

# Columbia Basin Collaborative Science Integration Work Group

## Meeting Summary

Monday, November 7, 2022, from 9:00 – 11:00am PT/ 10:00am – 12:00pm MT

### Attendees

**Working Group Members in Attendance:** Bob Lessard (Columbia River Inter-Tribal Fish Commission), Dennis Daw (Fort McDermitt Paiute and Shoshone/Upper Snake River Tribes Foundation), Aaron Lieberman (Idaho Outfitters and Guides Association), John Cassinelli (Idaho Department of Fish and Game), Steve Manlow (Lower Columbia Fish Recovery Board), Jay Hesse (Nez Perce Tribe), Patty Dornbusch (National Oceanic and Atmospheric Administration), Michelle Rub (National Oceanic and Atmospheric Administration), David Bain (Orca Conservancy), Tucker Jones (Oregon Department of Fish and Wildlife), Jay Backus (Port of Clarkston), David Doeringsfeld (Port of Lewiston), Kevin Scribner (Salmon-Safe), John Foltz (Snake River Salmon Recovery Board), Conor Giorgi (Spokane Tribe of Indians), David Moskowitz (The Conservation Angler), Gary Marston (Trout Unlimited), Haley Ohms (Trout Unlimited), Dan Feil (US Army Corps of Engineers), Claire McGrath (US Bureau of Reclamation), Sue Camp (US Bureau of Reclamation), Stephen Waste (US Geological Survey), Terrence Conlon (US Geological Survey), Tom Tebb (Washington Department of Ecology), Charlene Hurst (Washington Department of Fish and Wildlife), Michael Garrity (Washington Department of Fish and Wildlife), Tom Iverson (Yakama Nation Fisheries)

**Observers in Attendance:** Paul Arrington (Idaho Water Users), Mark Martin (Idaho Outfitters and Guides Association), Glen Spain (Pacific Coast Federation of Fishermen's Associations), Shane Scott (Public Power Council), Jeff Fisher (Seattle City Light), Stuart Crane (Yakama Nation)

**Facilitation Team:** Liz Mack (Kearns & West), Angela Hessenius (Kearns & West)

### Welcome, Agenda Review, Updates, and Introductions

Liz Mack, Kearns & West, provided an overview of the agenda and meeting guidelines. The topics included: 1) Feedback from I/RG, 2) Columbia Basin Partnership Task Force (CBPTF) Salmon Slider, 3) Gaps and Needs, and 4) Confirm Next Steps and Action Items.

### Feedback from I/RG

Liz reminded the group of the role of the topic specific work groups and the Science Integration Work Group (SIWG). Liz then provided a recap of the CBC Integration/Recommendations Group (I/RG) meeting held on October 19, 2022. During this meeting, the I/RG provided clarification on the role of the SIWG, which has two main objectives and expected deliverables: 1) make cross-cutting recommendations that are not specific to one of the limiting factors and 2) help evaluate the overall progress of the CBC and examine the recommendations from other work groups holistically. The SIWG is

not intended to serve as a clearinghouse; recommendations do not need agreement from the SIWG before they are submitted to the I/RG. The SIWG is meant to review, provide input, and add value to the recommendations from other work groups and to provide additional perspective that also goes to the I/RG.

The I/RG also reviewed the proposed SIWG work plan and recommended action form. The I/RG did not make any major changes to the work plan. They also saw value in the recommended action form that was proposed and drafted by this group during the previous SIWG meeting. The I/RG approved the use of this recommendation action form, while recognizing that some of the information may not be known for some of the recommendations. For the benefits described in the form, they would like to see these linked to the biological matrices.

Work group members added that there is a lot of information in the [CBPTF Report](#) that the work group should draw upon and utilize as a resource. Work group members also shared that there is a desire to describe benefits in terms of adult returns. In the recent Predation work group meeting, the group discussed the important concept of expressing benefits in terms of adult equivalents. One important role that the SIWG can play is to help standardize how benefits are measured across the work groups to align recommendations with the Columbia Basin Partnership goals.

## CBPTF Salmon Slider

Tucker Jones, Oregon Department of Fish and Wildlife (ODFW), provided an overview of the CBPTF Salmon Analyzer (referred to as the Salmon Slider), which is a model that was developed by Ray Beamesderfer (Fish Science Solutions). The genesis for this model was that the Partnership wanted the ability to do a “dial turning” exercise to address the following questions:

- What dials can we turn (i.e., what impacts can we reduce) to increase salmon or steelhead abundance?
- How much do we have to turn the dials (i.e., reduce impacts) to achieve a desired improvement?
- How feasible is it to turn any particular dial (i.e., to reduce any particular impact)?
- What combinations of dial turns (i.e., reductions in multiple impacts) get us where we want to go?

The model uses two analytical approaches: limiting factor analysis and life cycle analysis. The limiting factors are listed and defined in Table 12 of the [CBPTF Phase 2 Report](#) (page 58). Estimates of limiting factor impacts are defined as a percentage reduction in abundance of spawning salmon or steelhead associated with a reduction in productivity (or survival) for each limiting factor.

Tucker shared some important considerations regarding the Salmon Slider life cycle analysis. Both mainstem and latent mortality factors describe the effects of hydropower and are intrinsically linked to each other. However, latent mortality is treated separately in the limiting factors analysis because it is difficult to develop a numeric impact of latent mortality with the type of model used and data inputs

required. The model allows the use of a range of latent mortality. Tucker noted that not having latent and mainstem mortality linked is a downside to the Salmon Slider tool. Tucker also noted that the scale and significance of hatchery fish interactions with naturally produced fish remain a source of substantial uncertainty. Another consideration is that the limiting factors have varying degrees of impact on the different stocks in the basin.

The CBPFT used this analysis to develop quantifiable impact estimates that were incorporated into a heat map showing relative magnitude of impact from each category of limiting factor on each stock. This provides a way to quickly identify the relative severity of an impact, with some caveats. Tucker shared the following general takeaways from the heat map:

- Every stock is subject to significant impacts from multiple factors.
- Large-scale habitat impacts are pervasive for most stocks throughout the Basin.
- All stocks are subject to estuary habitat impacts, which vary depending on fish life history.
- Hydro-related effects, including mainstem impacts, latent mortality, and lost access in blocked areas, are large wherever significant dam construction has occurred.
- Predation impacts vary depending on fish life history but are significant for some stocks and often linked to habitat conditions created by hydropower system dams.
- Fishery impacts are stock-specific, with high values generally limited to relatively healthy stocks that are subject to widespread fishing in marine and freshwater.

More information on the relative impacts, how they were derived, and how they relate to each other is available in Appendix A of the Phase 2 Report.

The Salmon Analyzer is a simple life-cycle model that uses an equilibrium modeling approach to explore broad hypotheses to help achieve partnership goals. It allows users to analyze, at a coarse scale, the impact that different factors have on productivity or survival at various life stages and by stock. The Salmon Slider cannot evaluate specific actions, management decisions, or resource allocations, which require finer scale analyses than this tool is capable of. The core concept of this modeling approach is that the equilibrium or average salmon abundance measured on the spawning grounds can be directly and proportionally related to changes in limiting factors. However, these assumptions are not subject to other factors such as density dependence, which is one of the reasons why the slider is best suited to coarse evaluations.

Tucker then showed the group examples of what the Salmon Slider interface looks like. Users can select a specific stock and see the actual and goal abundance numbers. The limiting factors are the sliders that can be adjusted to represent a higher or lower impact level. There is also a sensitivity analysis section where users can select from several alternative inputs and scenarios, as well as adjust future conditions to look at varying levels of climate change impacts. Tucker also shared an example of outputs from the sensitivity analysis that are available for each stock in the Phase 2 Report.

To conclude, Tucker shared a few key takeaway messages from the Salmon Slider. The Salmon Slider is meant for coarse scale evaluations of different impact reductions, not to recommend specific actions.

The Slider does not provide information about the feasibility of any level of change in impacts, or corresponding costs or actions. The Slider can provide information on the relative scale of certain impacts on a coarse level (e.g., how big is a particular dial for a particular stock). The Salmon Slider is meant to be complimentary to other life-cycle modeling efforts.

### Questions and Discussion:

- Does the slider capture potential synergies across impact reductions?
  - Since the slider works stock by stock, it is not capable of capturing synergies across different stocks.
  - If you are toggling multiple limiting factors within individual stocks, it does capture the compounding effects of those impacts.
- When you zero out all the impacts, why doesn't the population return to historic abundance levels?
  - Historic abundance numbers are based on a pre-settlement system. There is also a potential climate effect within the model. So even if all the impacts are reduced to zero, the result still might not be as high as historic abundance numbers.
  - Another factor is that when you have extremely low abundance, it takes multiple generations for the population to rebound to historic levels.
  - In that situation, it could also indicate that either the historic abundance or the impact estimates are incorrect.
- What are the units used in the limiting factor analysis heat map? Are the numbers relative to one stock or across other stocks as well?
  - Each factor ranges from 0-100; they are measuring a percent impact to fish that ranged from 0% impacted to 100% impacted. These units are defined as percentage reductions in equilibrium abundance, generally equivalent to mortality rates.
  - The table also includes ranges of variability that are applied in the Salmon Slider model using the sensitivity analysis and alternative inputs.
- For most stocks at the ESU scale, it will take a combination of actions across impacts to achieve the CBPTF goals. It is important to consider which dials have already been turned and ensure that the recovery burden is shared equitably. We need to work across each of the limiting factors and acknowledge what has been done to date as we consider where we go in the future.
  - It is also important to consider that within ESUs, there are often smaller scale impacts that drive the overall impact.
  - This is why the Salmon Slider can provide a coarse, broad-scale sense of what to do but it cannot point to specific actions that are needed in a specific place.
- Is there a reason why ocean conditions are not included in the Salmon Slider?
  - There are not a lot of actions we can take that would have a large-scale impact on ocean conditions. The Salmon Slider is focused on impacts that are within our control.
  - Ocean conditions are somewhat included in the "Future Conditions" climate change component of the model.

- Tucker answered additional clarifying questions about the Salmon Slider form work group members:
  - The Salmon slider is an equilibrium population model, so the output is not just looking at a single generation response.
  - The hydro limiting factor only applies to mainstem hydropower (e.g., not Cowlitz River hydropower).
  - The Slider does not have a temporal component to say how quickly you would get a certain response from an impact reduction.
- Is the salmon slider available now for this group to use?
  - Patty Dornbusch volunteered to check with Ray to confirm.

## Gaps and Needs

Next, Liz reviewed the criteria for recommended actions and shared a list on screen of the science and infrastructure gaps that reach across threat categories, which the group brainstormed during the previous meeting. Using this list as a starting place, Liz facilitated a discussion for the group to identify which gaps and needs are well-suited to be developed into early recommended actions by the group. Work group members used the annotations function to identify actions from the list and discussed in more detail how they envision developing those gaps into potential actions.

### Questions and Discussion:

The following gaps and needs were selected by the group to focus on.

- #1: A framework for understanding compounding impacts and integrating actions impacts across the H's (hydropower, hatcheries, harvest, and habitat).
  - This group could develop a recommendation for a shared framework that is put into use by this group or other entities implementing projects or actions. The framework could be in the form of a checklist or series of questions to answer, or it could be a model.
  - The question of which audience this tool should be communicated to should be discussed by the I/RG.
  - This framework should include a temporal piece: what timeframe would you expect to see responses?
  - This group can use the [Washington Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan](#) (Lower Columbia Fish Recovery Board, 2010) as an example of how actions are framed.
    - See Volume 1, Chapter 4, Section 4.5.2 for conceptual information on how impact reductions were set across the Hs. Temporal considerations are addressed.
    - See Volume 1, Chapter 6, Section 6.4.3 for information on translation to threat reduction targets and impacts over time at an ESU scale (see Table 6.2 as an example).

- See Volume 1, Chapter 10 for an overview of how threat reduction strategies are translated to specific actions within an adaptive management framework.
  - Gap #5 (Salmon slider tool outputs are at a coarse scale; interpret and refine at the regional scale) could be a way to work toward this gap.
- #11: Understand and articulate how politics affects the various categories and their interactions.
  - Since one of the functions of this working group is to synthesize cross-cutting issues, it would be helpful to characterize what is required and who are the actors that need to be involved. The other TSWGs will be asked to identify who will implement their recommended actions. When identifying the entities that will implement these actions, it is important to be as specific as possible.
  - Understanding politics speaks to the feasibility of actions, which is something that is missing in the Salmon Slider model.
  - Some of the bottlenecks to undertaking actions have been a lack of funding and/or political fortitude. This group can help shape strong policy statements.
- #12: Plan for the infrastructure of the future, not just the infrastructure that currently exists.
  - Some work group members thought of infrastructure as physical (e.g., concrete, fish passage facilities, hatcheries, dams, etc.). Other members thought of infrastructure more broadly to include regulatory infrastructure, implementation, and enforcement in addition to physical infrastructure. This nonphysical infrastructure could include actions that help prevent backsliding. Infrastructure can also include planning for climate change and human growth and development; this can help prevent taking actions to restore habitat in one area while habitat is lost in other areas. County, state, federal regulations play a role in this.
  - This gap can also include building the infrastructure that would allow other actions such as dam removal to take place. There are transportation and energy infrastructure that need to be in place before we can even consider making major changes to existing infrastructure.
- #15: Carrying capacity in Columbia River mainstem and estuary.
  - It is important to keep in mind that these are not static numbers.
  - This group also needs to consider the “portfolio effect”: different populations use habitats at different times.
  - There have been scientific efforts on this subject in Puget Sound; this group could pursue something similar. This could involve hatchery release time studies and understanding how natural populations are utilizing the watershed over time.
- #6: Understand the differences between models; there is a need for life cycle models for a representative population within each major population segment to identify bottlenecks and priorities.
  - This may be an internal action. The SIWG could become a clearinghouse for models in order to minimize the confusion from dueling models.
- Work group members identified potential crossover or ways to combine multiple gaps.

- There is a temporal theme to both #4 (understand and summarize the relative timeframes for return on investment for different actions) and #12 (plan for the infrastructure of the future, not just the infrastructure that currently exists).
- #13 (incorporate adaptive management) could also be a part of #2 (adequately funded, modernized, and coordinated detection and monitoring at a basin-wide and project-level scale, e.g., PIT detection in the mainstem). Adaptive management should be a part of any monitoring program.
- Work group members also discussed potential missing gaps.
  - Some of the dials on the slider are more within control of state agencies than others; this factor is not included in the Salmon Slider.
  - There is an important science knowledge gap around carrying capacity and density dependence in the mainstem.
  - This group could recommend to the I/RG that an additional work group be formed to focus on the nexus between salmon and human (social/cultural/economic) considerations.

## Confirm Next Steps and Action Items

Liz reviewed the next steps for this work group based on the group's discussion and confirmed upcoming meeting topics. The next meeting (to be scheduled in early December) will focus on developing early actions. Work group members volunteered to reflect on the discussion and develop an early draft of a recommended action and bring that to the next meeting for consideration by the group. Below is a recap of the volunteers assigned to draft a short, written description of their action to address the listed gaps:

- #1, Framework for understanding compounding impacts and integrating actions across categories: Haley Ohms & Gary Marston
- #6, Understanding differences between models: Bob Lessard
- #8, Considering impacts of climate change across threat categories: David Moskowitz
- #11, Articulating effect of politics across threat categories: Steve Manlow
- #15, Studying carrying capacity in the Columbia: David Bain & Gary Marston

Liz thanked everyone for participating and adjourned the meeting.