FINAL

1201 3rd Avenue, Suite 2600
Seattle, Washington 98101
206.287.9130

ANCHOR QEA

Memorandum

To: Wells, Rocky Reach, and Rock Island HCP Coordinating Committees and Priest Rapids Coordinating Committee

Date: January 28, 2025

From: John Ferguson, HCP Coordinating Committees Chair
Larissa Rohrbach, PRCC Facilitator

cc: Kristi Geris, HCP Coordinating Committees and PRCC Support

Re: Final Minutes of the November 18, 2024, HCP Coordinating Committees and Priest Rapids Coordinating Committee – 2024 Subyearling Chinook Salmon Workshop Recap (Joint Session 1)

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plan (HCP) Coordinating Committees and Priest Rapids Coordinating Committee (PRCC) met by conference call on Monday, November 18, 2024, from 11:00 a.m. to 12:30 p.m. for a joint session to discuss the 2024 Subyearling Chinook Salmon Workshop. Attendees are listed in Attachment A to these conference call minutes.

Action Item Summary

1. Anchor QEA will develop a running list of questions about the analytical models for statistician review and comment (Item I-A).
2. Anchor QEA will develop a matrix of issues and resolutions toward studying subyearlings to help guide discussions (Item I-A). *(Note: a working draft matrix was distributed to the HCP Coordinating Committees and PRCC by Kristi Geris on January 27, 2025.)*
3. A 2024 Subyearling Chinook Salmon Workshop Recap (Joint Session 2) will be held during the HCP Coordinating Committees and PRCC meetings on January 28, 2025, (to be determined [TBD]) and will be held virtually (Item II-B).

I. Welcome

A. Review Agenda (John Ferguson and Larissa Rohrbach)

John Ferguson (HCP Coordinating Committees Chair) welcomed the HCP Coordinating Committees and PRCC. The purpose of today's joint session is to discuss the 2024 Subyearling Chinook Salmon Workshop, which was held on June 11, 2024. Since the first workshop in 2009, a lot more information has become available—biologically, analytically, and technically. For Douglas and Chelan PUDs, per the HCPs, subyearling Chinook Salmon are in Phase III (Additional Juvenile Studies). Workshops were convened in 2009 and 2016 to discuss the state of the science to inform whether subyearling Juvenile Project Survival could be measured. The answer was no. The HCP Coordinating Committees began convening quarterly check-ins and then convened a third workshop in 2024. For the HCPs, the key question is whether survival can be estimated, and it seems the driver is whether the analytical

models are to a point to make these determinations or estimate survival in a way that meets the requirements of the HCPs. Paired-release, Virtual/paired-release (ViPRe), Virtual release/dead-fish correction (ViRDCt), and incorporating time into survival models to assess how environmental or operational parameters influence survival are the current analytical frameworks. These all have pros and cons. Discussing the models seems like a good starting point for discussions. Everything is interconnected—biology, tag technology, data gaps—these topics will arise as the discussions unfold.

Larissa Rohrbach (PRCC Facilitator) also welcomed the attendees and thanked both committees for convening this joint session, which provides efficiencies in discussing together the conclusions about the science and what participants heard from the workshop. For Grant PUD and the Salmon and Steelhead Settlement Agreement (SSSA), while there are no phase designations or requirements for additional studies, there is a similar commitment through statements of agreement to continue seeking the best available information on subyearling survival. Recognizing the amount of information on this topic, Rohrbach and Ferguson agreed that these discussions will require multiple sessions. Andrew Murdoch (Washington Department of Fish and Wildlife) provided a draft agenda[1] toward breaking down these topics. These joint sessions should focus on the commonalities among the agreements, PUDs, and projects and, for now, set aside the project-specific differences for discussion within the respective committees, such as defining what qualifies as an active migrant through the different project areas. Tom Dresser (Grant PUD) added that he views the HCPs and SSSA as both in an information-gathering stage for summer subyearlings. The SSSA does require Grant PUD, at some point, to estimate survival for summer subyearlings. The SSSA also includes offramps through adaptive management.

Ferguson asked whether the committees agree with starting with the analytical models. No objections were expressed.

B. Joint Session Minutes Approval (John Ferguson and Larissa Rohrbach)

There are no past joint session minutes to approve. *(Note: these joint session minutes will be approved at the next joint session.)*

C. Joint Session Action Items Review (John Ferguson and Larissa Rohrbach)

There are no past joint session action items to review.

[1] A draft *Subyearling Chinook Survival Study Workshop Synopsis* by Andrew Murdoch was distributed to the PRCC on September 18 and to the HCP Coordinating Committees on September 19, 2024.

II. Joint Session 1

A. Subyearling Chinook Salmon Workshop Recap (All)

Keely Murdoch (Yakama Nation) said, regarding survival models and active migrants, she does not disagree that what is and is not an active migrant needs to be discussed, but she recalls from the workshop that the statistical survival study models have changed from the basic paired-release and mark-recapture models. Both Ryan Harnish (Pacific Northwest National Laboratory) and Rebecca Buchanan (University of Washington) offered statistical models that could sort out active versus nonactive migrants. Harnish proposed this with the ViRDCt model using virtual releases. Buchanan proposed this, but it seemed more complicated. Harnish also presented that there is utility in pairing multiple projects at one time to help with the virtual releases. Ferguson agreed Harnish presented a roadmap for a virtual release design that combines single-release and ViRDCt models for multiple dams. He pointed out that with this approach, resolving tagging and handling effects and delayed mortality from the upper dam would need to be addressed. Harnish offered how this might be moved forward with the ViPRe or ViRDCt models, but also pointed to issues that would have to be addressed. Buchanan also identified issues with the paired-release model. Fish have to be actively migrating, or the model does not work. Ferguson thinks there is potential, but he did not hear these models are quite there yet.

Lance Keller (Chelan PUD) agreed it is interesting to see the evolution of these survival model approaches. While the paired-release design has been more traditionally applied in the Mid-Columbia River, application of the ViRDCt model is becoming more prevalent in the Snake and Lower Columbia rivers. Buchanan said to determine a migrant versus a non-migrant, there needs to be some ability to detect when these fish are not moving and make a judgement call based on these movements. Harnish proposed an "outside of the box" application of the ViRDCt model when fish may not be active migrants, but greater sample sizes are required when using this application, and additional work is needed to evaluate project-level survival. Keller believes these models are evolving in an encouraging direction, but he believes there are still gaps.

A. Murdoch asked whether using a virtual release in the forebay defaults to an estimate of dam survival instead of project survival, and if so, is this acceptable? Ferguson said Harnish's approach used a combination of the single-release and ViRDCt models to estimate project survival. However, in the closing slides, he lists potential biases with this approach related to delayed mortality and handling effects. The HCPs' goal is project survival. If this cannot be measured, next is calculating dam passage survival. Keller understands with the ViRDCt and ViPRe models, whichever fish make it to the forebay from release determine which fish are in the denominator for calculating dam passage survival. However, per the HCPs, dam passage survival only gets to a Phase III (Additional Juvenile Studies) designation. The ultimate goal is Phase III (Standard Achieved), which requires meeting the

project survival standard point estimate. Dresser said Grant PUD has only project survival standards for the Priest Rapids and Wanapum projects.

K. Murdoch said what was learned from the subyearling behavioral investigations at the Rock Island Project, it seems, is that selecting fish from the Rocky Reach Dam surface collector may in itself be a mechanism to select actively migrating fish. This might not comport with what some people say is an active migrant, but in these investigations, fish migrated quickly. How fish are collected and which fish are used impact whether fish are actively migrating. Keller agreed, fish moved through the Rock Island Reservoir fairly fast in all 3 years, but he also acknowledged the uniqueness of the Rock Island Reservoir. There are passive integrated transponder (PIT) data that suggest this might not be occurring in other reservoirs. K. Murdoch feels it would be worthwhile to test this at other projects, such as sourcing fish from Rocky Reach and moving these upstream of Wells Dam. Andrew Gingerich (Douglas PUD) said the juxtaposition to this for Wells is that Douglas PUD's subyearling behavioral investigations showed a lot of fish rearing and foraging and not migrating. K. Murdoch noted that these were beach-seined fish that were not ready to migrate, and she is suggesting using migrating fish from Rocky Reach to see how fast these fish migrate through Wells. Gingerich said this is a good question—are fish collected at a dam representative? Ferguson asked how the Confederated Tribes of the Colville Reservation (CTCR) collect fish near the mouth of the Okanagan River. Kirk Truscott (CTCR) said all beach seining.

Tom Kahler (Douglas PUD) said Douglas PUD's behavioral investigations used growth estimates to apply to fish and travel time to determine what fish size would be upon reaching Rocky Reach. Generally, fish size was much larger than the size at tagging, by approximately 20 millimeters (mm). If fish are collected at Rocky Reach for release above Wells, he questioned whether this would be representative of fish passing Wells. Additionally, fyke net data from the 1980s, 1990s, and early 2000s for fish passing Wells include a large size range that is not representative of fish collected via beach seining and includes fish much smaller than fish collected at Rocky Reach. There is also timing to consider. Fish are passing Wells from May into August, with a size range of untaggable to over 100 mm through June, and then some are still untaggable into July. This goes to the questions of what the study timing should be and what is representative at that time.

K. Murdoch agreed that representation is important. However, none of the survival studies have been truly representative. At Rock Island, no study has included Wenatchee River fish for release. Rocky Reach has never included Entiat River fish. Wells has only used hatchery fish. She understands the concern expressed about Rocky Reach fish above Wells, but at this point, this would be more informative than no information at all. Kahler said the committees need to decide what kind of representation to sacrifice to obtain an estimate. There is no point in doing this unless the evaluation can get to project-level survival. The committees need to agree on what to accept as a valid project survival estimate for this life history type. K. Murdoch agreed that in survival studies to date, there have been tradeoffs in representation and what can be studied. She disagreed that if project survival

cannot be evaluated, there is no reason to do it. It is written into all three HCPs that dam survival is acceptable if project survival cannot be measured. Ferguson said subyearlings are in Phase III (Additional Juvenile Studies), and the next step could be to do additional studies, perhaps short of a full-blown project survival estimate. Kahler said moving from calculated dam passage survival to measured dam passage does not change mitigation.

A. Murdoch said active migrants need to be clearly defined. What is a migrating fish versus a rearing fish that migrates later? What is the migration speed that determines whether a fish is an active migrant or not? Is there a number? Does an active migrant need to move a certain distance over time? Understanding this will ultimately drive tag and study design and sample size requirements. Ferguson agreed and said this is a model question. In the models, how are active migrating and rearing defined, and how are these accommodated to make an estimate? Kahler said Tiffan et al. addressed this question in the Snake River, and he believes relative velocity was used which compared the movement of fish to water particle velocity in the thalweg. Others have used body lengths. Different people have done different things.

Kahler said, back to the point of these studies. The HCPs included these survival requirements with the intent to find out whether modifications to the dams or operations were necessary. What rate of mortality is occurring that can be attributed to project passage? Are there operational changes that need to be made to rectify excessive mortality? These survival studies were then used to establish hatchery compensation rates. At the subyearling workshop, one of the first questions from Dalton Hance (U.S. Geological Survey) was, why do the HCPs do it this way? Because there needs to be a value upon which to base hatchery production obligations. The question then is, do people believe there are problems with subyearling survival that are not manifested somehow in the calculated dam passage survival and need to be identified? Maybe we need to answer this larger fundamental question to direct how to study the fish.

Keller thinks the status (active migrant or not) of these fish could change day-by-day. Fish may move and then stop. These models need to justify this across the area of inference. K. Murdoch said this is how summer Chinook Salmon move, but these fish are still impacted by the projects. She would consider this type of movement an active migrant. Keller said to Ferguson's point, how do the models treat these fish? Is a fish a mortality because it does not show up by a certain time or place? K. Murdoch suggested compiling a list of questions to help figure this out. Anchor QEA will develop a running list of questions about the analytical models for statistician review and comment.

Ferguson asked whether there might be a data analysis step here and suggested compiling what is known about travel times and movements of PIT-tagged and acoustically tagged subyearlings down through the system. What is the behavior? Do these fish continually migrate, speed up, slow down, or stall out? A. Murdoch suggested pairing this with a decision tree to help remove fish from the analysis. Keller said Buchanan spoke to this in her presentation, via enhancements to the ViPRe and

virtual release models, but there needs to be consistency across areas of inference. Bill Gale (U.S. Fish and Wildlife Service) thinks fish moving out of the tributaries are likely part of the slower-moving group, and fish collected at the projects are likely the faster moving group, but both groups need to be assessed. How these tributary fish are incorporated is an important piece. Ferguson agreed all of this is important. The question is how to do it when the current models assign lack of movement as mortality.

Truscott appreciates what A. Murdoch pulled together, and he suggested developing a matrix of issues and resolutions toward studying subyearlings to help guide discussions. Anchor QEA will do this.

Truscott asked if fish are randomly assigned to test and control groups, does it make a difference whether all fish are actively migrating if the lack of active migration is a component in both groups? Also, is it feasible to collect, tag, and release fish so they can be randomly assigned to different groups and do not violate the model parameters? The committees agreed this is a good question for the statisticians, including questions about sample size, statistical rigor, and handling biases.

B. Next Steps (John Ferguson and Larissa Rohrbach)

John Ferguson said for the HCPs, next month is a packed agenda and suggested continuing these joint sessions in January. Anchor QEA will develop a matrix of issues, including pros and cons, questions, and uncertainties about the models building upon what was discussed during today's joint session. During each joint session, perhaps the committees can discuss one or two more topics. It will be informative for the committees to continue to work through understanding the state of the science together, then these discussions can split off into the respective forums. The committees agreed with this path forward.

A 2024 Subyearling Chinook Salmon Workshop Recap (Joint Session 2) will be held during the HCP Coordinating Committees and PRCC meetings on January 28, 2025, (TBD), and will be held virtually.

List of Attachments

Attachment A List of Attendees

Attachment A
List of Attendees

Name	Organization
John Ferguson	Anchor QEA
Kristi Geris	Anchor QEA
Larissa Rohrbach	Anchor QEA
Lance Keller*	Chelan PUD
Bill Towey*	Chelan PUD
Catherine Willard	Chelan PUD
Tom Kahler*	Douglas PUD
Andrew Gingerich*	Douglas PUD
John Rohrback	Douglas PUD
Tom Dresser†	Grant PUD
Rod O'Connor†	Grant PUD
Tim Taylor†	Grant PUD
Scott Carlon*†	National Marine Fisheries Service
Bill Gale*†	U.S. Fish and Wildlife Service
Chad Jackson*†	Washington Department of Fish and Wildlife
Andrew Murdoch*†	Washington Department of Fish and Wildlife
Keely Murdoch*†	Yakama Nation
Kirk Truscott*†	Confederated Tribes of the Colville Reservation
Tom Lorz†	Confederated Tribes of the Umatilla Indian Reservation
Pete McHugh	Columbia River Inter-Tribal Fish Commission

Notes:

* Denotes HCP Coordinating Committees representative or alternate.

† Denotes PRCC representative or alternate.