

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

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).

Anatomically, coho salmon are characterized by the presence of small dark spots on the back and upper lobe of the caudal fin and by the lack of dark pigment on the gumline of the lower jaw. While in the ocean they are greenish or dark metallic blue on the back, silver in the middle and lower sides, and white on the bottom. During spawning runs they turn dark to bright green on the head and back and bright red on the sides, with darker coloration on the belly. Males are more brightly colored than females. Males can reach 40 inches in length and 30 lbs in weight while females only reach a maximum of 25 inches in length.

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



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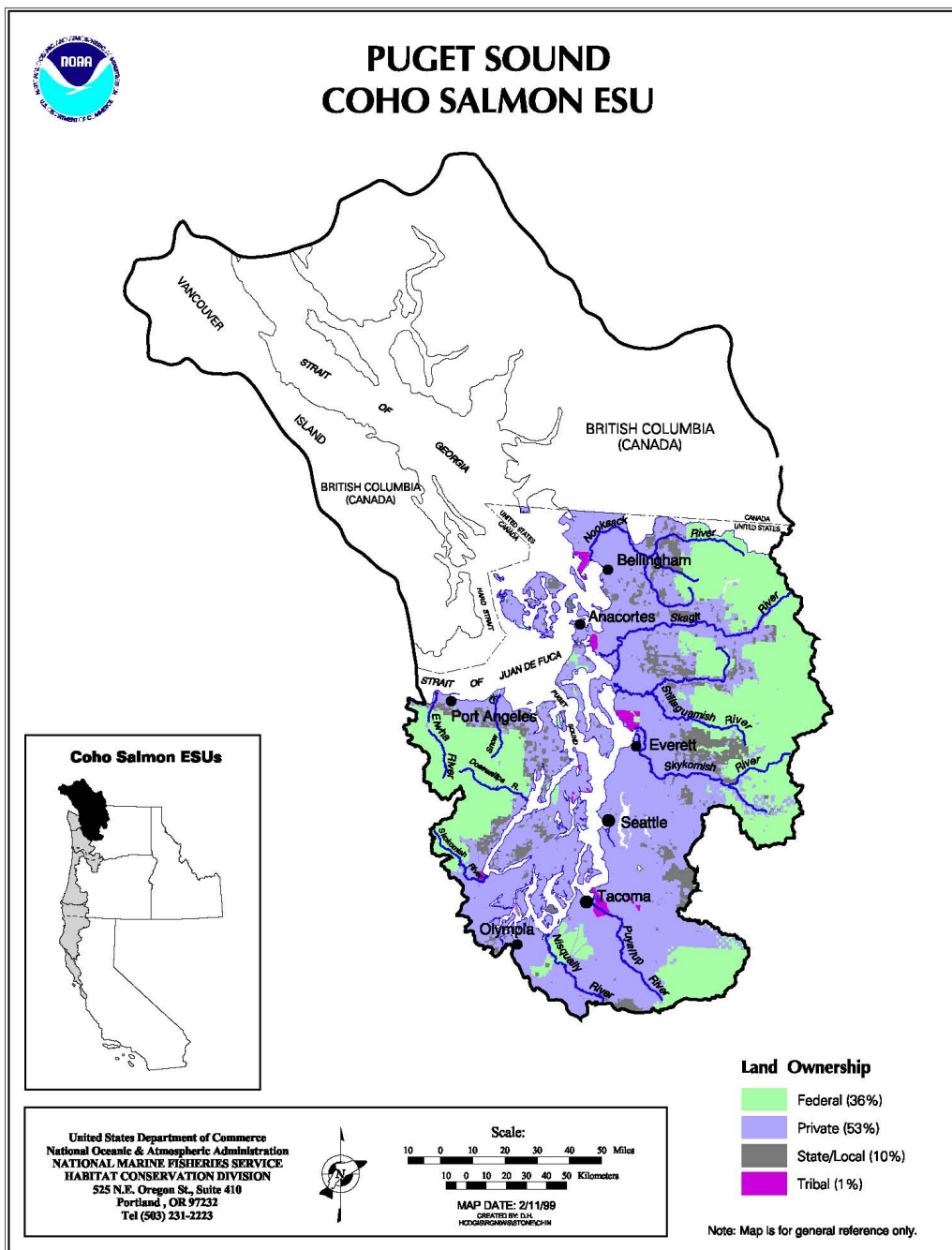


Figure 1: Map of the Puget Sound/Strait of Georgia ESU.



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hatchery fish in this 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. 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).



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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 basins, 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:

The program recently funded NOAA staff and partners to examine the impact of pyrethroid insecticides on two model Puget Sound coho streams.

Data Deficiencies: see above.

Existing Protections and Conservation Actions:

There are no explicit protections for this species. However, the species likely benefits from critical habitat determinations and recovery actions occurring in the Puget Sound area due to the Endangered Species Act listings of Chinook salmon and steelhead trout populations within their range.

Videos:

spawning (0:14) http://www.youtube.com/watch?v=oF3_BH8e0As&feature=related

Juveniles (1:17) <http://www.youtube.com/watch?v=4FP69aZxU2A>

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.



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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:

For further information on this Species of Concern, or on the Species of Concern Program in general, please contact NMFS, Office of Protected Resources, 1315 East West Highway, Silver Spring, MD 20910, (301) 713-1401, soc.list@noaa.gov; <http://www.nmfs.noaa.gov/pr/species/concern/>, or Dr. Rick Gustafson, NMFS, Northwest Fisheries Science Center, 2725 Montlake Blvd. East, Seattle, WA 98112-2097, (206) 860-3372, Rick.Gustafson@noaa.gov; or Dr. Laurie Weitkamp NMFS, Northwest Fisheries Science Center, 2032 S.E. OSU Drive, Newport, OR 97365-5275, (541) 867-0504, Laurie.Weitkamp@noaa.gov.