

NOAA FISHERIES SERVICE

West Coast Region

Southern Resident Killer Whales and Snake River Dams

Southern Resident killer whales are a distinct population of killer whales that eat primarily salmon and spend much of the summer months in the inland waters of the Salish Sea. NOAA Fisheries listed Southern Residents as endangered in 2005, and in 2015 named the whales as one of eight “Species in the Spotlight” that warrant intensive, focused efforts to help them recover. A 2014 NOAA Fisheries report summarized the first decade of conservation and research since the population was listed under the Endangered Species Act (ESA) and identified three primary threats to the Southern Resident population:

- Availability of prey, especially salmon
- Pollution and chemical contaminants
- Vessel traffic and noise

NOAA Fisheries has focused research on each of the three concerns to understand their impacts, and how best to address them and promote recovery of the Southern Residents. This fact sheet addresses the current understanding of the first of these concerns – availability of prey—especially the extent to which Southern Residents rely on salmon from the Columbia and Snake River systems. Several native salmon and steelhead stocks on the Columbia and Snake are listed as threatened and endangered, and wide-scale efforts are underway across the two basins to protect and restore them.



Photo: David Ellifrit, NOAA

Recently, some organizations have advocated for the removal of four federal dams on the lower Snake River to promote recovery of the Southern Resident killer whales. NOAA Fisheries assessed the operation of the four lower Snake River dams and their effects on listed salmon and steelhead in our Biological Opinion issued in 2008. In 2014, our supplemental Biological Opinion re-examined the issues, including consequences for Southern Resident killer whales. Neither opinion, nor the recovery plans NOAA Fisheries has developed for individual salmon species and stocks, concluded that breaching the dams is necessary for recovery of Snake River salmon or Southern Resident killer whales. The biological

opinions concluded that hatchery production of salmon and steelhead in the Columbia and Snake systems more than offsets any losses of salmon from the killer whale prey base caused by the dams.

Recovery of Southern Resident killer whales remains a high priority for NOAA Fisheries. The collective recovery of West Coast salmon and their habitat, including stocks closest to the killer whales' summer range in Puget Sound, will be important to the recovery of the whales; but no salmon recovery effort on a single river will bring about recovery of Southern Resident killer whales on its own.

Southern Resident Killer Whales and the Snake River Dams

Answers to common questions about Southern Resident killer whales and their prey

To what degree do Southern Resident killer whales prey on Columbia and Snake River fish?

Southern Resident killer whales spend much of the summer in the inland waters of the Salish Sea, where they prey primarily on adult Chinook salmon returning to the Fraser River in Canada. We know less about their late summer and fall diet, but data indicates that it includes coho salmon in late summer and Puget Sound Chinook and chum salmon in fall. During summer forays to the outer coast the whales may also consume salmon from other stocks, such as from the Columbia River system.

In winter, some of the whales spend more time on the outer coast, traveling as far north as northern British Columbia (and occasionally Southeast Alaska) and as far south as Monterey Bay in California. Preliminary analysis of fecal and prey samples indicate that Chinook salmon remain an important part of their winter diet. Available information indicates that whales consume Chinook from many different stocks up and down the coast, including but not limited to fish from the Columbia and Snake Rivers. Recent satellite tracking shows us that the whales often spend time in late winter and early spring between the mouth of the Columbia and Grays Harbor, Wash., when spring Chinook salmon would be returning. Other high-use areas also exist off Washington's Olympic Peninsula and Northern California.

Photo: Dawn Noren, NOAA Northwest Fisheries Science Center

The relative importance of Columbia and Snake River salmon compared to stocks from other major West Coast rivers such as the Fraser, Klamath, and Sacramento remains the focus of ongoing research.

How are Columbia and Snake River salmon doing compared to other stocks?

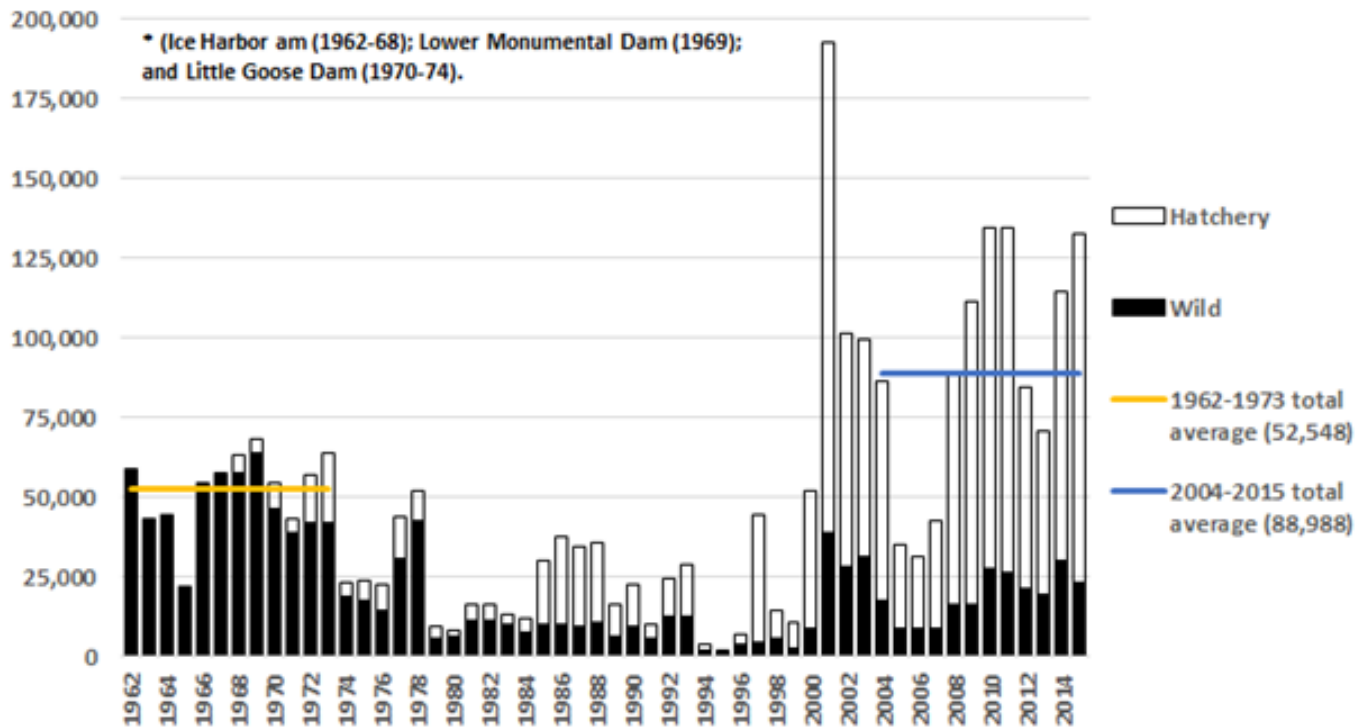
The Columbia River system has been a bright spot for increasing salmon returns in recent years. Last year's return of Chinook salmon to the Columbia totaled more than 1.3 million fish, the third record year in a row for total Chinook returns. Most were fall Chinook that return in late May through October, but spring and summer Chinook returns have also increased substantially compared to averages in the late 1980s and 1990s. Their increases are due in large part to greater abundance of hatchery fish, but have also accompanied the federal "all-H" approach to salmon recovery, i.e., an approach that combines fish passage improvements at hydropower dams, hatchery and harvest management, and habitat improvement, as well as control of predators. Those improvements have been supported by strong ocean conditions.

This increase in Chinook returns to the Columbia and Snake rivers helps support the Southern Residents to the extent it improves overall salmon abundance. Other Chinook salmon stocks in the killer whales' range, such as in Puget Sound and the Sacramento River, remain depressed. While good ocean conditions contributed to the increased salmon returns, the ocean can change quickly. The risk that ocean conditions could deteriorate makes it important to continue habitat restoration efforts and improvements in dam operations that also promote increased survival in the river system and tributaries where salmon spawn.



Southern Resident Killer Whales and the Snake River Dams

Abundance of wild and hatchery adult Snake River spring-summer Chinook salmon at Lower Granite Dam*



While numbers of wild Snake River spring-summer chinook remain low, substantially higher returns of hatchery fish have increased the total average number of the fish returning to the Snake River over the last decade or more. The chart begins in 1962, when Ice Harbor Dam became the first federal dam constructed on the Lower Snake River. Source: Idaho Department of Fish and Game.

Do killer whales distinguish between hatchery and naturally spawned salmon?

Killer whales appear to select salmon based on their species and size, preferring larger Chinook salmon. There is no evidence that they distinguish wild from hatchery fish.

Would more salmon promote recovery of Southern Resident killer whales?

Increasing salmon abundance is likely to help the whales and is an important component of the recovery plan for the population. Research indicates that the survival and reproductive success of the whales is positively correlated with Chinook salmon abundance. In 2011, NOAA Fisheries and Canada's Department of Fisheries and Oceans

commissioned a panel of scientists to examine the link between salmon abundance and killer whale health, and assess whether reductions in salmon fishing would benefit the whales by making more fish available. The scientists found that killer whale birth and survival rates generally improved with higher abundance of Chinook salmon, but were not confident this relationship could predict the effects of future changes because of other confounding factors, such as shifts in other predators that can also significantly affect fish numbers. For instance, they cautioned that additional salmon made available by restrictions on fishing may not translate into an equivalent increase in prey for the killer whales. This is because other predators, such as sea lions, may prey on the additional salmon, and because cyclic changes in ocean conditions could have a much greater effect on the availability of salmon than any changes in fishing impacts.

Southern Resident Killer Whales and the Snake River Dams

What is NOAA Fisheries doing to recover salmon that killer whales prey on?

Recovery plans developed under the Endangered Species Act (ESA) are our roadmaps for recovering salmon. NOAA Fisheries has adopted recovery plans for many salmon species and are working on others; all of those adopted so far are all available online at <http://go.usa.gov/cEYCY>. The recovery plans look across the life cycle of each stock, identifying actions at each stage that will rebuild populations and promote recovery. They address changes in hatchery and harvest practices, improvements in hydropower operations, restoration of freshwater habitat where fish spawn and rear, and the effects of predators. Recovery plans themselves are voluntary, not regulatory, and their success depends on the combined efforts of many agencies, tribes, local watershed groups, private landowners and others. NOAA Fisheries develops and implements each recovery plan collaboratively with public and private partners.

NOAA Fisheries also consults under Section 7 of the ESA with other federal agencies on issues such as operations of dams, recommending changes to make them safer for fish. These improvements are now well underway throughout the Columbia River Basin, which is home to one of the largest endangered species recovery programs in the country.



Photographed during Winter 2015 killer whale research survey to better understand different sources of salmon prey. Photo: NOAA Northwest Fisheries Science Center

numbers, whether from breaching dams or otherwise, would result in only a marginal change in the total salmon available to the killer whales. However, long-term recovery of West Coast salmon and their habitat collectively, including in Puget Sound, will likely be an important contributor to recovery of the whales.

Would breaching the lower Snake River dams recover killer whales?

Recovery of Southern Resident killer whales will require progress on many fronts, from effective management of boat traffic near the whales to improvements in their primary prey, salmon. Since they feed on many different salmon stocks at different times, though, no one salmon recovery action on a single river, such as breaching dams on the Snake, would itself bring about the recovery of Southern Resident killer whales. In addition, the relative size of the Snake River salmon stocks compared to others on the West Coast means that increases in their

For more information on Southern Resident killer whales:

Southern Resident killer whales: 10 Years of Research and Conservation
www.nwfsc.noaa.gov/news/features/killer_whale_report/index.cfm

Connection between salmon fisheries and killer whales
www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/effects_fisheries.html

Southern Resident killer whale Recovery Plan
www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/planning_implementation.html

