Southern Resident Killer Whale Task Force Meeting #4: Discussion Guide – Prey Group 2 (Hydropower)

This document is intended to help guide further discussion around the action items presented below. These action items were flagged as needing additional discussion based on responses to the survey sent to all Task Force members on 8/13/18 and/or the specific potential recommendations provided by the Working Group require Task Force Discussion.

Actions are NOT listed in priority order.

QUESTIONS TO BE DISCUSSED IN BREAK OUT GROUPS AT THE AUGUST 28 TASK FORCE MEETING

- Which option(s) for each action do you support including in the 2018 report to the Governor? Which require further Task Force discussion, and should be saved for potential 2019 recommendations?
- What additional information do you need to make a decision?
- Do you have suggestions for improvement to a potential recommendation?
- Is the package of hydropower recommendations bold enough to make meaningful progress towards Southern Resident Recovery?

For Hydro actions A1, A2 (Recommend that Ecology adjust total dissolved gas standards (match or exceed OR's gas caps) on the Snake and Columbia rivers…) and F2 (Remove the four lower Snake River dams to benefit Chinook passage), the Task Force has requested more information in order to fully consider these options. Time in the breakout groups will be used to determine what the Task Force would like to know to move the discussion forward in order to organize webinars to answer these question in the coming weeks.

HYDROPOWER OVERVIEW

Issues with Dams

Dams can block or impede fish passage, slow the migration rate of juveniles, and alter riverine ecosystems and their function, which negatively affects salmon survival. In the Columbia-Snake river system, juvenile salmon in particular can have a difficult time passing to downstream habitat on their outmigration to the sea. When the current draws juvenile fish into the dam's turbines, fish can be injured or killed when they strike the turbine blades or concrete walls, or implode from the intense pressure generated from falling and spinning water in the turbines. With many fish needing to pass multiple dams (up to nine in the Columbia-Snake system) on their way to the sea, the likelihood of injury or death can be quite high. Even where juvenile fish passage has been improved with new passage technologies and "fish friendly" water and dam management practices, the cumulative toll of passing multiple dams may remain significant. Some dams—some hydro and some not—have no fish passage at all.

Dam Retrofits & Modifications

Dams can be retrofitted to include structural features that help juvenile and adult fish pass through the dam without injury or death. Dams can also be operated to minimize impact on migrating fish. For juveniles, physical changes at dams including bypass chute systems, spillway weirs making it easier for fish to find the entrance to the spillway, surface collectors behind high-head dams, and new turbine designs that are more efficient and fish-friendly, can all help improve survival rates. Adults migration benefits from fish ladders (or multiple fish ladders at large dams), or "trap and haul" facilities at high head dams where regular fish ladders may be infeasible.

Salmon Recovery Efforts

The hydroelectric dams (both federal and non-federal) on the Columbia and Snake rivers were a major factor in the listing of 13 stocks of Columbia salmon and steelhead under the Endangered Species Act (ESA) in the 1990s, and continue to be one of many factors in depressing spring Chinook and other Columbia Basin salmon and steelhead populations. Thanks to improved dam operations, off-site habitat mitigation, fishery management and water management (spill), i.e., all H approach, some of these listed populations, such as mid-Columbia River steelhead and Snake River fall Chinook, have rebounded significantly since the 1990's (but not yet to the point of de-listing), while others, such as upper Columbia spring Chinook and Snake River spring/summer Chinook, remain well below ESA de-listing goals for a suite of reasons. But even depressed and at-risk stocks have responded to some to degree to improved hydrosystem operations (such as increased "spill" over the dams, sometimes over innovative passage routes like adjustable spillway weirs) and tributary and estuary habitat restoration.

Dam Removal

Removal of dams that have no fish passage has been shown to significantly benefit salmon. Within a few months of the removal of the Elwha Dam in northeast Washington, wild and hatchery salmon were using the mainstem and tributaries of the Elwha River; these included 4,000 spawning Chinook in the first season following dam removal. Depending on the type of dam, dam removal can also improve spawning and rearing habitat by flushing or removing existing siltation and preventing future siltation from occurring. It can also support healthy downstream habitat as small rocks, nutrients, and debris are no longer inhibited by the dam. Fish migration survival rates are improved due to safer and faster migrations, and the temperature of the water released from a dam may be cooler downstream once the reservoir no longer exists. In other cases, cool water deep in a reservoir above a dam can be released to cool downstream reaches.

Dam removal, especially of larger facilities, can be a long and cost-intensive process, and the outcomes can vary depending on the river system. The efficacy and trade-offs involved with large-scale changes to dam operations and/or configuration (up to and including lower Snake River dam removal) has been debated among co-managers, scientists, and stakeholders for decades.

Action Hydro F1: *Remove other hydro and non-hydro dams in locations that most benefit Chinook passage.*

Options from Working Group:

a) Support funding for currently agreed to/supported dam removal projects across the state benefiting Chinook.
b) Develop a list of dams that have already been removed to benefit salmon and develop a list of priority projects for potential removal
c) Halt dam projects that aim to address flooding on the Chehalis River. Instead, the state should pursue non-dam options to address flooding as WDFW assesses the potential impacts that dams on the Chehalis River would have on Chinook salmon and Southern Resident orcas.
d) Prioritize removal of dams from the American Whitewater list such as:

In the next 1-3 years:

- Middle Fork Nooksack Diversion Dam on the Middle Fork Nooksack River,
- Pilchuck on the Middle Pilchuck River, and
- Nelson Dam on the Naches River.

In the next 4-5 years:

- Chambers Creek Dam on Chambers Creek
- Enloe Dam on the Similkameen River

5 years plus:

- Electron Dam on the Puyallup River

Hydro F1: Working Group Ratings	
Effectiveness	High
Affordability	Low
Ease of implementation	Low
Timeline for benefits to SRKW	Intermediate
Geographic specificity	Analysis Pending / Statewide
Supporting and dissenting opinions on ratings (if applicable)	• Variable affordability, efficacy, depending on location • Consider SRKW chinook in proposals for new dams • No new dams doesn't account for potential climate change impacts (e.g., hydropower and flood management in places like the Chehalis Basin)
Notes	Addresses need for finer-scale, shared and updated understanding of locations (subdivisions) within current zone where SRKW feeding and socializing is concentrated (Ashe et al. 2010)

Survey Input from Task Force on Action Hydro F1:

- Task Force members recommended modifications/clarifications to this action, including:
  - Include a list of dams that this would affect. Prioritize specific dams based on criteria like public support, timeframe/readiness, benefits to salmon and SRKW.
  - De-couple hydro and non-hydro dams.
  - Change to: "Provide funding to remove dams that are already prioritized and have the necessary support and science completed."
- Some Task Force members said that they needed more information, including about negative impacts and unintended consequences for the economy and communities.
- Some expressed concerns or questions related to removing hydropower when we need to act on climate change.
- Some Task Force members suggested alternatives to this action, including:
  - First do a statewide analysis to first determine what facility removals would most benefit Chinook, then act on the results.

NEPA Review of the 14 Federal Columbia River Power System dams

As part of a larger study of Columbia and Snake River salmon management alternatives, a National Environmental Protection Act (NEPA) environmental review process is currently underway to examine dam removal against other alternatives on the 14 Federal Columbia River Power System dams. The Columbia River System Operations Environmental Impact Statement (EIS) is currently in the "developing alternatives for detailed evaluation" stage of the overall NEPA process and the next phase of the process is "detailed analysis." A cost-benefit analysis of potential dam removals in the Pacific Northwest does not currently exist, and would aid in the prioritization of potential removal of both large and small dams in terms of their effectiveness for SRKW recovery. This type of analysis could prioritize dams for removal that most benefit Chinook salmon and SRKW, and could address stakeholder perspectives and policy trade-offs, including an assessment of climate change benefits from protecting existing hydropower dams. The draft EIS will be issued and available for public comment by March 2020.[1]

Action Hydro G: *Expedite NEPA process for Columbia River operations.*

[1] Columbia River System Operations EIS: http://www.crso.info/eis.html

Options from Working Group:
a) Request Governor to send the US Army Corp of Engineers a letter requesting that NEPA be expedited
b) Request that the NEPA process and related Biological Opinion (BiOp) fully consider the impact of the FCRPS on the SRKWs and recommend that the alternatives analysis fully consider, especially in light of climate change: (a) increased spill system-wide up to 125 TDG, and (b) breaching the lower Snake River dams.
c) Oppose any additional extension of time to complete the FCRPS NEPA review process.

Hydro G: Working Group Ratings	
Effectiveness	L? See Notes below. This action was requested by the Task Force to be added after the development of these tables so agreed upon Working Group ratings not yet available
Affordability	Not yet available
Ease of implementation	Not yet available
Timeline for benefits to SRKW	Not yet available
Geographic specificity	Columbia River
Supporting and dissenting opinions on ratings (if applicable)	Not yet available
Notes	• This action is limited in its potential impact on SRKWs. Any impact is contingent on the outcome of the NEPA review and BiOp processes. Those processes are important, but they are being run by the federal agencies and while they will consider input, they are not required to take direction from the State of Washington or other stakeholders. They are also slow processes, and they would not result in short-term benefit to the whales. • The action as proposed is procedurally straightforward. It could be done in the form of a request directly from the Governor's office. However, the timeline for the FCRPS NEPA process has been set by court order. It is unlikely that any request by the Governor's office could change this timeline. That said, the Governor could influence the degree to which SRKWs are considered in the FCRPS and whether the related BiOp consider impacts to SRKWs.

Survey Input from Task Force on Action Hydro G:
- Several Task Force members said that they need more information or clarification about this action.
- Task Force members expressed concerns or questions related to risk because of current administration.

Spill

The Comparative Survival Study (CSS) model predicts that high levels of spill (to 125% Total Dissolved Gas) could allow Snake River spring Chinook to approach the Northwest Power and Conservation Council's goal of 4% smolt-to-adult return ratios (SARs), which would allow for relatively rapid recovery compared to current SARs, which are averaging below 1% over the last 20 years. 2% SARs are needed for stable populations, above 2% is needed for population growth. Similarly, the CSS projects that upper Columbia spring chinook would benefit from higher spill levels.

NOAA Fisheries' COMPASS model also has examined the effects of increased spill. COMPASS suggests lower levels of benefit with additional spill, and higher risk, due to different assumptions than CSS about "delayed mortality" effects of downstream dam passage as well as greater concern about unintended consequences of higher spill levels such as gas bubble trauma in juveniles and less efficient upstream passage for adult salmon.

Action Hydro A1: *Recommend that Ecology adjust total dissolved gas standards (match or exceed OR's gas caps) on the Snake and Columbia rivers to allow flexibility to adjust spill regimes, as needed, to benefit Chinook salmon and other salmonids.*

Options from Working Group:
a) Recommend that Ecology remove the 115% forebay total dissolved gas standard, leaving just the 120% tailrace standard in place on the Snake and Columbia Rivers to allow flexibility to adjust spill regimes, as needed, to benefit Chinook salmon and other salmonids.
b) Recommend that Ecology adjust gas standards to 125% on the Snake and Columbia Rivers to allow flexibility to adjust spill regimes, as needed, to benefit Chinook salmon and other salmonids.

Action Hydro A2: *Recommend that Ecology adjust total dissolved gas standards (match or exceed OR's gas caps) on the Snake and Columbia rivers and that spill be increased to these increased TDG standards to benefit Chinook salmon and other salmonids.*

Options from Working Group:
a) Recommend that Ecology adjust gas standards to 120% tailrace-only standard on the Snake and Columbia rivers and that spill be increased to this level to benefit Chinook salmon and other salmonids.

b) Recommend that Ecology work with Oregon to adjust gas standards to 125% on the Snake and Columbia rivers and that spill be increased to this level to benefit Chinook salmon and other salmonids.

Hydro A1 & A2: Working Group Ratings	
Effectiveness	High
Affordability	Medium
Ease of implementation	High
Timeline for benefits to SRKW	Intermediate
Supporting and dissenting opinions on ratings (if applicable)	Supporting: • Increased spill leads to increased survival rates of migrating fish. • Even if funds are reallocated away from habitat etc. due to increases in spill, the action has the potential to result in such an improvement to the number of fish successfully migrating that it would be worth it. Also, other funding sources could be sought to replace those lost. • NEPA process is too slow to benefit the SRKW when they most need it – action is needed before that process is complete in 2021 or 2022. Dissenting: • Disagreement on science about impacts of increased spill. Dueling models for how much more benefit additional spill provides—more light will hopefully be shed via NEPA over next 3 years, as well as potential new dam operations during that period. • Increased cost of changes in spill management could result in BPA reallocating funding currently going to habitat improvements or hatcheries
Notes	• Affordability depends on how much is spilled and when (spilling to 125% 24 hours a day would be relatively less affordable, but other amounts of spill, or flexible spill regimes could be medium or high affordability) • Spill regime and gas cap not inextricably linked – TF could recommend changing gas caps without changing spill regimes, which would allow flexibility to use the best available science to decide how much spill is beneficial at specific dams/systems, years, etc. • Barging of fish beyond dams may be a related action that will allow for greater survival of fish under certain dry year conditions.

Survey Input from Task Force on Action Hydro A1:

- Task Force members recommended modifications/clarifications to this action, including:
  - Better coordination of spill requests and requirements.
  - Use 125% TDG.
  - Specify the four lower Snake River dams and the four lower Columbia dams.
  - Optimizing across the full suite of dams, rather than at each dam alone.
- Some Task Force members said that they needed more information, including on the trade-offs, the current regime, Ecology's role, the cost of the additional spill, and the potential fish risk.
- Some expressed concerns or questions related to detrimental impacts to salmonids from adjusting gas gaps.
- Two Task Force members said they preferred A2 to A1.

Survey Input from Task Force on Action Hydro A2:

- Task Force members recommended modifications/clarifications to this action:
  - Use 125% TDG.
- Some Task Force members said that they needed more information, and clarification about the difference between A1 and A2.
- Some expressed concerns or questions related to upriver impacts, trade-offs, and detrimental impacts to salmonids from adjusting gas gaps.
- One Task Force member mentioned exploring Whooshh as an alternative, and another suggested evaluating effectiveness of this action versus habitat restoration that could be done with revenue lost to spill.

The efficacy and trade-offs involved with large-scale changes to dam operations and/or configuration (up to and including lower Snake River dam removal) has been debated among co-managers and stakeholders for decades. The most optimistic assessment of the power of these changes comes from the Comparative Survival Study (CSS). The CSS is a joint project of the Fish Passage Center, Washington, Oregon, and Idaho Fish and Wildlife/Game departments, and the Columbia River Inter-Tribal Fish Commission. The CSS model predicts that lower Snake River dam removal plus high levels of spill at the lower Columbia River dams could result in SARs approaching 6% for Snake River spring chinook, which could triple existing returns on average. As part of a larger study of Columbia and Snake River salmon management alternatives, a National Environmental Protection Act environmental review process is currently underway to examine dam removal against other alternatives on the lower Snake River.

Lower Snake River Dams[2]

Ice Harbor Dam, the first of four dams constructed on the Lower Snake River, was completed in 1962. It has a generation capacity of 603 MW and a hydraulic capacity of 106,000 cfs. It has two fish ladders for upstream-migrating fish, a spillway, a spillway weir, and a juvenile bypass system for downstream-migrating fish. Lower Monumental Dam and Little Goose Dam both completed construction in

[2] Columbia River System Operations EIS: http://www.crso.info/eis.html

1970 and have the same upstream/downstream accommodations for fish. They both have generation capacities of 810 MW and hydraulic capacities of 130,000 cfs. Lower Granite Dam was the last dam constructed on the Lower Snake River, completed in 1975. It also has a generation capacity of 810 MW and a hydraulic capacity of 130,000 cfs. It has one fish ladder with entrances on both shores, providing a passage for upstream-migrating fish, a spillway, a spillway weir, and a juvenile bypass system for downstream-migrating fish.

Action Hydro F2: *Remove the four lower Snake River dams to benefit Chinook passage.*

Options from Working Group:

a) Support the ongoing NEPA process and other discussions around potential removal of the lower Snake River dams to benefit Chinook populations.
b) Develop a local/state/federal table to discuss how to mitigate impacts to local communities, energy transmission system, and regional stakeholders, including hatcheries, when/if the dams are removed.
c) Develop a potential outline of a package to fund hatchery production to prevent any decreases in Chinook abundance due to dam removal (Snake River hatcheries currently depend on funding tied to the dams' existence and operation; Lower Snake River Compensation Plan documents report the budget is $30 million annually)
d) Advocate that Army Corps unilaterally make a decision to stop operating the dams and seek authority to breach dams in near-term. Work to develop mitigation package for affected communities and stakeholders, and to fund necessary hatcheries and habitat actions in the absence of mitigation funding depending on dam operations. Work to ensure dam's energy is replaced with carbon-free alternatives.
e) Pass executive order in favor of lower Snake River dam removal and replacement with carbon-free alternatives.

Hydro F2: Working Group Ratings	
Effectiveness	High
Affordability	Low
Ease of implementation	Low
Timeline for benefits to SRKW	Intermediate, once implemented
Supporting and dissenting opinions on ratings (if applicable)	• Variable opinions on affordability, efficacy, timeline to action implementation.
Notes	• See Regional Organization comments LINK

Survey Input from Task Force on Action Hydro F2:

- Task Force members indicated that they wanted more information to be able to evaluate this. That information could be provided through a webinar. Specific information requests included:
  - Models on the number of hatchery and wild Chinook Salmon that removal of these dams would both put into the system (as live out-migrating smolts) and that we could expect to see returning as adults (understanding that the numbers will come as a range and be associated with levels of uncertainty).
  - Negative impacts and unintended consequences for the economy and communities.
  - Comparison with costs and benefits of other actions in the basin, as relates to SRKW.
  - Realistic understanding of the cost, what the timeline might be, and who has the authority to make it happen.
- Some expressed concern about removing hydropower when we need to act on climate change.
- Some Task Force members suggested alternatives to this action, including:
  - Request that Governor discuss options with the US Army Corp of Engineers and the Bonneville Power Association.
  - Making this part of the Task Force's phase 2 work.
  - Adding an action that serves as a foundational step (see F1).