



Base from U.S. Geological Survey, 1:62,500
Potlatch, 1937-52 and Allyn, 1938

Anadromous fish, those spawning in fresh-water streams entering Hood Canal, but spending most of their lives in salt water, include chinook, chum, coho, and pink salmon; steelhead and searun cutthroat trout; and Dolly Varden char. Salmon spawned in this area contribute to commercial fisheries in the Pacific Ocean, Strait of Juan de Fuca, Puget Sound, and Hood Canal. Chinook, coho, and pink salmon are sport fished in the same areas. Sport fishing for salmon takes place in some streams entering Hood Canal. Steelhead, searun cutthroat trout, and Dolly Varden are taken only as sport fish in the Strait of Juan de Fuca, Puget Sound, Hood Canal, and streams entering the canal.

This map indicates which species spawn in streams entering the canal. Salmon and chars spawn in the fall and early winter months. Trout spawn in the late winter and spring months. During their fresh-water life, anadromous fish require good quality water with temperatures of about 50-55°F, and high dissolved oxygen content. High concentrations of sediments, metals, or toxic substances, and extremely low flows adversely affect fish survival.

Life Histories

Each anadromous fish species has a different life history that may be affected by man's activities. Table 1 lists some important life history characteristics of anadromous fish in Hood Canal.

Impacts
Some of the most important human activities that affect anadromous fish are:

1. *Vegetation removal-logging (clearcutting)-development (urbanization)*
Increased streamflows and sediment loads degrade stream habitat; small streams are especially affected. Vegetation removal next to streambanks results in increased water temperatures and erosion. All species of salmon and trout are affected, especially chum salmon.
2. *Obstructions to adult fish passage (culverts, log jams, etc.)*
Blockages, both man-caused and natural, can keep anadromous fish from reaching spawning areas; chum salmon will not pass through culverts, covered ditches or over fish ladders. All species of salmon and trout can be affected by severe blockages.
3. *Low flow conditions caused by diversions, vegetation removal, watershed degradation and gravel permeability*
These conditions affect those species remaining in the stream during one or more summers as juveniles including spring chinook, coho, summer and winter steelhead trout and searun cutthroat trout.
4. *Streambank modifications (channelization, rip-rapping)*
Encroachment onto the streambank reduces

water area available for rearing, may increase water velocities enough to scour gravel, closes off side channels used for spawning and rearing, and removes food sources for feeding fish. All species are affected, chum, coho, spring chinook, and winter and summer steelhead the most severely.

5. *Water quality degradation*
Addition of chemicals and effluents such as herbicides, pesticides, fertilizers, and human wastes all affect the aquatic environment. Those species most severely impacted include coho, spring chinook salmon, and steelhead and searun cutthroat trout, because they must spend at least one year in the stream before migrating to marine areas.

These impacts can be minimized by proper management and development of habitat types. An alternative that would minimize impact on anadromous fish is to retain stream courses and adjacent areas in their natural state to the greatest extent possible. The "buffer strip" concept is an especially valuable management proposal to preserve these natural areas. Gullies, ravines, and other riparian resources are extremely important and are easily damaged by man's encroachment. Streams cannot handle waste discharges and urban stream-water runoff and remain viable for fish production.

Separate waste handling facilities are needed to transport and dissipate waste materials. The application of agricultural fertilizers and toxicants should be reduced to an absolute minimum. Water diversions during low flow periods have severe impact on fishery resources. Alternative means of securing water within the capabilities and limitations of the natural system would be preferable to diverting stream water.

This map is one of a series being prepared by the U.S. Department of the Interior in cooperation with several agencies to present basic environmental information and interpretations to assist land-use planning in the Puget Sound area.

TABLE 1. - Life History Characteristics of Anadromous Fish in Hood Canal

SPECIES	Spawning Migration	Spawning Period	Hatching of Eggs	Residence in Fresh Water*	Age at Maturity (most common)	Critical Life Stages
Fall Chinook Salmon	Aug.-Oct.	Sept.-Nov.	Spring	3 months	3-5(4) yrs.	Intragravel egg development; 90-day stream residence
Spring Chinook Salmon	May-July	Sept.-Oct.	Spring	½-2 yrs.	3-5(4) yrs.	Intragravel egg development; stream residence of ½-2 years
Chum Salmon	Aug.-Dec.	Sept.-Jan.	Winter-Spring	-0-	3-5(4) yrs.	Intragravel egg development; early life in marine waters
Coho Salmon	Sept.-Dec.	Sept.-Jan.	Winter-Spring	½-1 ½ yrs.	2-3(3) yrs.	Intragravel egg development; stream residence of ½-1 ½ yrs.
Summer Steelhead Trout	June-Oct.	Jan.-April	Spring-Summer	½-2 yrs.	3-5(4) yrs.	Stream residence of ½-2 yrs.
Winter Steelhead Trout	Nov.-May	Jan.-June	Spring-Summer	½-2 yrs.	3-6(4) yrs.	Stream residence of ½-2 yrs.
Searun Cutthroat Trout	July-Jan.	Jan.-April	Winter-Spring	0-2 yrs.	3-5(4) yrs.	Intragravel egg development; stream residence of 0-2 yrs.
Pink Salmon	Aug.-Sept.	Sept.-Oct.	Winter-Spring	-0-	2 years	Intragravel egg development; early life in marine waters
Searun, Dolly Varden char life history information not available.						

*Average time spent instream before migration to marine waters.

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MAP SHOWING SPAWNING AREAS OF ANADROMOUS FISH IN SOUTHERN HOOD CANAL, WASHINGTON

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