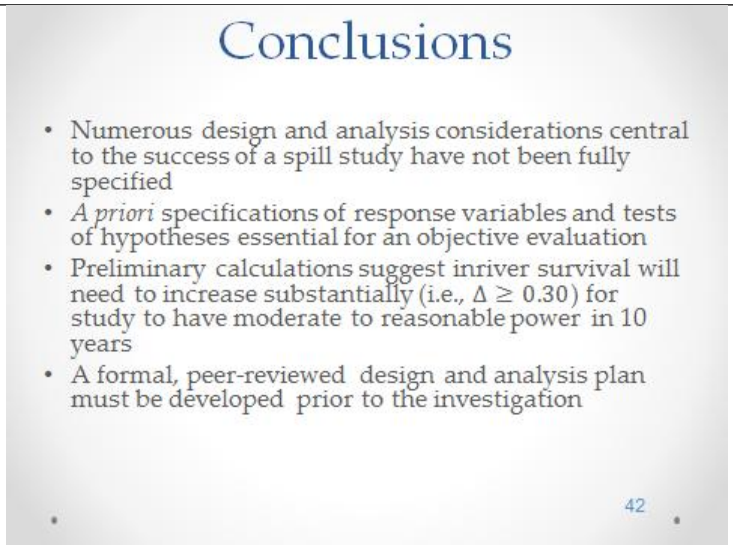
- Monitoring for change in smolt condition or size that could confound study
- Monitoring for increased incidence of gas bubble disease under 125% TDG
- Monitoring for changes in adult migration
- No trigger to stop study if problems occur

40

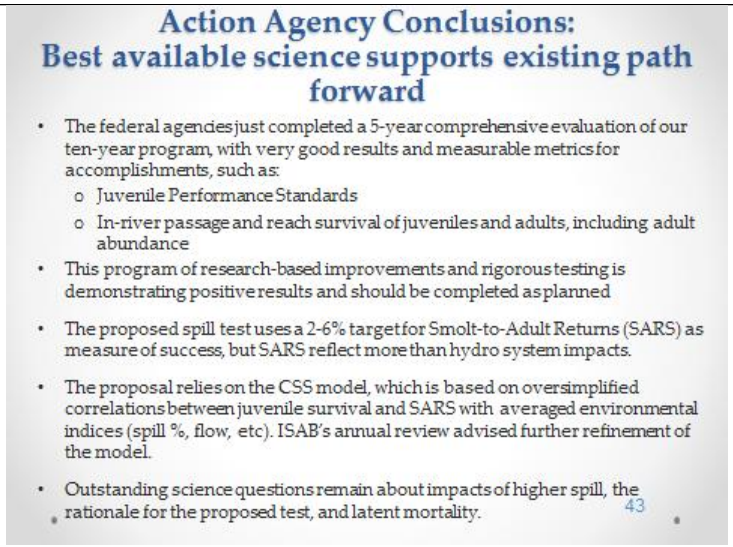
All the points in this slide are not true. The Smolt Monitoring Program includes monitoring for changes in smolt conditions. In addition, there are triggers (originally developed by NOAA) to terminate spill based on the incidence and severity of signs of gas bubble trauma in the existing and ongoing gas bubble trauma monitoring program. The gas bubble trauma monitoring program is a requirement of the state of Oregon for any TDG waiver from current EPA 110% standard. Finally, adult upstream success is monitored in-season by the fisheries management agencies.



The CSS is capable of conducting additional analyses on the effects of various study durations. It is important to note that it takes 3 years for out-migrant smolts to return as adults. Thus, it will take a number of years for the adults to return after several years of experimental spill operations.



The CSS provides an experimental adaptive management framework capable of providing the region with a real opportunity to determine if SARs can be improved under the present configuration of the hydro system. In addition to measurements of SARs, the experimental adaptive management framework provided by the CSS is capable of measuring in-river survival, fish travel time, and ocean survival rates to monitor the effects of increased spill levels on both yearling Chinook and steelhead, if implemented. Additional details on the analyses that have been conducted are available, and additional analyses could be provided if the CSS is requested to do so.

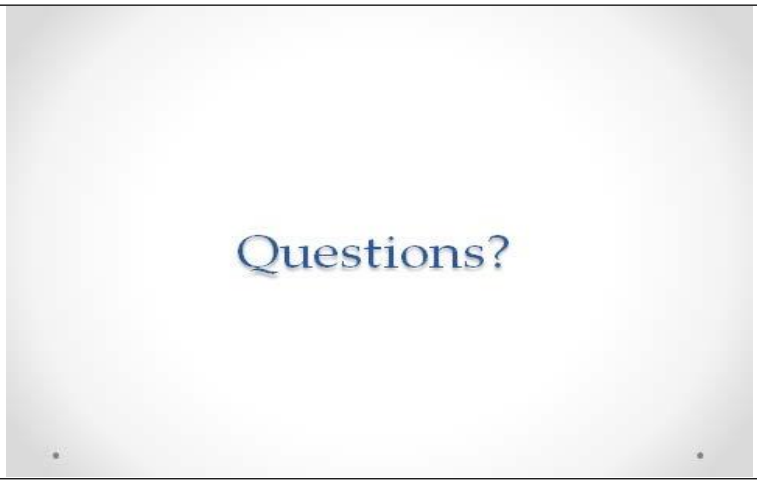


We disagree. The best available science does not support the existing path forward. The BPA and the COE continue to ignore the growing body of science that indicates that the juvenile, at-dam, performance standard approach underestimates the actual impact of hydro project passage and ignores the relationship between freshwater passage experience and early ocean survival. The BPA and COE continue to ignore the extensive body of technical comments, reviews, and concerns with both methods and analyses relative to performance standard testing and their management application.

The BPA and COE misrepresent the CSS model, which is not based on oversimplified correlations, particularly percent spill. The BPA and COE continue to ignore recent data and analyses including the development of the model spill metric which includes the implementation and operation of surface passage structures which is based on available acoustic tag data.

The BPA and COE refer to but do not identify specific ISAB comments. The CSS oversight committee responds in writing to all ISAB comments, which is made available on the FPC website.

The outstanding science questions which remain are the basis and rationale for conducting an evaluation of higher level of spill for fish passage.



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Burke, B.J., W.T. Peterson, B.R. Beckman, C. Morgan, E.A. Daly, and M. Litz. 2013. Multivariate models of adult pacific salmon returns. PLoS ONE. 8(1).

CSS Annual Review 2013 Presentations available on web at: http://www.fpc.org/documents/CSS/Presentations%20from%20the%202013%20CSS%20Annual%20Meeting.pdf

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June 24, 2009 - http://www.fpc.org/documents/memos/91-09.pdf

November 6, 2009 - http://www.fpc.org/documents/memos/173-09.pdf

July 29, 2010 - http://www.fpc.org/documents/memos/93-10.pdf

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February 16, 2011 - http://www.fpc.org/documents/memos/20-11.pdf

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Schaller, H.A., C.E. Petrosky, and E.S. Tinus. 2014. Evaluating river management during seaward migration to recover Columbia River stream-type Chinook salmon considering the variation in marine conditions. Canadian Journal of Fisheries and Aquatic Sciences, 71.

Tuomikoski, J., J. McCann, B. Chockley, H. Schaller, P. Wilson, S. Haeseker, J. Fryer, C. Petrosky, E. Tinus, T. Dalton, R. Elkhe, and R. Lessard. 2012. Comparative Survival Study of PIT-tagged Spring/Summer Chinook and Summer Steelhead, 2012 Annual Report. BPA Contract: 19960200.

Tuomikoski, J., J. McCann, B. Chockley, H. Schaller, S. Haeseker, J. Fryer, R. Lessard, C. Petrosky, E. Tinus, T. Dalton, and R. Elkhe. 2013. Comparative Survival Study of PIT-tagged Spring/Summer/Fall Chinook, Summer Steelhead, and Sockeye, 2013 Annual Report. BPA Contract: 19960200.

Ward D.L., J.H. Petersen, and J.J. Loch. 1995. Index of predation of juvenile salmonids by Northern Squawfish in the lower and middle Columbia River and in the lower Snake River. Transactions of the American Fisheries Society, 124(3), 321 334.

From: Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov>
Sent: Tuesday, September 19, 2017 3:49 PM
To: 'Blane Bellerud - NOAA Federal' (blane.bellerud@noaa.gov)
Subject: Re: Kintama Presentation to NOAA-Today
Attachments: Kintama Progress Update to NOAA (19 Sept 2017).pptx

Hi Blane,

I had mentioned this when I bumped into you earlier. It looks like Rich Zabel agreed to set up a webinar or presentation for the Kintama folks on Oct 4 I attached their slides. I think David Welch is trying to solicit major comments before sending it to a journal like Fisheries. Some of their tricky steps are identifying SAR time series that meet criteria for comparable methods and number of years, and also comparability of PIT and CWT SARs. The Columbia has such a widespread use of PIT tags but the notion of what range adult returns should be at point back to SARs collected with different methods in previous decades.

Christine

From: Rich Zabel (NOAA Federal) [mailto:rich.zabel@noaa.gov]
Sent: Tuesday, September 19, 2017 12:41 PM
To: David Welch
Cc: Petersen,Christine H (BPA) - EWP-4; Erin Rechisky; Aswea Porter
Subject: [EXTERNAL] Re: Kintama Presentation to NOAA-Today

How about Wed Oct 4 at 1PM?

> On Sep 19, 2017, at 12:22 PM, David Welch <David.Welch@kintama.com> wrote:
>
> OK-understood.
>
> I am unavailable 27-29 September and 13-22 October. Otherwise, my schedule is pretty open to the end of October.
>
> Have a look at the presentation that I just sent to you the bottom line is that the survival of Snake River Chinook (& steelhead) appears to be pretty much the same as everywhere else along the coast.
>
> So the take home message for policy folks is that if salmon in regions without dams have the same survival as the Snake River stocks have, why would removing the dams improve survival in the Columbia River region?
>
> ---
>
> **From:** Rich Zabel (NOAA Federal) [mailto:rich.zabel@noaa.gov]
> **Sent:** Tuesday, September 19, 2017 12:13 PM
> **To:** David Welch
> **Cc:** Petersen,Christine H (BPA) - EWP-4; Erin Rechisky; Aswea Porter
> **Subject:** Re: Kintama Presentation to NOAA-Today
> **Importance:** High
>
> David,

I'm sorry but I have not set anything up, particularly with people on this end. I think it would be better to reschedule todays meeting to a time when I can be sure to have key people available. Maybe in a week or two?
Rich

Kintama Update to NOAA

19 September 2017

KINTAMA

1.

What we are Reporting

- Results primarily confined to Chinook in this update
  - Subyearling & yearling populations separated
- We show a few steelhead results to indicate the same general conclusions will likely hold more broadly
- ***Important Caveat:*** We are in the process of refining the CWT vs PIT tag database analyses to make the SAR comparisons as robust as possible.

KINTAMA

2

Primary Results

The broad coast-wide analysis of SARs leads to very different perspective from the current view in the Columbia River basin:

1) SARs in all regions are falling, starting in the early-mid 1970s
2) For CR basin stocks, only MCOL yearlings SARs are higher than Snake River SARs- and only two MCOL populations (***not all***).
3) For Yearling Chinook, "raw" Snake River SARs same as Upper & Lower Columbia & are higher than Puget Sound, Strait of Georgia, North-Central BC
   - Little or no evidence for "delayed mortality" in Snake River Chinook
4) When "raw" data are corrected for methodological differences between CWTs & PIT tags, Snake River populations ***do not*** have lower survival than other stocks not migrating through the Snake River dams
5) Data are consistent with a coast-wide northern expansion with time of a region of poor ocean survival, progressively encompassing more stocks (even Alaska now affected!)
6) A deleterious effect caused by the Columbia dams is not evident.

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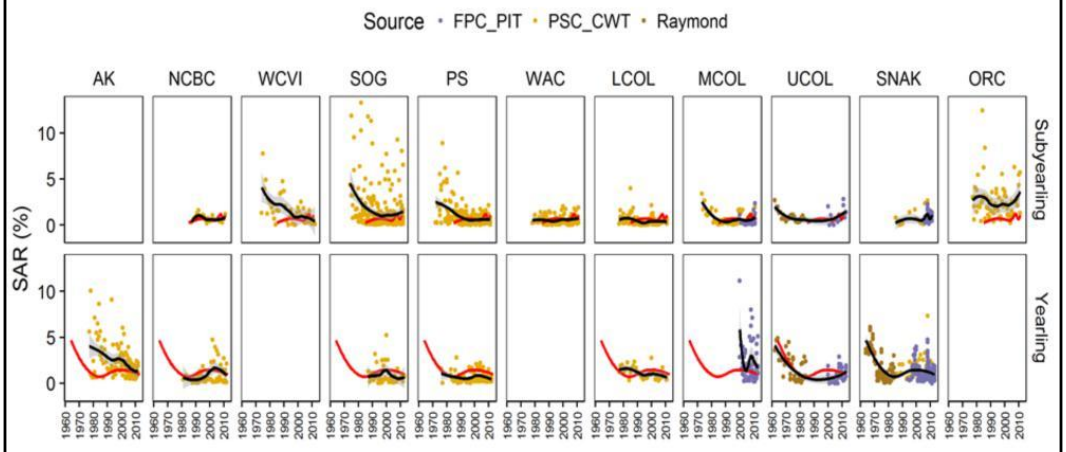
3

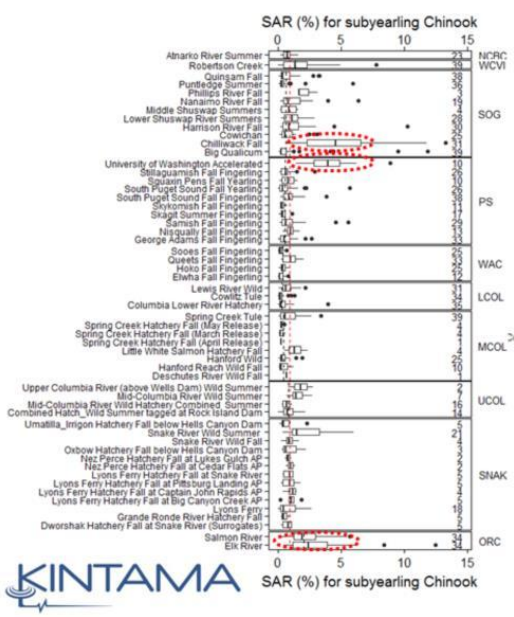
Chinook-All SAR Data by Region

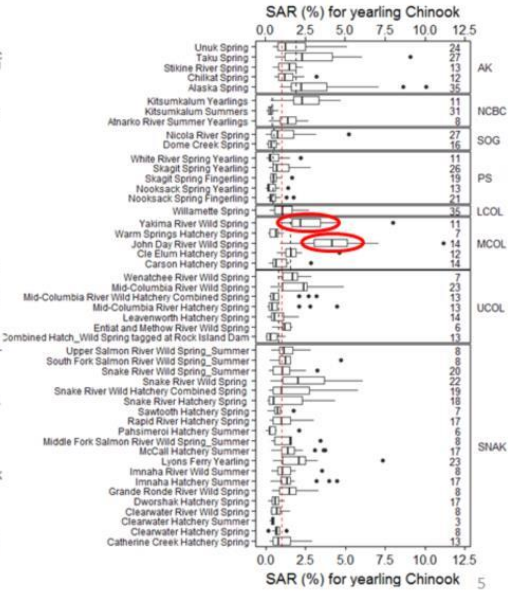


- Plotted SARS against time, split out by regions (columns) & Chinook life history types (rows)
- LOWESS trend line (black) fitted to the SAR data. Snake River trend line (red) overplotted on all panels to facilitate comparison.

4

Stock-Specific Chinook SARS-All Years





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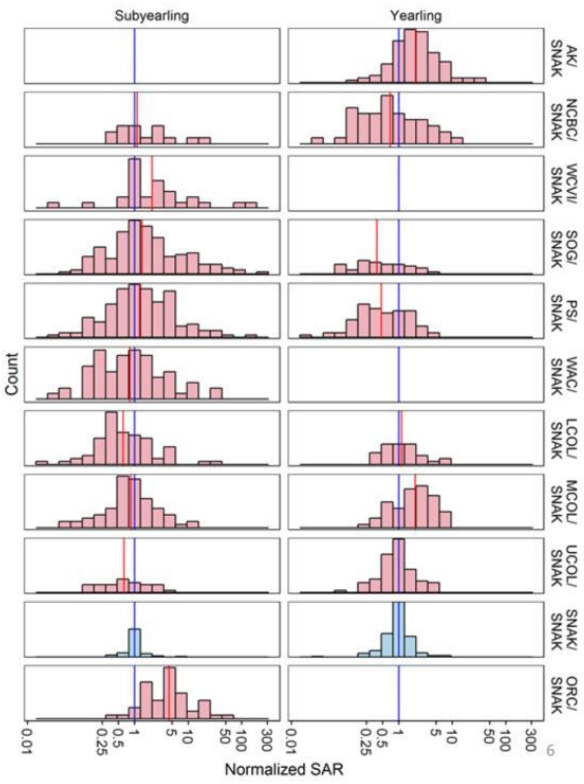
5

Comparison of Regional SARs

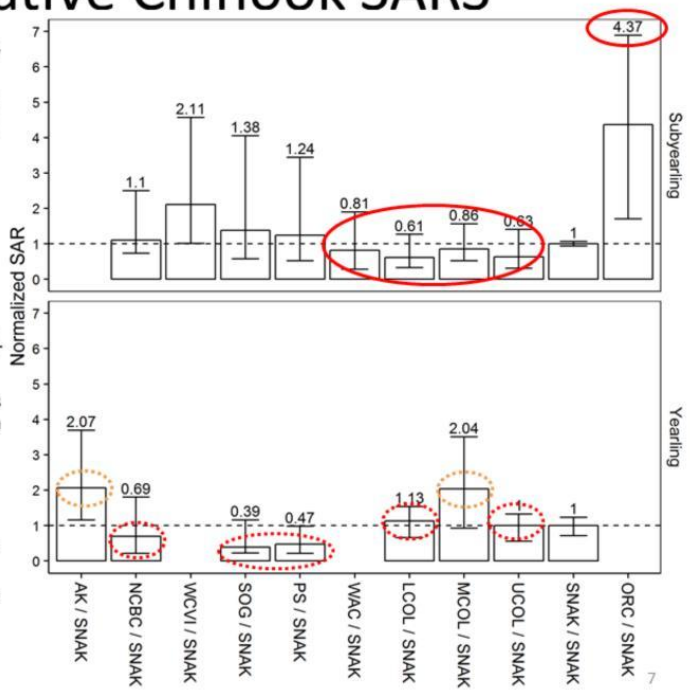
(Region X/Snake)

- Divided annual SARs for Region X by the Snake River median SAR for the same year
- Plotted the results as a frequency histogram
- Snake River is in blue



Relative Chinook SARS

1. Same data as prior slide, just different presentation (error bars are 25 & 75 percentiles)
2. For subyearlings:
   1. Oregon Coast Chinook have SARS 4.37X Snake River.
   2. But Upper/Mid/Lower Columbia River SARS are **lower** than Snake River subyearling SARS, as are WAC (Washington Coast).
3. For Yearling Chinook:
   1. Snake River SARs same as Upper & Lower Columbia & higher than Puget Sound, Strait of Georgia, North-Central BC
4. Only Mid-Columbia & Alaska have higher SARs than Snake River (& recall Alaskan SARs have fallen to Snake River levels in recent years)

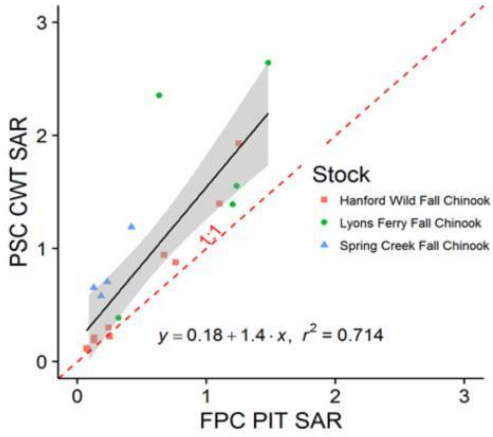


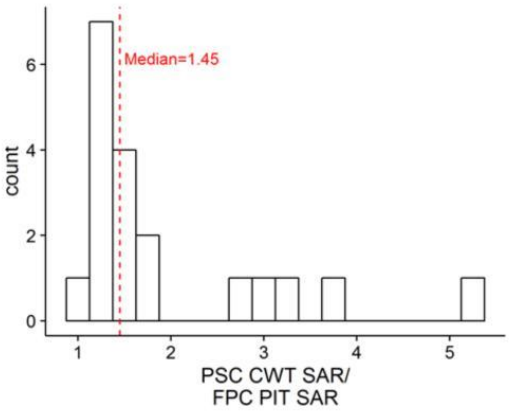
Major Remaining Uncertainties

- Regional SARs derived by different methodologies
  a) In Columbia, early data from Raymond (branding)
  b) CWT survival data:
     i. Survival calculated from smolt release to adult return to spawning grounds
     ii. Corrected for harvest in sport & commercial fisheries (PSC)
  c) FPC survival data is based on PIT tags:
     i. Survival calculated from smolts reaching a dam to adults returning to a dam
     ii. Excludes smolt survival "pre-dams" and adult survival "post-dams".
     iii. Not corrected for harvest in sport & commercial fisheries

8

PSC CWT vs PIT SAR Methodologies

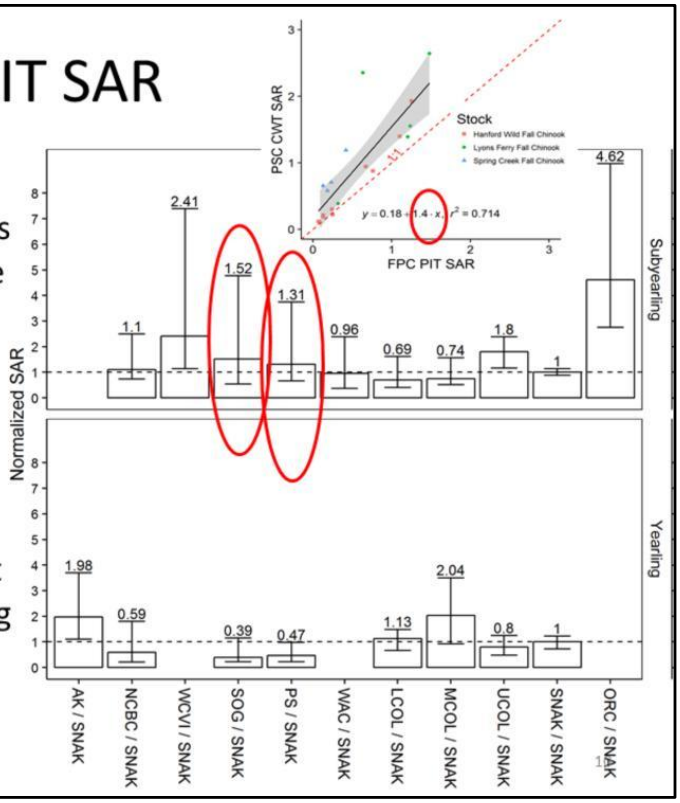




9

PSC CWT vs PIT SAR

- For Fall Chinook, PSC CWT SAR values ≈1.45X FPC SAR values
- This is about what the CWT vs PIT SAR ratios are for the Salish Sea:
  - SOG/SNAK=1.5
  - Puget/SNAK=1.3
- Little to no evidence that Snake River Fall SARs are worse than other regions of coast
- (Still looking for Spring Chinook SARs to compare)



Questions

1) Is this analysis useful?
2) What analyses can we add that will better address the legal (& social/economic) issues that you face?
3) As we work this up for publication, can you provide any other thoughts or guidance?

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11

Steelhead Results
(Different Species, Similar Story)

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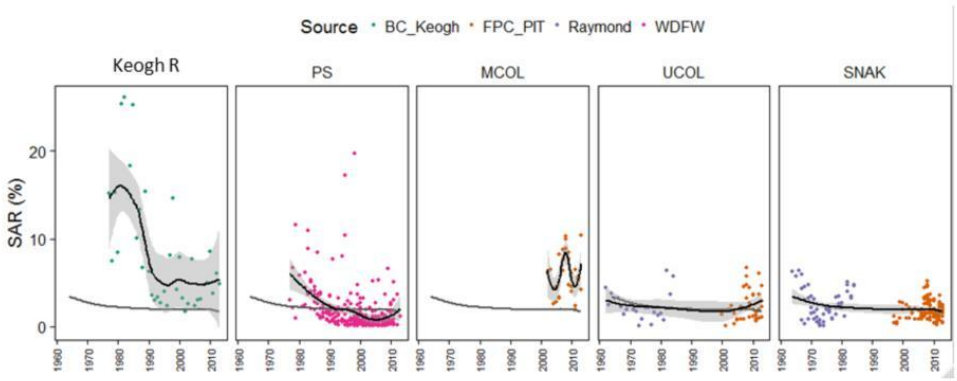
12

Steelhead-Available SAR Time Series



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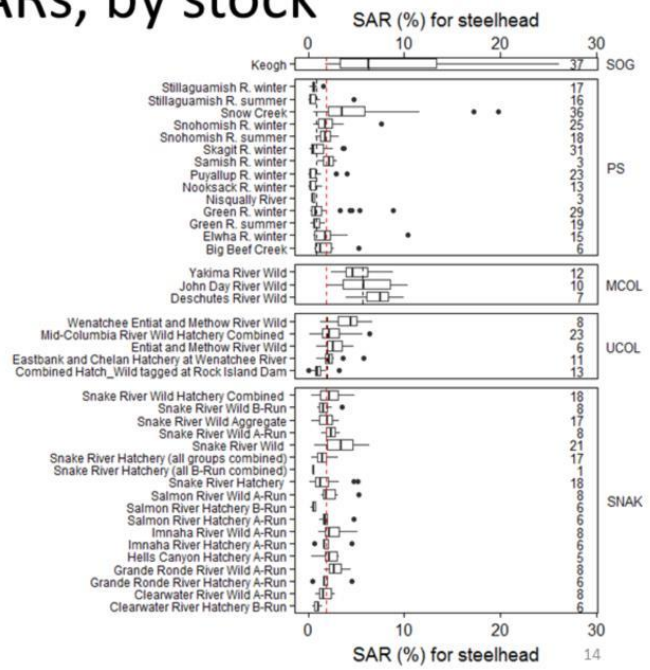
13

Steelhead SARs, by stock



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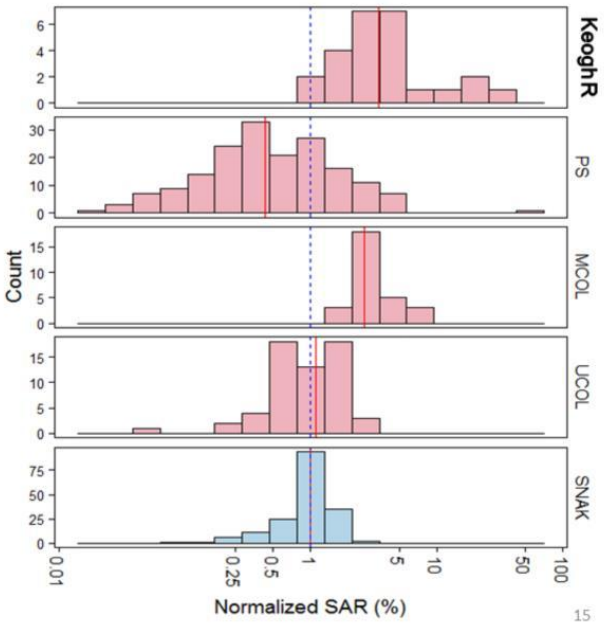
14

Steelhead-Normalized SARs (All Years)



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15

From: Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov>
Sent: Tuesday, October 3, 2017 9:53 AM
To: Blane Bellerud - NOAA Federal
Subject: RE: Kintama presentation

Hi Blane,

Let's see it is delayed until Oct 13th. What actually happened was that when Jeff and I referred to the presentation occurring at NOAA, a number of coworkers who had not seen it said that they wanted to make sure that they had seen and digested it first because they were anticipating this coming up in interagency coordination calls. So we asked Rich to delay by at least another week. I think we still might have had some miscommunication on our end our managers were probably visualizing NOAA policy staff bringing this up when they weren't prepared, but Kintama does not have a draft paper yet. They are asking Science Center staff to provide review feedback at an earlier stage so that they can respond or incorporate this in the first draft. They hopefully will have this draft within a couple months because BPA does intend to use it for the proposed action.

I did talk to David Welch a bit about that 2008 Fraser vs. Columbia paper last week. Carl Schreck was one of the coauthors on that paper which garnered a wide response, and he is on the list of people being considered as the judge's advisor. He said that they spent hours discussing how to present the data, and Schreck initially completely rewrote the manuscript and changed the title to reflect a pessimistic viewpoint about the Fraser essentially saying "surprisingly, the Fraser has outmigration survival as poor as that seen in the Columbia, which we know suffers from many problems. Next we should examine limiting factors in the Fraser", rather than "the Columbia, somewhat surprisingly, has survival rates as good as those seen in the Fraser, which has no hydropower". They sort of settled on wording that "survival rates are similar in these two river systems, which have several contrasts".

We will probably be receiving some update from them for this presentation with our management this week.
Christine

From: Blane Bellerud - NOAA Federal [mailto:blane.bellerud@noaa.gov]
Sent: Tuesday, October 03, 2017 9:34 AM
To: Petersen,Christine H (BPA) - EWP-4
Subject: [EXTERNAL] Kintama presentation

Isn't it supposed to be tomorrow? Have you gotten any updates?

--
Blane L. Bellerud Ph.D.
Fisheries Biologist
NOAA Fisheries
Portland, OR

From: Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov>
Sent: Tuesday, October 10, 2017 3:55 PM
To: 'Blane Bellerud - NOAA Federal' (blane.bellerud@noaa.gov)
Subject: FW: WebEx meeting invitation: Welch brief (Rich Zabel)

Hi Blane,

It looks like Rich has this set up on Thursday at 3pm.
Yes They are primarily using CWT SARs that are reviewed by the Pacific Salmon Commission the Canada-US treaty. There are some technical details they are still working on with regards to PIT and coded wire tag availability, but it seems like there is an interesting story for the trend through time within each of the CWT time series rather than looking at comparability of PIT and brand mark-recapture. I suppose the subyearlings would have a larger correction factor for harvest than spring Chinook although there is some zone 6 harvest. Also, the Willamette spring Chinook aren't exactly the same as spring Chinook in the upper Columbia/Snake but they probably have more spring characteristics like long ocean migration than subyearling fall Chinook.

Christine

From: David Welch [mailto:David.Welch@kintama.com]
Sent: Tuesday, October 10, 2017 10:53 AM
To: David Welch; Rich Zabel (NOAA Federal)
Cc: Erin Rechisky; Petersen,Christine H (BPA) - EWP-4; Aswea Porter
Subject: [EXTERNAL] RE: WebEx meeting invitation: Welch brief (Rich Zabel)

…& this time with the Powerpoint attached!

d

From: David Welch
Sent: Tuesday, October 10, 2017 10:51 AM
To: 'Rich Zabel (NOAA Federal)'
Cc: Erin Rechisky; Petersen,Christine H (BPA) - EWP-4; Aswea Porter
Subject: RE: WebEx meeting invitation: Welch brief (Rich Zabel)

Hi Rich

Here is the presentation.

Just in case there is a glitch, can I have your mobile # in case I have to call through if we get cut off? Also, if you can let us know who will probably be in the room, it would be appreciated.

Best, David

KINTAMA
Office: (250) 729-2600
Mobile (b) (6)

From: Rich Zabel (NOAA Federal) [mailto:rich.zabel@noaa.gov]
Sent: Tuesday, October 03, 2017 4:00 PM
To: David Welch
Cc: Erin Rechisky; Petersen,Christine H (BPA) - EWP-4; Aswea Porter
Subject: Re: WebEx meeting invitation: Welch brief (Rich Zabel)

David, I can give you complete control of the meeting so you can step through the presentation. You should probably send me the presentation (whichever format) in advance in case there are any problems.

> On Oct 3, 2017, at 3:34 PM, David Welch <David.Welch@kintama.com> wrote:
>
> Thanks.
>
> Four questions:
>
> 1. How/whom do we give the slide deck to?
> 2. Any preference on format (PPT or PDF)?
> 3. How soon do you need if before the meeting?
> 4. Will "we" Kintama have control (so we can press keys to step through a PPT presentation with animations) or change the on-screen slide, or will someone from NOAA need to do this?
>
> David
>
> **From:** Rich Zabel (NOAA Federal) [mailto:rich.zabel@noaa.gov]
> **Sent:** Tuesday, October 03, 2017 3:11 PM
> **To:** David Welch; Erin Rechisky; Petersen,Christine H (BPA) - EWP-4; Aswea Porter
> **Subject:** Fwd: WebEx meeting invitation: Welch brief (Rich Zabel)
>
> Here's the webex information for our meeting on Oct 12. Weber access actually begins at 2:45, so you can sign in early. Let me know if you have any questions on how to access.
> Rich
>
> Begin forwarded message:
>
> **From:** NWFSC HELPDESK <messenger@webex.com>
> **Subject: WebEx meeting invitation: Welch brief (Rich Zabel)**
> **Date:** October 3, 2017 at 12:26:15 PM PDT
> **To:** rich.zabel@noaa.gov
> **Reply-To:** nwfsc.helpdesk@noaa.gov
>
> Hello,
>
> NWFSC HELPDESK invites you to join this WebEx meeting.
>
> **Welch briefing (Rich Zabel)**
> Thursday, October 12, 2017

3:00 pm | Pacific Daylight Time (San Francisco, GMT-07:00) | 2 hrs

(b) (2)

Add to Calendar When it's time, join the meeting.

Join by phone

(b) (2) Call-in toll number (US/Canada)

Can't join the meeting?

****

Rich Zabel
Director, Fish Ecology Divsion
NOAA Fisheries
Northwest Fisheries Science Center
office: (206) 860-3290
cel (b) (6)

****

Kintama Brief to NOAA

12 October 2017

KINTAMA

1.

What we are Reporting

- Results primarily confined to Chinook
  - Subyearling & yearling populations separated
- We show a few steelhead results to indicate the same general conclusions will likely hold more broadly
- Comparison of the CWT vs PIT tag database analyses to make the SAR comparisons as robust as possible.

KINTAMA

2

Primary Results

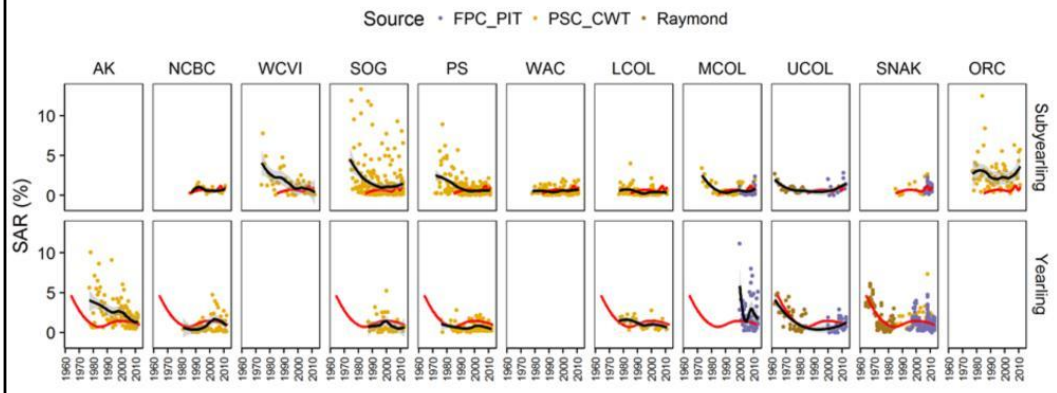
The broad coast-wide analysis of SARs leads to very different perspective from the current view in the Columbia River basin:

1) SARs in all regions are falling, starting in the early-mid 1970s
2) For CR basin stocks, only MCOL yearlings SARs are higher than Snake River SARs- and only two MCOL populations (***not all***).
3) For Yearling Chinook, "raw" Snake River SARs same as Upper & Lower Columbia & are higher than Puget Sound, Strait of Georgia, North-Central BC
   - Little or no evidence for "delayed mortality" in Snake River Chinook
4) When "raw" data are corrected for methodological differences between CWTs & PIT tags, Snake River populations ***do not appear to*** have *"markedly"* lower survival than other stocks not migrating through the Snake River dams
5) Data are consistent with a coast-wide northern expansion with time of a region of poor ocean survival, progressively encompassing more stocks (even Alaska now affected!)
6) A deleterious effect caused by the Columbia dams is not evident.

KINTAMA

3

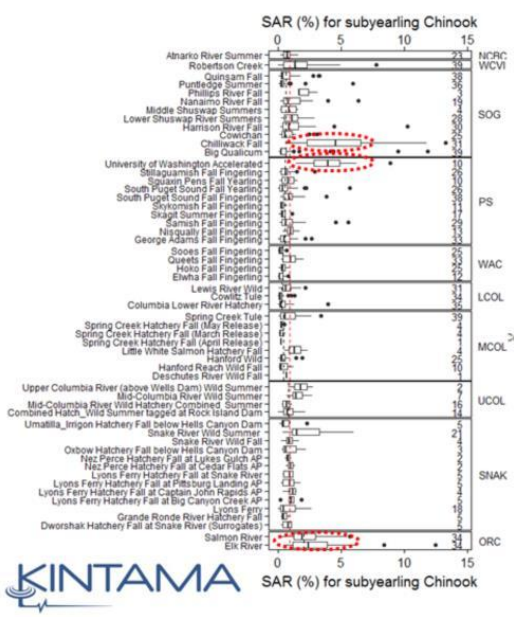
Chinook-All SAR Data by Region

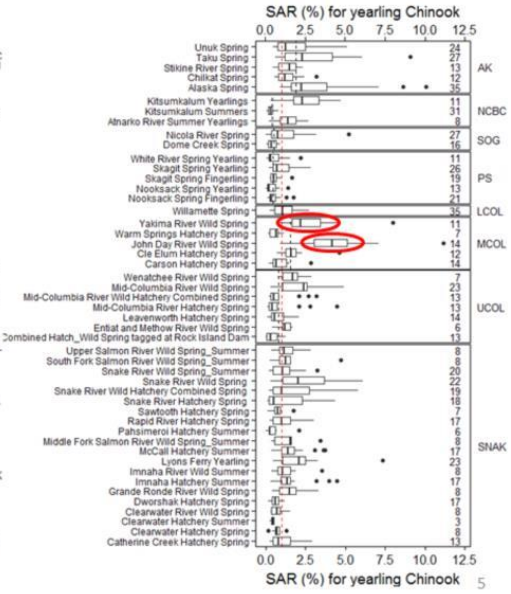


- Plotted SARS against time, split out by regions (columns) & Chinook life history types (rows)
- LOWESS trend line (black) fitted to the SAR data. The Snake River trend line (red) is plotted on all panels to facilitate comparison.

4

Stock-Specific Chinook SARS-All Years





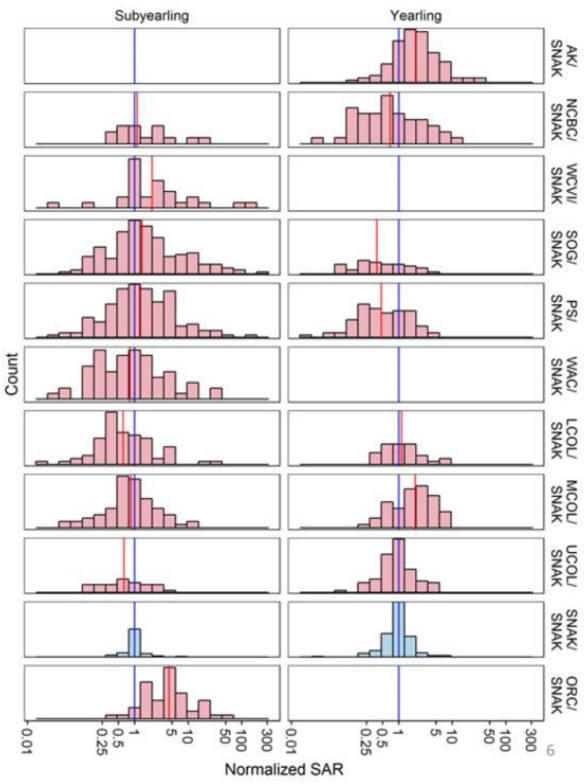
KINTAMA

5

Comparison of Regional SARs

(Region X/Snake)

- Divided annual SARs for Region X by the Snake River median SAR for the same year: SAR_x/SAR_{Snake}
- Plotted the results as a frequency histogram
- Snake River is in blue



Relative Chinook SARS

1. Same data as prior slide, just different presentation (error bars are 25 & 75 percentiles)
2. For subyearlings:
   1. Oregon Coast Chinook have SARS 4.37X Snake River.
   2. But Upper/Mid/Lower Columbia River SARS are **lower** than Snake River subyearling SARS, as are WAC (Washington Coast).
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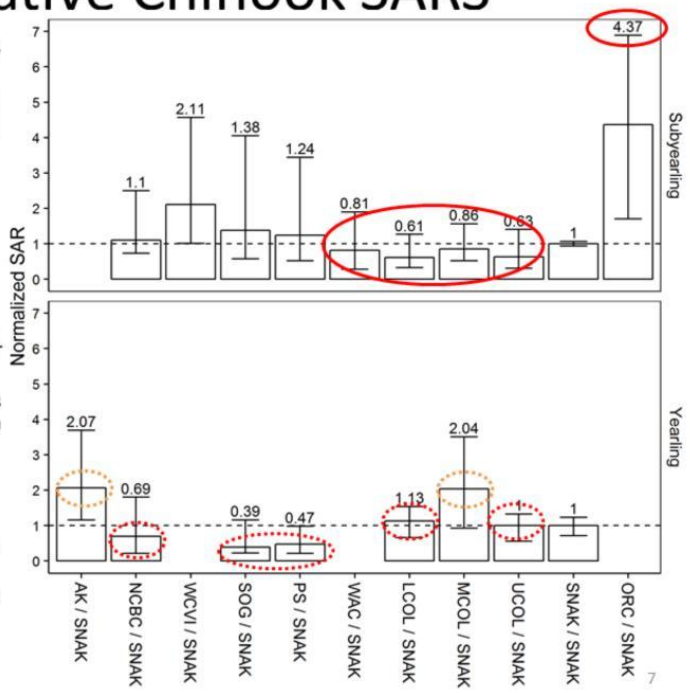
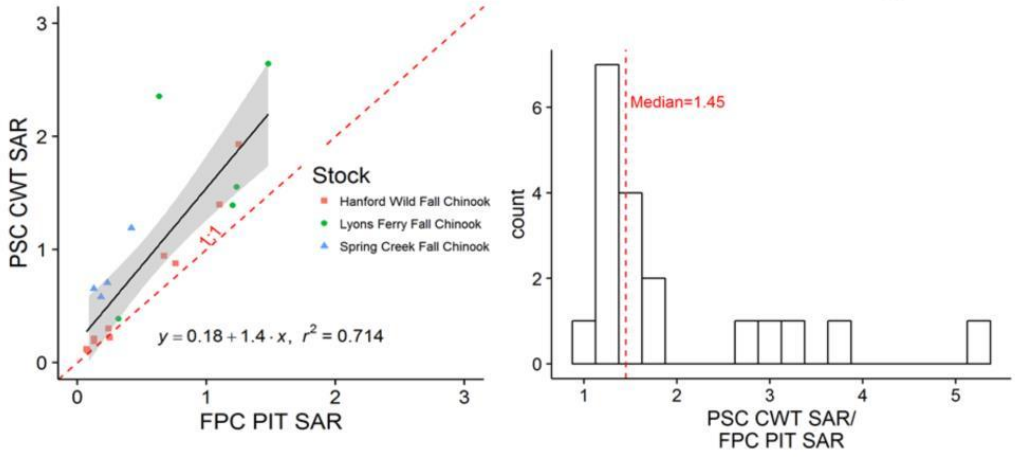


Major Uncertainties

- Regional SARs derived by different methodologies
  a) In Columbia, early data from Raymond
  b) CWT survival data (PSC):
     i. Survival calculated from smolt release to adult return to spawning grounds
     ii. Corrected for harvest in sport & commercial fisheries
  c) FPC survival data is based on PIT tags:
     i. Survival calculated from smolts reaching a dam to adults returning to a dam
     ii. Excludes smolt survival "pre-dams" and adult survival "post-dams".
     iii. Not corrected for harvest in sport & commercial fisheries

8

PSC CWT vs FPC PIT SAR Methodologies

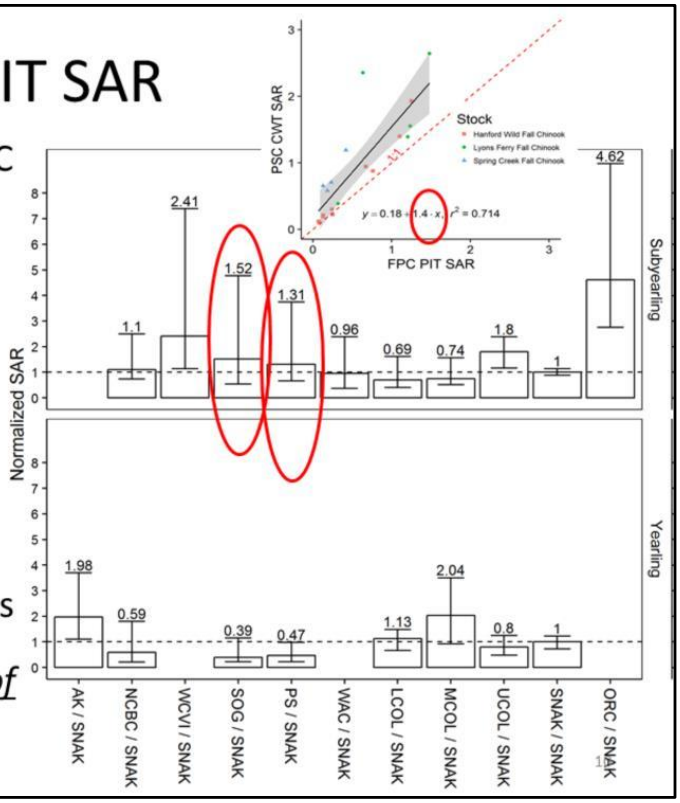


- Compared CWT & PIT tag derived Fall Chinook SARs for the same year ***and the same stock*** (few stocks available to make this comparison)
- On average, PSC CWT SARs are ~1.4X FPC's PIT-tag based SARs
- (*Recall: FPC adds in harvest, includes all survival losses from smolt release location to adult enumeration site*)

9

PSC CWT vs PIT SAR

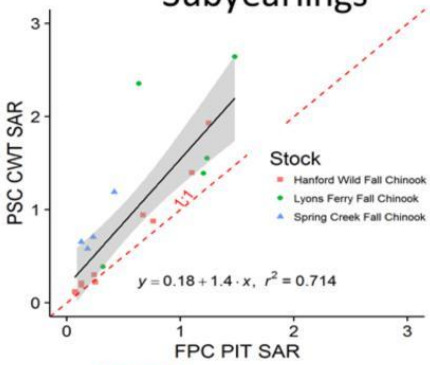
- For Fall Chinook, PSC CWT SAR values ≈1.45X FPC SAR values
- This is about what the CWT vs PIT SAR ratios are for the Salish Sea:
  - SOG/SNAK=1.5
  - Puget/SNAK=1.3
- Results suggest that Snake River Fall SARs are *about the same as in other regions of coast without dams*

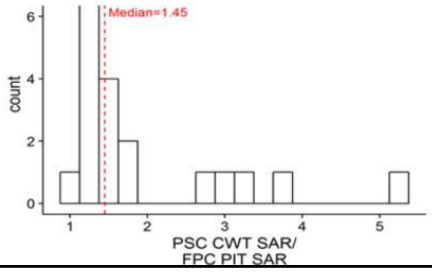


Current Work (in Progress!)

DIRECT COMPARISON: PSC vs FPC SARs

Subyearlings





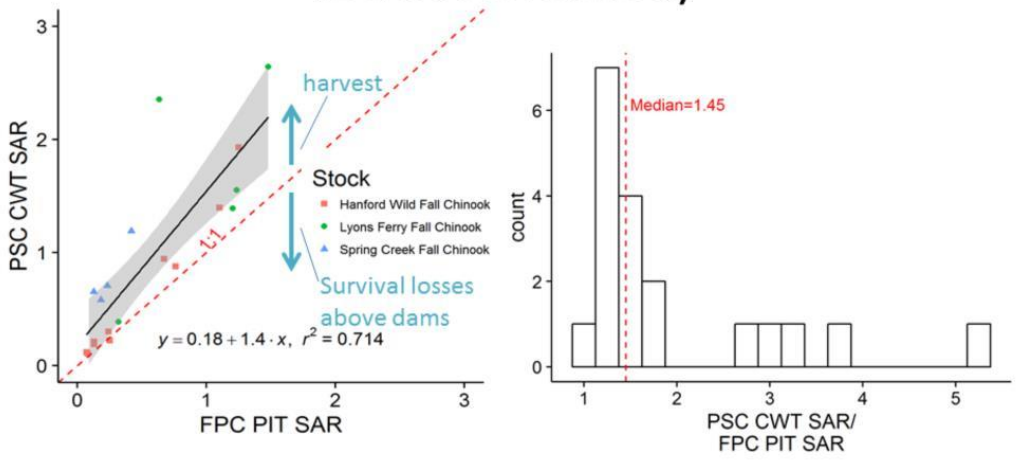
Yearlings

NO DATA

NO DATA

12

PSC CWT vs PIT SAR Methodologies (Direct Method)



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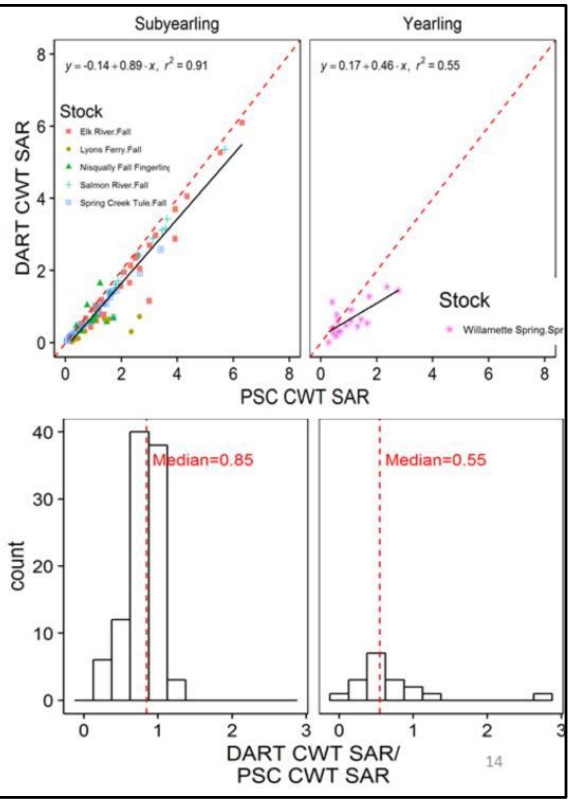
- (*Recall: PSC adds in harvest, includes all survival losses from smolt release location to adult enumeration site; FPC PIT-tag estimates exclude these factors*)

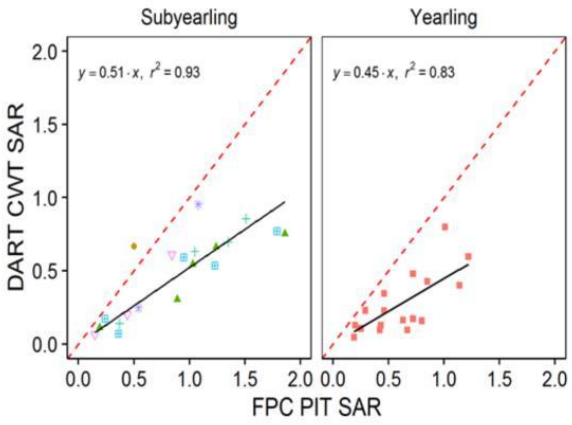
13

A) PSC CWT SARs vs DART CWT SARs

- No direct comparison of PSC & FPC SARs available for Yearlings
- We can develop a "convoluted" estimate using DART as an intermediate.



B) FPC PIT SARs vs DART CWT SARs



- This gives us a conversion between FPC PIT-tag based SARs and DART CWT-based SARs
- The prior slide gave us a conversion between DART & PSC CWT-based SARs
- So…

15

THE INDIRECT METHOD (USING MEDIAN VALUES FOR ALGEBRAIC SIMPLICITY):

Subyearlings:

- $SAR_{Dart}=0.85*SAR_{PSC}$
- $SAR_{Dart}=0.51*SAR_{FPC}$

So:

- $SAR_{PSC}=(0.51/0.85)*SAR_{FPC} \approx 0.6*SAR_{FPC}$

Yearlings:

- $SAR_{Dart}=0.55*SAR_{PSC}$
- $SAR_{Dart}=0.45*SAR_{FPC}$

So:

- $SAR_{PSC}=0.45/0.55*SAR_{FPC} \approx 0.8*SAR_{FPC}$

16

Reality Check:

YEARLINGS:

- Direct Method: **No Data**
- Indirect Method:

  $SAR_{PSC} \approx 0.8 * SAR_{FPC}$ (Close to 1:1)

SUBYEARLINGS:

- Direct Method: $SAR_{PSC} \approx 1.4 * SAR_{FPC}$
- Indirect Method: $SAR_{PSC} \approx 0.6 * SAR_{FPC}$
- Results don't match, but are "not far off" a 1:1 relationship, suggesting that FPC/PIT & PSC/CWT SAR data are not hugely different (work in progress)
- Incorporating the large variability evident in the scatterplots is crucial

17

Current Conclusions/Next Steps

- Snake River SARs "*look to be*" similar to other regions, but we are not yet certain *how similar*
- Refine data, switch to Fall & Spring categories rather than Subyearlings & Yearlings
- Combine (messy!) CWT vs PIT tag conversion factors with SAR time series to inform the question: *"How likely is it that Snake River SARs are actually lower than SARS in other regions lacking dams?"*
- *Our current thinking is that it may never be possible to get a "near-perfect" general conversion ratio between PIT & CWT-based SAR estimates:*
  - *Harvest rates vary between stocks depending upon marine migration route, return timing, and regulatory decisions choosing which stocks to target or protect*
  - *Survival "above the dams" cannot be the same… distance from release to the top dam varies widely, predators/river dynamics vary…*
- A philosophical question: Is it simply enough to note that Snake River SARS are "about the same" as other regions to change thinking, or does it really have to be statistically "proven"… *and what if it can't be?!*

18

Questions

1) What analyses can we add that will better address the legal (& social/economic) issues that you face?
2) What do you see as the important uncertainties that we need to address?
3) As we work this up for publication, can you provide any other thoughts or guidance?

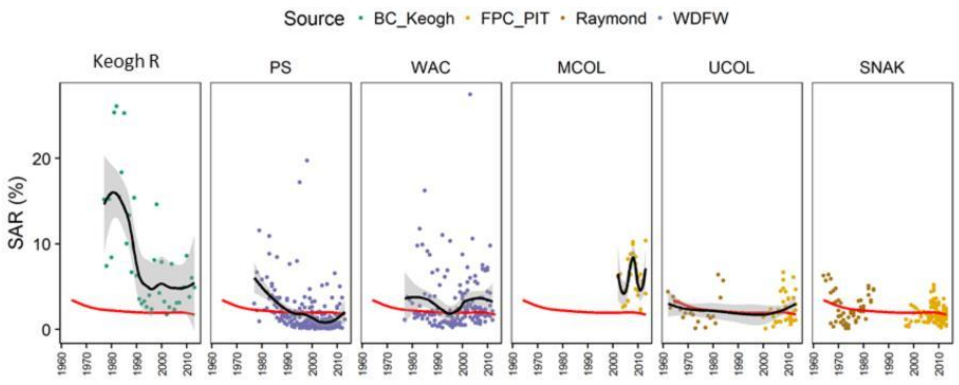
KINTAMA

19

Steelhead Results
(Different Species, Similar Story)

KINTAMA

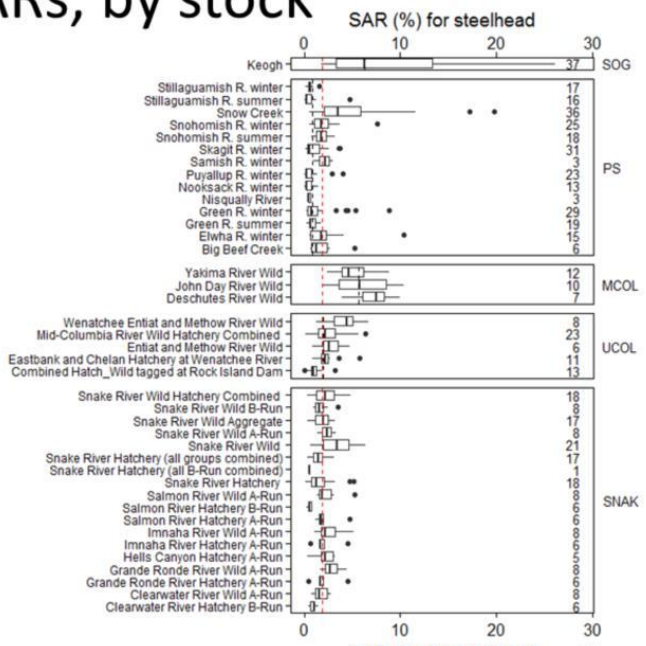
Steelhead-Available SAR Time Series



KINTAMA

21

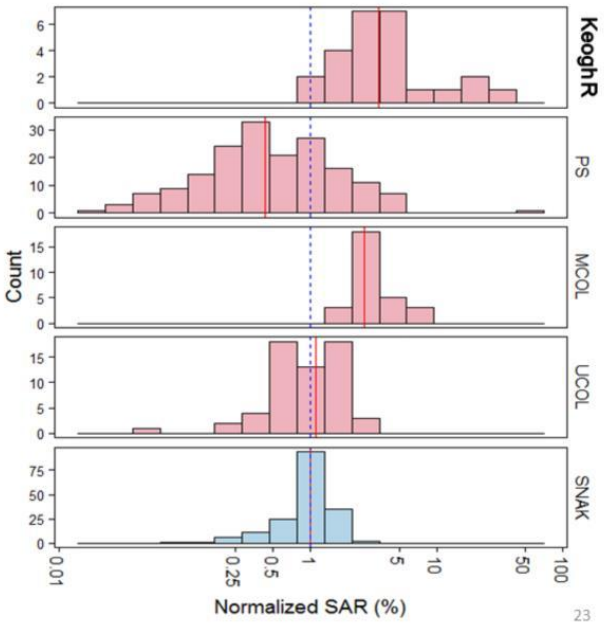
Steelhead SARs, by stock



KINTAMA

22

Steelhead-Normalized SARs (All Years)



KINTAMA

23

From: Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov>
Sent: Wednesday, February 17, 2021 6:46 AM
To: Blane Bellerud - NOAA Federal; Trevor Conder
Subject: FW: ISAB Feb 18, 19 and March 18 Meetings: Briefings on bypass selectivity (Faulkner et al./Storch et al.) and avian predation (Haeseker et al./Payton et al.)

Are you tracking this series of presentations with the ISAB?

From: Erik Merrill <emerrill@nwcouncil.org>
Sent: Tuesday, February 16, 2021 10:14 AM
To: Leslie Bach <LBach@NWCouncil.org>; amikkelsen@cdatribe-nsn.gov; art.c.martin@state.or.us; Benjamin.Blank@dfw.wa.gov; bjk@spokanetribe.com; blod@yakamafish-nsn.gov; bnichols@SpokaneTribe.com; brad.houslet@ctwsbnr.org; brenthall@ctuir.org; Bret.Nine@colvilletribes.com; calla.hagle@burnspaiute-nsn.gov; ccolter@sbtribes.com; chris.brun@ctwsbnr.org; christine.kozfkay@idfg.idaho.gov; Daniel.Rawding@dfw.wa.gov; daves@nezperce.org; deca@critfc.org; dosterman@knrd.org; dr@ucut-nsn.org; erica.maltz@usrtf.org; geneshippentower@ctuir.org; gepl@critfc.org; greg.sieglitz@noaa.gov; ireland@kootenai.org; jayh@nezperce.org; Jeannette.Finley@colvilletribes.com; jennifer.graham@ctwsbnr.org; jmaroney@knrd.org; joe_blodgett@yakama.com; lance.hebdon@idfg.idaho.gov; laura@ucut-nsn.org; lawrence.schwabe@grandronde.org; lynnd@cskt.org; mark_bagdovitz@fws.gov; MBoyer@mt.gov; Michael.Garrity@dfw.wa.gov; mike.edmondson@osc.idaho.gov; mikek@ctsi.nsn.us; PARB@critfc.org; randall.friedlander@colvilletribes.com; rentz@knrd.org; rsalakory@cowlitz.org; Ryan.Banks@osc.idaho.gov; scott.hauser@usrtf.org
Cc: Drohr5@aol.com; greer.maier@ucsrb.org; jennifer_bayer@usgs.gov; john@snakeriverboard.org; Melody.kreimes@ucsrb.org; nleonard@psmfc.org; sarah.walker@ucsrb.org; Shaun.seaman@chelanpud.org; smanlow@lcfrb.gen.wa.us; Donahue,Scott L (BPA) - EWP-4 <sldonahue@bpa.gov>; Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>; George,Rodrigo (BPA) - EWB-4 <rdgeorge@bpa.gov>; Kavanagh,Maureen A (BPA) - EWP-4 <makavanagh@bpa.gov>; Allen,Brady (BPA) - EWP-4 <mballen@bpa.gov>; Lofy,Peter T (BPA) - EWU-4 <ptlofy@bpa.gov>; Skidmore,John T (BPA) - EWL-4 <jtskidmore@bpa.gov>; Kaplowe,David J (BPA) - EWM-4 <djkaplowe@bpa.gov>; Knapp,Douglas D (BPA) - EWL-4 <ddknapp@bpa.gov>; Jule,Kristen R (BPA) - EWP-4 <krjule@bpa.gov>; Lando,Jody B (BPA) - EWP-4 <jblando@bpa.gov>; Welch,Sean P (BPA) - EWP-4 <spwelch@bpa.gov>; Patty O'Toole <potoole@nwcouncil.org>; Gregory, Stanley Vincent <stanley.gregory@oregonstate.edu>
Subject: [EXTERNAL] ISAB Feb 18, 19 and March 18 Meetings: Briefings on bypass selectivity (Faulkner et al./Storch et al.) and avian predation (Haeseker et al./Payton et al.)

Hi All,

At the Regional Coordination Forum's January 21 meeting, Leslie Bach, Stan Gregory, and I briefed the forum on four current ISAB assignments, and several of you expressed interest in listening to briefings to the ISAB on the four topics. Many of you listened to Dr. David Welch and co-authors' briefing on their coastwide Chinook salmon survival analyses to the ISAB on February 5 thank you. Over the next month, the ISAB is holding several meetings that include briefings on bypass selectivity (Faulkner et al./Storch et al.) and avian predation (Haeseker et al./Payton et al.) that may be of interest to you:

1. Thursday, February 18, 10am-12:15 PST - Bypass Selectivity (Faulkner et al.) (GoToMeeting link)
2. Friday, February 19, 10am-12:15pm PST - Avian Predation (Payton et al.) (GoToMeeting link)
3. Thursday, March 18, 2021 8:00 AM 12:30 PM (PDT) - Bypass Selectivity (Storch et al.) and Avian Predation (Haeseker et al.) (GoToMeeting link)

The full GoToMeeting details are provided below, and here's a link to the ISAB's assignment memo that provides background on the reviews.

1. ISAB Briefing – Bypass Selectivity (Faulkner et al.)

Thursday, February 18, 10am-12:15pm PST

- 10:00-10:15 Introductions (Stan Gregory, ISAB Chair)
- 10:15-11:15 Presentation (Jim Faulkner, Rich Zabel, and co-authors)
- 11:15-12:15 Q&A (Stan and Carl Schwarz facilitate)

Please join my meeting from your computer, tablet or smartphone.

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You can also dial in using your phone.
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(b) (2)

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Dial in or type: 67.217.95.2 or inroomlink.goto.com
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2. ISAB Briefing – Avian Predation (Payton et al.)

Friday, February 19, 10am-12:15pm PST

- 10:00-10:15 Introductions (Stan Gregory, ISAB Chair)
- 10:15-11:15 Presentation (Quinn Payton and co-authors)
- 11:15-12:15 Q&A (Stan, Tom Turner, and Tom Wainwright facilitate)

Please join my meeting from your computer, tablet or smartphone.

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3. ISAB Briefings - Bypass Selectivity (Storch et al.) and Avian Predation (Haeseker et al.)

Thursday, March 18, 2021 8:00 AM – 12:30 PM (PDT)

8:00-8:15 Introductions (Stan Gregory, ISAB Chair)
8:15-10:15 Storch et al. regarding Faulkner et al. bypass selectivity

- 8:15-9:15 Presentation
- 9:15-10:15 Q&A (Stan and Carl Schwarz facilitate)

10:15-10:30 Break

10:30-12:30 Haeseker et al. regarding avian predation

- 10:30-11:30 Presentation
- 11:30-12:30 Q&A (Stan, Tom Turner, and Tom Wainwright facilitate)

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…

Stay well,

Erik Merrill
Independent Science Manager
Northwest Power and Conservation Council
851 SW 6th Avenue, Suite 1100
Portland, Oregon 97204
503-222-5161
800-452-5161 (toll-free)

From: Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov>
Sent: Friday, December 14, 2018 9:42 AM
To: Blane Bellerud - NOAA Federal
Subject: FW: looking for a SOW on a BPA contract - KINTAMA WORK

Hi Blane,
Here was the email I received from my coworker yesterday re: the Welch/Porter/Rechisky study. Stepping back, it is actually legitimate to look into the Power Council's review of research studies in their main program. But it is a bit different to say that you need to investigate this because you were asked to review a paper. In this case, the POST study with marine Vemco tags ended in 2011 (which had been in the Council program). Jeff Stier and others decided to use the BPA technical services budget to fund this review paper; this fund does not fall under the Council but must follow government contracting guidelines including bidding/sole source justification. Also, in this case, David Welch insisted on having text clauses declaring that they are intellectually independent in their study and not subject to any editorial control- so that they could clearly assert this when sending to a journal.
Christine

From: McDonald,Katie M (BPA) - EWP-4
Sent: Thursday, December 13, 2018 1:23 PM
To: Lando,Jody B (BPA) - EWP-4; Jule,Kristen R (BPA) - EWP-4; Petersen,Christine H (BPA) - EWP-4
Cc: Hauser,Tracy L (BPA) - EWL-4
Subject: FW: looking for a SOW on a BPA contract - KINTAMA WORK

Hi Kristen, Jody and Christine,

Michele Dehart from Fish Passage Center has reached out to Tracy Hauser requesting a copy of the draft manuscript from the Kintama work and contract 75025.

I know there are some technical, policy and political sensitivities surrounding this work, as well as the arrangement that Lorri and Bryan came to with Kintama on how the work was to be reviewed and received by BPA.

I am not sure where Michele's request/direction to review the report comes from.
She specifically provided the following in her email to Tracy: "I am trying to understand what the contract specified in terms of question pursued and deliverable. I checked in cbfish and I could not find that contract number. Would it be possible for you to locate that contract SOW ?"

It seems like it would be good for someone from BPA who is in a position of management/leadership to reach out to Michele to discuss this.
I have not experienced that we ask Fish and Wildlife Program contractors (eg. FPC) to review other FWP contractors contract delivery (eg. question pursed and deliverable) as Michele described above. This could be wading into some tricky waters quickly.

If Michele on the other hand has been asked to be a technical reviewer in Kintama's formal publication efforts for their first paper perhaps this is OK

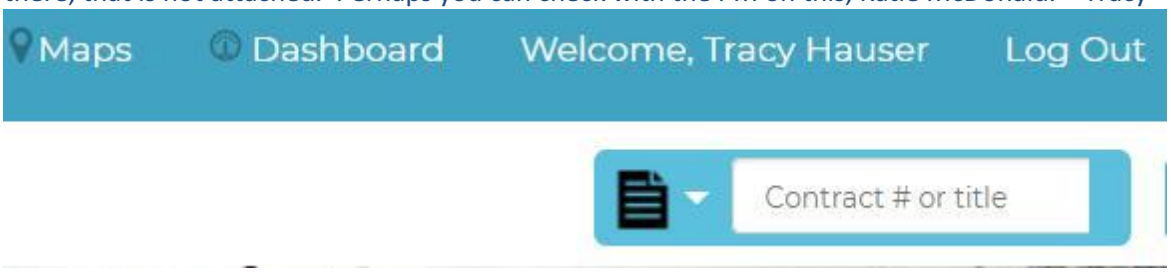
Regardless, flagging for you both Kristen and Jody as this seems politically sensitive for us.
I am the Project manager for 1996-017-00 while Christine is the COR for the individual contract. Please let us know how you would like to proceed.
(cc'd Tracy on this email so she sees we will work to come up with a plan to respond to Michele's request)

Thank you,
Katie

Katie McDonald,
Tributary Habitat Research, Monitoring & Evaluation (RM&E) Lead
BPA F&W Division | Policy & Planning Group (EWP-4)
M - F: office hours 8-4pm
Office: (503) 230-4056
Cell (b) (6)
kmmcdonald@bpa.gov | 905 NE 11th Avenue | Portland, OR 97232

From: Hauser,Tracy L (BPA) - EWL-4
Sent: Thursday, December 13, 2018 1:05 PM
To: Michele Dehart
Cc: McDonald,Katie M (BPA) - EWP-4
Subject: RE: looking for a SOW on a BPA contract

HI Michele
The contract is in CBFISH, just enter the contract number and the SOW/documents come up. I do not see a report in there, that is not attached. Perhaps you can check with the PM on this, Katie McDonald. ~ Tracy



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Tracy L. Hauser, F&W Project Mgr

From: Michele Dehart <mdehart@fpc.org>
Sent: Thursday, December 13, 2018 12:27 PM
To: Hauser,Tracy L (BPA) - EWL-4 <tlhauser@bpa.gov>
Subject: [EXTERNAL] looking for a SOW on a BPA contract

Hi Tracy:
I am looking for the statement of work, and or deliverables on a specific BPA contract. We have been asked to review a draft journal article, and that article identifies a specific BPA contract number -75025 - I do not know the title of the contract that is not identified. The author and so I assume the contractor is David Welch. I am trying to understand what the contract specified in terms of question pursued and deliverable. I checked in cbfish and I could not find that contract number. Would it be possible for you to locate that contract SOW ?

Thank You
Michele

From: Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov>
Sent: Friday, December 14, 2018 12:39 PM
To: Blane Bellerud - NOAA Federal
Subject: Re: FW: looking for a SOW on a BPA contract - KINTAMA WORK

Thank you very much!

Yes I just spoke with Jody and we're going to be a bit cautious for the time being- we don't want discussion that circulates back to the journal. Also haven't identified whether the reviewer is Michele or someone in her group, and it could be a problem to mistakenly pass this on and violate an anonymous reviewer confidentiality.

Christine

From: Blane Bellerud - NOAA Federal [mailto:blane.bellerud@noaa.gov]
Sent: Friday, December 14, 2018 12:34 PM
To: Petersen,Christine H (BPA) - EWP-4
Subject: [EXTERNAL] Re: FW: looking for a SOW on a BPA contract - KINTAMA WORK

OK, I will tell him it is not to be shared widely.

Blane

On Fri, Dec 14, 2018 at 11:02 AM Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov> wrote:

> Hi Blane,
>
> I think so because it was a pretty open or direct request, although keep in mind that I haven't spoken with many coworkers about this, and only Katie has had the phone discussions with their group. I have also not mentioned the inquiry to David Welch.
>
> Christine
>
> **From:** Blane Bellerud - NOAA Federal [mailto:blane.bellerud@noaa.gov]
> **Sent:** Friday, December 14, 2018 10:01 AM
> **To:** Petersen,Christine H (BPA) - EWP-4
> **Subject:** [EXTERNAL] Re: FW: looking for a SOW on a BPA contract - KINTAMA WORK
>
> Can I share this with Ritchie?
>
> Blane

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(cc'd Tracy on this email so she sees we will work to come up with a plan to respond to Michele's request)

Thank you,

Katie

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BPA F&W Division | Policy & Planning Group (EWP-4)

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Office: (503) 230-4056

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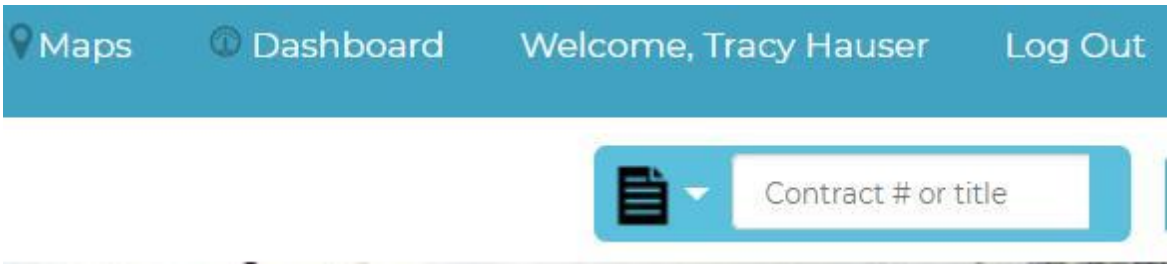

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Thank You

Michele

--

Blane L. Bellerud Ph.D.

Fisheries Biologist

NOAA Fisheries

Portland, OR

(503)231-2238

--
Blane L. Bellerud Ph.D.
Fisheries Biologist
NOAA Fisheries
Portland, OR
(503)231-2238

From: Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov>
Sent: Friday, December 14, 2018 12:18 PM
To: Blane Bellerud - NOAA Federal
Subject: Correction

Hi Blane,
Actually, could you please limit discussion of this matter for the time being? My coworkers would like to approach John Skidmore and others before acting further, and they have no specifically asked us not to discuss widely until they are able to further consider.

Thank you.
Christine P.

From: Blane Bellerud - NOAA Federal [mailto:blane.bellerud@noaa.gov]
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Regardless, flagging for you both Kristen and Jody as this seems politically sensitive for us.

I am the Project manager for 1996-017-00 while Christine is the COR for the individual contract. Please let us know how you would like to proceed.

(cc'd Tracy on this email so she sees we will work to come up with a plan to respond to Michele's request)

Thank you,

Katie

Katie McDonald,

Tributary Habitat Research, Monitoring & Evaluation (RM&E) Lead

BPA F&W Division | Policy & Planning Group (EWP-4)

M - F: office hours 8-4pm

Office: (503) 230-4056

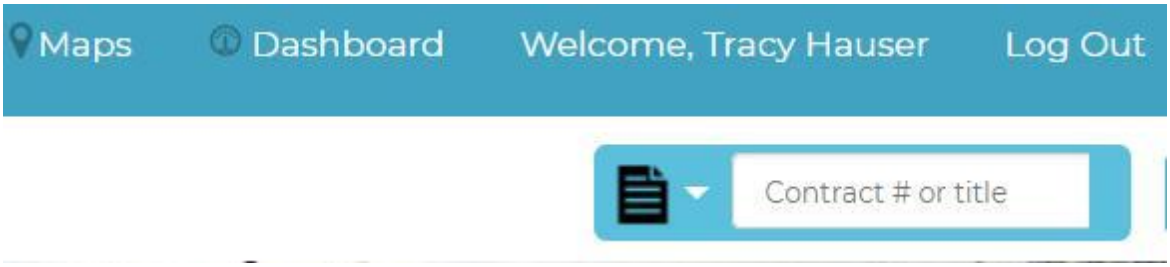
Cell (b) (6)

kmmcdonald@bpa.gov | 905 NE 11th Avenue | Portland, OR 97232

From: Hauser,Tracy L (BPA) - EWL-4
Sent: Thursday, December 13, 2018 1:05 PM
To: Michele Dehart
Cc: McDonald,Katie M (BPA) - EWP-4
Subject: RE: looking for a SOW on a BPA contract

HI Michele

The contract is in CBFISH, just enter the contract number and the SOW/documents come up. I do not see a report in there, that is not attached. Perhaps you can check with the PM on this, Katie McDonald. ~ Tracy



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Tracy L. Hauser, F&W Project Mgr

From: Michele Dehart <mdehart@fpc.org>
Sent: Thursday, December 13, 2018 12:27 PM
To: Hauser,Tracy L (BPA) - EWL-4 <tlhauser@bpa.gov>
Subject: [EXTERNAL] looking for a SOW on a BPA contract

Hi Tracy:

I am looking for the statement of work, and or deliverables on a specific BPA contract. We have been asked to review a draft journal article, and that article identifies a specific BPA contract number -75025 - I do not know the title of the contract that is not identified. The author and so I assume the contractor is David Welch. I am trying to understand what the contract specified in terms of question pursued and deliverable. I checked in cbfish and I could not find that contract number. Would it be possible for you to locate that contract SOW ?

Thank You

Michele

--
Blane L. Bellerud Ph.D.
Fisheries Biologist
NOAA Fisheries
Portland, OR
(503)231-2238

From: Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov>
Sent: Wednesday, December 19, 2018 10:44 AM
To: Blane Bellerud - NOAA Federal
Subject: Re: FW: looking for a SOW on a BPA contract - KINTAMA WORK

Yes, we also realized we might want to ask who requested the review- someone may have forwarded that early journal link and they are preparing a memoz although phrasing it that way does imply that the journal requested peer review.

Christine

Sent from Workspace ONE Boxer

On Dec 14, 2018 4:18 PM, Blane Bellerud - NOAA Federal <blane.bellerud@noaa.gov> wrote:
OK, if there is any violation of confidentiality, she has already done it, so no worries

Blane

On Fri, Dec 14, 2018 at 12:38 PM Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov> wrote:

Thank you very much!

Yes I just spoke with Jody and we're going to be a bit cautious for the time being- we don't want discussion that circulates back to the journal. Also haven't identified whether the reviewer is Michele or someone in her group, and it could be a problem to mistakenly pass this on and violate an anonymous reviewer confidentiality.

Christine

From: Blane Bellerud - NOAA Federal [mailto:blane.bellerud@noaa.gov]
Sent: Friday, December 14, 2018 12:34 PM
To: Petersen,Christine H (BPA) - EWP-4
Subject: [EXTERNAL] Re: FW: looking for a SOW on a BPA contract - KINTAMA WORK

OK, I will tell him it is not to be shared widely.

Blane

On Fri, Dec 14, 2018 at 11:02 AM Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov> wrote:

Hi Blane,

I think so because it was a pretty open or direct request, although keep in mind that I haven't spoken with many coworkers about this, and only Katie has had the phone discussions with their group. I have also not mentioned the inquiry to David Welch.

Christine

From: Blane Bellerud - NOAA Federal [mailto:blane.bellerud@noaa.gov]
Sent: Friday, December 14, 2018 10:01 AM
To: Petersen,Christine H (BPA) - EWP-4
Subject: [EXTERNAL] Re: FW: looking for a SOW on a BPA contract - KINTAMA WORK

Can I share this with Ritchie?

Blane

On Fri, Dec 14, 2018 at 9:42 AM Petersen,Christine H (BPA) - EWP-4 <chpetersen@bpa.gov> wrote:

Hi Blane,

Here was the email I received from my coworker yesterday re: the Welch/Porter/Rechisky study. Stepping back, it is actually legitimate to look into the Power Council's review of research studies in their main program. But it is a bit different to say that you need to investigate this because you were asked to review a paper. In this case, the POST study with marine Vemco tags ended in 2011 (which had been in the Council program). Jeff Stier and others decided to use the BPA technical services budget to fund this review paper; this fund does not fall under the Council but must follow government contracting guidelines including bidding/sole source justification. Also, in this case, David Welch insisted on having text clauses declaring that they are intellectually independent in their study and not subject to any editorial control- so that they could clearly assert this when sending to a journal.

Christine

From: McDonald,Katie M (BPA) - EWP-4
Sent: Thursday, December 13, 2018 1:23 PM
To: Lando,Jody B (BPA) - EWP-4; Jule,Kristen R (BPA) - EWP-4; Petersen,Christine H (BPA) - EWP-4
Cc: Hauser,Tracy L (BPA) - EWL-4
Subject: FW: looking for a SOW on a BPA contract - KINTAMA WORK

Hi Kristen, Jody and Christine,

Michele Dehart from Fish Passage Center has reached out to Tracy Hauser requesting a copy of the draft manuscript from the Kintama work and contract 75025.

I know there are some technical, policy and political sensitivities surrounding this work, as well as the arrangement that Lorri and Bryan came to with Kintama on how the work was to be reviewed and received by BPA.

I am not sure where Michele's request/direction to review the report comes from.
She specifically provided the following in her email to Tracy: "I am trying to understand what the contract specified in terms of question pursued and deliverable. I checked in cbfish and I could not find that contract number. Would it be possible for you to locate that contract SOW ?"

It seems like it would be good for someone from BPA who is in a position of management/leadership to reach out to Michele to discuss this.

I have not experienced that we ask Fish and Wildlife Program contractors (eg. FPC) to review other FWP contractors contract delivery (eg. question pursed and deliverable) as Michele described above. This could be wading into some tricky waters quickly.

If Michele on the other hand has been asked to be a technical reviewer in Kintama's formal publication efforts for their first paper perhaps this is OK

Regardless, flagging for you both Kristen and Jody as this seems politically sensitive for us.

I am the Project manager for 1996-017-00 while Christine is the COR for the individual contract. Please let us know how you would like to proceed.

(cc'd Tracy on this email so she sees we will work to come up with a plan to respond to Michele's request)

Thank you,

Katie

Katie McDonald,

Tributary Habitat Research, Monitoring & Evaluation (RM&E) Lead

BPA F&W Division | Policy & Planning Group (EWP-4)

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kmmcdonald@bpa.gov | 905 NE 11th Avenue | Portland, OR 97232

From: Hauser,Tracy L (BPA) - EWL-4
Sent: Thursday, December 13, 2018 1:05 PM
To: Michele Dehart
Cc: McDonald,Katie M (BPA) - EWP-4
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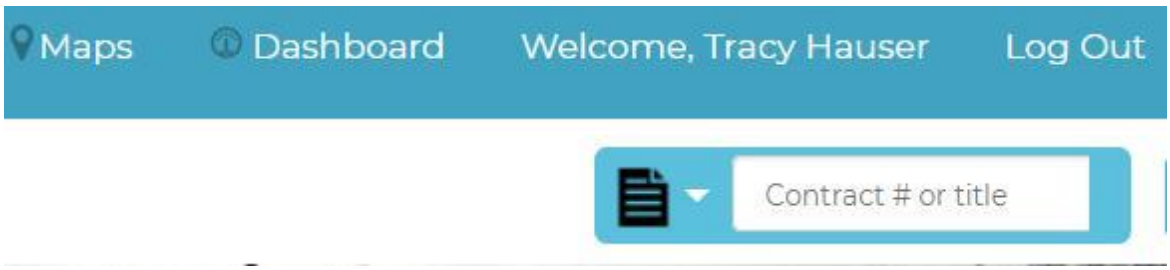

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Tracy L. Hauser, F&W Project Mgr

From: Michele Dehart <mdehart@fpc.org>
Sent: Thursday, December 13, 2018 12:27 PM
To: Hauser,Tracy L (BPA) - EWL-4 <tlhauser@bpa.gov>
Subject: [EXTERNAL] looking for a SOW on a BPA contract

Hi Tracy:

I am looking for the statement of work, and or deliverables on a specific BPA contract. We have been asked to review a draft journal article, and that article identifies a specific BPA contract number -75025 - I do not know the title of the contract that is not identified. The author and so I assume the contractor is David Welch. I am trying to understand what the contract specified in terms of question pursued and deliverable. I checked in cbfish and I could not find that contract number. Would it be possible for you to locate that contract SOW ?

Thank You

Michele

--

Blane L. Bellerud Ph.D.

Fisheries Biologist

NOAA Fisheries

Portland, OR

(503)231-2238

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Blane L. Bellerud Ph.D.

Fisheries Biologist

NOAA Fisheries

Portland, OR

(503)231-2238

--
Blane L. Bellerud Ph.D.
Fisheries Biologist
NOAA Fisheries
Portland, OR
(503)231-2238

From: Sweet,Jason C (BPA) - PGB-5 <jcsweet@bpa.gov>
Sent: Wednesday, December 9, 2020 2:41 PM
To: Ritchie.Graves@noaa.gov
Subject: ISAB 2020 (002).pdf
Attachments: ISAB 2020 (002).pdf

As discussed. See the questions being posed related to items 1, 2, and 3. In my mind, asking the ISAB to weigh in on the relevance of these papers to management of fish and wildlife in the Pacific Northwest is a good question to ask. Asking the ISAB to review the data and overall quality of papers that have already been published in refereed, peer-reviewed journals doesn't make as much sense.

December 8, 2020

MEMORANDUM

TO: **Fish and Wildlife Committee Members**

FROM: **Erik Merrill and Leslie Bach**

SUBJECT: **Discuss four potential ISAB assignments**

BACKGROUND:

Summary: Staff will discuss and seek the committee's input on four potential ISAB assignments. The discussion will be informational, and no committee decision or recommendation is needed. The committee's input will help inform Chair Devlin's consideration of approval of the assignments in his role on the ISAB Administrative Oversight Panel. The potential assignments include:

1. A request from NOAA to review scientific findings and subsequent debate on juvenile fish size selectivity in dam bypass systems and implications for estimating and interpreting fish survival (i.e., Faulkner et al. 2019, 2020 and Storch et al. 2020)
2. A request from CRITFC to compare research findings on avian predation impacts on salmon survival (i.e., Haeseker et al. 2020 and Payton et al. 2020)
3. A request from the Administrative Oversight Panel to evaluate "A Synthesis of the Coast-wide Decline in Survival of West Coast Chinook Salmon" (Welch et. al 2020) and its interpretation of the implications of smolt-to-adult return values as well as the Fish Passage Center's review of the paper (FPC 2020)
4. A proposal by the ISAB to produce a state of the science report about American shad impacts on management and restoration programs in the Columbia Basin

Draft review requests are provided below for each potential assignment.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204 1348
www.nwcouncil.org

Bill Edmonds
Executive Director

503 222 5161
800 452 5161
Fax: 503 820 2370

Relevance: These four review assignments highlight scientific issues with important management implications. The debate about analysis of juvenile fish bypass information informs hydrosystem management, particularly regarding spill. The avian predation research comparison could help inform whether to focus more attention on avian predator management. The Welch et al. paper challenges the efficacy of freshwater actions in face of coast-wide Chinook salmon declines in survival. American shad have become the most abundant anadromous fish in the Columbia River Basin, but the ecosystem and management implications are uncertain and could be significant.

Workplan: Independent scientific review is an integral and ongoing component of the Fish and Wildlife Program and the Division's workplan.

Background: The potential reviews are targeted and narrow in scope, and thus the ISAB could work on the reviews concurrently and produce timely reports. The assignments would be well within the ISAB's budget and leave ample budget for other assignments during the fiscal year.

When the Administrative Oversight Panel approved the ISAB Fiscal Year 2021 Work Plan in June 2020, they asked the Ex Officios to recommend a list of prioritized assignments from the larger set of potential assignments described in the work plan. In September, the ISAB Executive Committee considered the work plan assignments and identified a few priority assignments that the full ISAB considered. The ISAB Ex Officios and members agreed that reviews concerning 1) data sources, calculations, and interpretations of smolt-to-adult return rates (SARs) and 2) American shad would be timely and beneficial to undertake early in fiscal year 2021.

Although the first three assignments listed above could be part of one comprehensive SAR review report, we thought completing the reviews as separate documents would maintain the focus on each of the specific issues. Findings from these smaller, focused ISAB reports could then be used to develop a larger summary guidance document on SARs. We feel that this review approach will help readers discern among the different aspects of this interrelated issue.

We envision that the bypass, avian, and coastwide survival reviews could be completed in approximately four months by April 23, 2021 and that the American shad review could be completed by August 1, 2021. We would organize online briefings from regional experts to provide critical information for the reviews. We propose that these online briefings be tailored to a wider audience than just the ISAB and encourage fish and wildlife managers and policy makers to attend.

More Info:

Review Request #1: Review of analyses of juvenile fish size selectivity in dam bypass systems and implications for estimating and interpreting fish survival

NOAA Fisheries asks the Independent Scientific Advisory Board to review scientific findings and subsequent dialogue on fish size selectivity in juvenile bypass systems and implications for estimating and interpreting fish survival.

It has long been observed that juvenile salmonids that encounter multiple juvenile bypass systems during downstream migration return as adults, on average, at a lower rate than those that have fewer bypass encounters. Two, non-mutually exclusive, hypotheses have been put forth to explain this phenomenon: 1) bypass systems impart some sort of damage or stress that results in mortality, but not until the fish have completed passage through the hydropower system; 2) bypass systems select for individuals that are smaller or have other characteristics that result in a survival disadvantage regardless of passage routes at dams.

The Fish Passage Center and the Comparative Survival Study (CSS) have promoted using an index of average cumulative powerhouse passage for groups of fish, which they call PITPH, to capture the effect of passage route taken by juveniles and to estimate the magnitude of delayed mortality in the estuary and ocean. This metric is based on predicted powerhouse passage probabilities from dam passage models and does not track the passage history of individual fish. It is currently being used to guide management decisions regarding the amount of water spilled at federal dams.

Addressing the issue of effect of passage history on ocean mortality is important because the current management strategy of maximizing spill is designed to route fish away from bypass systems.

Faulkner et al. (2019) sought to investigate whether differences in length between fish utilizing alternative passage routes might help explain differences in associated adult return rates. They found that smaller fish were more likely to enter juvenile bypass systems than larger fish and that smaller fish were less likely to return as adults. They also found that apparent effects of bypass passage on adult returns were diminished or disappeared when fish length was taken into account. In a comment to the journal, Storch et al. (2020) were critical of the data and approach adopted by Faulkner et al. (2019). In addition, the 2019 CSS report (McCann et al. 2019) had an appendix (Appendix G) that was also critical of Faulkner et al. (2019).

Review questions for the ISAB:

1. Was the Faulkner et al. analysis scientifically sound and were the data it used appropriate for addressing the question?

2. Were the conclusions drawn by Faulkner et al. supported by their results?

3. Does the ISAB have recommendations to improve the analysis?

4. Are the criticisms raised by the Storch et al. comment and the CSS report appendix valid and supported by the evidence, and do any of those criticisms weaken Faulkner et al.'s results or conclusions?

5. Was the Faulkner et al. (2020) response to the Storch et al. comment appropriate and were their criticisms of the Storch et al. methods valid?

6. Is PITPH an effective index of the powerhouse passage of individual fish, and is it valid to use it to draw causative inferences about effect of powerhouse passage on ocean survival?

We appreciate the ISAB's ongoing review of fish passage and survival analyses and look forward to a constructive discussion and review. If feasible, we would appreciate a completed review by April 23, 2021.

References

Faulkner, J.R., B.L. Bellerud, D.L. Widener, and R.W. Zabel. 2019. Associations among fish length, dam passage history, and survival to adulthood in two at-risk species of Pacific salmon. Transactions of the American Fisheries Society 148:1069-1087.

Faulkner, J.R., B.L. Bellerud, D.L. Widener, S.G. Smith, and R.W. Zabel. 2020. Associations among fish length, dam passage history, and survival to adulthood in two at-risk species of Pacific salmon: response to comment. Transactions of the American Fisheries Society (in print).

McCann, J., B. Chockley, E. Cooper, B. Hsu, G. Scheer, S. Haeseker, R. Lessard, T. Copeland, E. Tinus, A. Storch, and D. Rawding. 2019. Comparative survival study of PIT-tagged spring/summer/fall Chinook, summer steelhead, and sockeye: 2019 annual report. Contract report to the Bonneville Power Administration. www.fpc.org/documents/CSS/2019CSSAnnualReport.pdf

Storch, A.J., S.L. Haeseker, G. Scheer, J.A. McCann, B. Chockley, T. Copeland, and R.B. Lessard. 2020. Comment: Associations among fish length, dam passage history, and survival to adulthood in two at-risk species of Pacific salmon. Transactions of the American Fisheries Society (in print).

Review Request #2: Compare research findings on avian predation impacts on salmon survival (i.e., Haeseker et al. 2020 and Payton et al. 2020)

Columbia Basin fish and wildlife managers, policy makers, and researchers have expressed concern about differences in the conclusions and management implications of the following two studies: *Avian predation on steelhead is consistent with compensatory mortality* (Haeseker et al. 2020) and *Measuring the additive effects of predation on prey survival across spatial scales* (Payton et. al 2020).

Significant questions remain about to what extent avian predation is additive or compensatory. At its most basic, additive means that the survival rate of the prey population is directly proportional to the predation rate; whereas, compensatory means that other life cycle factors may work to negate or counteract the effects of predation mortality on survival rates (Haeseker et al. 2020). These questions and conclusions ultimately impact decisions about future regional management actions to reduce impacts of avian fish predators (i.e., hazing, re-locating, culling, and such). For example, with the conclusion that avian predation is compensatory, Haeseker et al. 2020 concludes, "Management efforts to reduce the abundance of the bird colonies are unlikely to improve the survival or conservation status of steelhead …" The contrasting conclusion of Payton et al. 2020 that Caspian tern predation may be an additive source of mortality has important implications for predator management actions designed to increase survival of endangered salmonids.

The Columbia River Inter-Tribal Fish Commission asks that the ISAB review and compare the Haeseker et al. 2020 and Payton et al. 2020 analyses, results, and interpretations, preferably in the context of the draft Avian Predation Synthesis Report, compiled by Real Time Research for the U.S. Army Corps of Engineers.

Review questions for the ISAB:

1. Were the Haeseker et al. 2020 and Payton et al. 2020 analyses scientifically sound, and were the data used appropriate for addressing the question?

2. Were the conclusions drawn by Haeseker et al. 2020 and Payton et al. 2020 analyses supported by their results?

3. How do the modeling approaches of Haeseker et al. 2020 and Payton et al. 2020 differ, and do these analytical differences or other reasons account for the contrasts in their conclusions?

4. Does the ISAB have recommendations to improve the analysis?

5. What are the management implications of the results?

If feasible, we would appreciate a completed review by April 23, 2021.

References

Haeseker, S.L., G. Scheer, J. McCann. 2020. Avian predation on steelhead is consistent with compensatory mortality. The Journal of Wildlife Management 84(6):1164 1178. https://doi.org/10.1002/jwmg.21880

Payton, Q., A. F. Evans, N. J. Hostetter, D. D. Roby, B. Cramer, and K. Collis. 2020. Measuring the additive effects of predation on prey survival across spatial scales. Ecological Applications 00(00):e02193. 10.1002/eap.2193 https://doi.org/10.1002/eap.2193

Review Request #3: Evaluate "A Synthesis of the Coast-wide Decline in Survival of West Coast Chinook Salmon" (Welch et. al 2020) and its interpretation of the implications of smolt-to-adult return values as well as the Fish Passage Center's review of the paper (FPC 2020)

The Independent Scientific Advisory Board is asked to review scientific basis for the analysis of regional declines in Chinook salmon abundances and the conclusions and recommendations of "A Synthesis of the Coast-wide Decline in Survival of West Coast Chinook Salmon" (Welch et. al 2020). A review by the ISAB could provide an important context for interpreting the findings and important questions raised by this recent publication and the Fish Passage Center's review of the paper (FPC 2020).

Welch et al. 2020 examined SAR data for Chinook salmon for the Pacific coast to determine whether there are large-scale patterns of salmon survival based on coded wire tag data. Welch et al. report Chinook salmon survival has declined broadly across the Pacific coast and SAR values of 1% or less are widely observed. They highlight the use of the low SAR values to support management actions in the Columbia River Basin and question the validity of the interpretation of those SAR values. They note that similar declines in SAR values have been observed in west coast rivers without major dams and suggest that "contemporary survival is driven primarily by broader oceanic factors rather than local factors." They identify several methodological issues related to analyzing coded wire tags and PIT tags to calculate SAR values. Based on these interpretations, they indicate that targets for restoring salmon populations in the Columbia River Basin may not be attainable and question whether restoring freshwater habitat or improving dam passage will improve returns of salmon. The authors suggest that salmon recovery efforts should focus on actions in the marine environment rather than freshwater habitats. Welch et al. 2020 called for "a systematic review by funding agencies to assess consistency and comparability of the SAR data generated and to further assess the implications of survival falling to similar levels in most regions of the west coast." These findings and their interpretations raise critical questions that should be examined more closely.

In response to requests from the Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife, the Fish Passage Center conducted a

technical review of the Welch et al. paper and raised issues about the paper's methods, results, and interpretations (FPC 2020).

A review by the ISAB would provide information for the Council and regional policy makers for interpreting the findings of the Welch et al. paper about SARs, salmon survival, and appropriate management actions and also the Fish Passage Center's criticism of the paper.

Review questions for the ISAB:

1. Was the Welch et al. analysis scientifically sound, and were the data it used appropriate for addressing the question?

2. Were the conclusions drawn by Welch et al. supported by their results?

3. Does the ISAB have recommendations to improve the current analysis and interpretation of SAR values in the future?

4. Are the criticisms raised by the Fish Passage Center supported by the evidence and do any of those criticisms weaken Welch et al.'s results or conclusions?

5. What are the management implications of the ISAB's conclusions and recommendation?

If feasible, we would appreciate a completed review by April 23, 2021.

References

Fish Passage Center (FPC). 2020. Technical review of Welch et al. (2020), titled, *A synthesis of the coast-wide decline in survival of West Coast Chinook Salmon (Oncorhynchus tshawytscha, Salmonidae).* Memorandum from Michele DeHart (FPC) to Bill Tweit (WDFW), Tucker Jones (ODFW), and Margaret Filardo (citizen). December 4, 2020. https://www.fpc.org/documents/memos/53-20.pdf

Welch, D.W, A.D. Porter, and E.L. Rechisky. A synthesis of the coast-wide decline in survival of West Coast Chinook Salmon (*Oncorhynchus tshawytscha,* Salmonidae). *Fish and Fisheries* 2020; 00: 1 18. https://doi.org/10.1111/faf.12514

Review Request #4: American Shad Impacts on Native Fish Management and Restoration Programs in the Columbia Basin

Summary Request: The ISAB proposes to produce a state of the science report about American shad and their potential impacts on native fish management and restoration programs in the Columbia Basin.

Rationale: Native to the Atlantic coast of North America, anadromous American shad *(Alosa sapidissima*) became established in the Columbia River through migrations of fish introduced to the Sacramento River in California in 1871 and from fish stocked directly in the Columbia, Willamette, and Snake rivers in the 1880s. But it was not until hydrosystem development increased food sources, upstream passage, and reservoir habitat suitable for American shad that they reached the high abundance and expansive distribution observed over the past few decades. 7.5 million shad passed Bonneville Dam in 2019 and 5.8 million in 2020, representing 91% and 82% of all fish passing Bonneville Dam in these years. American shad are the most abundant anadromous fish species in the Columbia River, which is the largest population within their current native or expanded ranges. Such high abundances and associated biomass conceivably could have substantial impacts on the aquatic ecosystem.

Despite their high abundance, attention to American shad in recent Fish and Wildlife Programs is minimal compared to earlier plans in the 1990s that called for exploring ambitious control actions to reduce American shad interactions with salmon and steelhead. To our knowledge, such actions have not been explored. Many questions remain about the potentially complex ecological consequences of shad abundance for native fish communities and ecosystems of the Columbia River and the nearshore ocean. For example, there is evidence that American shad compete with juvenile Chinook salmon for food, but they may also provide a food source for both juvenile and adult Chinook salmon and for white sturgeon. Moreover, they may buffer juvenile salmon from predation in the river, estuary, and ocean, and may buffer adult salmon from sea lion predation. Thus, their net effect on salmon might be beneficial, neutral, or deleterious, and it might not be the same for all species or stocks.

In addition, high abundances of shad create problems for processing fish in collection facilities, deplete dissolved oxygen in fish ladders, and hinder identification of migrating fish in fish counting locations. Upriver migrations of spawning of shad are strongly controlled by temperature, which requires inter-annual variation and trends in water temperature and other environmental factors to be considered in assessing their ecological and operational impacts. Better understanding of the biology of American shad and its influences on the food webs of the Columbia River basin will inform management of both shad and other non-native species, such as northern pike and smallmouth bass. The ISAB currently includes members with expertise on American shad in North America, making such a review timely.

Review Questions:

1. What are the trends in American shad abundance in the Columbia River, and what are their potential ecological impacts on native aquatic communities of the Columbia River and nearshore Pacific Ocean?

    - How thoroughly do we understand the complete life cycle of American shad in the Columbia River (e.g., spawning locations, juvenile residence in freshwater, timing of outmigration, ocean residence, freshwater and marine survival rates)? Are there multiple life history patterns?

- What risks do American shad present for anadromous salmonids and freshwater communities (e.g., food web effects, predation, disease, habitat utilization)?

- Can increases in American shad abundance cause greater predation on juvenile salmon and steelhead by increasing the food supply for their predators or reduce predation by saturating predators on juvenile and adult salmonids?

- Can American shad populations impact the freshwater and marine food webs through competition or indirect food web effects?

- Do high abundances of American shad create significant biological or non-biological impacts (e.g., redirected sport fishing effort, reduced up-river passage efficiency through the hydrosystem, upriver nutrient transport).

2. Based on the answers to these questions, should management of American shad in the Columbia Basin change? If so, what management alternatives should be considered?

Products: The review would result in a synthesis report (~50 pages) and presentations to the Council and professional forums in the Basin. Although work to draft journal publications is generally not funded through the ISAB budget, the authors may also publish a summary of the report in a peer-reviewed journal, to ensure wide access and distribution.

Methods: The ISAB would synthesize scientific findings from American shad research in the Columbia Basin and summarize management actions and alternatives either undertaken or considered in the Basin. We would organize briefings from scientists and managers who have studied or managed American shad in the Columbia Basin and elsewhere. Several ISAB members have conducted American shad research and may also brief the group. We propose that these online briefings be tailored to a wider audience than just the ISAB and encourage fish and wildlife managers and policy makers to attend.

Timeline: Assuming most of this American shad review would occur after the other three assignments are done, we suggest the review would be completed by August 1, 2021.

From: Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov>
Sent: Wednesday, February 17, 2021 8:25 AM
To: Blane Bellerud - NOAA Federal
Subject: RE: [EXTERNAL] Re: FW: ISAB Feb 18, 19 and March 18 Meetings: Briefings on bypass selectivity (Faulkner et al./Storch et al.) and avian predation (Haeseker et al./Payton et al.)

I figured. I knew these were coming up but I didn't have the dates until yesterday. Good luck on prep for Thursday.

From: Blane Bellerud - NOAA Federal <blane.bellerud@noaa.gov>
Sent: Wednesday, February 17, 2021 8:06 AM
To: Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov>
Subject: [EXTERNAL] Re: FW: ISAB Feb 18, 19 and March 18 Meetings: Briefings on bypass selectivity (Faulkner et al./Storch et al.) and avian predation (Haeseker et al./Payton et al.)

Yes, I have been involved in working on our presentation to the ISAB

Blane

On Wed, Feb 17, 2021 at 6:46 AM Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov> wrote:

> Are you tracking this series of presentations with the ISAB?

From: Erik Merrill <emerrill@nwcouncil.org>
Sent: Tuesday, February 16, 2021 10:14 AM
To: Leslie Bach <LBach@NWCouncil.org>; amikkelsen@cdatribe-nsn.gov; art.c.martin@state.or.us; Benjamin.Blank@dfw.wa.gov; bjk@spokanetribe.com; blod@yakamafish-nsn.gov; bnichols@SpokaneTribe.com; brad.houslet@ctwsbnr.org; brenthall@ctuir.org; Bret.Nine@colvilletribes.com; calla.hagle@burnspaiute-nsn.gov; ccolter@sbtribes.com; chris.brun@ctwsbnr.org; christine.kozfkay@idfg.idaho.gov; Daniel.Rawding@dfw.wa.gov; daves@nezperce.org; deca@critfc.org; dosterman@knrd.org; dr@ucut-nsn.org; erica.maltz@usrtf.org; geneshippentower@ctuir.org; gepl@critfc.org; greg.sieglitz@noaa.gov; ireland@kootenai.org; jayh@nezperce.org; Jeannette.Finley@colvilletribes.com; jennifer.graham@ctwsbnr.org; jmaroney@knrd.org; joe_blodgett@yakama.com; lance.hebdon@idfg.idaho.gov; laura@ucut-nsn.org; lawrence.schwabe@grandronde.org; lynnd@cskt.org; mark_bagdovitz@fws.gov; MBoyer@mt.gov; Michael.Garrity@dfw.wa.gov; mike.edmondson@osc.idaho.gov; mikek@ctsi.nsn.us; PARB@critfc.org; randall.friedlander@colvilletribes.com; rentz@knrd.org; rsalakory@cowlitz.org; Ryan.Banks@osc.idaho.gov; scott.hauser@usrtf.org
Cc: Drohr5@aol.com; greer.maier@ucsrb.org; jennifer_bayer@usgs.gov; john@snakeriverboard.org; Melody.kreimes@ucsrb.org; nleonard@psmfc.org; sarah.walker@ucsrb.org; Shaun.seaman@chelanpud.org; smanlow@lcfrb.gen.wa.us; Donahue,Scott L (BPA) - EWP-4 <sldonahue@bpa.gov>; Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>; George,Rodrigo (BPA) - EWB-4 <rdgeorge@bpa.gov>; Kavanagh,Maureen A (BPA) - EWP-4 <makavanagh@bpa.gov>; Allen,Brady (BPA) - EWP-4 <mballen@bpa.gov>; Lofy,Peter T (BPA) - EWU-4 <ptlofy@bpa.gov>; Skidmore,John T (BPA) - EWL-4 <jtskidmore@bpa.gov>; Kaplowe,David J (BPA) - EWM-4 <djkaplowe@bpa.gov>; Knapp,Douglas D (BPA)

- EWL-4 <ddknapp@bpa.gov>; Jule,Kristen R (BPA) - EWP-4 <krjule@bpa.gov>; Lando,Jody B (BPA) - EWP-4 <jblando@bpa.gov>; Welch,Sean P (BPA) - EWP-4 <spwelch@bpa.gov>; Patty O'Toole <potoole@nwcouncil.org>; Gregory, Stanley Vincent <stanley.gregory@oregonstate.edu>
Subject: [EXTERNAL] ISAB Feb 18, 19 and March 18 Meetings: Briefings on bypass selectivity (Faulkner et al./Storch et al.) and avian predation (Haeseker et al./Payton et al.)

Hi All,

At the Regional Coordination Forum's January 21 meeting, Leslie Bach, Stan Gregory, and I briefed the forum on four current ISAB assignments, and several of you expressed interest in listening to briefings to the ISAB on the four topics. Many of you listened to Dr. David Welch and co-authors' briefing on their coastwide Chinook salmon survival analyses to the ISAB on February 5 thank you. Over the next month, the ISAB is holding several meetings that include briefings on bypass selectivity (Faulkner et al./Storch et al.) and avian predation (Haeseker et al./Payton et al.) that may be of interest to you:

1. Thursday, February 18, 10am-12:15 PST - Bypass Selectivity (Faulkner et al.) (GoToMeeting link)
2. Friday, February 19, 10am-12:15pm PST - Avian Predation (Payton et al.) (GoToMeeting link)
3. Thursday, March 18, 2021 8:00 AM 12:30 PM (PDT) - Bypass Selectivity (Storch et al.) and Avian Predation (Haeseker et al.) (GoToMeeting link)

The full GoToMeeting details are provided below, and here's a link to the ISAB's assignment memo that provides background on the reviews.

1. ISAB Briefing – Bypass Selectivity (Faulkner et al.)

Thursday, February 18, 10am-12:15pm PST

- 10:00-10:15 Introductions (Stan Gregory, ISAB Chair)
- 10:15-11:15 Presentation (Jim Faulkner, Rich Zabel, and co-authors)
- 11:15-12:15 Q&A (Stan and Carl Schwarz facilitate)

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2. ISAB Briefing – Avian Predation (Payton et al.)

Friday, February 19, 10am-12:15pm PST

- 10:00-10:15 Introductions (Stan Gregory, ISAB Chair)
- 10:15-11:15 Presentation (Quinn Payton and co-authors)
- 11:15-12:15 Q&A (Stan, Tom Turner, and Tom Wainwright facilitate)

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3. ISAB Briefings - Bypass Selectivity (Storch et al.) and Avian Predation (Haeseker et al.)

Thursday, March 18, 2021 8:00 AM – 12:30 PM (PDT)

8:00-8:15 Introductions (Stan Gregory, ISAB Chair)

8:15-10:15 Storch et al. regarding Faulkner et al. bypass selectivity

- 8:15-9:15 Presentation
- 9:15-10:15 Q&A (Stan and Carl Schwarz facilitate)

10:15-10:30 Break

10:30-12:30 Haeseker et al. regarding avian predation

- 10:30-11:30 Presentation
- 11:30-12:30 Q&A (Stan, Tom Turner, and Tom Wainwright facilitate)

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Stay well,

Erik Merrill

Independent Science Manager

Northwest Power and Conservation Council

851 SW 6th Avenue, Suite 1100

Portland, Oregon 97204

503 222 5161

800 452 5161 (toll free)

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Blane L. Bellerud Ph.D.
Fisheries Biologist
NOAA Fisheries
Portland, OR
(503)231-2238

From: Bettin,Scott W (BPA) - EWP-4 <swbettin@bpa.gov>
Sent: Friday, March 19, 2021 2:45 AM
To: Trevor Conder - NOAA Federal
Subject: letters
Attachments: Welch Letter to the Governors & Legislators (17 March 2021).pdf; 2021.Sci.Letter.Final.2.22.21.pdf

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Kintama Research Services Ltd
755 Terminal Avenue
Nanaimo, B.C.
Canada V9S 4K1
M: (250) 739-9044

17 March 2021

Subject: 68 Scientists' letter on the need for lower Snake River dam removal is wrong

TO: Northwest Governors, Members of the US Senate & Congress, Policymakers

I am writing to refute the recent letter signed by 68 scientists stating that Snake River dam removal is required "*to protect and restore abundant salmon and steelhead runs to the Snake/Columbia River Basin*" (22 February, 2021).

Only one of their four claims is correct, namely that "*The actions set forth in the 2020 Federal Environmental Impact Statement (EIS) and Biological Opinion (BiOp) are insufficient and will not reverse salmon declines*". However, my colleagues' call to remove the Snake River dams will not work. It is mathematically impossible for removing the four Snake River dams to materially change salmon survival levels and it is long past time to make this clear to decision makers. Their letter also misrepresents the state of salmon runs in most other regions of the West Coast, which have similar conservation issues. In short, their three conclusions concerning removal of the Snake River dams as a fix for the salmon problems are just plain wrong.

Let me explain.

Snake River Spring Chinook and steelhead currently have a greater than 96% survival rate per dam[i]. These survival levels are the result of major efforts taken by the action agencies and are substantially greater than in the early 1970s when the dams were constructed. They are also roughly on par with survival rates reported from other regions without dams[ii]. As my 68 colleagues correctly informed you, current adult survival levels (SARs) are inadequate to restore Snake River salmon populations to abundance. However, removing the dams will not change this, because the failure of salmon to recover is because of poor ocean survival. Removing the Snake River dams won't fix this.

What the Group of 68 have not said is that it is impossible to achieve the target of 2-6% SARs by making further changes in freshwater. This should have been stated years ago.

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[i] Skalski et al (2016). Status after 5 Years of Survival Compliance Testing in the Federal Columbia River Power System (FCRPS). N. Amer. J. Fisheries Management, 36(4), 720 730. doi:10.1080/02755947.2016.1165775

[ii] Welch, D. W., Porter, A. D., & Rechisky, E. L. (2021). A Synthesis of the Coast wide Decline in Survival of West Coast Chinook Salmon. Fish & Fisheries, 22(1):194 211. doi:10.1111/FAF.12514

Consider a simple thought experiment. If you remove all four Lower Snake River dams as requested, it is simple to calculate that SARs will increase from 1.1% to only 1.3%--a barely measurable increase[iii] compared with the needed 4%.

My colleagues, undaunted, will then simply declare that they are still right, but it will require even more heroic efforts to achieve the goals… obviously, the four Columbia mainstem dams must now go as well; surely, taking out the four lower Columbia dams will fix the problem as claimed?

Eight dams are now gone. SARs increased from 1.1% to 1.3% to (now) 1.5%... not even close to the long-promised 4% needed for recovery[iv]. This is the stark mathematical reality that they ignore.

Much of the mortality in the FCRPS is actually due to predators feeding on salmon smolts in the regions between dams, not the dams. Suppose you as the regional decision makers also institute an unprecedented extermination program, wiping out all bird and fish predators and all disease-causing agents contributing to smolt mortality. In effect, you sterilize the river. Average historical smolt survival for the entire 8 dam FCRPS is 53%[v], so eliminating all causes of smolt deaths (8 dams + all predators) moves the SAR from 1.1% to 2.1%—the very lower limit of current recovery targets— but will require major extermination programs that are legally and ethically fraught.

In reality, SARs will hardly budge if you follow my colleagues' plan. Despite their earnest letter, taking out the four Snake River dams won't even come close to achieving what is needed.

Why so little change? My esteemed colleagues will probably assure you that the mysterious "delayed mortality" due to accumulated stresses from the dams will also vanish because the dams are gone, so my simple calculations are too pessimistic. (And they certainly won't mention those extermination programs). However, also unmentioned in their letter, the claims for delayed mortality vanish when broader data sets are considered, which until our recent paper was published[ii] had never been discussed. Evidence for delayed mortality also disappears when adjusting for juvenile salmon size, according to a 2019 NOAA Fisheries study[vi].

The Group of 68's letter simply does not mention the extensive contradictory data because it does not fit with their beliefs. However, a simple calculation shows what level of delayed mortality must be occurring to achieve the 4% recovery target. To get from 2.1% SARs (remember, all dams must be removed and all predators exterminated to achieve this) to 4%, fully 47.5%--*half* of all Snake River smolts passing Bonneville Dam—must be dying from "delayed mortality"

[iii] Moving from 96% per project survival to 100% would increase the SAR by a factor of (1/0.96) per dam. This would increase the SAR from 1.1% to 1.1% x $(0.96)^4$ 1.3% if all 4 Snake River dams were removed.

[iv] The math is equivalent for removing 8 dams and yields 1.1% x $(0.96)^8$ 1.5%. Haeseker (2012) reports slightly lower average historical smolt survival for the entire 8 dam FCRPS of 53%, so eliminating all smolt deaths would move the SAR from 1.1% to 1.1÷0.53 2.1%. This is an overestimate of the gain because it ignores the benefits from more recent improvements in smolt passage. It also requires extermination programs for the entire FCRPS.

[v] Average SAR values from Haeseker et al. (2012). Assessing Freshwater and Marine Environmental Influences on Life Stage Specific Survival Rates of Snake River Spring Summer Chinook Salmon and Steelhead. Transactions of the American Fisheries Society, 141(1):121 138. doi:10.1080/00028487.2011.652009

[vi] Faulkner *et al* (2019). Associations among Fish Length, Dam Passage History, and Survival to Adulthood in Two At Risk Species of Pacific Salmon. Transactions of the American Fisheries Society, 148(6):1069 1087. doi:10.1002/tafs.10200

caused by those dams. If we "just" take out the 4 Snake River dams, the current demand, *two-thirds* of all Snake River smolts passing Bonneville must be dying because of the stress of passing those dams[vii]. This is totally unrealistic.

The ISAB is preparing an evaluation of our published study[ii], so their assessment should be available soon. Unless the ISAB contradict the findings in our paper and conclude that there is real evidence for delayed mortality, the best the region can expect is to get to the lower end of the range (2%)—but only with the help of those major extermination programs that the Group of 68 do not mention. The salmon recovery promised in their letter is impossible, ignores the basic mathematics of the situation, and relies on their personal beliefs instead of the facts.

It gets worse. The Group of 68 go on to note in their letter, *"…the four dams must be removed to not only avoid extinction, but also to restore abundant salmon runs and to achieve the region-wide goals"*. Missing from their confident assertions is any caution about the parlous state of salmon in other river systems. In British Columbia's Fraser River, the largest undammed river on the West Coast, Chinook, sockeye, and steelhead are all in catastrophic decline. For Chinook, only 2 of 15 Fraser populations received "green" status; 11 were assigned a Red status ("…*a conservation unit being considered at risk of extinction*"), one was assigned a Red/Amber status, and one was assigned Amber[viii]. For sockeye, the situation is similar, with the lowest adult returns in over a century occurring in 2019[ix]. None of my colleagues in either the US or Canada can tell you why only two Fraser Chinook and one Fraser sockeye population are doing well when all the other populations are doing extremely poorly, but it clearly can't be because of differences in the number of dams they migrate past, because there are none. Dams certainly aren't the reason the vast majority of Chinook and sockeye populations are in deep trouble. So why should you conclude that the dams are the culprit for the Snake River? Chinook populations in a much broader range of West Coast river systems are in serious trouble[ii], and the Group of 68's arguments clearly won't fix the problems in these other river systems.

For Fraser River steelhead, the situation is even worse: both the Chilcotin and Thompson River populations have tumbled to catastrophically low population numbers over the past few decades, despite having an abundance of pristine habitat and no dams to migrate past[x]. Steelhead in both

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[vii] To see this, consider what fraction of Snake River smolts passing Bonneville Dam must be dying because of the delayed effect of dam passage. Call this proportion x. To get from a 2.1% SAR to the target 4% SAR by "fixing" the claimed delayed mortality, the equation is $4\% \quad \frac{2.1\%}{(1 \quad x)}$. Solving for x gives x 47.5% (half of all smolts must die due to delayed mortality from the dams). If you remove only the 4 Snake River dams so the SAR rises to 1.3%, the calculation yields 67.5%; two thirds of all smolts passing Bonneville must die due to these claimed delayed effects. In short, both values are ludicrous, because they require the "delayed" effects in the ocean of the Snake River dams to be as great or greater than direct deaths from all causes occurring in the entire 8 dam FCRPS.

[viii] CSAS (2016). Integrated Biological Status of Southern British Columbia Chinook Salmon Under The Wild Salmon Policy, Canadian Science Advisory Secretariat, Pacific Region Science Advisory Report. 2016/042: 15. http://waves-vagues.dfo-mpo.gc.ca/Library/40595419.pdf

[ix] MacDonald *et al.* (2020). State of the Salmon: Informing the survival of Fraser Sockeye returning in 2020 through life cycle observations, Dept. of Fisheries & Oceans, Government of Canada. Canadian Technical Report of Fisheries and Aquatic Sciences 3398: 76 pp. https://waves vagues.dfo mpo.gc.ca/Library/4088546x.pdf

[x] The Chilcotin River is pristine and has freshwater habitat conditions most regions can only dream of. The 2020 population estimate is 38 adult steelhead. For the Thompson River, the estimate is 257 adults. R. Bison, Province of B.C.; personal communication. robert.bison@gov.bc.ca

Fraser River tributaries are requested for emergency listing[xi]. Why, if the Group of 68 are correct and it is the Snake River dams blocking "*the gateway to high quality, resilient spawning habitat*" do we see such catastrophic conditions in these major tributaries of the undammed Fraser River? Why should the reduced marine survival thought to be impeding recovery of Fraser stocks not also apply to the Snake River? Similarly, why should the similar reported SARs of Puget Sound Chinook[xii] and steelhead[ii,xiii,xiv] not also tell us that removing the Snake River dams (and all those predatory populations of birds and fish) cannot possibly be a major factor in the current situation?

The reality is that Chinook populations are in trouble all the way up to the Yukon River in Alaska—despite the pristine freshwater habitat in northern areas that my colleagues are convinced will turn around the fate of Snake River populations if the dams are just removed. They have no explanation for why such problems occur elsewhere, so they simply ignore them.

Early on in our training, the principle of Occam's Razor teaches junior scientists to look for the simplest explanation. Yet too often in salmon conservation this principle is abandoned in favor of complex river-specific narratives that deliberately ignore the parallel declines in salmon abundance in other river systems. In our recent publication we found that rivers without dams or even those with truly pristine freshwater habitat values are suffering the same decline in survival as the Snake River[ii]. Perhaps the most remarkable point is that the generations of salmon biologists running these monitoring programs have not pointed this out. Predictably, the Fish Passage Center labeled our work as incompetent, without ever providing an explanation for why the different agencies performing salmon monitoring work along the West Coast should converge on similar survival values. The Group of 68 in their letter to you also chose to omit any mention of the remarkable similarity in SAR levels that all these agencies are now measuring. The reason is obvious—it doesn't fit with their preconceived ideas.

A Way Forward

The Northwest salmon debate is hardly unique in its shift from science to advocacy. Scientists are people, subject to emotion and opinions. However, to provide true value to society salmon science needs to go back to the basics. Partly this means using the simple calculations I outline to show that the basic claims made are mathematically impossible. However, it also means using the scientific method to rigorously test claims that are still within the realm of possibility. If one has a theory—for example, delayed mortality—then rigorous scientific testing is needed to prove it exists. Mere observation of patterns or correlations, such as better survival of some populations, is not proof of a cause-and-effect relationship and *always* need to be rigorously tested—the stakes are simply too high for the region to rely on belief. In fact, willingness to rely on "expert opinion" rather than rigorous hypothesis testing led to the current impasse, where biologists

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[xi] Neilson, J., & Taylor, E. (2018). *Emergency assessments of the Steelhead Trout (Oncorhynchus mykiss): Thompson River and Chilcotin River populations (2018).* Government of Canada, Ministry of Environment and Climate Change Retrieved from https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife/special-reports.html

[xii] Sobocinski et al. (2021). A hypothesis driven statistical approach for identifying ecosystem indicators of coho and Chinook salmon marine survival. Ecological Indicators, 124. doi:10.1016/j.ecolind.2021.107403

[xiii] Welch et al. (2018). The coast wide collapse in marine survival of west coast Chinook and steelhead: slow moving catastrophe or deeper failure? *BioRXiv*, 476408. https://www.biorxiv.org/content/10.1101/476408v1.abstract

[xiv] Sobocinski et al. (2020). Ecosystem indicators of marine survival in Puget Sound steelhead trout. Progress in Oceanography, 188, 102419. doi:10.1016/j.pocean.2020.102419

blindly call for evermore efforts in freshwater in the hope that they can somehow compensate for poor marine survival. The belated recognition that many of these past analyses even failed to account for changes in salmon harvest[ii] should be seen as a warning flag that all is not well in salmon science.

A conspicuous element of the Snake River debate surrounds how studies contradicting cherished beliefs are dismissed by opponents as "unrepresentative" without ever showing the claim is actually true. Unfortunately, such claims are commonplace in the Columbia Basin and make your job as policy makers more difficult. Many of the recent claims that analyses contradicting long-held dogma are "unrepresentative" are in fact directly testable using explicit scientific experiments—but currently aren't. These claims need to be tested or the region risks being held hostage by theoretical possibilities rather than proven problems.

Global Warming, Climate Change, and the Future of PNW Salmon

As the four PNW States debate what to do about salmon and the recent call by the Group of 68 to remove the dams, please bear in mind that salmon are not the only resource at risk; so too are hydropower dams as incredibly valuable sources of clean, CO_2-free power.

Dams kill small numbers of salmon in their operations, although much of what is attributed the dams is actually due to salmon predators, and smolt survival in other rivers without dams seems broadly similar[xv,xvi]. A recent paper by NOAA scientists explicitly identifies the ocean as the main cause of future decreased survival due to global warming[xvii]. A UN analysis of plans from 74 countries, accounting for a third of global CO_2 emissions, found those nations' emissions would be reduced by only 0.5% by 2030, compared with 2010 levels[xviii]. However, the Intergovernmental Panel on Climate Change reports that global emissions must fall by about 45% by 2030 to stand a chance of staying below 1.5°C[xix]. The gap is huge.

You and your advisors must balance the direct impacts of hydropower on salmon mortality with the broader goals of identifying a path to a low carbon future. Measured direct impacts of the dams on salmon are now trivial. It is time to say this and recognize that past efforts to correct passage problems have achieved this.

Renewing Salmon Science

The disputes surrounding Snake River salmon now center on differences of opinion as to the underlying causes. Opinion should really count for little. You, as decision makers, should demand

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[xv] Welch et al. (2008). Survival of Migrating Salmon Smolts in Large Rivers With and Without Dams. *PLoS Biology, 6*(10), 2101 2108. doi:10.1371/journal.pbio.0060265

[xvi] See Fig. 2. of Welch et al. (2018). The coast wide collapse in marine survival of west coast Chinook and steelhead: slow moving catastrophe or deeper failure? BioRXiv, 476408. https://www.biorxiv.org/content/10.1101/476408v1.abstract

[xvii] Crozier, L. G., Burke, B. J., Chasco, B. E., Widener, D. L., & Zabel, R. W. (2021). Climate change threatens Chinook salmon throughout their life cycle. Communications Biology, 4(1), 222. doi:10.1038/s42003 021 01734 w

[xviii] https://www.newscientist.com/article/2269432 we are nowhere near keeping warming below 1 5c despite climate plans/#ixzz6nsnkmYkf

[xix] https://www.ipcc.ch/sr15/chapter/spm/

a higher standard than simply expressions of professional opinion—there is far too much we do not know about the ocean life of salmon to rely on opinion, no matter how educated or sincere the individuals. Biomedical science recently emerged from a similar malaise with the recognition that much of their scientific literature was deeply flawed because of psychological issues surrounding interpretation of data[xx]. The solution in medicine was to *insist on rigorous double blinded experimental testing of key issues*—not selective interpretation of data supporting a particular viewpoint—coupled with pre-publication of the study plan to avoid cherry picking of the data supporting a particular view. The importance and value of regional hydropower means that you should insist on the same standards for scientific advice you receive.

Difficult Days Ahead

The Pacific Northwest needs to prepare for a much warmer world where salmon populations will likely be reduced to vestigial remnants and, quite probably, regional extinctions. There is much to do. Ignoring this possibility will make the political and legal problems much worse as the climate warms further.

NOAA's recently released study showing massive negative impacts on Snake River salmon from future ocean warming should be a warning bell[xvii]; if future ocean survival should drop as predicted, is it really even advisable to be moving salmon to the ocean more quickly? The Group of 68 are silent on why accelerating salmon to the ocean by dam breaching is even wise, let alone whether it can actually compensate for further reductions in marine survival... and if it cannot, why do it? This question is pertinent because the benefits from decreasing spill at hydropower dams means more carbon-free energy and more flexibility in using the dams to aid in the transition to greater use of wind and solar.

Summary

Your advisors will have told you that relying solely on intermittent power resources (wind, solar) without secure sources of reliable power will likely require three times the capital expenditure otherwise required[xxi]. The required sums are enormous. The Pacific Northwest is fortunate that hydropower dams provide that backstop capacity. The recent calamity in Texas demonstrates the consequences of disrupting reliable sources of power as the climate changes.

I am not an expert on the US power grid. However, I am an expert on the biology of Pacific salmon. I have watched with dismay over three decades as fisheries agencies in both the U.S. and Canada preferentially expanded freshwater monitoring programs that are in reality simply documenting massive decreases in ocean survival without giving much insight into what is going wrong in the ocean. The reasons for this preference for freshwater over marine work are complex and deserving of careful sociological study. However, the end result has left the Pacific northwest exposed to likely catastrophic further declines in Pacific salmon returns caused by poor survival at sea as the oceans warm, with little capability to distinguish between real and imagined impacts of the dams.

[xx] Horton, R. (2015). Offline: What is medicine's 5 sigma? Lancet, 385(9976), 1380. doi:10.1016/S0140 6736(15)60696 1

[xxi] Sepulveda, et. al. (2018). The role of firm low carbon electricity resources in deep decarbonization of power generation. *Joule, 2*(11), 2403 2420. doi:10.1016/j.joule.2018.08.006

You, as decision makers, have a difficult task—that of balancing competing risks. Snake River salmon are in trouble and there are legal obligations to protect them. The Columbia River Basin dams also need protecting, as sources of reliable CO_2-free power crucial in the pivot away from fossil fuels, which helps slow down climate change—which helps salmon. Operating the dams kills some salmon and brings some gains. My professional advice to you is to balance the risks and rewards but recognize that the claims of my 68 colleagues are impossible.

Regional salmon coordination bodies with complex working groups cannot replace an actual understanding of what is occurring in the ocean. Consider that scientists cannot even tell you with confidence that flushing salmon smolts into the ocean faster will result in smolts having better survival than in the river. That this is not known despite many of my colleagues calling for dam removal to speed smolts into the ocean faster should give you pause— they assume that this it is a good thing without knowing it is true. As so often the case with science, it is the hidden assumptions that can be the fatal flaw in the argument.

I urge you to not get stampeded by panicked calls to do ever-more of what hasn't worked well in the past. The basic mathematics make no sense, even if the objectives are laudable. There may be a need for triage with Snake River salmon —past multi-billion dollar investments have not appreciably changed their SARs compared to other regions along the west coast, so further efforts are unlikely to be more successful.

In closing, there is ample reason to question the diagnosis presented by my 68 colleagues. As the regional decision makers, I urge you to ask your own experts two hard questions: (1) Are the (very) simple mathematical calculations I laid out correct? and (2) Why were the basic issues I raise not acknowledged decades ago rather than simply continuing to focus on the dams as the problem? It is clearly time to develop a more flexible and thoughtful approach to the coming climate changes.

Sincerely,
David Warren Welch, Ph.D. (just one).
President, Kintama Research Services, Ltd.
755 Terminal Ave N, Nanaimo BC, Canada V9S 4K1
Mobile: (250) 739-9044
david.welch@kintama.com

Welch's awards and past involvement in identifying the role of ocean climate change on Pacific salmon can be viewed here: http://kintama.com/about-kintama/leadership-team/

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NW Congressional Delegation

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