LEWIS RIVER AQUATIC COORDINATION COMMITTEE

Facilitator: ERIK LESKO
503-412-8401

Location: TEAMS MEETING ONLY

Date: January 13, 2022

Time: 9:30 AM – 12:15 PM

AGENDA ITEMS

9:30 AM	Welcome ➢ Review and Accept 1/13/2022 Agenda ➢ Review and Accept 12/9/2021 Meeting Notes
10:00 AM	Public Comment Opportunity
10:15 AM	Swift Floating Surface Collector: Collection Efficiency Presentation *Chris Karchesky/Four Peaks Environmental Staff*
11:15 AM	Aquatic Fund Scoring Matrix Review *Erik Lesko*
11:30 AM	Fish Passage Subgroup Development – decision document *Bill Sharp/Erik Lesko*
11:45 AM	Study/Work Product Updates ➢ Flows/Reservoir Conditions Update ➢ ATS Update ➢ Fish Passage Update ➢ USFWS update on fish stranding above Swift (tentative)
12:00 PM	Next Meeting's Agenda Public Comment Opportunity
12:15 PM	Meeting Adjourn

Note: all meeting notes and the meeting schedule can be located at:
https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html

Join on your computer or mobile app

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Or call in (audio only)

+1 563-275-5003,,644857650# United States, Davenport

Phone Conference ID: 644 857 650#

FINAL Meeting Notes
Lewis River License Implementation
Aquatic Coordination Committee (ACC) Meeting
January 13, 2022
TEAMS Meeting Only

ACC Representatives and Affiliates Present (21)
Bridget Moran, American Rivers
Sarah Montgomery Anchor QEA
Eli Asher, Cowlitz Indian Tribe
Amanda Froberg, Cowlitz PUD
Steve West, LCFRB
Bonnie Shorin, NMFS
Chris Karchesky, PacifiCorp
Erik Lesko, PacifiCorp
Jeremiah Doyle, PacifiCorp
Mark Ferraiolo, PacifiCorp
Jim Byrne, Trout Unlimited
Kate Day, USFS
Jeff Garnett, USFWS
Aaron Roberts, WDFW
Bryce Glaser, WDFW (joined late)
Erin Peterson, WDFW
Josua Holowatz, WDFW
Kale Bentley, WDFW
Peggy Miller, WDFW
Bill Sharp, Yakama Nation
Elaine Harvey, Yakama Nation

Guests (2)
Sam Haffey (Four Peaks Environmental)
Kelley Jorgensen (on behalf of Northwoods)

Calendar:

January 13, 2022	ACC Meeting	TEAMS Meeting

Assignments from January 13, 2022	**Status**
Erik Lesko: share Swift Reservoir operations and spatial data that is provided to the Services to the ACC (if not deemed confidential); if confidential; communicate that it cannot be shared.	**Complete (02/10/2022).**
Erik Lesko: Present monitoring strategies for fish stranding assessments in Swift Reservoir in 2022 with the ACC in April.	**Ongoing.**
Kale Bentley: Provide feedback to Karchesky regarding time-stratified estimates of collection efficiency using passive integrated transponder (PIT) tag data.	**Complete (02/10/2022).**

Assignments from December 9, 2021	Status
Fish Passage Subcommittee: finalize the Decision Document for the formation of the Fish Passage Subcommittee and recommend it to the ACC for final approval.	**Complete.**

Assignments from November 16, 2021	Status
All: Provide comments on the Aquatic Monitoring and Evaluation Plan (AMEP) to Chris Karchesky by February 15, 2022.	**Ongoing.**
Erik Lesko: Extend the Aquatic Fund period of performance for the Chum Channel Project.	**Ongoing.**

Assignments from August 13, 2020	Status
ACC members: Provide background information regarding why the Merwin floating trap design was identified as part of the Settlement Agreement.	**Assigned to the FPS (02/10/2022)**

Opening, Review of Agenda and Meeting Notes
Erik Lesko (PacifiCorp) called the meeting to order at 9:35 a.m. and reviewed the agenda. No changes were made. Lesko reviewed the December 9, 2021, meeting notes. The meeting notes were approved at 9:45 a.m., with clarifying edits from Washington Department of Fish and Wildlife (WDFW).

Public Comment Opportunity
None.

Swift Floating Surface Collection: 2021 Collection Efficiency Study Presentation
Sam Haffey (Four Peaks Environmental) provided a summary presentation for the 2021 collection efficiency study results. Karchesky (PacifiCorp) explained that this evaluation has been conducted annually at the Swift FSC since it was commissioned in 2012 and is designed to assess facility performance in regards to collection efficiency. The performance target for collection efficiency (CE) at the Swift FSC has been defined as 98% of fish available for collection. He also went on to mention that the report summarizing this work will be included in the 2021 Lewis River Annual Fish Passage Report which will be distributed to the ACC for review in June 2022. Karchesky introduced Haffey to the ACC and explained that Four Peaks Environmental had been contracted to perform this evaluation for PacifiCorp in 2021. A copy of the presentation slides are provided below and in Attachment A:

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Swift Reservoir 2021 Floating Surface Collector Efficiency Evaluation

Lewis River Aquatic Coordination Committee
Meeting
January 13, 2022

Swift Floating Surface Collector History Review

- Commissioned in December of 2012
- Initial studies (2013-15) revealed that fish had difficulty locating the collector
  - Collection efficiency less than 30% during these years for most species
  - Spring Chinook had collection efficiency <1%
- Several adjustments successful in helping fish find and enter the collector
  - Lead net installation in 2016
  - Operational noise reduction in 2017
  - Attraction flow velocity increase in 2019
- These adjustments were successful and now nearly 100% of the fish that enter the forebay also enter the collector; however, retention within the collector continues to limit collection efficiency
  - About 50% of the fish that enter the collector turn back before collection

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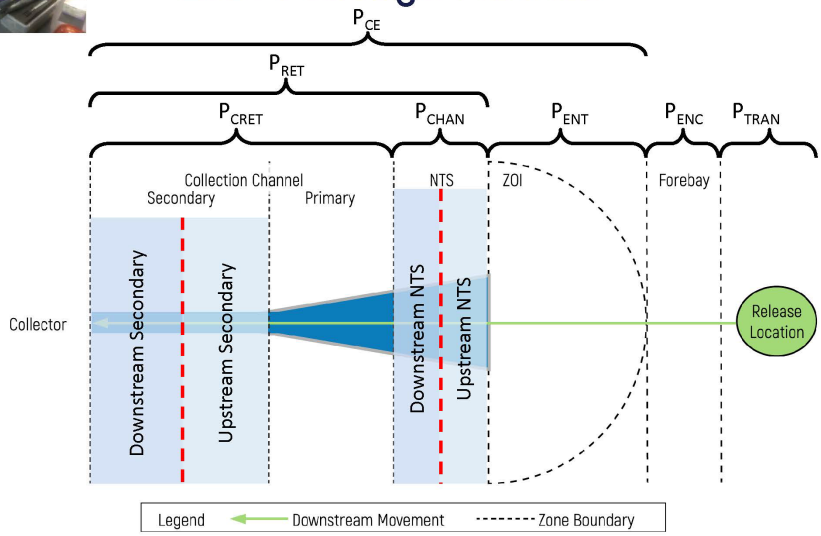
2021 Passage Metrics



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2021 Study Objectives

- Primary objective is to calculate passage metrics
  - Per objective 2 of the M&E plan
- Focus on where fish are rejecting within the fish channel
  - Identify factors that may explain rejection behavior

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Methods Overview

- Acoustic telemetry used to position fish in discrete zones along the migration path to collection
  - ZOI
  - NTS with sub zones
  - Collection Channel with sub zones
- Additional variables monitored to obtain data on factors that may influence passage success
  - Weather and water temperature
  - Human activity
  - Operational sound and pumping rates
  - Debris loading
- Resulting zone presence data analyzed to estimate passage metrics and investigate fish behavior in the NTS and collector
  - Zone presence data used to determine how far fish progress within the Collection Channel
  - Factors that influence fish behavior in the Collection Channel evaluated

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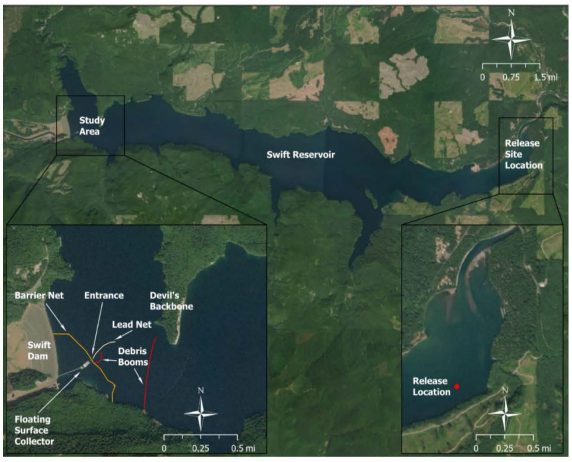
Fish Tracking Field Study Overview



- 443 dual-tagged* fish released
  - 39 Chinook Salmon
  - 212 Coho Salmon
  - 192 steelhead
- Site: 9 miles upstream of the Swift floating surface collector (FSC)
- Release dates: April 1 to June 1

* dual-tags consist of passive integrated transponder (PIT) and acoustic telemetry

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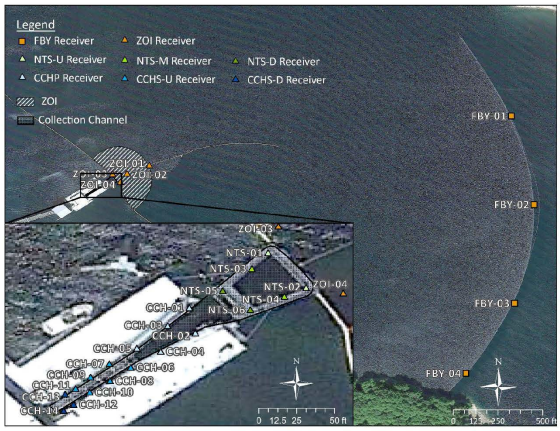
Fish Tracking Field Study Overview (cont.)

- Fish tracked via acoustic telemetry from release through the Collection Channel
- Fish tracking continued until July 15
  - Each tag has an estimated 45-day battery life from time of release
- Collection confirmed with PIT tags



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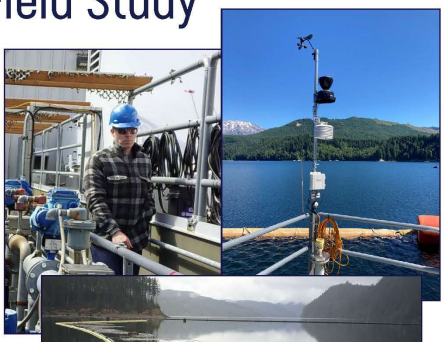
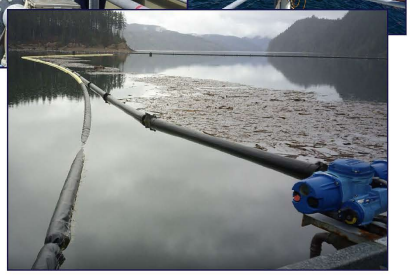
Covariate Field Study

- Environmental factor monitoring
  - Meteorology
  - Water temperature
  - Solar radiation
  - Debris loading
- Operational factor monitoring
  - Human activity level
  - Operational sound
- Operation of attraction pumps
  - Varied the number of primary attraction pumps to evaluate passage behavior in the primary channel under different flow conditions (10 vs. 8 pumps)





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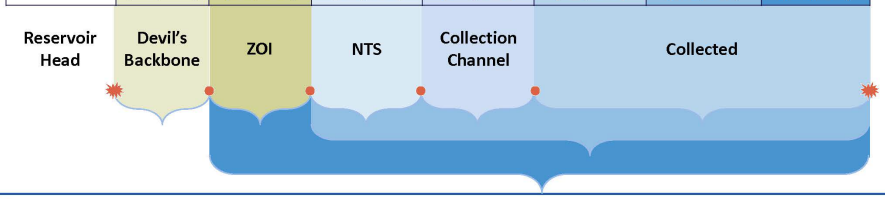
Passage Metrics

Species	P_{TRAN} (%)	P_{ENC} (%)	P_{ENT} (%)	P_{CHAN} (%)	P_{CRET} (%)	P_{RET} (%)	P_{CE} (%)
Chinook Salmon	74	86	100	57	92	52	52
	(63, 86)	(76, 97)	-	(40, 73)	(79, 100)	(36, 68)	(36, 68)
Coho Salmon	89	95	95	78	52	41	40
	(86, 93)	(92, 97)	(92, 97)	(73, 83)	(45, 59)	(34, 47)	(34, 46)
Steelhead	73	94	94	84	60	50	48
	(68, 78)	(91, 98)	(91, 98)	(78, 89)	(52, 68)	(43, 58)	(41, 55)
All	81	94	94	79	57	45	44
	(78, 84)	(92, 96)	(92, 96)	(75, 83)	(52, 62)	(41, 50)	(39, 48)



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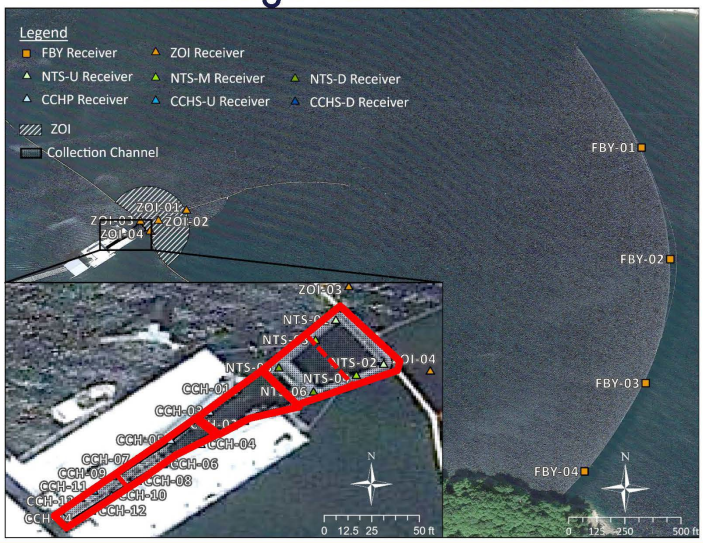
Passage Zones Review



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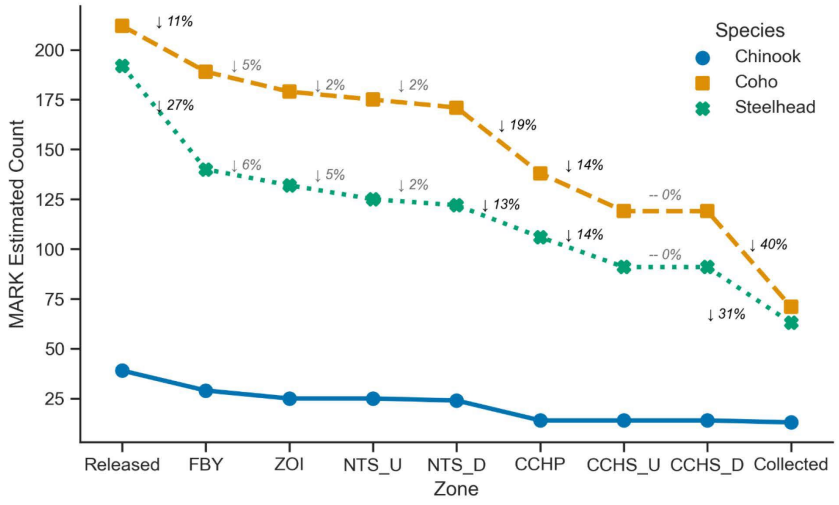
Passage Bottlenecks



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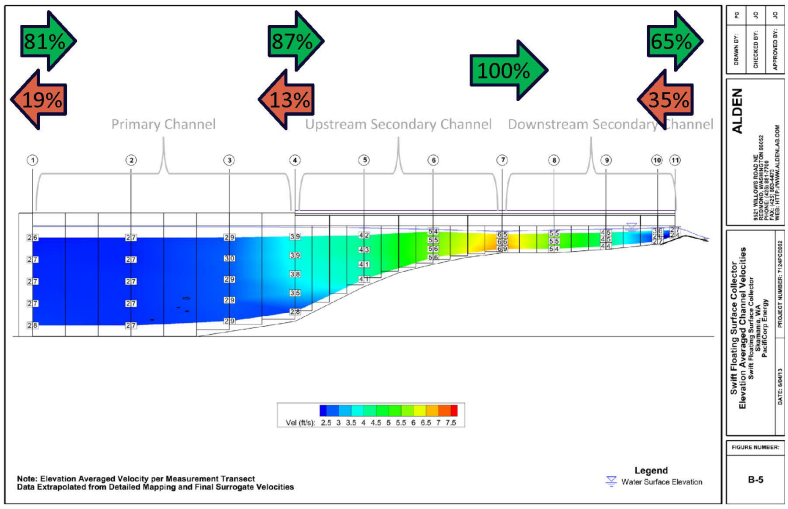
Passage Velocity Gradients



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Passage Attempt Analysis

- Identify individual passage attempt events in the fish tracking data
- Look for patterns that explain passage success
- Analysis included visualizations, descriptive statistics, and multifactor logistic regressions that considered
  - Meteorology (water temperature, wind, light level, barometric pressure)
  - Species
  - Fork length
  - Time of passage attempt
  - Date of passage attempt
  - Debris loading
  - Human activity
  - Primary channel flow condition
  - Operational sound

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Passage Attempt Analysis Results

- Environmental factors that appear to influence fish behavior
  - Stronger east winds result in fewer fish attempting passage
  - More fish attempt passage on days following a debris event
  - Shorter fish have a higher probability of success
- Important operational findings
  - Human presence on the collector does not appear to be a factor in passage success
  - When more (10) pumps are operating, fish make more attempts, and those attempts have a higher probability of success than when fewer (8) pumps are operating

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Summary

- Highest collection efficiency (P_{CE}) to date for steelhead in any acoustic study
  - Collection efficiency for Chinook was also the highest but low sample sizes may have impacted results
  - Collection efficiency for Coho was consistent with previous years, but slightly lower than the all-time high that occurred in 2019
- Nearly all fish that enter the forebay enter the FSC (P_{ENT})
  - Gains in this metric indicate that FSC adjustments continue to be effective at encouraging fish to enter
- Retention within the FSC (P_{RET}) continues to be the limiting factor to achieving collection efficiency targets

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Summary (cont.)

- Rejection at the transition from the downstream end of the channel to collection is the most significant bottleneck to successful passage
  - Other bottlenecks exist at the interface of the NTS and primary channel
- Larger fish have a lower probability of collection after entering the Collection Channel
  - Stronger swimmers may be more capable of holding and then escaping when presented with any stimuli that initiates avoidance
- More fish attempt passage and those attempts are more successful when more pumps operate in the primary collection channel

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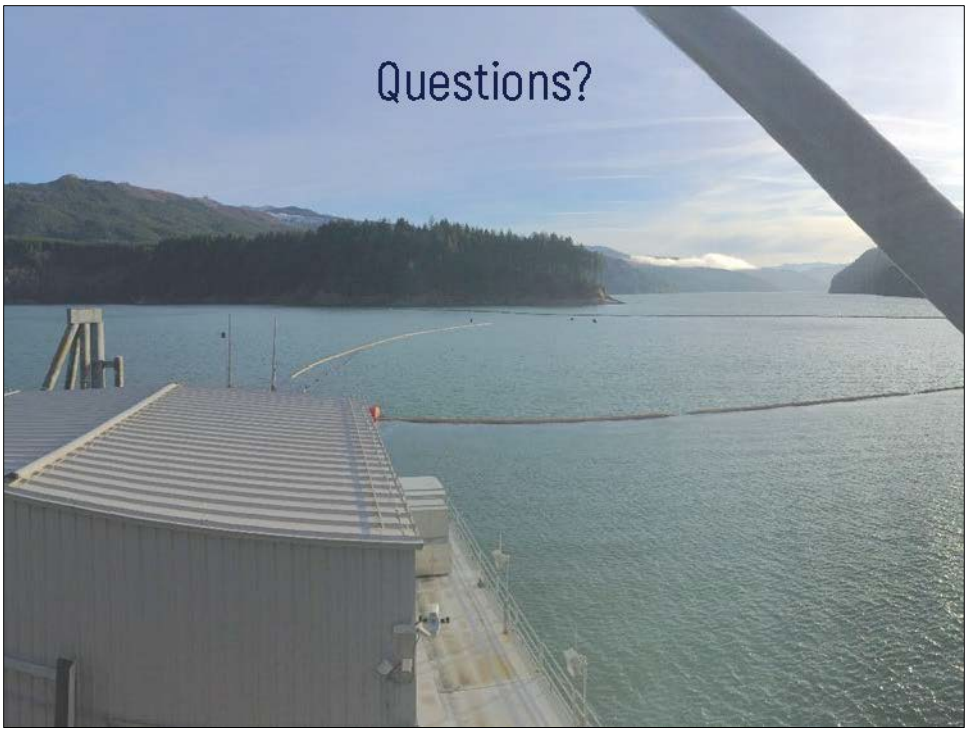


Following the presentation, Bonnie Shorin noted that as she reviewed collection data, she noticed that the priority appears to be improving collection efficiency for spring Chinook salmon. As adjustments have been made to increase CE for spring Chinook, sometimes there is a decrease in CE for other species. Karchesky responded that the previous adjustments made to the Swift FSC have been really intended to improve CE for all three reintroduction species. He noted however, that the issue with evaluating spring Chinook in Swift Reservoir is that in some years it has been difficult to get enough juveniles of the right size to tag in order to make meaningful inference on CE. Karchesky also noted that although previous adjustments have been aimed to benefit all three species, there has been variability observed over time due to other covariates like environmental conditions.

Other questions and comments are summarized as follows:

- Shorin asked whether the size or maturation state of fish was a significant factor in passage success. She noted that when fish reach a certain size or level of maturity, they tend to orient with the flow compared to earlier life stages.
    - Haffey said bigger fish were less likely to be passed successfully, which may be attributed to stronger swimming abilities. Though the flow in the collection channel should be sufficient to entrain fish, it is possible that some use the “rest area” in the downstream secondary channel to rest and turn around to swim back up the channel. The fish are generally in the same maturation state when tagged, and any specific injury or condition notes were recorded when the fish were tagged, but not included as a factor in the model.
    - Karchesky confirmed fish that are showing signs of smoltification are used in the study.
    - Haffey noted the debris cleaning cycle, which shuts down pumps for a moment, may also provide a short period of rest or lower flow that allows fish to turn around.
- Kale Bentley asked what the next steps are to modify the facility, and whether the timing distribution of tags was a factor in the regression model.

    - Haffey said the number of fish being tagged is based off the estimated run timing, but ideally, fish that are tagged and released will reach the FSC in a curve that mimics the run. Graphics showing this distribution will be included in the report. The report will also include a description of the release groups, which have different sample sizes in the model due to the run curve. There was some variability in CE between release groups, but it was minimal and still allowed for the data to be pooled. Conditions that change significantly over the course of the season (like temperature) were more significant predictors of passage success than release groups.
    - Bentley said within-season variability could have a potentially significant impact on the overall pattern of CE estimates, and he may have additional feedback on CE estimators that take a more stratified approach.
- Bill Sharp asked what is the fate of the fish that do not pass the FSC?
    - Karchesky said just because fish are not detected as passing during the study does not necessarily mean that they never pass, only that they did not pass during the study period. Acoustic tag batteries last for 45 days, so sometimes these fish migrate after the batteries have died in the fall and are confirmed using PIT tag detections downstream. Residualism also likely occurs, especially with juvenile steelhead.
    - Josua Holowatz noted that creel information is not currently available for the Swift Reservoir.
    - Jim Byrne noted that annual opening day creel surveys were previously conducted at Swift Reservoir, and substantial numbers of residualized coho salmon were observed in those surveys in the years after the collector was installed, but they decreased as improvements were made.
    - Karchesky agreed and said the numbers of residualized coho appeared to have decreased over time but are still seen at the Swift FSC.
- Byrne asked if fish tagged at the FSC have already passed through the system once.
    - Haffey confirmed that the study looks at fish passing the FSC the second time, as they are initially collected and tagged at the FSC prior to being released at the head of Swift Reservoir.
- Josua Holowatz asked whether fish that out-migrate after the study period (ending July 15) are included in estimates of total collection efficiency.
    - Haffey said these fish are not included in the estimate of CE because the denominator for CE is the number of fish that enter the zone of influence (ZOI). Including fish that pass after July 15, which are identified by PIT tag at the FSC instead of by acoustic tags in the ZOI and in the FSC, would bias the estimate because fish that enter the ZOI and turn around would not be detected using only PIT tag data.
    - Karchesky added that the objective of the study is to examine the facility performance. Any overarching population level metrics are captured in the Aquatic Monitoring and Evaluation Plan under objective 1.
    - Bentley noted that it may be possible achieve an unbiased and time-stratified estimate of CE using PIT tags. He will provide additional feedback on this option to Karchesky.
- Jeff Garnett asked if predator effects have been observed or modeled as part of the study.
    - Haffey said predators can certainly affect fish behavior in the ZOI, and both bull trout and rainbow trout have been entrained in the FSC in the past.
    - Garnett noted at the Cushman Dam, bull trout have been tagged and observed waiting at the entrance to the collector where they predate upon juvenile salmonids.
    - Karchesky agreed and said previous studies at the Swift FSC have observed predators at the entrance of the Swift FSC, and also noted that they were present. He noted that previous work at the fish collector on the Clackamas River (PGE) documented

interactions between large predators and juvenile out migrating salmon, and showed that fish behavior changed when predators were present. While predators are a documented covariate that can affect fish passage, Karchesky indicated that there has not been a lot of clarity on what to do about it – certainly when the predators are bull trout.

- Holowatz noted that the CE for coho is lower than for steelhead, yet steelhead are larger than coho so would be expected to have a higher CE.
    - Haffey said there appears to be a negative relationship between size and CE, suggesting that larger fish are more likely to swim out of the collector after initially being entrained. However, there were many other covariates that affect CE in the model, and the confidence intervals for the two species' estimates overlap.
- Given the result of the 2021 CE study, Karchesky described the next steps for future evaluating adjustments to the Swift FSC and areas that would be focused on continuing to improve CE
    - Because it appeared that largest bottleneck for fish passage at the FSC in 2021 was occurring in the lower most portion of the fish channel, Karchesky indicated that is where they were planning to focus on making adjustment this winter and would be evaluated this coming spring (2022). The anticipated adjustments would focus on preventing fish from swimming back out of the fish channel as well as better understanding control weir elevation on fish passage success (the control weir is located just before fish enter the sorting building and are captured). Specifically, PacifiCorp would be evaluating fish behavior within the secondary portion of the fish channel without the debris flush mechanism in place. This system was installed temporarily to aid in debris management within the sorting building and was in place during the spring 2021 evaluation. It has since been removed following the installation of the permanent traveling screen system within the FSC this summer. It was suspected that operation of this temporary system may have been contributing to fish being able to swing out of the channel last spring. Also, PacifiCorp plans to evaluation whether the elevation of the control weir that transitions fish from the secondary chamber into the sorting building has an effect on fish passage success. And finally, PacifiCorp also plans to include a low lying, horizontal weir within the floor of the secondary channel to prevent fish from swing back out of the lower portion of the channel by utilizing the lower water velocity at the bottom of the channel (i.e., edge effect). In addition to the core performance metrics being evaluated (similar to this year), Karchesky expects additional hydrophones to evaluation fish behavior and movement will be installed in the secondary screen channel (i.e., lower fish channel).
    - Once additional information is available on where the adjustments in lower portion of the fish channel were successful in improving fish passage success, additional adjustments to the entrance of the FSC (Net Transition Structure – NTS) may be needed. These adjustments would potentially address fish falling out further upstream in the fish channel (primary screen channel), which was also found to be a bottleneck in the 2021 evaluation. Similar to the work that was completed in 2019 to the NTS, additional adjustments to this structure could be used to test different flow conditions within the upper portion of the fish channel to assess fish passage success. While potential adjustments to this structure were considered before the 2022 outmigration season, they could not be completed in time. Karchesky will provide the ACC a more detailed discussion on these potential adjustment in the future and once more information becomes available on the success of the work planned for 2022 season.

- Karchesky noted that as more information becomes available on what factors are affecting fish passage success within the Swift FSC, more permanent solutions and modifications to this facility can be considered. He also noted that results from the 2021 evaluation are encouraging given that the current bottleneck for fish passage appears to be occurring just before fish are entering the sorting building. It was just a few years ago that fish were simply have a difficult time just finding the entrance to the FSC let alone entering it.

ACC representatives present thanked Haffey for the presentation and discussion. Karchesky noted that if there are any additional questions or comments, to please let him know.

<Break from 11:41 to 11:51 a.m.>

Aquatic Fund Scoring Template Review

Erik Lesko shared the Aquatic Fund Scoring Template 2022 (Attachment B) with the ACC, which was distributed to the ACC following the meeting. The template, including updates for 2022, are summarized as follows:

- The five priority questions are "go/no go," and each question must be selected "go" for the project to move forward.
- If all priority questions are "go," the next fourteen questions are scored from one to ten. Guidance on how to score these values is included in the Instructions tab. To be consistent, a score of ten should represent a project with a very high probability of success. When one does not feel strongly that a project has a high probability of success, that score would be more in the range of one to three.
- The maximum score is 140, with questions weighted by different categories.
- There is a place to mark an "x" for a project that is of concern. Notes regarding the concern should be added to the Notes tab.

Lesko said each ACC representative should fill out the matrix for the two projects proposed and provide it back to him and Montgomery by February 1. The scores will be combined and distributed to the ACC prior to the next ACC meeting on February 10 when project selection will occur. There were no questions or comments on the new template or scoring process.

Fish Passage Subcommittee – Decision Document

Erik Lesko shared the draft Decision Document for the Fish Passage Subcommittee (FPS, Attachment C). Bill Sharp said Peggy Miller provided some edits to the Decision Document, but additional work may be needed in the section describing passage at Merwin Dam, similar to the section on Yale Dam. Lesko noted that the Services' determination was sent out over the holidays, and PacifiCorp's legal team is reviewing the letter. While there are lingering questions about whether or when PacifiCorp or the Utilities will engage with the FPS, he expects the legal questions to be resolved by the next ACC meeting. He suggested that the FPS provide a clean version of the Decision Document back to the ACC for final approval. After discussing the needed revisions, representatives present made the necessary editorial changes, accepted redlines provided by the FPS, and added language about passage at Merwin Dam. The final version of the Decision Document was approved then distributed to the ACC after the meeting. The final decision template will be added to the 2021 Annual Report submitted to the FERC in June of 2022.

Study/Work Product Updates

Flows/Reservoir Conditions Update

Merwin Reservoir – currently at 232.32 (-7.28)
Yale Reservoir – currently at 470.5 (-19.5)
Swift Reservoir – currently at 983.5 (-16.5)
Total current hole – 43.32 feet (33.32) feet when Yale limitation is included)

Erik Lesko said PacifiCorp is currently in compliance with the FERC requirement of at least a 17-foot hole. He said the natural flows are still quite high (10,832 cfs) and discharge is at 11,500 cfs of generation flow (not spilling). Minor spilling events (averaging 3,600 cfs) occurred from January 6 to 9 at Merwin Dam due to peak runoff from snowmelt.

ATS Update
Erik Lesko said the ATS is currently working to finish the 2022 AOP. He has contracted with Anchor QEA to assist in completing the 2022 AOP due to the many changes resulting from the 2020 H&S Plan. He said WDFW staff are also supporting development of the genetics monitoring section, which was recently provided back to PacifiCorp to review. He anticipates having a final draft prepared by the end of January for the ATS to review. The goal is to complete the plan, or at least sections pertaining to steelhead broodstock collection, before early February when steelhead start arriving.

Merwin Fish Passage Update (see also Attachment D for the November Fish Passage Report)
Chris Karchesky said the coho run at Merwin Dam is nearly over, and they reached the upstream transport goal of 9,000 adults upstream. He mentioned that it appeared that we are sitting at approximately 60% early coho and 40% late coho upstream and of those about 60% were hatchery origin and the remaining natural origin. He also mentioned that the high flow event in November washed out the Eagle Cliff Release pipe and that fish taken upriver since had been released at the Swift Forest Camp Boat Launch.

Karchesky said the late-winter steelhead have just started showing up, and to date, five Blank Wire Tag and 10 natural-origin fish had returned and had been taken upstream. The outage that was originally planned for January 2022 was actually completed in December 2021 in preparation for winter passage. Additionally, the Merwin Trap lift and conveyance system was turned off during the end of December due to inclement weather and freezing conditions.

Swift Floating Surface Collector (see also Attachment E for the December Fish Passage Report)
Karchesky said the Swift FSC was currently in operation. It was also turned off at the end of December due to inclement weather and transportation issues. The high numbers of fish that passed in November, were associated with a high-water event, and have decreased as expected. In January, there have been cooler temperatures and fewer fish passing the facility (approximately 100 per day – mainly parr).

Lewis River Fish Passage Update
See Attachment F.

USFWS Update on Fish Stranding Above Swift Dam
Jeff Garnett said he recently discussed fish stranding above Swift Dam with PacifiCorp staff. He requested additional Swift Reservoir data from PacifiCorp including rates of drawdown, outflow

from Swift Reservoir, reservoir water temperatures and bathymetry, which will help inform the Services' understanding of pool elevations and stranding risks. The previously communicated plan to write an addendum to the existing Biological Opinion (BiOp) to address take related to stranding in Swift Reservoir is ongoing. Erik Lesko said PacifiCorp staff are working to compile these data in a format that is acceptable to share (as deemed by legal counsel). Josua Holowatz asked that the data also be shared with the ACC, or an explanation provided as to why they are not shared. Lesko said he will share any public information with the ACC and communicate the restrictions around confidential data (if necessary).

Jim Byrne noted that decisions about stranding in Swift Reservoir may be critical to selecting projects for Aquatic Funds. Lesko responded that in December, the ACC resolved the question of whether the project is eligible for funding—NOAA staff communicated that any addendum that would provide Endangered Species Act coverage for stranding in the reservoir would not specify how stranding is addressed. Therefore, projects that address stranding are not an explicit obligation of PacifiCorp through either the existing Settlement Agreement, FERC license, or anticipated addendum to the BiOp, and thus would be eligible for Aquatic Funds. Bonnie Shorin agreed and reminded the ACC that the BiOp considers the adverse effects of the action and determines whether the action would jeopardize the continued existence of listed species or would cause adverse modification to listed critical habitats. An addendum to the 2007 BiOp would include reasonable and prudent measures to minimize incidental take, and the incidental take statement and its terms and conditions would be modified to account for the adverse effects previously not considered. She said she does not foresee the terms and conditions making a restoration project ineligible for funding. Byrne thanked Lesko and Shorin for the explanation.

Lesko noted that PacifiCorp has monitored stranding issues in Swift Reservoir for the past two years and said he will add the topic of monitoring plans for 2022 to an upcoming agenda (likely March) for discussion.

Public Comment Opportunity
Kelley Jorgensen asked whether her presentation during the November ACC meeting was provided to the ACC, as it could be helpful when the ACC reviews Aquatic Fund proposals. Montgomery said she does not believe it was distributed because it would be attached to the final meeting notes, which have not been finalized due to an outstanding question for Jorgensen. Jorgensen will provide both the presentation and the outstanding response to Montgomery who will distribute the notes and presentation to the ACC.

Erik Lesko mentioned to Jorgensen that he has recently found older imagery of the Swift area. Though not aerial imagery as she had initially requested, it may still be helpful to her, and he will send it. Jorgensen thanked Lesko and said the imagery could certainly be helpful.

Agenda Items for February 10, 2022

- Review January 13, 2021, Meeting Notes **(ACC COMMENTS DUE February 3, 2022)**
- Aquatic Fund Proposals Scoring
- Services Update on Fish Stranding above Swift (Tentative)
- Study/Work Product Updates

Adjourn 12:41 p.m.

Next Scheduled Meeting

February 10, 2022

Teams Call Only
9:30 a.m. – 12:30 p.m.

Meeting Handouts & Attachments

- Meeting Notes from 12/9/2021
- Agenda from 1/13/2022
- **Attachment A –** Swift Reservoir 2021: Floating Surface Collector Efficiency Evaluation (PowerPoint presentation by Four Peak Environmental)
- **Attachment B –** Aquatic Fund Scoring Template 2022
- **Attachment C –** Fish Passage Subcommittee Decision Document - Final
- **Attachment D –** Merwin Adult Trap Collection Report (December 2021)
- **Attachment E –** Swift FSC Facility Collection Report (December 2021)
- **Attachment F –** Lewis River Fish Passage Report (December 2021)

FOUR PEAKS ENVIRONMENTAL
Science & Data Solutions

Swift Reservoir 2021 Floating Surface Collector Efficiency Evaluation

Lewis River Aquatic Coordination Committee Meeting

January 13, 2022

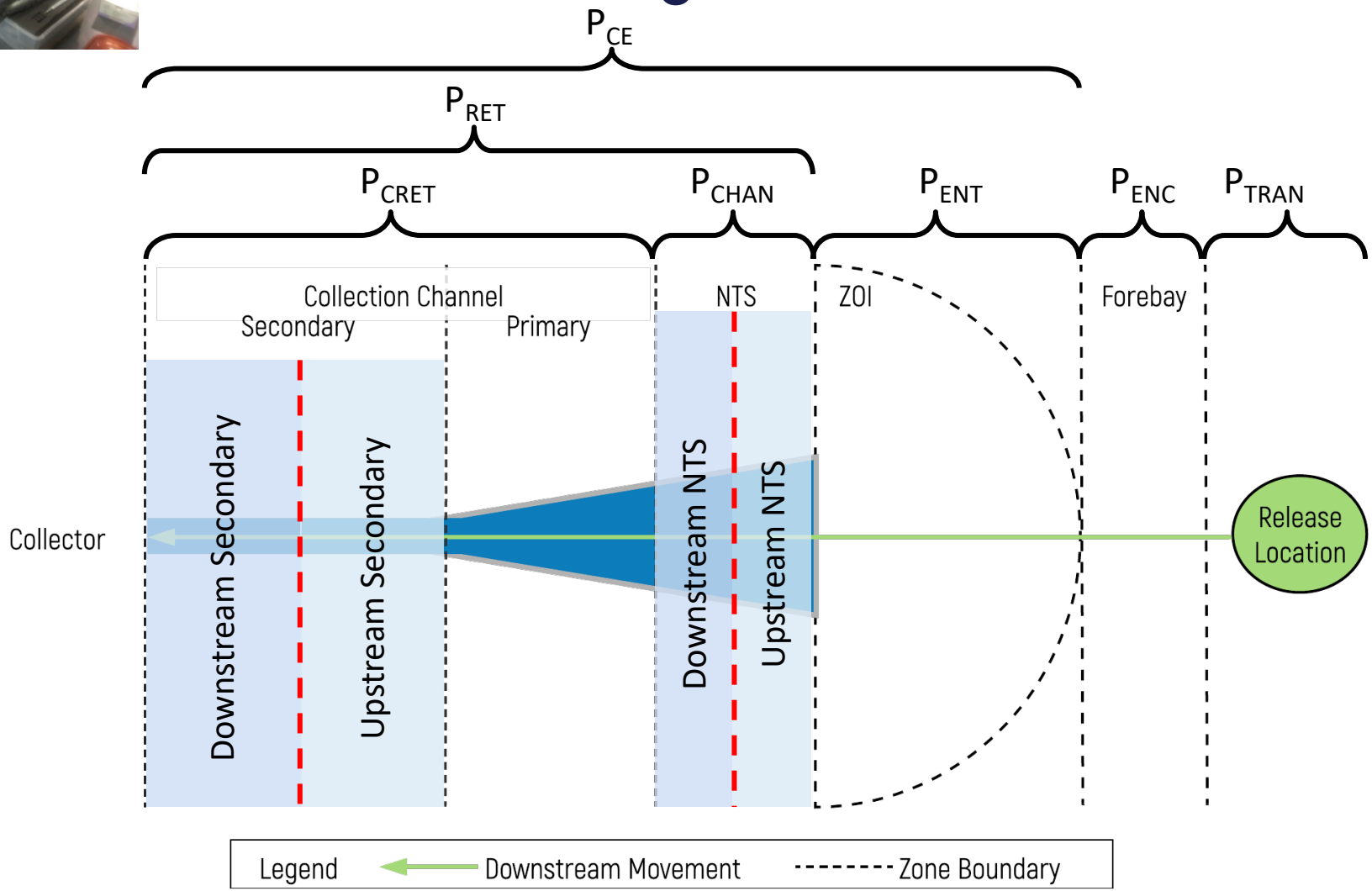
Swift Floating Surface Collector History Review

- Commissioned in December of 2012
- Initial studies (2013-15) revealed that fish had difficulty locating the collector
  - Collection efficiency less than 30% during these years for most species
  - Spring Chinook had collection efficiency <1%
- Several adjustments successful in helping fish find and enter the collector
  - Lead net installation in 2016
  - Operational noise reduction in 2017
  - Attraction flow velocity increase in 2019
- These adjustments were successful and now nearly 100% of the fish that enter the forebay also enter the collector; however, retention within the collector continues to limit collection efficiency
  - About 50% of the fish that enter the collector turn back before collection

2021 Study Objectives

- Primary objective is to calculate passage metrics
  - Per objective 2 of the M&E plan
- Focus on where fish are rejecting within the fish channel
  - Identify factors that may explain rejection behavior

2021 Passage Metrics

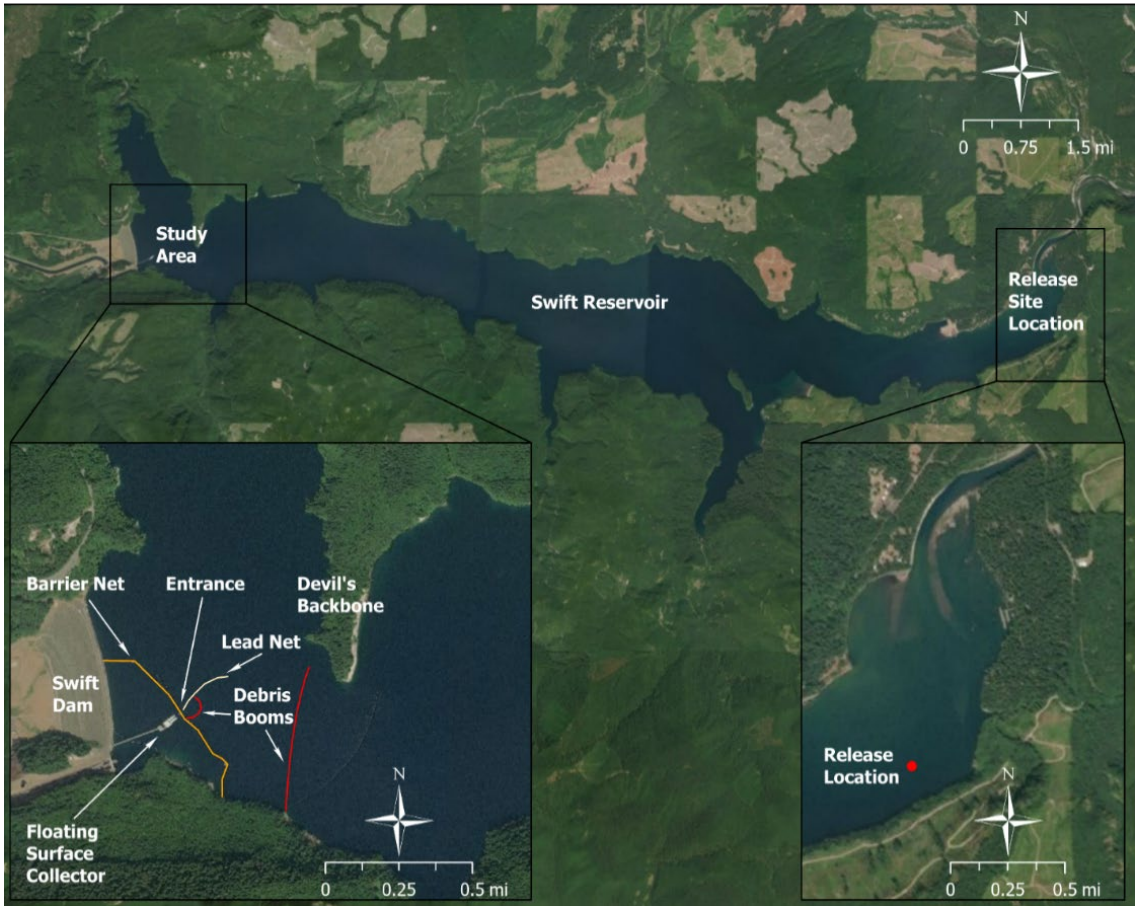


FOUR PEAKS ENVIRONMENTAL
Science & Data Solutions

Methods Overview

- Acoustic telemetry used to position fish in discrete zones along the migration path to collection
  - ZOI
  - NTS with sub zones
  - Collection Channel with sub zones
- Additional variables monitored to obtain data on factors that may influence passage success
  - Weather and water temperature
  - Human activity
  - Operational sound and pumping rates
  - Debris loading
- Resulting zone presence data analyzed to estimate passage metrics and investigate fish behavior in the NTS and collector
  - Zone presence data used to determine how far fish progress within the Collection Channel
  - Factors that influence fish behavior in the Collection Channel evaluated

Fish Tracking Field Study Overview

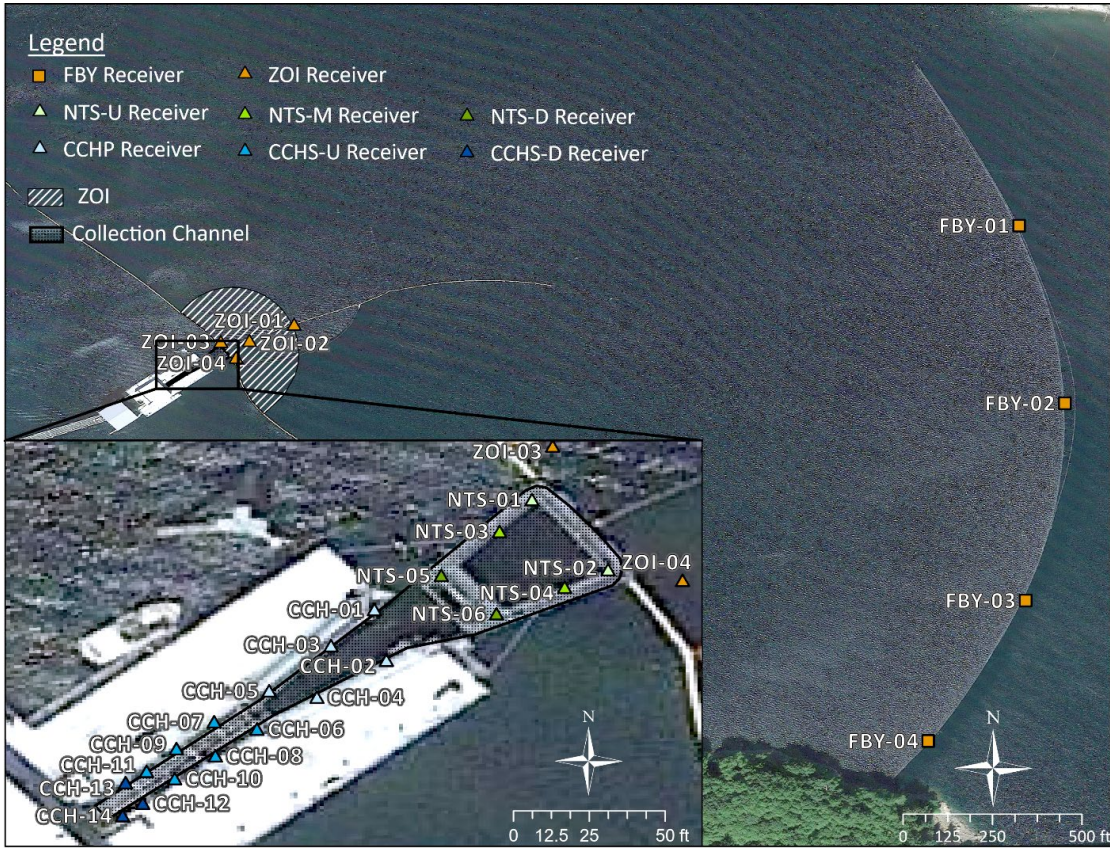


- 443 dual-tagged* fish released
  - 39 Chinook Salmon
  - 212 Coho Salmon
  - 192 steelhead
- Site: 9 miles upstream of the Swift floating surface collector (FSC)
- Release dates: April 1 to June 1

* dual-tags consist of passive integrated transponder (PIT) and acoustic telemetry

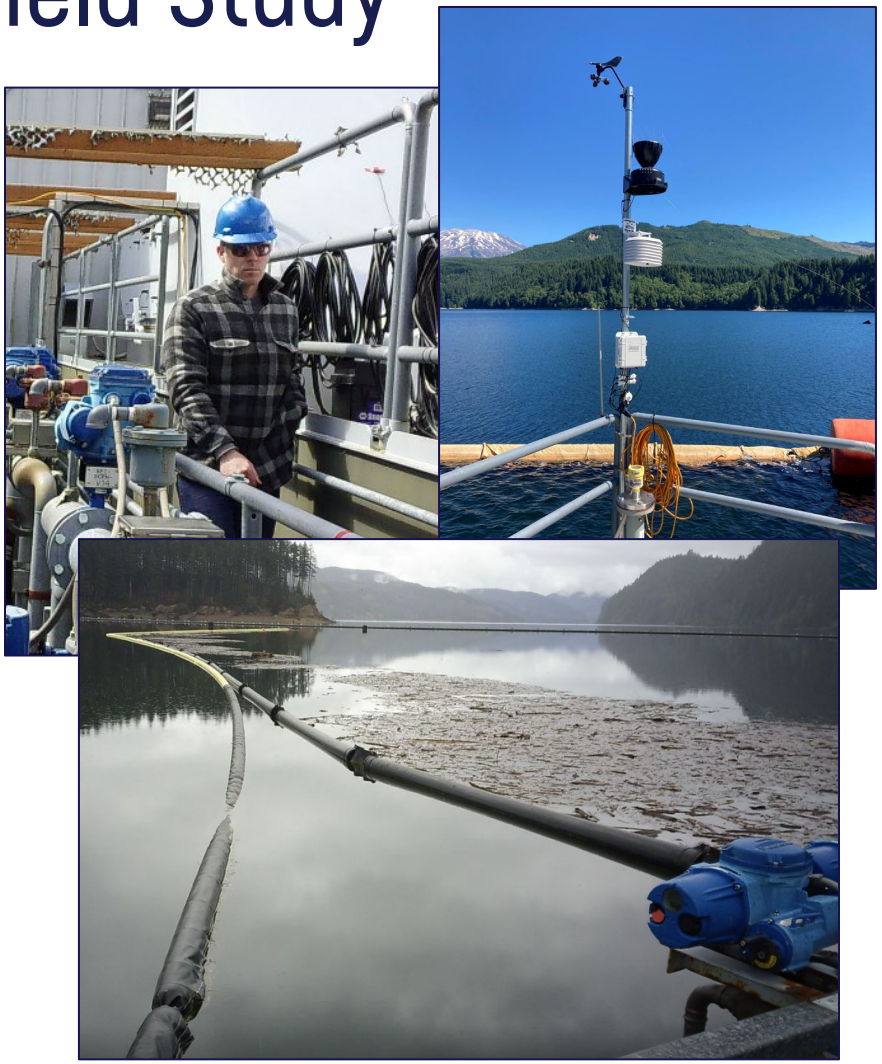
Fish Tracking Field Study Overview (cont.)

- Fish tracked via acoustic telemetry from release through the Collection Channel
- Fish tracking continued until July 15
  - Each tag has an estimated 45-day battery life from time of release
- Collection confirmed with PIT tags



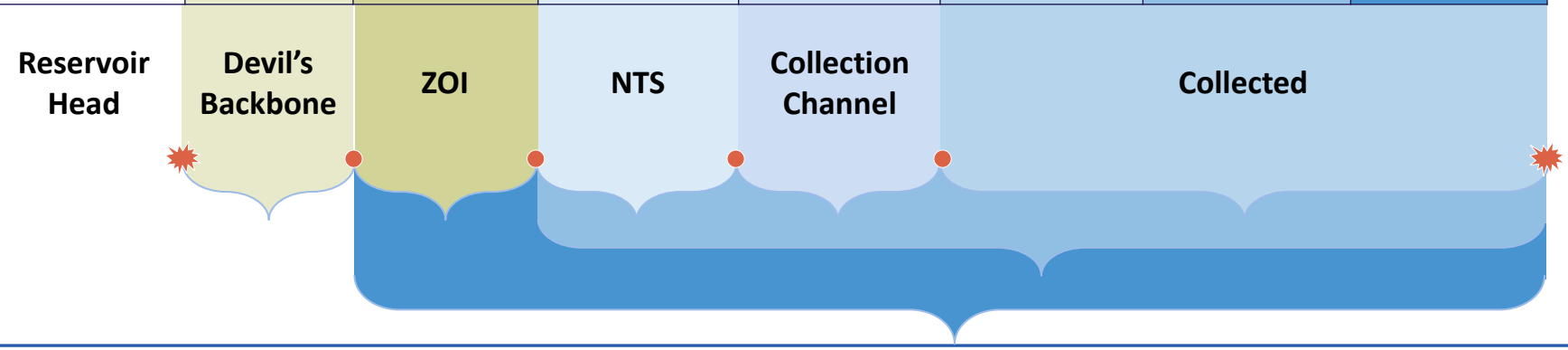
Covariate Field Study

- Environmental factor monitoring
  - Meteorology
  - Water temperature
  - Solar radiation
  - Debris loading
- Operational factor monitoring
  - Human activity level
  - Operational sound
- Operation of attraction pumps
  - Varied the number of primary attraction pumps to evaluate passage behavior in the primary channel under different flow conditions (10 vs. 8 pumps)

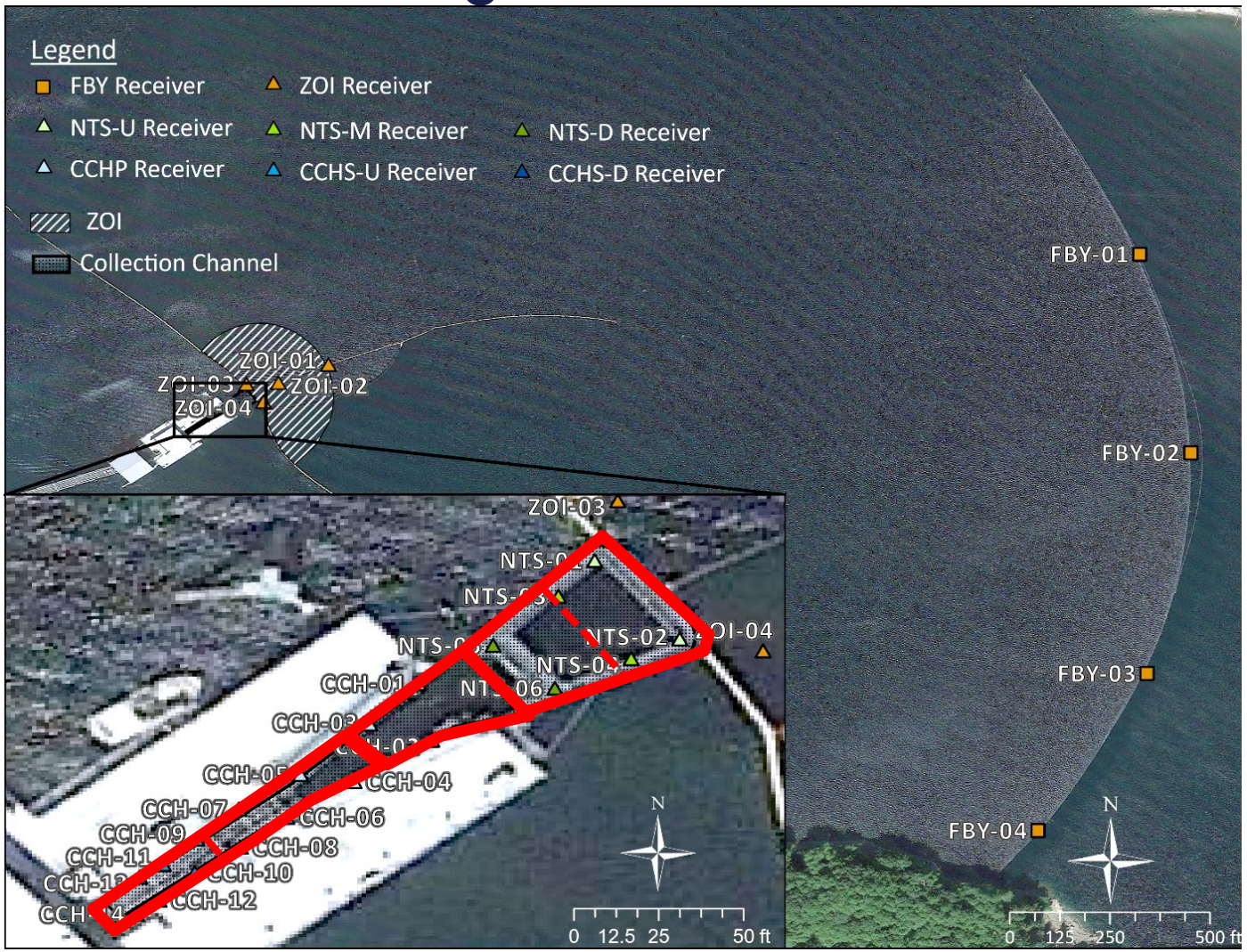


Passage Metrics

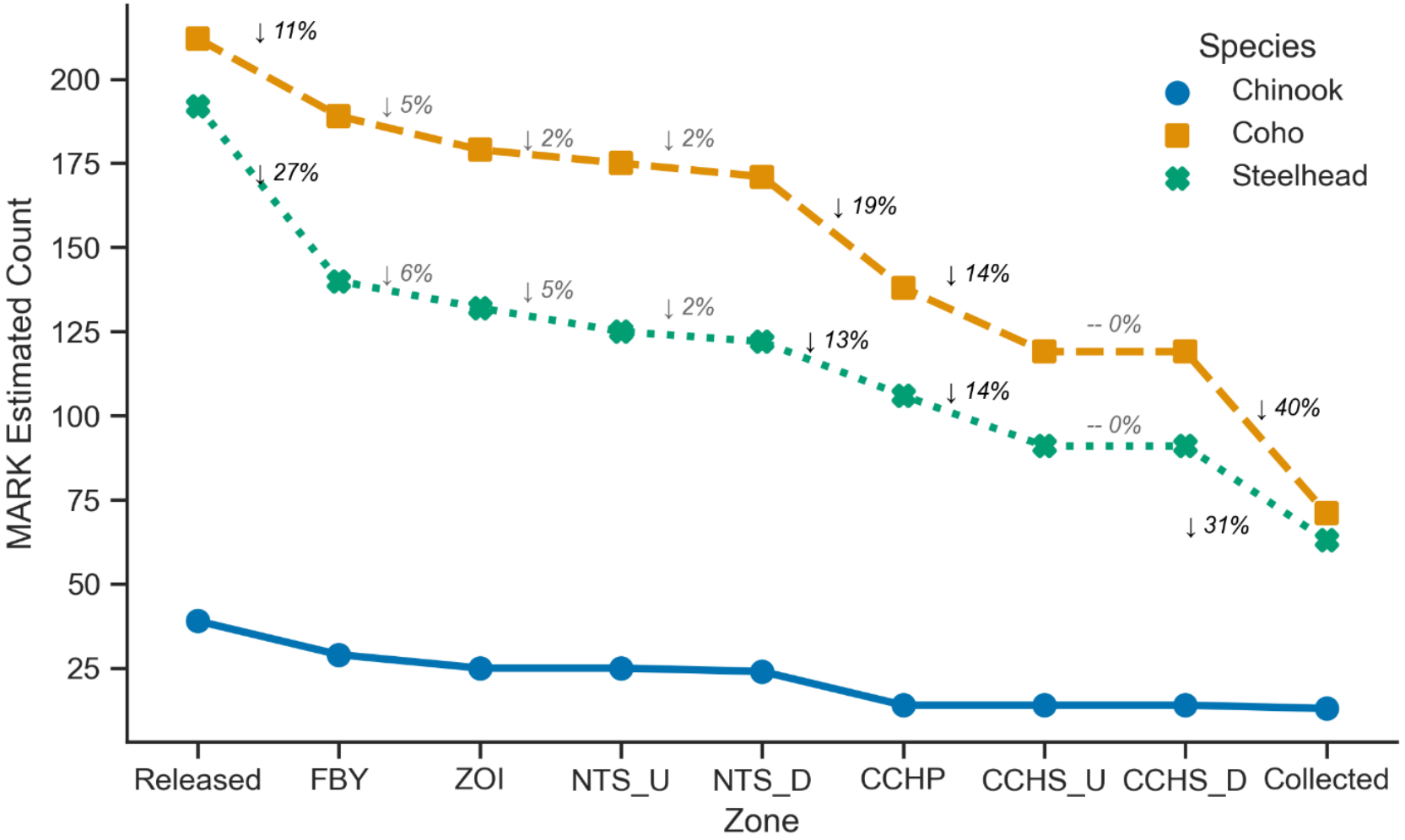
Species	P_{TRAN} (%)	P_{ENC} (%)	P_{ENT} (%)	P_{CHAN} (%)	P_{CRET} (%)	P_{RET} (%)	P_{CE} (%)
Chinook Salmon	74	86	100	57	92	52	52
	(63, 86)	(76, 97)	-	(40, 73)	(79, 100)	(36, 68)	(36, 68)
Coho Salmon	89	95	95	78	52	41	40
	(86, 93)	(92, 97)	(92, 97)	(73, 83)	(45, 59)	(34, 47)	(34, 46)
Steelhead	73	94	94	84	60	50	48
	(68, 78)	(91, 98)	(91, 98)	(78, 89)	(52, 68)	(43, 58)	(41, 55)
All	81	94	94	79	57	45	44
	(78, 84)	(92, 96)	(92, 96)	(75, 83)	(52, 62)	(41, 50)	(39, 48)



Passage Zones Review

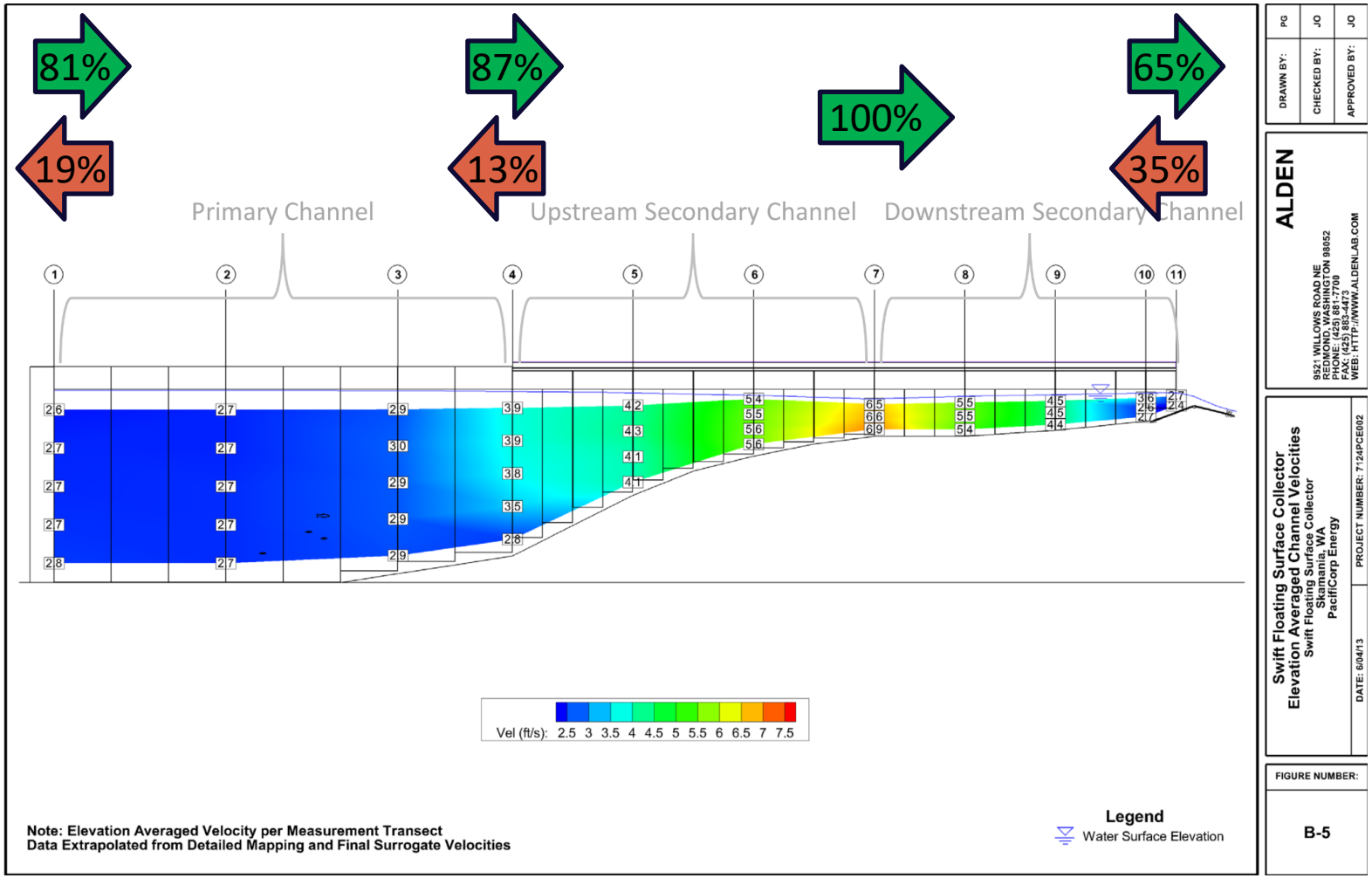


Passage Bottlenecks



FOUR PEAKS ENVIRONMENTAL
Science & Data Solutions

Passage Velocity Gradients



FOUR PEAKS ENVIRONMENTAL
Science & Data Solutions

Passage Attempt Analysis

- Identify individual passage attempt events in the fish tracking data
- Look for patterns that explain passage success
- Analysis included visualizations, descriptive statistics, and multifactor logistic regressions that considered
  - Meteorology (water temperature, wind, light level, barometric pressure)
  - Species
  - Fork length
  - Time of passage attempt
  - Date of passage attempt
  - Debris loading
  - Human activity
  - Primary channel flow condition
  - Operational sound

Passage Attempt Analysis Results

- Environmental factors that appear to influence fish behavior
  - Stronger east winds result in fewer fish attempting passage
  - More fish attempt passage on days following a debris event
  - Shorter fish have a higher probability of success
- Important operational findings
  - Human presence on the collector does not appear to be a factor in passage success
  - When more (10) pumps are operating, fish make more attempts, and those attempts have a higher probability of success than when fewer (8) pumps are operating

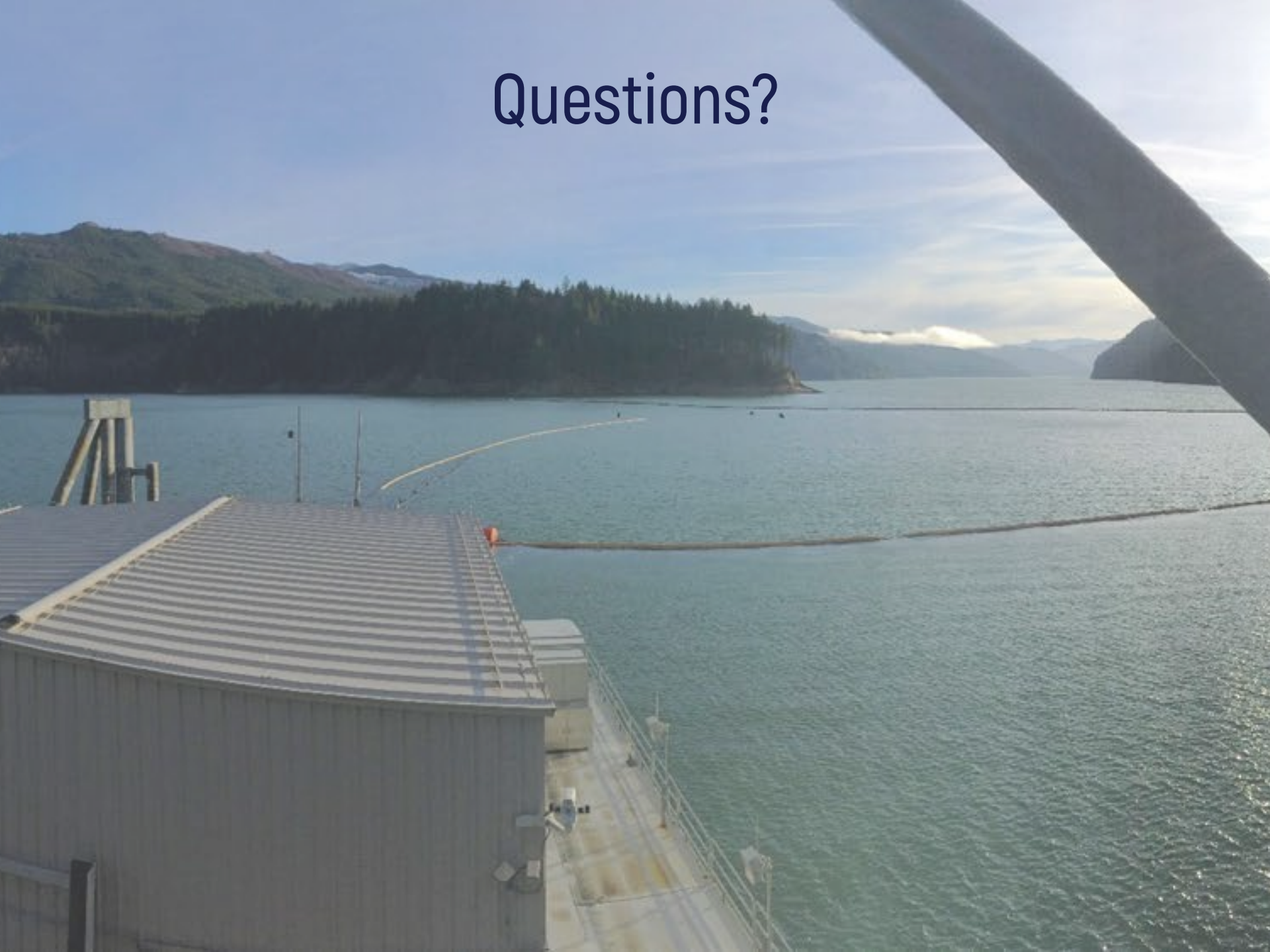
Summary

- Highest collection efficiency (P_{CE}) to date for steelhead in any acoustic study
  - Collection efficiency for Chinook was also the highest but low sample sizes may have impacted results
  - Collection efficiency for Coho was consistent with previous years, but slightly lower than the all-time high that occurred in 2019
- Nearly all fish that enter the forebay enter the FSC (P_{ENT})
  - Gains in this metric indicate that FSC adjustments continue to be effective at encouraging fish to enter
- Retention within the FSC (P_{RET}) continues to be the limiting factor to achieving collection efficiency targets

Summary (cont.)

- Rejection at the transition from the downstream end of the channel to collection is the most significant bottleneck to successful passage
  - Other bottlenecks exist at the interface of the NTS and primary channel
- Larger fish have a lower probability of collection after entering the Collection Channel
  - Stronger swimmers may be more capable of holding and then escaping when presented with any stimuli that initiates avoidance
- More fish attempt passage and those attempts are more successful when more pumps operate in the primary collection channel

Questions?



Instructions and descriptions for using the scoring template

Priority Objectives

All proposals must meet the 5 priority objectives to be accepted (i.e., all 5 Priority objectives must recieve a rating of 'GO').

1. *Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species?*
2. *Support the reintroduction of anadromous fish throughout the Basin?*
3. *Enhance fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River?*
4. *Is the proposal consistent with applicable Federal, State, and local laws and plans to the extent feasible?*
5. *Are any funds requested that would otherwise be required by law to perform?*

Categories

Accepted proposals will be evaluated and scored using the scoring template that includes 14 questions over 4 weighted categories.

	Category	Weighting
1	Benefit to Fish	35%
2	Scientific Validity	30%
3	Feasibility	20%
4	Cost Effectiveness	15%
		100%

How to Score

- The scoring template only requires input in the yellow highlighted cells. The weighted calculation is done automatically based on the scores inputted.
- Reviewers will assign a GO - NOGO (i.e., meet or doesn't meet) for each of the five priority objectives. Any NOGO designations will be discussed during the project selection meeting.
- Reviewers will assign a numeric score from 1 to 10 (10 being best) for each of the 14 evaluation questions. **All questions must receive a whole number score between 1 and 10..**
- In the event that a question does not lend itself to a numeric score (e.g., binary), reviewers should assign a score based on the 'extent' that each question is addressed by the proposal.

General guidance on scoring:

7-10	The proposal meets a high level of support or probablilty of success in addressing the question
4-6	The proposal meets a moderate level of support or probability of success in addressing the question
1-3	The proposal has a low level of support or probability of success in addressing the question

Project of Concern

- Identify projects that have attributes considered to be fatal flaws not reflected in the scoring.
- If the 'Project of Concern' box is checked, please identify those concerns (and any other statements) using the Notes template.

Final Combined Score Calculation

- A final combined score is the sum of of weighted project scores received divided by the number of templates received.
- Each proposal is then ranked based on the highest to lowest final project score
- The combined scoring template and notes template will be distributed to the ACC prior to the selection meeting

AQUATIC FUNDS PROJECT SCORING TEMPLATE

Project Number	Project Name	PRIORITY OBJECTIVES (GO - NOGO)					Scores (use only whole numbers, 1 - 10 with 10 being best)													* Project of Concern?	TOTAL PROJECT		
							Benefits to Fish (35%)			Scientific Validity (30%)			Feasibiltiy (20%)				Cost Effectiveness (15%)					Score	% of max. Score	Rank
		1	2	3	4	5	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14				
2022-01	Swift Campground Creek Culvert Replacement						0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0%	1
2022-02	Northwoods Cold-water Refuge Habitat Restoration Project						0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0%	1

**** Please use notes template if "project of concern" is checked***

	Priority Questions (Go - NO GO)
1	Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species?
2	Support the reintroduction of anadromous fish throughout the Basin?
3	Enhance fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River?
4	Is the proposal consistent with applicable Federal, State, and local laws and plans to the extent feasible?
5	Are any funds requested that would otherwise be required by law to perform?

	Evaluation Questions:
Q1	Does the project provide direct benefit(s) to priority species and habitat reaches?
Q2	Does the project lead to or provide tangible, on the ground benefits?
Q3	Does the project address a limiting factor(s) to the target species without adversely impacting other species, life history stages, or habitat processees?
Q4	Does the proposal apply appropriate and proven methods, designs and technologies?
Q5	Are the project objectives identified appropriate and justified given the proposed scope and schedule?
Q6	Does the project describe and consider long term benefits and influences (e.g., watershed processes, hydro operations, climate change, etc.)?
Q7	To what extent do constraints or contingencies affect project implementation (e.g., permitting, legal, location, funding, etc)?
Q8	Is the probability of success high, medium or low?
Q9	How qualified and experienced is the project team in successfully completing projects of similar scope, nature, and magnitude?
Q10	To what extent would other habitat protection, assessments, or restoration actions in the watershed positively impact or compliment the project?
Q11	To what extent do other funding sources support the project (e.g., matching contributions, in-kind participation, grants, etc.)?
Q12	Are project costs reasonable by work effort and type (administration, permitting, goods and services, rentals, labor, contracts, etc.)?
Q13	Are the total costs justified based on expected short and long term benefits to fish?
Q14	To what extent is maintenance required after project completion?

REVIEWER NOTES (including reason for marking any project of concern)

ACC REPRESENTATIVE	NOTES

EVALUATION QUESTIONS AND ASSIGNED WEIGHTING

Priority Objectives	1	Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species?
	2	Support the reintroduction of anadromous fish throughout the Basin?
	3	Enhance fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River?
	4	Is the proposal consistent with applicable Federal, State, and local laws and plans to the extent feasible?
	5	Are any funds requested that would otherwise be required by law to perform?

			Points Available	Total Points Available	Weighted Multiplier	Weighted Points Available
Benefits to Fish (35%)	Q1	Does the project provide direct benefit(s) to priority species and habitat reaches?	10			
	Q2	Does the project lead to or provide tangible, on the ground benefits?	10			
	Q3	Does the project address a limiting factor(s) to the target species without adversely impacting other species, life history stages, or habitat processees?	10			
				30	**1.63**	**49.00**
Scientific Validity (30%)	Q4	Does the proposal apply appropriate and proven methods, designs and technologies?	10			
	Q5	Are the project objectives identified appropriate and justified given the proposed scope and schedule?	10			
	Q6	Does the project describe and consider long term benefits and influences (e.g., watershed processes, hydro operations, climate change, etc.)?	10			
				30	**1.40**	**42.00**
Feasibility (20%)	Q7	To what extent do constraints or contingencies affect project implementation (e.g., permitting, legal, location, funding, etc)?	10			
	Q8	Is the probability of success high, medium or low?	10			
	Q9	How qualified and experienced is the project team in successfully completing projects of similar scope, nature, and magnitude?	10			
	Q10	To what extent would other habitat protection, assessments, or restoration actions in the watershed positively impact or compliment the project?	10			
				40	**0.70**	**28.00**
Cost Effectiveness (15%)	Q11	To what extent do other funding sources support the project (e.g., matching contributions, in-kind participation, grants, etc.)?	10			
	Q12	Are project costs reasonable by work effort and type (administration, permitting, goods and services, rentals, labor, contracts, etc.)?	10			
	Q13	Are the total costs justified based on expected short and long term benefits to fish?	10			
	Q14	To what extent is maintenance required after project completion?	10			
				40	**0.53**	**21.00**
				140		**140**

2021/2022 Lewis River Aquatic Fund Process Timeline

Activity	Target Milestone Date
Request for proposals distributed along with landowner acknowledgement form	July 5
Draft Full Proposals due to ACC	October 25
Conduct Proposed Project Information Meeting *(applicant presentations)*	November 16 ACC Meeting
ACC members submit written request for clarification of project information if questions not answered in previous meeting/presentation.	December 3
Final Full Proposals due (ACC requests for clarification need to be included as an Appendix)	December 31
Final Full Proposals submitted to ACC for 30-day review and evaluation	January 4
ACC scoring template due to Utilities	February 1
Distribute combined master scoring template to ACC	February 3
*Conduct Project Selection Meeting	February 10 ACC meeting
Provide add'l 7-day review period for absentee ACC participants, if needed	February 17
Submit Project Selection Report to FERC	By April 15th

*Project applicants not permitted to attend this meeting.

Request No. *[2021 – 01]*
Request Date: *[10-14-2021]*

North Fork Lewis River Project
Request for Decision Template

Creation of North Fork Lewis River Fish Passage Subcommittee

Part A –Decision Summary (to be completed after decision is made)

Date of Decision: *10-14-2021*
Expected Implementation Date of Action (if applicable): *11-05-2021*
Expected completion date of action (if applicable): *Not Applicable*

- **Decision Summary** *(brief summary of decision or action made by Committee)*

The Services determined that passage, as required in the current license, remains appropriate. Based on the letters, the ACC voted unanimously to form a Fish Passage Subcommittee (FPS). The purpose of the FPS will be to provide technical recommendations to the ACC based on review and evaluation of Settlement Agreement conditions (Section 4: Fish Passage Measures) in the development of the fish passage facilities on the North Fork Lewis River. Recommendations from the FPS will help guide the ACC in determining their recommendations for the implementation of Section 4 of the Settlement Agreement.

Part B –Decision Request (to be completed by Representative(s) requesting decision)

1. Representatives and Affiliations

At the October 14th 2021 ACC meeting the formation of the Fish Passage Subcommittee (FPS) was approved. Settlement Parties in attendance unanimously supported formation of the FPS by voice vote.

American Rivers
Cowlitz Tribe
Lower Columbia Salmon Recovery Board
Washington Dept. of Fish & Wildlife
Trout Unlimited
Yakama Nation
US Forest Service
National Marine Fisheries Service
US Fish & Wildlife Service
PacifiCorp & Cowlitz PUD*

* *PacifiCorp's representative stated that while the Utility supported subcommittee formation, it would not participate in the subcommittee until the Services issued a final determination that fish passage remains appropriate to Yale and Merwin reservoirs per section 4.1.9 of the Settlement Agreement and technical details regarding fish passage design elements. On October 27, 2021 the Services issued a final determination that fish passage is appropriate at Yale Reservoir. The Services have not yet made an "appropriateness" determination regarding Merwin Reservoir and have not yet provided technical guidance on fish passage design elements for either reservoir.*

2. Description and Justification of Request

- **Requested Action:** What specifically is the Committee to decide?

Formation of the Lewis River Fish Passage Subcommittee (FPS) within the Aquatic Coordination Committee (ACC) will serve to advance evaluation, design, construction, and operations of Lewis River Hydroelectric Project adult and juvenile salmon passage facilities per FERC licenses, Orders, and Settlement-Agreement, and report those recommendations to the ACC.

What specifically is the Committee to decide?
Passage Subcommittee members will provide recommendations to the ACC for conditions specified in Section 4 of the Settlement Agreement, FERC licenses and Orders. This includes but is not limited to providing information for short term steps to achieve Section 4 conditions such as review of additional passage information, examine fish passage technologies and current operations, identify study needs, and review design plans.

The Fish Passage sub-committee (FPS), under the direction of the ACC, shall assist in development and review of designs for downstream passage at Yale Dam, downstream passage at Merwin, upstream passage at Yale and upstream passage at the Swift projects provided by Utilities. The FPS in conjunction with the ACC shall review and provide comment to PacifiCorp's implementation schedule and timelines that identifies each milestone of the process, starting from design study selection through construction completion of the facilities.

3. FERC or Settlement Agreement Requirement(s)

- **What relevant FERC or SA articles justify this action?** ***[Articles xx]***

1) Section 4 of the 2004 Lewis River Hydroelectric Project Relicensing Settlement Agreement.

2) NMFS and USFWS October 27, 2021 FERC filing on their "Determination on Appropriateness of Passage at Yale Lake Lewis River Project (FERC Nos.: P-935-140, P-2071-082, P-2111-080, P-2213-043).

Part C – Committee Decision (to be completed by the ACC)

4. Committee Decision

- **Was the decision made by consensus (as defined in the Committee ground rules)?**
  Yes, including 7-day additional review time for absentee representatives.

- **Document voting record and tally (if applicable)**

  All Representatives in attendance at the October 14, 2021 ACC meeting voted in favor of the request to form a Lewis River Fish Passage Subcommittee.

  Yes = 10

No=0,
Abstain=0
7-Day Additional Review = No objections received

Representative	Vote
Scott Anderson, NMFS	Yes
Eli Asher, Cowlitz Indian Tribe	Yes
Jim Byrne, Trout Unlimited	Yes
Kate Day, USFS	Yes
Jeff Garnett, USFWS	Yes
Bryce Glaser, WDFW	Yes
Erik Lesko, Utilities	Yes
Bridget Moran, American Rivers	Yes
Bill Sharp, Yakama Nation	Yes
Steve West, LCFRB	Yes

5. Justification for Committee Decision

- **What information (i.e., empirical data) and how was this information used to inform decision?**
  The ACC voted in favor to form a Fish Passage Subcommittee based on the Services letters indicating that fish passage remains appropriate.

6. Contingencies or Conditions of the Decision

- **Is decision contingent on other actions or information?**
  NO
- **Is implementation of decision contingent on specific actions or information?**
  NO
- **Are there any conditions attached to this decision?**
  NO

7. Additional Information or Notations

Fish Facility Report
Merwin Adult Trap
December 2021

Reporting Date	Spring Chinook (1) AD-Clip M	AD-Clip F	AD-Clip JK	Wild M	Wild F	Wild JK	Recap M	Recap F	Recap JK	Early Coho AD-Clip M	AD-Clip F	AD-Clip JK	CWT M	CWT F	CWT JK	Wild M	Wild F	Wild JK	Recap M	Recap F	Recap JK
1-Dec																					
2-Dec																					
3-Dec																					
4-Dec																					
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31-Dec																					
Monthly	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Annual	920	835	703	153	114	18	0	0	0	5159	4769	3512	1190	1109	752	723	575	265	0	0	0

Reporting Date	Late Coho AD-Clip M	AD-Clip F	AD-Clip JK	CWT M	CWT F	CWT JK	Wild M	Wild F	Wild JK	Recap M	Recap F	Recap JK	S. Steelhead Fresh M	Fresh F	Recap M	Recap F	Wild M	Wild F
1-Dec	31	55	13	10	31	7	3	1										
2-Dec	36	45	8	9	21	3	10	4	2									
3-Dec	25	25	6	3	7	5	1	8										
4-Dec	12	22	1	6	16	1	2	8	2									
5-Dec	5	18	1	2	5		8	2										
6-Dec	4	16		1	2		2	11	2									
7-Dec	13	27	2	6	11	1	6	7										
8-Dec	10	30	13	2	6		1	7										
9-Dec	12	13	4		3	1	6	3	2									
10-Dec	6	9	6	1	3		5	3	1									
11-Dec	5	2	3	1	5		5	4										
12-Dec	2	3			2		11	10										
13-Dec	6	6	4				7	7	1									
14-Dec																		
15-Dec	1	1	1				1	1										
16-Dec	2	7	3				8	3	1									
17-Dec	1	3	1				4	9	2									
18-Dec	2	1	2			1	7	5										
19-Dec	1	3			1		3	2	3									
20-Dec	2	2					2	6	1									
21-Dec	1	1	2				2											
22-Dec	1	1																
23-Dec		2					2	1										
24-Dec																		
25-Dec																		
26-Dec																		
27-Dec																		
28-Dec																		
29-Dec																		
30-Dec																		
31-Dec																		
Monthly	**178**	**292**	**70**	**41**	**113**	**19**	**96**	**102**	**17**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Annual	1169	1717	479	407	520	99	496	464	88	0	0	0	269	553	46	176	2	10

Reporting Date	W. Steelhead AD-Clip M	AD-Clip F	BWT M	BWT F	Recap M	Recap F	Wild M	Wild F	Fall Chinook AD-Clip M	AD-Clip F	AD-Clip JK	Wild M	Wild F	Wild JK	Recap M	Recap F	Recap JK	Sockeye M	Sockeye F	Chum M	Chum F	Pink M	Pink F	Cutthroat	Rainbow (< 20 inches)	Bull Trout	Daily Total
1-Dec	21	7																						2			**181**
2-Dec	19	7																						2			**166**
3-Dec	17	6										1	1														**105**
4-Dec	14	6											1											4			**95**
5-Dec	21	7																						4			**73**
6-Dec	14	5																									**57**
7-Dec	15	7																									**95**
8-Dec	44	14						1																			**128**
9-Dec	16	4	1																								**65**
10-Dec	14	10										1												1			**60**
11-Dec	21	7																						1			**54**
12-Dec	24	12						1				1															**66**
13-Dec	30	3										1															**65**
14-Dec																											
15-Dec	57	29																						2			**93**
16-Dec	68	15	1																								**108**
17-Dec	43	25						1																			**89**
18-Dec	50	29																						1			**98**
19-Dec	37	17	1				1	1																2			**72**
20-Dec	18	9												1										3			**44**
21-Dec	31	12											2														**51**
22-Dec	23	13																						2			**40**
23-Dec	17	6																									**28**
24-Dec																											
25-Dec																											
26-Dec																											
27-Dec																											
28-Dec																											
29-Dec																											
30-Dec																											
31-Dec																											
Monthly	**614**	**250**	**3**	**0**	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**4**	**4**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**0**	**1833**
Annual	746	499	87	124	0	0	73	102	252	193	30	123	182	62	0	0	0	0	1	1	1	1	1	173	0	0	29943

1 Only hatchery verses wild distinctions are currently being made. All hatchery fish are labeled as "AD-Clip".
2 Total counts do not include recaptured salmon.

Fish Facility Report

Swift Floating Surface Collector

December 2021

	Coho			Chinook			Steelhead				Cutthroat			Bull	Planted	
Day	**fry**	**parr**	**smolt**	**fry**	**parr**	**smolt**	**fry**	**parr**	**smolt**	**kelt**	**fry**	**<13 in**	**> 13 in**	**Trout**	**Rainbow**	**Total**
1	44	381	160			4			16			16		0	0	**621**
2	12	239	180			105			6			4		0	0	**546**
3	20	244	80			40			0					0	0	**384**
4	98	381	82			116		19	0					0	1	**697**
5	17	246	35			28			4					0	0	**330**
6	36	176	67			31			0					0	0	**310**
7		136	80			16			0					0	1	**233**
8	8	59	36			16			0					0	0	**119**
9	4	105	33			6			2					0	0	**150**
10	10	122	33		1	6			1			2		0	0	**175**
11	5	84	28		1	8			0					0	0	**126**
12	2	65	18			4		1	1					0	0	**91**
13	8	62	10			8		1	1			4		0	0	**94**
14	2	39	14			9			0					0	0	**64**
15	2	28	11			6			0					0	0	**47**
16		30	4			9			2			1		0	0	**46**
17		14	1		1	5			0					0	0	**21**
18	2	29	7		1	18			1					0	0	**58**
19		15	3		3	7			2					0	0	**30**
20		22	7			21			1			1		0	1	**53**
21		31	9		1	10			2			2		0	0	**55**
22	7	31	11			15			0			1		0	0	**65**
23	2	24	5			3			1					0	0	**35**
24																
25																
26																
27																
28																
29																
30																
31																
Monthly	279	2563	914	0	8	491	0	21	40	0	0	31	0	0	3	**4350**
Total	1833	22784	46055	27	533	2644	33	193	5562	35	3	731	26	6	4140	**84605**

Lewis River Fish Passage Report

December 2021

Merwin Fish Collection Facility and General Operations

During the month of December, a total of 1,833 fish were captured at the Merwin Dam Adult Fish Collection Facility (MFCF). Similar to November, late-run coho were the most prevalent species collected this month (n= 928), followed by winter steelhead (n= 872), cutthroat trout (n= 24), and Fall Chinook (n= 9). Coho collection totals at the MFCF in 2021 were considerably higher than the 2014 – 2020 average (Figure 1). A total of 193 adult coho containing PIT tags have been detected passing the Merwin facility so far this Fall. The majority of these fish had been PIT tagged as juveniles at the Swift Floating Surface Collector (FSC) in the spring of 2020 (n= 173), while a smaller component was made up of fish that had been tagged in 2021 (n= 11) and late 2019 (n= 9).

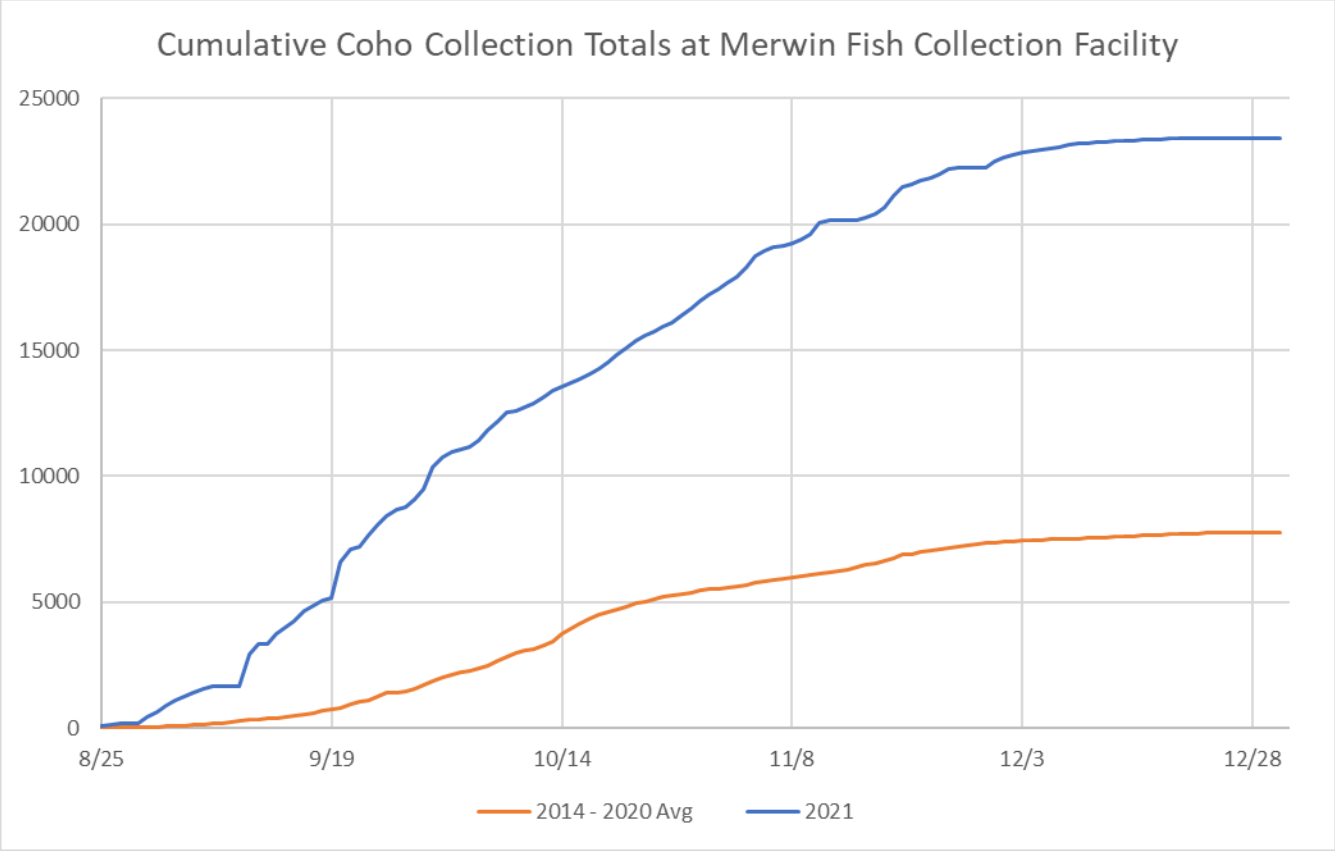

Figure 1. Calendar year 2021 coho collection totals compared to 2014-2020 average collection totals.

The MFCF was taken out of service on December 14 in order to accommodate scheduled quarterly maintenance. The MFCF was also taken out of service from December 24 – 31 due to unsafe operating conditions created by winter weather conditions and ice accumulation on the lift and conveyance system. Flows below Merwin Dam varied considerably throughout the month (Figure 2).

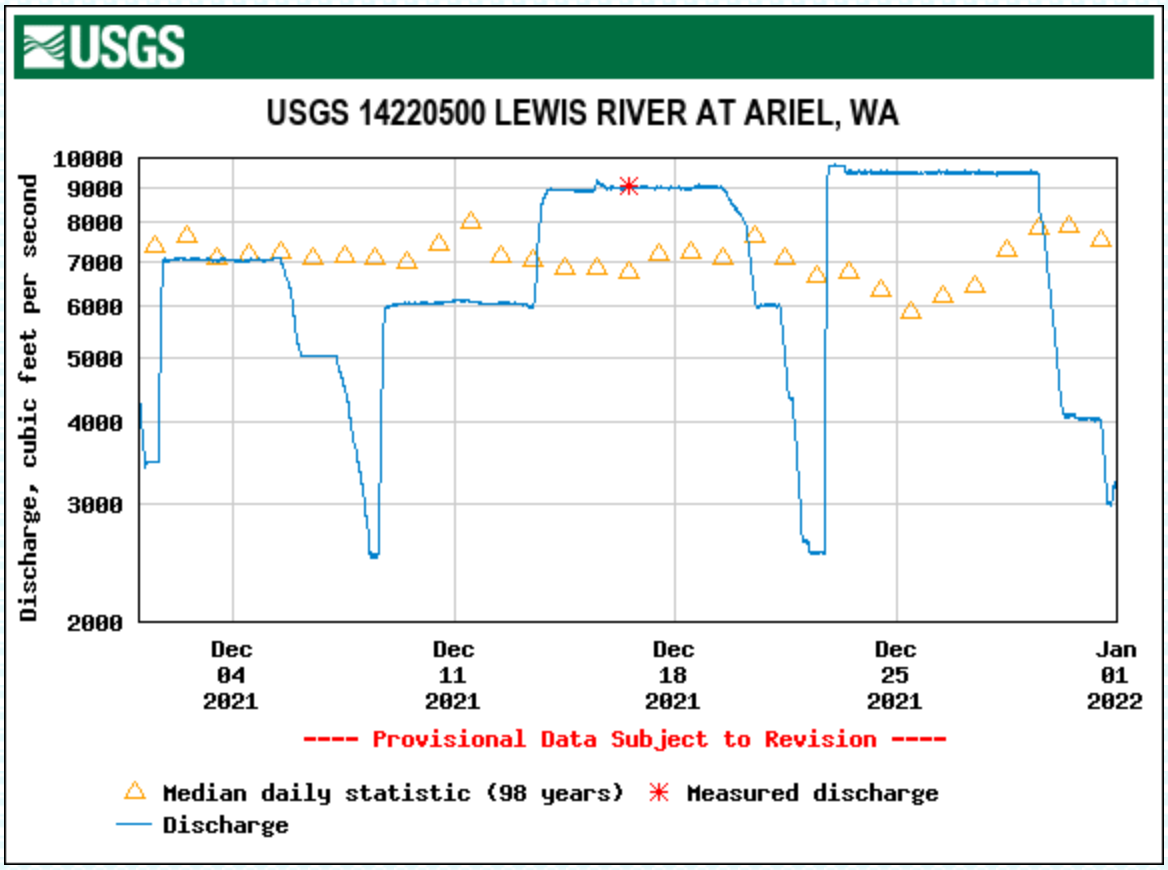

Figure 2. Discharge in cubic feet per second recorded at the USGS Ariel, WA gauge (14220500) located immediately downstream of Merwin Dam.

Upstream Transport

A total of total of 646 adult fish were transported upstream in December, 586 of which were collected at the MFCF. The remaining 60 fish were supplied by Lewis River Hatchery. Late run coho composed the majority of the fish transported upstream in December (n= 615), followed by cutthroat (n= 24), NOR winter steelhead (n= 4), and BWT winter steelhead (n= 3).

For calendar year 2021, a total of 6,174 early-run coho (4,149 HOR/2,025 NOR), 3,239 late run coho (2,109 HOR/1,130 NOR), 1,184 spring Chinook (897 HOR/ 287 NOR), 321 winter steelhead (210 BWT/111 NOR), and 168 cutthroat trout have been transported upstream of Swift Dam.

Floating Surface Collector (FSC)

The Swift Reservoir Floating Surface Collector (FSC) was taken out of service on December 24th, when winter weather conditions created unsafe operating conditions for truck transport, and the facility's outside operational systems. The FSC remained off for the remainder of the month. Prior to being taken out of service, a total of 4,350 fish were collected this month, which is a decrease from last month's record-setting total of 23,041. The majority of the fish collected in December were coho (n= 3,756), followed by spring Chinook (n= 499), steelhead (n= 61), cutthroat trout (n= 31), and hatchery rainbow trout (n= 3).

Table 1: Total number of out-migrating salmonids (by species) collected at the Swift FSC and transported downstream of Merwin Dam during the month of November since 2013.

Run Year	November Collection Totals by Run Year at the Swift FSC				
	Coho	Chinook	Steelhead	Cutthroat	**TOTAL**
2013	75	239	1	7	**322**
2014	271	236	6	2	**515**
2015	115	91	7	0	**213**
2016	675	213	15	25	**928**
2017	2,654	1,106	37	40	**3,837**
2018	157	178	5	0	**340**
2019	605	412	17	31	**1,065**
2020	618	26	27	13	**684**
2021	22,579	230	168	64	**23,041**