

# Evaluating Salmon Harvest Effects on Southern Resident Killer Whales in Washington State

Washington Department of Fish and Wildlife  
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## Executive Summary

There is significant concern regarding the endangered Southern Resident Killer Whale (SRKW) population. While there are several threats affecting their recovery, the decline of Chinook is a major contributing factor. This paper summarizes how Chinook fishery seasons are set, describes how fishery reductions are evaluated relative to SRKW recovery, and describes changes in how fishery managers will evaluate impacts on the SRKW population in 2019 and beyond.

In recent evaluations of proposed fisheries in Puget Sound, the National Marine Fisheries Service (NMFS) noted that there are significantly more Chinook available in Puget Sound than what is needed to sustain the SRKW population now. NMFS also indicated that eliminating Puget Sound fisheries would likely result in a less than one percent increase in Chinook abundance that would benefit SRKWs. Other analyses have shown that ocean salmon and Columbia River fisheries have similar non-significant impacts on SRKW prey abundance.

In 2019, the Washington Department of Fish and Wildlife (WDFW) and NMFS will identify conditions when increased prey is essential for SRKWs, and will help guide fishery actions that will increase available Chinook in critical times and areas to contribute to orca recovery.

## Purpose

In 2018, the population of SRKWs dropped to 74, the lowest number in more than 30 years. By early 2019, there are two more SRKWs exhibiting signs of critically poor health. The loss of SRKWs is unacceptable for Washington's environment, economy, culture, and way of life and is a concern for citizens worldwide.

Significant efforts are under way and more are developing in both Canada and here in the U.S., where Governor Inslee issued an [executive order in 2018](#) directing additional Washington state resources and established a task force to tackle SRKW recovery.

The [task force's recommendations](#) focused on three major threats to SRKWs: lack of salmon prey; high levels of contaminants; and disturbance and noise from vessels. A recent study indicates that while addressing all three threats is important, a combination of decreasing noise and disturbance, along with providing more prey is the most critical and effective way to achieve a healthy SRKW population (Lacy et al., 2017). For example, Lacy et al. (2017) suggested that acoustic disturbance would need to be reduced by half and Chinook abundance increased by 15 percent for the SRKW population to reach its recovery target of 2.3 percent growth rate.

NMFS has presented that the effects of prey abundance on fecundity and survival are the largest impact on the population growth rate of SRKW (NMFS 2018). Since the SRKW diet is composed almost entirely of salmon, with a strong preference for Chinook, efforts to increase the abundance of prey for orcas have focused mostly on this species. Although Chinook are dense in calories and the largest of the Pacific salmon species, they are also the least abundant, exacerbating recovery efforts of SRKWs.

While the abundance of Chinook is affected by a multitude of factors, reduced fishing may be a potential tool for SRKW recovery. This paper addresses four questions around this issue:

1. What is the current framework for managing fisheries?
2. How are fisheries effects evaluated for impacts to SRKWs?
3. Would a moratorium on fishing be a meaningful action to increase Chinook availability?
4. How will setting fishing seasons incorporate SRKW needs in 2019?

## **1. What is the current framework for managing fisheries?**

Chinook that originate in Washington may be harvested by tribes, recreational and commercial in fisheries in Alaska, British Columbia, off Washington's coast, or in Washington's inland waters before they reach their natal spawning grounds.

There are multiple forums where representatives from these regions work together to manage salmon fisheries:

- Pacific Salmon Treaty: The United States and Canada are signatory to the Pacific Salmon Treaty. The Treaty determines the sharing of salmon across Alaska, Canada, and southern United States' fisheries while minimizing impacts to stocks of concern through allocations and area-specific management measures.
- Pacific Fishery Management Council: Salmon fisheries in federal Pacific Ocean waters off Washington are managed by the Pacific Fishery Management Council, which was established by the Magnuson-Stevens Fishery Conservation and Management Act.
- North of Falcon: Recreational, commercial, and tribal salmon fisheries in Washington that occur north of Cape Falcon, Oregon, are negotiated through the North of Falcon annual salmon season-setting process, which is the implementation mechanism for *U.S. v. Washington* treaty obligations.
- *U.S. v. Oregon*: Salmon fisheries in the Columbia River are co-managed by the states of Oregon and Washington and the tribes through the *U.S. v. Oregon* process. Through this process, state/tribal harvest and hatchery management agreements with Treaty Tribes are negotiated.

Through our work in each of these season-setting fishing forums, WDFW's objectives are to provide sustainable recreational, commercial, and treaty fishing opportunities in a manner that does not jeopardize the recovery of salmon or other species listed under the Endangered Species Act (ESA).

## **2. How are fisheries effects evaluated for impacts to SRKWs?**

As the lead agency to ensure proposed fisheries are in compliance with the ESA, NMFS evaluates whether the proposed action jeopardizes the recovery of federally-listed salmon or other species, such as SRKW, and describes their process and conclusions in Biological Opinions (hereafter BiOps). If NMFS determines that the proposed fisheries will not jeopardize the recovery of any ESA-listed stock or population, then NMFS issues an incidental take permit for the proposed fisheries. Incidental take permits may be valid for only one year or, in some cases, five to ten years. However, as the salmon seasons are set annually, NMFS reviews all proposed salmon fisheries (tribal, commercial, and recreational) to ensure ESA compliance each year. While there is recognition that SRKWs prey on other fish, the NMFS BiOps have primarily focused on Chinook as the population's preferred prey.

Prior to 2018, the effects of proposed fisheries were analyzed in BiOps by assessing prey needs for SRKWs, the expected available prey for that year, and the magnitude of prey reduction resulting from those proposed fisheries.

While this same general approach was used in 2018, the analysis used more recent data and the proposed fisheries included new actions to reduce disturbance to SRKWs: 1) a voluntary "no-go" zone along the west coast of San Juan Island, and 2) a fishery closure in September in Marine Area 7.

### ***Assessing prey needs for SRKWs***

While NMFS has calculated the daily caloric needs for the current population of SRKWs, the numbers and density of fish that need to be available in the ocean in the areas and times that SRKWs will be foraging is unknown (NMFS 2018). Based on estimates of nutritional needs of SRKWs, the number of Chinook the current SRKW population need to consume can range from 274,845 to 329,230 Chinook per year (Mongillo pers comm. 2018). This assumes SRKWs have a diet that is comprised of Chinook only and therefore is a conservative number of fish required to meet their current nutritional needs. However, this estimate is lower than the number of fish needed to increase the SRKW population and achieve recovery.

### ***Estimating available prey for SRKWs***

In analyzing the daily dietary needs of SRKWs relative to prey abundance, NMFS (2018) indicated that there are significantly more Chinook available in Puget Sound than what is needed to sustain the SRKW population now.

- The estimated ratios of Chinook abundance relative to SRKW prey needs indicates that there were 11-22 times the amount of Chinook food energy available in Puget Sound in 2014 (Table 15, NMFS 2018).
- In some years (e.g., 2012) the range drops as low as about nine times the amount needed during the July-September timeframe, but has also been as high as 16 times the amount needed in other years (e.g., 2010) for the same period.

Other BiOps for ocean salmon fisheries (NMFS 2008) and Columbia River fisheries (NMFS 2017) have similar conclusions relative to impacts on SRKW prey abundance with the latter noting that the reductions in Chinook availability were offset by the proposed increases in hatchery production that were included as part of the actions evaluated in the BiOp.

### ***Evaluating prey reduction resulting from fisheries***

In evaluating the effect of Puget Sound fisheries on SRKW prey abundance, NMFS (2018) indicated that only a small portion of the returning fish in any given year are harvested through Puget Sound fisheries.

- In 2018, the presence of age 3-5 Chinook to inland waters was estimated to be around 1.78 million fish.
- Fish caught in Puget Sound fisheries on the other hand, numbered 44,500, or 2.5% of the entire return; however, it is highly unlikely that the full amount that would be harvested in fisheries would be available to SRKWs. Those fish are not congregated in a SRKW foraging area, but are distributed throughout Puget Sound, and may be consumed by other predators or subject to other causes of mortality. Therefore, NMFS also indicated that eliminating Puget Sound fisheries would likely result in a less than one percent increase in Chinook abundance that would benefit SRKWs, rather than 2.5% (NMFS 2018).

### **3. Would a moratorium on fishing in Washington be a meaningful action to increase prey for orcas?**

Based on the information available and the analyses in the NMFS BiOps for Puget Sound (2018), Pacific Ocean (NMFS 2008 and 2009), and Columbia River salmon fisheries (NMFS 2017), it has been determined that a moratorium on fishing in these areas would likely not result in meaningful increases in prey available to SRKWs. As noted above, the amount of Chinook present in Puget Sound without fisheries is 9 to 22 times the amount needed to meet their annual dietary needs and, given the relatively low numbers of salmon that are harvested in Puget Sound fisheries, a fishing moratorium would have little benefit to SRKWs.

### **4. How will setting fishing seasons incorporate SRKW needs in 2019?**

WDFW and NMFS will assess and consider SRKW needs in developing the 2019 salmon seasons during the annual North of Falcon process. Additionally, through the Pacific Salmon Treaty negotiations, there are expected to be reductions in harvest of Washington-origin Chinook in southeast Alaska and Canadian fisheries that encounter them. NMFS will also review proposed state and tribal fisheries resulting from North of Falcon and the implementation of the Pacific Salmon Treaty for ESA compliance, including an assessment of effects on SRKWs.

On January 11, 2019, the Washington Fish and Wildlife Commission directed WDFW fishery managers to consider the dietary needs of SRKW when they work with tribal co-managers to propose salmon-fishing seasons in 2019 and beyond.

An excerpt from the 2019 Commission's Policy for North of Falcon (C-3620) states:

The Department will continue to consider effects of salmon fisheries on Southern Resident Killer Whales (SRKW) when setting fishing seasons. The Department will work with the National Marine Fisheries Service to refine tools to assess the effects of fisheries on available prey for SRKW, and will plan fisheries to ensure that they provide proper protection to SRKW from reduction to prey availability or from fishery vessel traffic, consistent with the Endangered Species Act.

The full policy is available at: <https://wdfw.wa.gov/commission/policies/c3608.pdf>

Recognizing that the plight of the SRKW is dire, in 2019, NMFS and WDFW plan to use a newly developed tool for adjusting fishing seasons for the benefit of SRKW. This tool identifies conditions when increased prey is essential for whales, and will help guide fishery actions to increase available prey in critical times and areas. The framework categorizes SRKW status and expected abundance of Chinook in coastal and inland waters for a given year, weights fisheries based on their spatial overlap with SRKW during key foraging times, and establishes threshold proportions for the maximum allowable reduction of Chinook by fisheries for a given time and area. If planned fisheries are projected to exceed the allowable prey reduction threshold, then they will be adjusted until the threshold is met prior to finalizing fishing seasons.

This approach ensures that fisheries are responsive to SRKW needs and managed in a manner that provides adequate prey for SRKWs. Further, it focuses fishery modifications in the areas most important to SRKWs, while maintaining flexibility for other fisheries that may have lesser effects on SRKW prey needs.

The intent of this work is to ensure that conditions for SRKW improve over the next 10 years and harvest management contributes to SRKW recovery.

## References

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