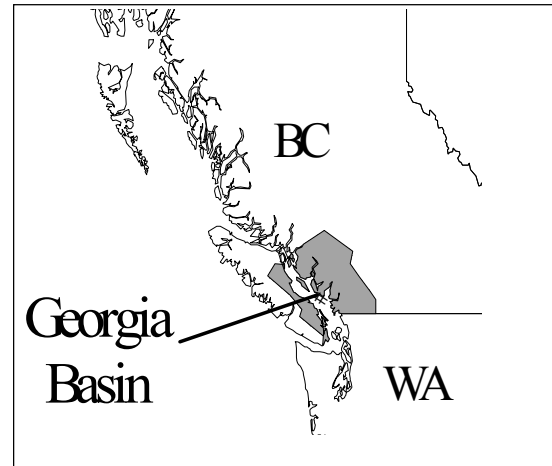


Coho Salmon in the Coastal Waters of the Georgia Basin



Background

The coho salmon (*Oncorhynchus kisutch*) is one of six species of anadromous Pacific salmon found in British Columbia. Juvenile coho prefer low-gradient freshwater habitats with low water velocities and an abundance of cover, and are abundant in streams, lakes, and beaver ponds throughout the Georgia Basin. Juvenile coho also occur in marginal sloughs of large rivers and along the shores of lakes.

Juveniles are aggressive and territorial. Often vibrantly coloured, with a large orange anal fin edged in black and white, they may be difficult to distinguish from chinook. In freshwater, coho feed on aquatic and aerial insects, plankton, and occasionally small fish. Young coho rear for one and sometimes two years in more than 350 streams around the Strait of Georgia, not including the Fraser drainage upstream from Hope.

Migrating to sea in the spring, some males ("jacks") will mature and return to their birthplace to spawn in the fall of the same year. The rest continue to grow rapidly, usually within 1,000 km of their home stream. Coho feed at first on euphausiids and other plankton, later on squid, herring, sand-lance and other small fishes. They return the following summer and fall to spawn in their natal streams primarily from October to December. All die after spawning.

The Fishery

Strait of Georgia coho are caught in aboriginal, recreational, and commercial net and troll fisheries. Coho catches in south coastal B.C. have declined since the mid-1980s, initially due to declining abundance and now because of severe conservation measures. The catch was 1.55 million in 1995 and is now virtually zero. Strait of Georgia stocks comprise a significant portion of these catches, with the remainder originating in the west coast of Vancouver Island, the United States and the upper Fraser River drainage.

In addition to declining catches, coho harvest distribution has changed. In six of the past eight years (1991 and 1994 through 1998) unusually high proportions of the catch of Strait of Georgia coho have been taken off the west coast of Vancouver Island rather than in the strait itself.

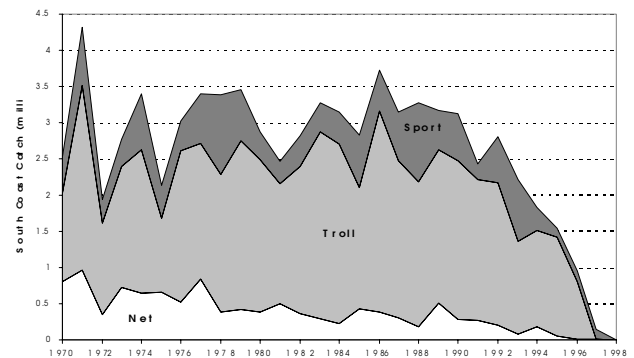


Figure 1. Estimate of the commercial and recreational catch of hatchery and wild-origin coho in south coast B.C. waters, 1970 to 1998.

While the aboriginal harvest of coho is small compared with other salmon species, a number of First Nations rely partly on coho for food, social and ceremonial purposes. Coho are caught in hook and line, net and spear fisheries in or near their local streams. They are also caught incidentally by other salmon fisheries.

Eighty-nine percent of the commercial coho catch in the south coast of B.C. was taken by the troll fleets and the remainder by net fisheries. The west coast of Vancouver Island (WCVI) troll fishery was the single largest commercial harvester, taking an average of 1.51 million coho in the 10-year period before 1997, when major restrictions were imposed. This fishery was controlled by a Pacific Salmon Treaty catch ceiling, which limited the catch in many years. Coho caught in this fishery are bound for U.S., Strait of Georgia and WCVI spawning grounds. The troll fishery inside the Strait of Georgia has not been permitted to retain coho since 1995. Although its catch was historically much smaller than the WCVI troll fishery, it was made up of a very high proportion of Strait of Georgia stock.

Net fisheries in Johnstone Strait, Juan de Fuca Strait and the Strait of Georgia harvest coho incidentally during directed fisheries on sockeye, pink and chum salmon. Strait of Georgia coho are predominant in the Johnstone Strait and Strait of Georgia net fisheries while coho originating in the U.S. are the main stocks in the Juan de Fuca net fishery. Curtailment of net fisheries in recent years due to low returns of the target species and concerns for chinook and coho have resulted in reduced coho catches in net fisheries.

Recreational fishing in British Columbia tidal waters is important to many residents and visitors. Until the recent distribution shift and severe fishing restrictions, about 70 % of the tidal recreational fishing took place within the Strait of Georgia. Chinook and coho are the mainstay of this fishery, largely because they remain in nearshore waters longer than sockeye, which are available to anglers only for a short time during their spawning migration back from the high seas. While chinook are the glamour fish, coho have been the mainstay of the recreational fishery in the Strait of Georgia because they have been more abundant than chinook and are generally easier to catch.

During "inside" years when coho are abundant in the Strait of Georgia, the recreational fishery is a significant harvester of Georgia Basin stocks. During "outside" years when coho migrate to the west coast of Vancouver Island, the impact of the recreational fishery is reduced. From 1988 to 1997 and excluding 1994, which was an intermediate year for catch distribution, the average catch in the Strait of Georgia recreational fishery in inside years (1988-90 and 1992-93) was 750,000 coho. In outside years (1991 and 1995-97) it was 160,000. Overall, including 1994, the average catch was 470,000. Up to 1996, the average catch of Georgia Basin coho elsewhere on the south coast was estimated to be 60,000.

In the last four years, most coho normally resident in the Strait of Georgia have migrated to the west coast of Vancouver Island. Consequently, there have been very low numbers of coho available in the Strait of Georgia and fishery efforts have declined to a very low level.

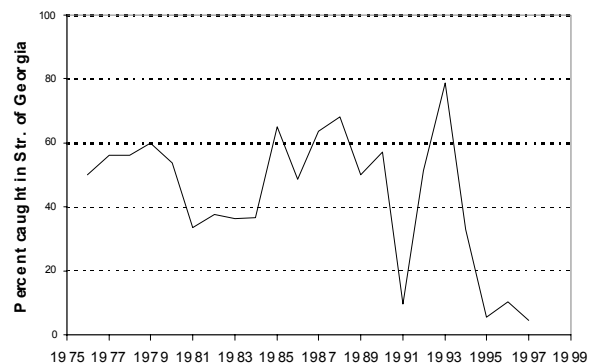


Figure 2. Average catch in the Strait of Georgia of several Georgia Basin stocks, expressed as a percentage of total catch.

Stock Status

The conservation of Georgia Basin coho has been an issue since at least 1989, when the Pacific Scientific Advice Review Committee first identified a need to reduce total fishery exploitation rates, from a range of 75 to 80 % to a range of 65 to 70%. However, declining marine survival rates over the last decade have reduced stock productivity to the point where even this lower target range was judged by PSARC to be too high. Fishery management achieved its reduced target of 60 % exploitation in 1995 and 1996 and lowered it further to about 37 % in 1997 and only 5% in 1998.

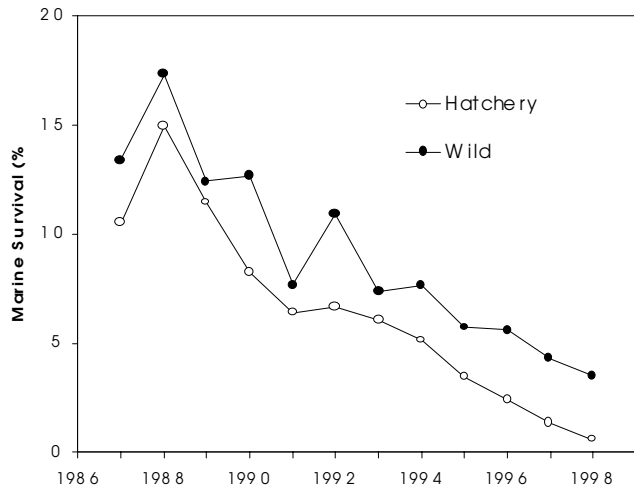


Figure 3. Marine survival of Strait of Georgia wild and hatchery coho smolts

Spawning escapements to most south coast B.C. streams showed improvements in 1997 over the extremely poor runs in 1996. Spawning numbers generally increased again in 1998 in response to the much reduced exploitation- more so in the northern strait than further south, where the response was more sluggish (southeast Vancouver Island) or inconsistent (lower Fraser River).

The reduced abundance of coho in recent years is due in large part to much reduced marine survival rates observed for most hatchery and wild stocks. Survival rates of 8 to 18 % in the 1980s have declined to 1 % or less in many stocks. Near-zero exploitation rates will need to be maintained to stabilize escapements under these poor ocean conditions and permit future rebuilding.

Habitat Status

The other major concern in the decline of coho is the loss and degradation of freshwater habitat due to increasing economic and development pressures in the Strait of Georgia. The loss of habitat is associated not only with the increased numbers of people living in the area but also with the ever-increasing intensity of resource use. Low-gradient streams within 100 km of the coast make up a significant proportion of the freshwater habitat for coho in British Columbia. These are the same areas where logging, agriculture and urbanization have resulted

in stream degradation. Coho habitat, especially in small streams, remains particularly threatened in the lower Fraser Valley, along the Sunshine Coast and on Vancouver Island from Sooke to Campbell River.

DFO has a number of initiatives to involve communities in the protection of streams and wetlands. This will be critical for the identification, protection and rehabilitation of coho habitat in the south coast area.

Outlook

Conservation concerns for Georgia Basin coho have been expressed by Fisheries and Oceans Canada since the late 1980s. High fishery exploitation rates, steadily declining numbers of coho surviving at sea, and habitat degradation are the primary factors contributing to the reduction of spawning escapements.

Scientists studying changes in climate and fish stocks, both in the Strait of Georgia, and globally, have different views on the long-term outlook for coho. Some believe that we are undergoing a "regime shift" or change in the ecosystem of the Strait of Georgia, while others believe that current conditions are part of a longer-term cycle that will eventually see a return to the cooler conditions that typified the middle decades of this century. Regardless of their differences over the long-term, there is consensus that the short-term outlook for coho is not bright.

Management Considerations

Fishing mortality must be virtually eliminated to maintain generally adequate spawning levels during this period of extremely poor marine survival. Harvest management needs to be risk-averse, meaning when managers are not sure, they must err on the side of caution. Uncertainties in the migration pattern of Georgia Basin coho will demand that harvest management actions encompass not only the Strait of Georgia but also the approach routes of Johnstone Strait and Juan de Fuca Strait, as well as the west coast of Vancouver Island, with the importance of each area varying from year to year.

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