Species of Concern
NOAA National Marine Fisheries Service

Coho salmon
Oncorhynchus kisutch
Puget Sound/ Strait of Georgia ESU

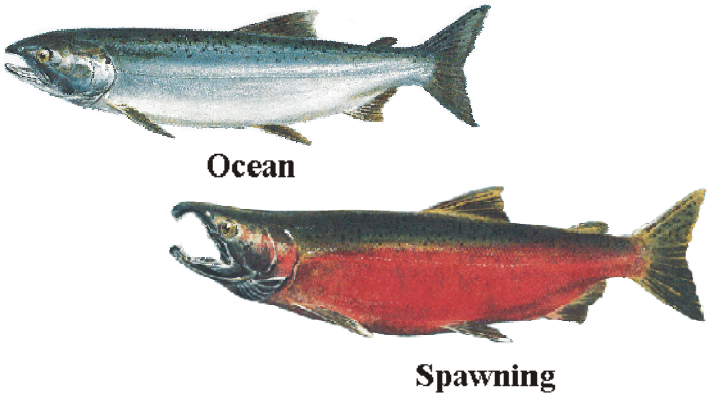

Photo credit: Canada Fisheries and Oceans.

KEY INFORMATION

Area of Concern
Drainages of Puget Sound and Hood Canal, the eastern Olympic Peninsula (east of Salt Creek), and the Strait of Georgia from the eastern side of Vancouver Island and the British Columbia mainland (north to and including Campbell and Powell Rivers), excluding the upper Fraser River above Hope.

Year Identified as "Species of Concern"
1997

Factors for Decline
- Hatchery fish interactions
- Fishing
- Logging
- Agriculture
- Development
- Dams and hydropower projects
- Pollution

Conservation Designations
American Fisheries Society: Vulnerable
IUCN: Not Evaluated
Species of Greatest Conservation Need: WA

Brief Species Description:
Coho salmon are distributed throughout the North Pacific Ocean, and inhabit most coastal streams and rivers from Alaska to central California. The Puget Sound/Strait of Georgia (PS/SOG) **Evolutionarily Significant Unit** (ESU) includes coho salmon from drainages of Puget Sound and Hood Canal, the eastern Olympic Peninsula (east of Salt Creek), and the Strait of Georgia from the eastern side of Vancouver Island and the British Columbia mainland (north to and including Campbell and Powell Rivers), excluding the upper Fraser River above Hope (Figure 1). Coho salmon are **anadromous**, meaning they migrate from the ocean to spawn in fresh water. In contrast to the life-history patterns of other anadromous salmonids, coho salmon from central British Columbia southwards generally exhibit a relatively simple, 3-year life cycle. Adults typically begin their freshwater spawning migration in the fall, spawn by mid winter, then die. Juveniles rear in fresh water for up to 15 months, and then migrate to the ocean as "**smolts**" in the spring. Coho salmon typically spend two growing (summer) seasons in the ocean before returning to their natal streams to spawn as 3 year-old adults.

Rationale for "Species of Concern" Listing:

Demographic and Genetic Diversity Concerns:
The status of the PS/SOG coho ESU is of concern due to declines in abundance and productivity, reduced distribution, and threats to its genetic diversity. Historic run sizes were probably a bit over 1 million fish. There is, and historically has been, significant production of hatchery fish in this ESU. Hatchery production is suspected of causing changes in population structure and diversity, and loss of genetic diversity within the ESU. The abundant hatchery populations in the ESU represent a substantial portion of the remaining genetic resources within the ESU. Average recent run sizes (1981-1992) for the main US stocks of the ESU are about 479,000 natural and 776,000 hatchery fish. Thus, total run size in the US has not declined, but is mostly made up of hatchery fish. The trend in abundance of the Canadian portion of the ESU has been a downward decline of 50% through until the mid-1990s. It is unclear what proportion of Canadian coho salmon production is due to hatchery versus wild production.

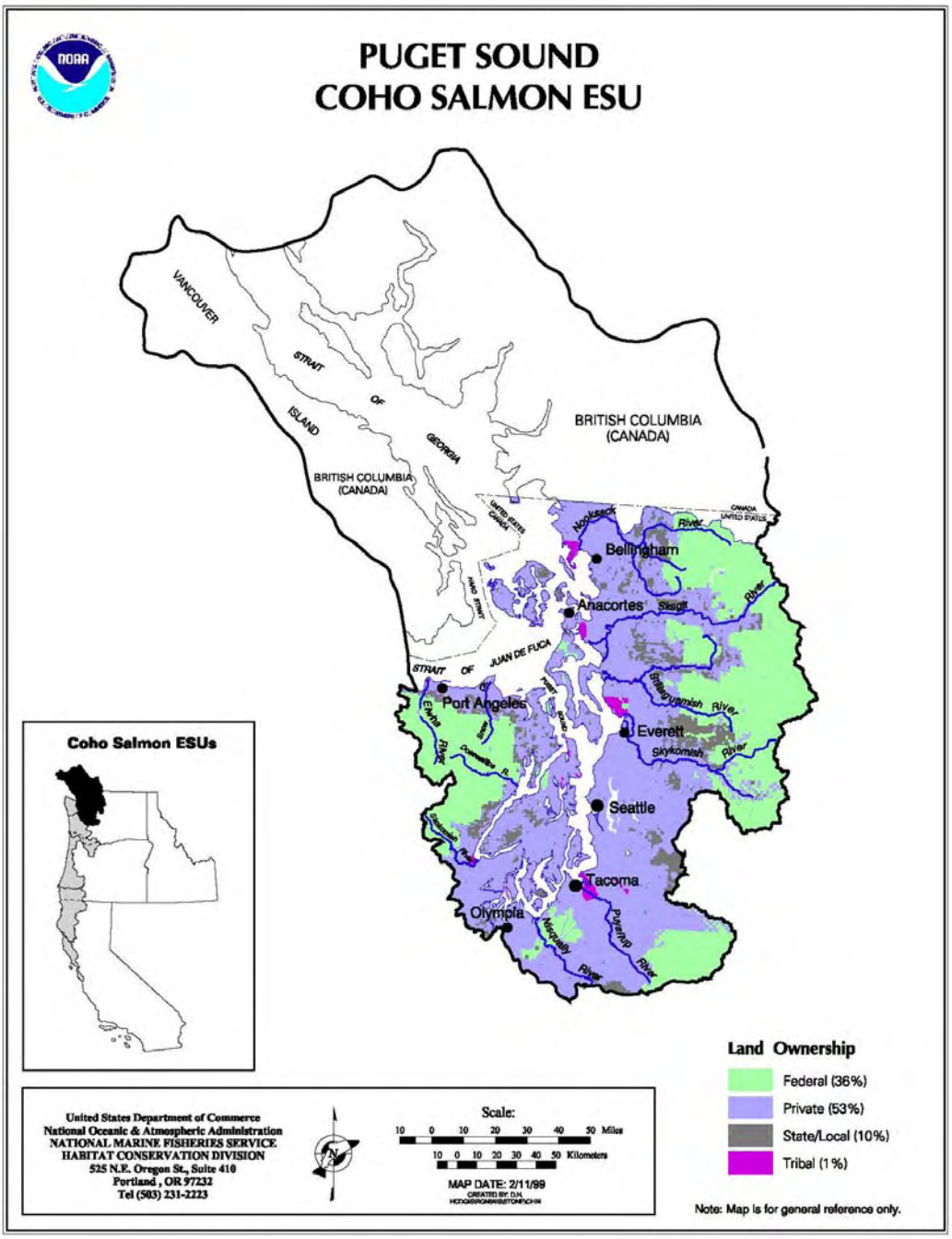

Figure 1: Map of the Puget Sound/Straight of Georgia ESU.

Bledsoe et al. (1989) examined changes in run sizes of Puget Sound salmon since 1896. They reported a dramatic 85% decline of coho salmon terminal runs in south Puget Sound from 1935 to 1975, which they attributed to increasing catch in ocean fisheries. However, they did not find a decline in run sizes for wild runs over the entire time period (since 1896).

Stocks in this ESU were considered by WDF et al. (1993) to range from healthy to critical status. Nehlsen et al. (1991) identified three coho salmon stocks in this ESU as at high risk of extinction, and one (Nooksack River) to be possibly extinct. None of the stocks in this ESU that they identified as healthy were of strictly wild origin (i.e., had no hatchery influence). Two stocks (Deer Creek and Sumas/Chilliwack) were identified as of native origin with wild production, but were of unknown status.

Photo Credit: Penny Crane, USFWS.

Only three rivers have long-term (extending back to the 1930s or 1940s) escapement data from which to estimate trends. Trap counts at Baker River and White River generally showed declining trends in the 1960s and 1970s, with some evidence of recovery in the 1980s. The number of adults passed above the hatchery racks on the Samish River showed neither increasing nor decreasing trends over a 55-year period. More recent spawner survey data are available for numerous rivers within this ESU, but no reliable breakdown of natural and hatchery production is available for these data.

Of the stocks identified by WDF et al. (1993), abundance estimates were available for the period from 1965 through 1993 for 17 stocks. Two stocks had significant downward trends, five had significant upward trends, and the remainder had no significant trend. Between 1972 and 1993 the average size of fish in the terminal landings underwent a sharp decline, from an average of about 9 lbs (4 kg) to about 4 lbs (2 kg) (Weitkamp et al. 1995).

Factors for Decline:

Hatchery production has been a key threat to the viability of PS/SOG coho. Artificially produced coho salmon can adversely affect naturally producing PS/SOG coho populations by: direct genetic changes caused by hybridization and introgression as many of the hatchery fish are from out-of-basin sources; indirect genetic changes from competition, predation and disease, and the loss of locally adapted populations with the genetic homogenization that can occur with hybridization with widely

straying hatchery stocks. Historically, PS/SOG coho have been subject to significant harvests. Additionally, freshwater coho salmon habitat, like most other West Coast river basis, is far from pristine. Logging, agriculture, urbanization, modifications associated with navigation, dams for hydropower and flood control, and pollution have likely contributed to the ESU's decline. Droughts and unfavorable ocean production conditions may also be threats. Decline in adult body size and associated decrease in fecundity has likely led to reduced population productivity.

Status Reviews/Research Underway:
None.

Data Deficiencies:

Existing Protections and Conservation Actions:

References:

Bledsoe, L.J., D.A. Somerton, and C.M. Lynde. 1989. The Puget Sound runs of salmon: An examination of the changes in run size since 1896. In: C.D. Levings, L.B. Holtby, and M.A. Henderson (eds.), Proceedings of the National Workshop on Effects of Habitat Alteration on Salmonid Stocks, May 6-8, 1987, Nanaimo, B.C., p. 50-61. Can. Spec. Publ. Fish. Aquat. Sci. 105.

Busby, P. et al. 1996. Status review update for salmon from Washington, Oregon, and California. NOAA NMFS. http://www.nwr.noaa.gov/Publications/Biological-Status-Reviews/upload/SR1996-coho2.pdf.

Nehlsen, W., J. E. Williams, and J. A. Lichatowich. 1991. Pacific salmon at the crossroads: stocks at risk from California, Oregon, Idaho, and Washington. Fisheries 16:4–21.

Washington Department of Fisheries (WDF), Washington Department of Wildlife (WDW), and Western Washington Treaty Indian Tribes (WWTIT). 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI). Wash. Dep. Fish Wildl., Olympia, 212 p. plus three Appendices:

Weitkamp, L. L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, and R. S. Waples. 1995. Status review of coho salmon from Washington, Oregon, and California. NOAA Technical Memorandum NMFS-NWFSC-24. Seattle, WA.
http://www.nwfsc.noaa.gov/assets/25/4237_06172004_123333_coho.pdf

Point(s) of contact for questions or further information:
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