

Southern Resident Killer Whale Task Force Meeting #4: Discussion Guide – Prey Group #1 (Predation)

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, and this is not the full list of potential prey-related actions.

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 predation recommendations bold enough to make meaningful progress towards Southern Resident Recovery?

PREDATION ON SALMONIDS BY BIRDS AND PINNIPEDS

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

Predation B4: *Continue the development of additional science to better understand pinniped predation on salmonids, especially Chinook.*

Options from Working Group:

- Fund monitoring to provide area specific estimates of Chinook survival between the mouth of the Columbia River and Bonneville Dam.
- Support the continued development of science to better understand the extent pinniped predation in Puget Sound and the Outer Coast to determine and apply appropriate management actions. Analyses should help determine if pinniped predation is a limiting factor for Chinook in each area, where and what types of management actions are best suited to the situation, and, if needed, provide any information necessary to secure authorization to perform needed control actions. Both the science and assessment of the management actions should account for factors that may exacerbate or ameliorate predation, including infrastructure haul outs, hatchery strategies, and the presence/absence of forage fish or other fish that are staple food for pinnipeds.

Predation B4: Working Group Ratings	
Effectiveness	This action was pulled out separately from the other predation actions by the Working Group after the development of these tables so ratings not yet available
Affordability	Not yet available
Ease of implementation	Not yet available
Timeline for benefits to SRKW	Intermediate (dependent upon findings and then associated regulatory process after studies completed)

Geographic specificity	Lower Columbia River, Outer Coast, Strait of Juan de Fuca, and Puget Sound
Supporting and dissenting opinions on ratings (if applicable)	
Notes	<ul style="list-style-type: none"> • A wealth of data about pinniped effects on salmonids already exists for the Columbia River and management actions (non-lethal and lethal) have been taken there for many years. Effects on salmonids, especially some runs, are still a problem for salmon populations in the Columbia and therefore there are currently bills in Congress aiming to alter the MMPA for more management flexibility to deal with the issue there. • For Puget Sound and the Outer Coast, new data is becoming available on pinniped numbers and diet (which will give a more current and area-specific estimate of predation levels). This allows for new analyses by Winter 2018 from WDFW and partners and 2019-2021 from Canada DFO (the most recent population assessments for harbour seal and Steller Sea Lions in BC can be found in Olesiuk 2010 and 2018; of note, Harbour Seal populations have been stable in the Strait of Georgia (where there are the highest densities of Harbour Seals on the BC Coast). • This information (which is more geographically specific and up to date) and future science is needed to determine: <ul style="list-style-type: none"> ○ What is the estimated level of consumption of juvenile and adult Chinook salmon by harbor seals, California sea lions, and Steller sea lions in the following regions: Washington coast, Strait of Juan de Fuca/San Juan Islands/Eastern Bays, Hood Canal, and South-central Puget Sound? ○ How much does that proportion of predation impact Chinook survival compared to other types of mortality? What is the relative contribution of predation in the context of other impediments to salmon recovery in Washington? ○ Is the level of consumption in these areas impeding Chinook recovery? ○ If so, where? (Hotspot analysis) ○ What should be done for each of these places? (Lethal removal, removing haul outs, changing hatchery releases, increasing forage fish populations, altering structures that hinder fish survival, etc.) ○ Any information that is needed to apply for a permit under the MMPA, or alternatively, if needed, justify any changes to the federal law.

Survey Input from Task Force on Predation Action B4:

- Task Force members recommended modifications/clarifications to this action, including:
 - Adding "Columbia."
 - Getting a better understanding of other predators as well.
- Some Task Force members expressed concerns or questions related to potential impacts to transient killer whales; whether this is already happening at NOAA; whether it could be construed to take pinniped removal off the table in Year 2; and where the Chasco paper fits in.

Hydro C: Increase survival at predation hot spots associated with dams

Chinook survival near dams and through river systems with multiple dams could be increased through such actions as deterring birds, non-lethal deterrent actions, and other programs to reduce unnatural levels of predation.

Options from Working Group (specific to birds and pinnipeds):

- a) Distribute the discharge/release sites for juvenile salmonids collected at Columbia and Snake River dams
- b) Support existing cormorant management plan objectives for East Sand Island in the Columbia River Estuary (including discouraging nesting on the Astoria/Megler Bridge)
- c) Request direct congressional appropriations and authority to USACE to restore/create cormorant nesting habitat in non-sensitive areas outside of the Columbia Basin, such as has already been done as part of the federal Caspian tern management plan. Creation of habitat will allow for expanded management options by alleviating habitat constraints in other areas of the cormorant's range.
- d) Support further relocation of Caspian terns from the Columbia River Estuary to historical or prepared colony sites outside of the Columbia River Basin.
- e) Support non-lethal dissuasion to reduce bird predation near dams

<i>Hydro C: Working Group Ratings</i>	
Effectiveness	Medium
Affordability	Low to Medium
Ease of implementation	Low to Medium
Timeline for benefits to SRKW	Intermediate
Geographic specificity	Applies at or near dams where appropriate Statewide
Supporting and dissenting opinions on ratings (if applicable)	Supporting: <ul style="list-style-type: none"> • Predation has been shown to be a massive issue in some locations limiting Chinook stocks Dissenting: <ul style="list-style-type: none"> • Questions of lethal measures lacking effectiveness at reducing predation. • Lethal measures associated with these may be emotional issue for mammals and birds and may lead to lawsuits.
Notes	<ul style="list-style-type: none"> • Affordability will vary by specific action

Survey Input from Task Force on Hydro Action C:

- Task Force members recommended modifications/clarifications to this action, including:
 - Identifying the hotspots.
 - Looking at all non-native invasives.
 - Listing specific actions proposed to increase survival.
 - Including specific metrics (increase survival by how much?)
- Some Task Force members expressed questions related to the cost, and whether this is linked to lethal removal.

Predation B2: *Lethal removal of birds to benefit specific runs and stocks.*

Lethal removal of predators could be considered at specific locations to reduce predation of Chinook and benefit SRKW. This option would require a high degree of administrative engagement with federal regulators to address compliance issues with 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.

NOTE: The options for this action are the same as listed for Hydro C above because all were associated with dams.

Survey Input from Task Force on Predation Action B2:

- Task Force members recommended modifications/clarifications to this action, including:
 - Making it targeted to a location.
 - Noting specific bird species that are causing problems and that we are targeting.
- Some Task Force members expressed concerns or questions related to:
 - Lack of evidence that this will be effective.
 - Adverse or unintended consequences (e.g., animal welfare; could have large negative ecosystem-level consequences).
 - Having appropriate uses for any euthanized animals.
- Some Task Force members suggested alternatives to this action, including:
 - Managing the human activities that have created the problem.
 - Only removing non-native/invasive fish like Northern Pike.

Predation A1: *Remove or alter artificial pinniped haul outs in places most important for SRKWs and Chinook so they are not as attractive.*

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/if this would be effective. MMPA authorization is required for this activity.

Options from Working Group:

- a) Where feasible and permitted, pilot the removal or alteration of artificial haul out sites used by pinnipeds in the Puget Sound in places that may improve Chinook survival. Monitor the effectiveness of this approach through the pilot and support ongoing scientific analyses of potential predation hotspots to guide potential future haul out removals.
- b) Establish a fund to support infrastructure costs associated with modification of artificial haul-outs that would be available to private entities, individuals or state agencies.
- c) Integrate “Best Management Practices” that discourage pinniped haul outs into review and permitting of projects (e.g., docks, swim platforms, buoys, riprap etc.) that could create haul-out sites at predation hotspots.

<i>Predation A1: Working Group Ratings</i>	
Effectiveness	Low
Affordability	High
Ease of implementation	Medium
Timeline for benefits to SRKW	Immediate
Geographic specificity	If deemed appropriate for specific areas/stocks and federal permits are obtained, recommend implementing on a pilot basis where important SRKW stocks might benefit and monitoring results (due to effectiveness uncertainty).
Supporting and dissenting opinions on ratings (if applicable)	
Notes	<ul style="list-style-type: none"> • Effectiveness is uncertain and therefore rankings difficult • Will have to fund and perform monitoring to assess benefits and discontinue if ineffective

Survey Input from Task Force on Predation Action A1:

- Task Force members recommended modifications/clarifications to this action, including:
 - Clarifying whether is only for pinnipeds or also for birds.
 - Focusing on artificial structures used by predators with a link to specific salmon runs.
 - Using this as an early step while exploring a more comprehensive approach.

- Some Task Force members expressed concerns or questions related to whether we really know how to do this; what the unintended consequences and tradeoffs would be; and whether it would just move pinnipeds to new locations.

Predation B1: *Lethal removal of pinnipeds to benefit specific runs and stocks.*

Lethal removal of predators could be considered at specific locations to reduce predation of Chinook and benefit SRKW. This option would require a high degree of administrative engagement with federal regulators to address compliance issues with the Marine Mammal Protection Act (MMPA). Lethal removal is also a politically sensitive topic and would require time for public and stakeholder engagement and collaboration.

Options from Working Group:

- Support efforts to amend the Marine Mammal Protection Act (MMPA) to more effectively manage pinniped predation of salmonids in the Columbia River (2018 bills in Congress).
- Support efforts to amend the Marine Mammal Protection Act (MMPA) to more effectively manage pinniped predation of salmonids in the Columbia River (2018 bills in Congress). Secure funding for the removal program at Bonneville dam and Willamette Falls at a level sufficient to remove >95% of pinnipeds present.
- Ask NOAA to expediently convene the Pacific Scientific Review Group to perform an assessment to determine the Optimal Sustainable Populations of the harbor seal stocks of Puget Sound. This assessment will determine allowable removal levels (number of animals; Potential Biological Removal) under the MMPA, and therefore inform management option decisions.

<i>Predation B1: Working Group Ratings</i>	
Effectiveness	Medium (This action had low agreement around effectiveness ratings, including some rating it Low and others High.)
Affordability	Medium
Ease of implementation	Low
Timeline for benefits to SRKW	Intermediate
Geographic specificity	If deemed appropriate for specific areas/stocks and federal permits are obtained, recommend implementing on a pilot basis where important SRKW stocks might benefit and monitoring results (due to effectiveness uncertainty).
Supporting and dissenting opinions on ratings (if applicable)	Supporting: <ul style="list-style-type: none"> • Predation has been shown to be a massive issue in some locations limiting Chinook stocks Dissenting: <ul style="list-style-type: none"> • 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.
Notes	<ul style="list-style-type: none"> • Effectiveness is uncertain and therefore rankings difficult • Will have to fund and perform monitoring to assess benefits and discontinue if ineffective

Survey Input from Task Force on Predation Action B1:

- Task Force members recommended modifications/clarifications to this action, including:
 - Very specific areas, focused on specific choke points or hot spots; done only when we are certain that it will benefit salmon/SRKW.
- Task Force members expressed concerns or questions related to:
 - Having enough scientific data to understand the risks and benefits. Are we sure this will increase harvestable salmon?
 - Making sure we have the documentation that sub-lethal measures have been tried and are ineffective.
 - Adverse or unintended consequences (e.g., may cause more harm since pinnipeds also eat fish that prey on salmon; animal welfare; could have large negative ecosystem-level consequences).
 - Dealing with Marine Mammal Protection Act issues.
 - Having appropriate uses for any euthanized animals.

Predation C: Lethal removal in order to establish new baseline population levels of pinnipeds

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 throughout the state. This action cannot be accomplished currently without changes to the Marine Mammal Protection Act.

THIS ACTION WAS NOT SENT TO THE WORKING GROUP FOR MORE SPECIFIC RECOMMENDATIONS DUE TO AN APPARENT LACK OF SUPPORT IN TASK FORCE DISCUSSIONS ON AUGUST 7, BUT WAS REQUESTED BY A MEMBER OF THE TASK FORCE TO BE ADDED BACK IN THE SURVEY FROM AUGUST 13.

<i>Predation B1: Working Group Ratings</i>	
Effectiveness	Medium (This action had low agreement around effectiveness ratings, including some rating it Low and others High.)
Affordability	Medium
Ease of implementation	Low
Timeline for benefits to SRKW	Intermediate

Geographic specificity	Statewide
Supporting and dissenting opinions on ratings (if applicable)	Supporting: <ul style="list-style-type: none"> • Predation has been shown to be a massive issue in some locations limiting Chinook stocks Dissenting: <ul style="list-style-type: none"> • 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
Notes	<ul style="list-style-type: none"> • Effectiveness is uncertain and therefore rankings difficult • Will have to fund and perform monitoring to assess benefits and discontinue if ineffective

Survey Input from Task Force

This action was not included in the survey.