Southern Resident Killer Whale Task Force Meeting #3: Discussion Guide – Prey (Hatchery, Harvest, Predation)

The Prey Working Group met on June 25 and July 25, 2018 and identified the following potential actions for **Hatchery, Harvest, and Predation** that are presented here for discussion and consideration by the Task Force. Potential actions for Hydro, Habitat, and Forage Fish are covered in a separate discussion guide. They evaluated the effectiveness, affordability, and ease of implementation for each action. Appendix A (Considerations Matrices For Evaluating Potential Actions) produced during the Prey working group meeting provides more detail on these actions.

This document is intended to help summarize discussions and potential actions that were discussed at the WG meeting. This document presents some key issues for discussion and consideration so the Task Force may begin to select actions to move forward and to provide further direction to the Working Group. Any comments to improve accuracy of issues discussed or the WG conversation are welcomed.

These actions are NOT in order of priority.

QUESTIONS FOR THE TASK FORCE

For each issue below, please discuss and reply to the following questions:

- Would you like this action to be considered as a Task Force recommendation?
- What questions do you have about this potential action?
- Do you have suggested revisions or clarifications to this action?

HATCHERY

The largest threat to Southern Residents is a decline in salmon numbers, both natural and hatchery stocks. Reductions to hatchery production are mainly attributable to reforms in production plans and policies and/or funding constraints. Reductions to natural production are attributed mainly to the five major threats the Task Force and Working Groups have discussed (4-H's and P). Chinook salmon make up the majority of the Southern Resident diet. Southern Residents do not discriminate between wild and hatchery-raised Chinook, feeding freely on both when available. Hatchery production plays an important role in increasing prey abundance for Southern Residents, especially in the intermediate term (3-10 years), since increasing the abundance of natural Chinook stocks will take more time. In the meantime, there are concerns about the presence of hatchery fish leading to genetic dilution in some natural stocks. It is recommended that the conservation or recovery of local natural salmon populations be considered before deciding where hatchery increases should occur. Periodic review of increased hatchery production should occur to evaluate ecosystem responses. Hatchery production changes require cross-agency coordination among WDFW, Tribes, and NOAA, with other entities like the Hatchery Science Review Group and the Regional Salmon Board of Directors consulted.

Note: Washington Department of Fish and Wildlife has already been directed and funded to increase some hatchery production to benefit Southern Residents by Governor Inslee and the legislature in 2018-2019. This work is already in progress. WDFW was also asked to develop a plan outlining what future increased Chinook production for Southern Residents should look like. The plan is due by the end of December 2018.

The Prey Working Group suggests two potential hatchery actions for the Task Force to consider:

Action A: ***Increase hatchery production at facilities that most benefit SRKWs and apply measures to remove excess hatchery fish before they reach spawning grounds (e.g. weirs, mark-selective harvest).***

Action B: ***Perform actions in hatcheries to increase productivity, smolt-to-adult survival and/or marine survival of Chinook (including but not limited to reducing predation on hatchery fish), adjust return timing and locations to align with whale needs, increase size and age of return, and reduce potential competition with wild fish.***

Summary of Hatchery Actions

Action	E	A	I	Timeline for SRKW Benefits	Supporting and Dissenting Opinions on Ratings (if applicable)	Geographic Specificity Progress	Notes
Action A *Increase hatchery production at facilities that most benefit SRKWs and apply measures to remove excess hatchery fish before they reach spawning grounds (e.g. weirs, mark-selective harvest).*	H	H	M	Intermediate	Supporting: • Increases are essential in the near term for the whales due to dire need for more Chinook • Disagreement with some that believe wild stocks are not impacted by hatchery fish. • It is possible to increase production in some areas without negatively impacting wild stocks (for example see suggestion letter from ODFW and accompanying memo) Dissenting: • Increased production may increase risk for wild fish recovery. • WDFW should proactively coordinate with Regional Organizations to ensure any increased hatchery production aligns with recovery plan goals and objectives, prior to making decisions. This should include evaluation and modeling of risks and benefits, where supported by data. This evaluation should also address populations in the Coast Region, where the focus would be to ensure hatchery production does not result in increased risk to non ESA-listed natural origin populations. • Increased hatchery production is not a long-term goal or solution in itself but instead just one tool to get to larger Chinook abundances. Larger goal is healthy wild Chinook populations and ecosystems. • If production is increased it needs to be for a timeframe only (e.g. 10 years) before it is fully analyzed for effectiveness. Do not want this effort to result in a blank check for more hatchery production for other purposes.	Analysis Pending; WDFW is drafting a decision-making model for potential production increase locations, including factors like: 1)c apacity in existing programs, 2) benefits to SRKW, 3) numbers of Chinook per dollar invested, 4) programs that can best be operated consistently with salmon conservation and recovery. Model will be out for review in early August.	• Due to carrying capacity issues, habitat improvements are needed for increases to be effective at producing adult fish. • Decisions on production increase locations should consider adjacent wild stock categorization (supporting, contributing, primary) and not affect primary stocks. • Needs a strong emphasis on comprehensive reviews (5 year intervals) and adaptive management (annual) to limit hatchery impacts to wild stocks. Should consider: stray rates, productivity, PNI, juvenile rearing carrying capacity, smolt to adult ratios, genetic fitness, etc. • Limited ability to use mark selective harvest to remove hatchery fish because Canada does not mark their fish. • Locations of harvest of these hatchery fish needs to ensure that SRKW get a chance to forage on them first.
Action B *Perform actions in hatcheries to increase productivity, smolt-to-adult survival and/or marine survival of Chinook (including but not limited to reducing predation on hatchery fish), adjust return timing and locations to align with whale needs, increase size and age of return, and reduce potential competition with wild fish.*	M	M	M	Intermediate		Pilot suggested at a location where increases occur (see above)	• Need to better reflect natural run timing and variability. SRKW would benefit from more diverse prey availability throughout the year and selecting for larger fish.

HARVEST

Harvest, depending on many factors, may reduce the number of adult fish available to Southern Residents in areas where the orcas forage. Reducing harvest or altering harvest methods in some areas may make more adult Chinook, the primary food source for Southern Residents, available to the whales. It is essential that any recommendations pertaining to fisheries harvest greatly consider any implications for tribal treaty fishing rights. In addition, the Task Force should consider the value of healthy fisheries to local economies and culture in deciding on any measures related to harvest. Harvest is managed by different entities and processes dependent upon the geographic scope and fish species involved. For salmon fisheries, state, federal and tribal fishery managers gather annually to plan recreational and commercial salmon fisheries in the ocean along coastal Washington and northern Oregon to freshwater rivers and inland marine waters including Puget Sound, Grays Harbor and Willapa Bay. This series of public meetings is generally referred to as the North of Falcon Salmon Season Setting process. The North of Falcon planning process is intertwined with meetings of the Pacific Fishery Management Council (PMFC), where ocean fisheries are set. Between PFMC meetings, the states of Washington and Oregon and the Treaty Tribes hold additional meetings and negotiation sessions; many of these are public meetings with interested constituency groups and individuals.

The Prey Working Group suggests six potential harvest actions for the Task Force to consider. For each of these actions, the Prey Working Group wants to stress that nearly all the potential harvest actions require strong consideration of tribal fishing rights and other place-based concerns.

Action A. Further limit Chinook harvest in specific areas important to SRKW foraging
This would allow for geographic specificity in harvest limitations. Current Chinook harvest in areas of the Salish Sea utilized by SRKW for foraging is already a limited, so the potential number of fish "freed up" to Southern Residents would be low. Ratings for this action only consider impacts to prey abundance and not vessel impacts that may be associated with harvest. (See Vessel Working Group potential actions)

Action B. Subsidize or compensate fishers to not fish
Financial compensation could be offered to recreational and commercial fishers to stop or reduce fishing in specified areas.

Action C. Reduce non-targeted fisheries' impact, including limiting gear types that increase mortality and incentivizing innovative gear types that decrease mortality, and by-catch
Other fisheries—such as hake and pollock—catch chinook by accident (bycatch). Restrictions on certain types of gear, requiring bycatch excluder devices, or incentives to use gear that reduces bycatch could reduce the amount of chinook mistakenly harvested.

Action D. Negotiate reductions in AK and Canadian fisheries to allow more Chinook to reach WA waters
The Pacific Salmon Treaty, first signed in 1985, is a bilateral agreement under which the U.S. and Canada co-operate on harvest/management, research and enhancement of Pacific salmon that swim through the waters of both countries. Agreements outlined in this treaty are renegotiated and renewed about every 10 years, with the current re-negotiations finishing up right now; the result of these are likely to benefit WA Chinook stocks. However, future negotiations provide an opportunity for greater consideration of Southern Resident needs.

Action E. Reduce marine harvest and transfer opportunity to terminal fisheries
Transferring some fishing effort to terminal (in or near rivers) fisheries, could benefit Southern Residents by letting the whales feed on the returning adult Chinook in marine areas before they are subject to fisheries. There are considerable legal and economic challenges associated with this action including tribal treaty rights and non-tribal fishery issues.

Action F: Implement slot size limits to get larger fish to whales, spawning grounds, and hatcheries (put a maximum size limit on catch)
Restricting the size of Chinook that can be retained by fishers could aid Southern Residents by both increasing the energetics value (larger size, more calories) of Chinook available and by increasing the number of Chinook available in future years, since larger fish have higher productivity and therefore could produce more juvenile fish.

Summary of Harvest Actions

Action	E	A	I	Timeline for SRKW Benefits	Supporting and Dissenting Opinions on Ratings (if applicable)	Geographic Specificity Progress	Notes
Action A. *Further limit Chinook harvest in specific areas important to SRKW foraging*	L	H	L	Immediate	Supporting: • If we're serious about SRKWs, then close fisheries as an emergency action with immediate results Dissenting: • Treaty right concerns regardless of whether or not tribes are specifically excluded from harvest limits • Likely low benefit for SRKWs – in Marine Area 7 recreational catch was only 3500 chinook for summer	Marine Area 7—San Juan Islands	If any type of closure area is considered (due to vessel and/or prey impacts) then it should not be specific to fishers only, both due to social issues and because it would not be as beneficial to SRKW.
Action B *Subsidize or compensate fishers to not fish*	L	H	L	Immediate	Supporting: • If we're serious about SRKWs, then we need to reduce harvest because it has immediate results • It's possible because sport industry has been compensated before and commercial fisheries have had buy-backs in past Dissenting: • Treaty right concerns regardless of whether or not tribes are specifically excluded from harvest limits; low return • Disagreement about including recreational fishers – no mechanism to individually compensate	Marine waters when and where SRKW are actively feeding or likely to be arriving within one month/one week (I don't know)	
Action C *Reduce non-targeted fisheries' impact, including limiting gear types that increase mortality and incentivizing innovative gear types that decrease mortality, and by-catch*	M	M	M	Immediate	Supporting • Differences geographically w/ west coast fishery (low effectiveness) and AK fishery (high effectiveness) – changes need to happen in AK Dissenting • There is a tribal allocation and treaty right concern	This pertains to coast-wide fisheries but is especially pertinent in AK where there is opportunity for the most improvement	
Action D *Negotiate reductions in AK and Canadian fisheries to allow more Chinook to reach WA waters*	H	L	L	Long-term	Supporting • Already complete, will be in place for 10 years—discussions include some SRKW benefits • Taskforce should still make comments regarding what this should look like in the future	Alaska and Canada	
Action E *Reduce marine harvest and transfer opportunity to terminal fisheries*	M	M	L	Immediate	Supporting: • If we're serious about SRKWs, we need to reduce harvest because it has immediate results Dissenting • Significant tribal treaty concerns – action would affect tribes disproportionately and likely result in legal action	West Coast Ocean Fisheries Area	
Action F *Implement slot size limits to get larger fish to whales, spawning grounds, and hatcheries (put a maximum size limit on catch)*	L	M	M	Long-term	Supporting: • Could help to get bigger fish the whales Dissenting • May have impacts to wild stocks. Need full analysis to understand effects • Could have unintended consequence of catch mortality if catch and release rates increased • Fishing derbies would be eliminated	Puget Sound, Coast, and Columbia	• Potential gear restrictions for commercial harvest for large fish escapement • Long-term because would take time to fully implement

PREDATION

There is a growing interest on the effects of predation on salmon in Washington, especially predators like fish-eating birds, predatory fish, and pinnipeds.

"Pinniped" is a term for sea lions, seals, and other related marine mammals. They regularly "haul out" onto beaches, rocks, and human-made infrastructure such as buoys and docks, which are referred to as artificial haul-outs. Pinniped consumption of salmon has increased over the last 40 years in the Pacific Northwest as their populations rose after the adoption of the Marine Mammal Protection Act. Recent available information confirms that pinniped predation on Columbia River and Bonneville Dam is adversely affecting the recovery of threatened salmon and both non-lethal and lethal control actions have been underway to address this issue for several years. Less is known about the impact of seal and sea lion predation on salmon in the Puget Sound and Outer Coast and there is uncertainty around whether pinniped predation may be a limiting factor for the recovery of ESA-listed fish stocks, particularly Chinook salmon, in these areas. Bioenergetics modelling work (Chasco et al. 2017) suggests that while killer whales consume the largest biomass of Chinook, harbor seals consume the largest number of individuals because they consume both out-migrating smolts and adults. These results suggest that the increase in abundance of harbor seals in particular may be adversely affecting Chinook, and consequently, Southern Residents. Although Chasco et al. suggests that pinnipeds, and harbor seals in particular, may be limiting Chinook populations, these effects vary over space and time. In addition, new predator diet and population estimates since the publication of the Chasco et al. analyses indicate the need to refine these models. Both Canada and WDFW are in the process of collating new information and updating models to ascertain more recent and geographically-specific levels of Chinook consumption by pinnipeds to determine if and where any additional predation control actions are needed to protect Chinook and Southern Residents.

Predatory birds (e.g., cormorants, terns) benefit from artificial islands, piers, pilings, and other features that offer them high reproductive success and advantageous resting and feeding structures. A variety of management actions have been implemented with the goal of reducing predation of fish by bird predators, including controlling the size of breeding populations on the lower Columbia estuary and some interior stretches of the Columbia River.

(by reducing the spatial extent of the breeding area and/or planting vegetation at the sites to make them inaccessible to terns) .

Predatory fish species benefit from altered habitat (boat docks, rip rap, pilings, piers, dam reservoirs, etc.) because these features provide optimal habitat, feeding advantages or ambush sites that are utilized by juvenile salmon. Predatory fish of primary concern for salmon are invasive non-natives (Northern Pike), non-native warm water species (Walleye, bass), and native fish (northern pikeminnow). A high priority and potential big impact is Northern Pike if they move into areas overlapping with salmon in the Columbia River.

The Prey Working Group suggests four potential predation actions for the Task Force to consider:

Action A: Remove or alter artificial habitats or breeding locations so they are not as attractive to predators (Pinnipeds and Birds)
Removing or changing artificial habitats (such as buoys, platforms, etc.) could reduce pinniped predators in the proximity of migration or other "pinch-points" where Chinook may be most vulnerable, but it is unlikely to limit the total number of pinnipeds and much is unknown about how the predators will respond or whether this would be effective. Removing or making areas unattractive to nesting bird predators may lead to redistribution of the birds to other areas that may or may not be desirable.

Action B: Lethal removal to benefit specific runs and stocks (pinnipeds, birds, fish)
Lethal removal of predators could be considered at specific locations to reduce predation of Chinook and benefit SRKW. This option would re require a high degree of administrative engagement with federal regulators to address compliance issues with the Marine Mammal Protection Act (MMPA) and the Migratory Bird Treaty Act (MBTA). Lethal removal is also a politically sensitive topic and would require time for public and stakeholder engagement and collaboration. (This action could be considered by the Task Force for pinnipeds, birds, fish, or for any combination of these predators.)

Action C. Lethal removal in order to establish new baseline population levels (pinnipeds, birds, fish)
This option is similar to option B, but would not be limited to specific locations. The goal would be to reduce predator populations of pinnipeds, birds, and fish throughout the state. (This action could be considered by the Task Force for pinnipeds, birds, fish, or for any combination of these predators.)

Action D. Employ non-lethal hazing or exclusion techniques
This would involve targeted efforts to use non-lethal means to deter, discourage or interfere with predators that may be targeting Chinook. Non-lethal measures for a variety of predators have been and are currently in use (especially at dams), with varying and limited effectiveness.

Summary of Predation Actions

Action	E	A	I	Timeline for SRKW Benefits	Supporting and Dissenting Opinions on Ratings (if applicable)	Geographic Specificity Progress	Notes
Action A *Remove or alter artificial habitats or breeding locations so they are not as attractive to predators (Pinnipeds and Birds)*	L	H	M	Immediate		Statewide where appropriate: Haul out and breeding colony maps available	
Action B *Lethal removal to benefit specific runs and stocks (pinnipeds, birds, fish)* pinnipeds birds fish	 M M M	 M M M	 L M M	Intermediate	Supporting: • Predation has been shown to be a massive issue in some locations limiting Chinook stocks Dissenting • Uncertainty at ecosystem-wide scale effects and unintended consequences that may not benefit Chinook or SRKW • Emotional issue for mammals and birds and may lead to lawsuits	Recommend implementing on a pilot basis where important SRKW stocks might benefit (due to effectiveness uncertainty)	• Effectiveness is uncertain and therefore rankings difficult • Will have to be monitoring to assess benefits and discontinue if ineffective
Action C *Lethal removal in order to establish new baseline population levels (pinnipeds, birds, fish)* pinnipeds birds fish	 M M M	 H H H	 L L M	Intermediate	Supporting • Predation has been shown to be a massive issue in some locations limiting Chinook stocks Dissenting • Emotional issue for mammals and birds and would be a violations of Migratory Bird Act and MMPA—will lead to lawsuits • Uncertainty at ecosystem-wide scale effects and unintended consequences that may not benefit Chinook or SRKW		• Effectiveness is uncertain and therefore rankings difficult • Will have to be monitoring to assess benefits and discontinue if ineffective
Action D. *Employ non-lethal hazing or exclusion techniques*	L	H	H				• Good to keep as alternative to lethal removal, but there are no new methods known and much has already been tried.

Appendix A

The Prey Working Group matrix with more information about each action can be found at this link: Prey Working Group Matrix.