



Chinook Salmon

Chinook salmon are a cultural icon of the Pacific Northwest. Truly the “King” of Pacific salmon, Chinook are the largest species. Adults can exceed 30 pounds, and reports of larger fish were once more common.

Returning Chinook are highly prized by anglers and commercial fisherman and are a favorite food of Orca whales. Puget Sound Chinook return in the summer and fall to spawn, build gravel nests, and lay their eggs in rivers and streams. Their carcasses provide nutrients for freshwater invertebrates which in turn provide food for young fish. As they grow, juvenile Chinook move from freshwater to estuaries and nearshore areas to find food and cover to hide from predators. They eventually move to more exposed shorelines where they depend on eelgrass and kelp beds as they continue their migration to the ocean.

Puget Sound Chinook are about one-third as abundant as they were in the early 1900s and were listed in 1999 as “threatened” under the federal Endangered Species Act.

Chinook Salmon

INDICATOR:
Chinook salmon population abundance as measured by the number of natural origin adult fish returning to spawn
 Indicator lead: Recovery Implementation Technical Team

2020 TARGET:
 Stop the overall decline and start seeing improvements in wild Chinook abundance in two to four populations in each biogeographic region.

PROGRESS:

IS THE TARGET MET?	NO	IS THERE PROGRESS?	NO
---------------------------	-----------	---------------------------	-----------

CURRENT STATUS 2006-2010

BASELINE REFERENCE

2020 TARGET

All 5 regions with declining populations

No change (no regions show any overall improvement or decline from baseline)

All 5 regions meeting target for improving populations

From 2006-2010, most Chinook populations showed large annual variability in abundance but no discernable increasing or decreasing trends. Overall, only one population showed an improving trend, and one population showed a declining trend. None of the five regions have yet met their targets for improving population abundance.

Progress Towards Target

For the 22 remaining populations of Puget Sound Chinook salmon, one increased and one declined in abundance from 2006 to 2010. Thus, none of the five regions are currently meeting their target of improving trends in two to four populations in each region.

The total number of Chinook salmon has not increased, and most populations remain well short of their recovery goals. Nonetheless, the fact that we have any natural-origin Chinook left is testament to the success of our restoration and harvest reduction work so far.

What Is This Indicator?

Chinook population abundance is reported here two ways: The number of natural origin spawners and the number of natural origin recruits.

Spawning escapement is the number of Chinook salmon returning to rivers to spawn. Spawner abundance is normally estimated each year by counting the number of redds (gravel nests) in a river. Redds are counted by walking the stream and/or from boats or aircraft. For many populations, some hatchery-origin salmon mix with natural origin salmon on the spawning grounds, complicating our estimates of natural origin salmon returns. The proportion of spawners that were natural or hatchery origin is typically estimated based on the composition of carcasses and then extrapolated back to the total spawning population to estimate the number of natural origin versus hatchery-origin spawners.

The second measure, the total number of natural origin recruits, represents the potential return of adult salmon to the spawning rivers if there were no commercial, subsistence, or recreational harvest affecting them. This is the estimated total number of natural origin adult salmon before human harvest. The numbers of hatchery-origin fish were excluded from both estimates of Chinook abundance.

Interpretation of Data

Chinook populations in Puget Sound exhibit large annual variations in abundance, as well as long-term fluctuations (over ten or more years) that confuse simple evaluations of short or long-term trends in numbers (Figure 1). Long-term natural-origin spawner abundance numbers have shown little progress towards the target, with numbers declining since the early 2000s. In addition, overall productivity and the total number of natural origin salmon recruits have declined according to NOAA. All Puget Sound Chinook populations are currently well below abundance levels (recovery goals)

Abundance of Chinook Natural-Origin Spawners in Puget Sound 1990 –2010

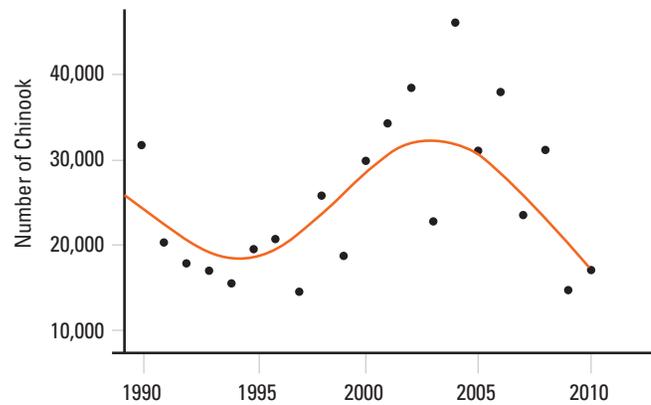
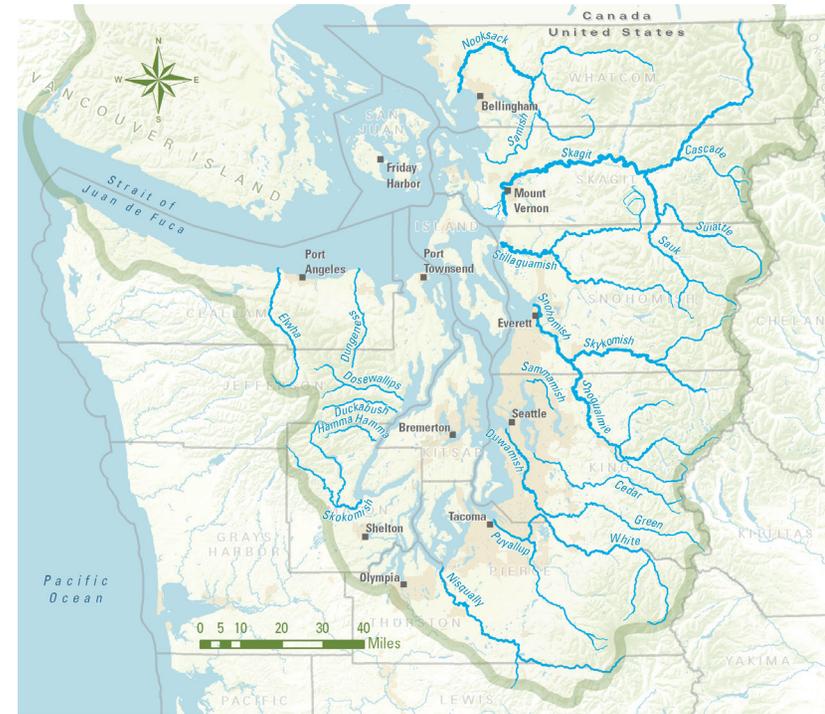


Figure1. Number of natural-origin Chinook spawners observed in Puget Sound watersheds for 22 populations. Shown are total numbers of natural-origin spawners observed each year (points) and a fitted line derived from locally weighted scatterplot smoothing.
Source: NWFSC Salmon Population Summary database



Chinook Salmon Rivers

- County border
- Salish Sea Basin boundary
- Cities and Urban Growth Area

needed for populations to recover and to reduce their risk of extinction (Table 1). Chinook salmon in Puget Sound are currently listed as Threatened under the Endangered Species Act.

Trends for Chinook recruits were calculated for five- and ten-year periods. For 2006-2010, only two out of 22 populations showed a statistically significant trend. One population increased (Sammamish), and one population (Skokomish) decreased. In contrast, for a ten-year trend analysis from 2001-2010, nine out of 22 populations showed a statistically significant decrease in the number of fish.

Puget Sound Chinook Abundance and Trends

Region/Population	Recovery Goal ¹	Natural-Origin Spawners	Natural-Origin Recruits (Spawners + Harvest)		
	Range	5 year average ² (2006-2010)	5 year average (2006-2010)	5 year Trend ³ (2006-2010)	10 year Trend ³ (2001-2010)
Strait of Georgia					
N Fk Nooksack	3,800 -16,000	274	470		
S Fk Nooksack	2,000-9,100	265	475		
Strait of Juan de Fuca					
Elwha	6,900-17,000	126	282		Decreasing
Dungeness	1,200-4,700	122	336		
Hood Canal					
Skokomish	Unknown	501	863	Decreasing	
Mid-Hood Canal	1,300-5,200	45	78		Decreasing
Whidbey Basin					
Suiattle	160-610	219	301		
N Fk Stillaquamish	4,000-18,000	465	803		
S Fk Stillaquamish	3,600-15,000	79	133		Decreasing
Cascade	290-1,200	315	431		
Upper Sauk	750-3,030	584	812		
Lower Sauk	1,400-5,600	620	1,252		
Skykomish	8,700-39,000	2,336	3,081		Decreasing
Snoqualmie	5,500-25,000	1,390	3,013		Decreasing
Upper Skagit	5,380-26,000	8,118	15,134		Decreasing
Lower Skagit	3,900-16,000	1,629	3,252		
Central/South Puget Sound					
White R	unknown	1,216	1,435		Decreasing
Green/Duwamish	27,000	1,311	6,005		Decreasing
Sammamish	1,000-4,000	92	148	Increasing	
Cedar	2,000-8,200	807	1,389		
Nisqually	3,400-13,000	501	3,000		
Puyallup	5,300-18,000	831	1,520		Decreasing

Table 1. Puget Sound Chinook abundance and trends.

¹ High and low productivity planning targets from Table 2 “Chinook Spawner Abundance Planning Targets & Ranges for Puget Sound Region” in Final Supplement to the Shared Strategy’s Puget Sound Salmon Recovery Plan. November 2006. National Marine Fisheries Service.

² Averages are geometric means; data from NOAA’s Northwest Fisheries Science Center’s Salmon Population Summary database.

³ Significance of trends (p < 0.05) was calculated using methods reported in NOAA’s Status Review Update for Pacific Salmon and Steelhead Listed under the Endangered Species Act (Ford [ed.], 2011).