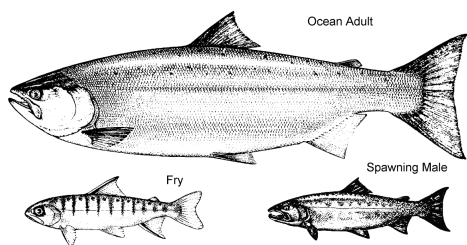
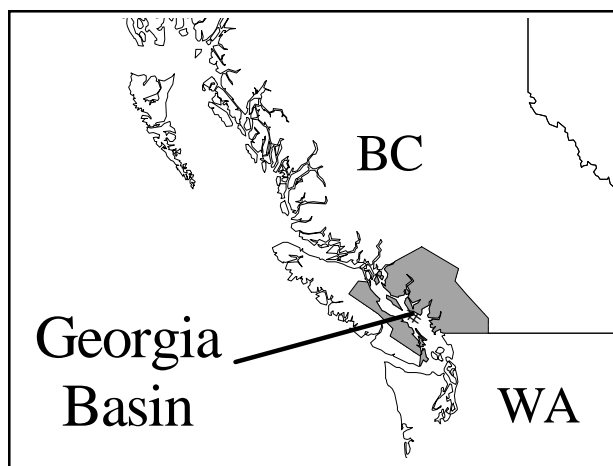


Pacific Region



Coho Salmon in the Coastal Waters of the Georgia Basin



Background

Coho salmon (Oncorhynchus kisutch), is one of six species of anadromous Pacific salmon found in British Columbia. Juvenile coho live in streams, lakes, beaver ponds and sloughs. In streams, they prefer low gradient habitats with low water velocities and an abundance of cover. In lakes, coho inhabit the near-shore zone. Juveniles are aggressive, territorial and are often vibrantly coloured with a large orange anal fin edged in black and white. Juvenile coho may be difficult to distinguish from chinook. In freshwater, coho feed on aquatic and aerial insects, plankton, and occasionally small fish. Young coho rear in streams and lakes for one and sometimes two years in this area (coastal waters feeding into the Strait of Georgia or the “Georgia Basin”).

Migrating to sea in the spring, some males will mature and return to their birthplace to spawn in the fall of the same year. These males are called jacks. The rest continue to grow rapidly, usually within a thousand kilometres of their home stream. Coho feed at first on euphausiids and other plankton. Squid, herring, sand-lance and other small fishes are included in the diet as the fish grow. They return the following summer and fall to spawn in their natal streams primarily from October to December and then all die after spawning.

Coho salmon occur in over 350 streams around the Strait of Georgia, including the lower Fraser drainage as far upstream as Hope (there are many more stocks in the upper Fraser system but they are outside the scope of this report). With losses of habitat and fishing in the last century, the number of populations has no doubt declined.

The Fishery

Strait of Georgia coho are caught in aboriginal, recreational, and commercial net and troll fisheries. Initially due to declining abundance and now the result of severe conservation measures, coho catches in south coastal B.C. have declined since the mid-1980s. Catches rapidly declined from 1.55 million to virtually zero from 1995 to 1998, and have remained very low since. Strait of Georgia coho comprised a significant portion of these catches, with the remainder originating from the west coast of Vancouver Island (WCVI), the United States, and the upper Fraser River drainage.

In addition to declining catches, coho harvest distribution has changed. In eight of the past ten years (in 1991 and from 1994 to 2000) unusually high proportions of the coho have been off the west coast of Vancouver Island rather than in the Strait during their second and last year of ocean life.

While the aboriginal harvest of coho is small in comparison to other salmon species, bands rely on coho for some food, social and ceremonial purposes. Coho are caught in hook and line, net and spear fisheries in, or near, their local streams. Coho are also caught incidentally during other salmon fisheries.

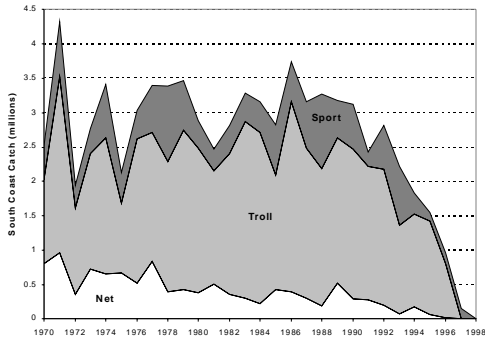


Figure 1. Commercial and recreational catch of hatchery and wild-origin coho in southern B.C. waters, 1970 to 1998. Fishing mortality in 1999 and 2000 was similar to 1998.

Until 1997, 89% of the commercial coho catch on the south coast of B.C. was taken by the troll fleets and the remainder by net fisheries. The 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 served to limit the catch in many years. Coho caught in this fishery were bound for southern 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. Its catch was historically much smaller than the WCVI troll fishery and mostly consisted of Strait of Georgia fish.

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 U.S. origin coho are the main stocks in the Juan de Fuca net fishery. The fishing mortality of coho in net fisheries is now very low due to curtailment of net fisheries in recent years in response to low returns of target species and also to prohibitions on retention of coho, new practices to avoid coho, and better handling methods before release.

Recreational fishing in the tidal waters of B.C. is very important to many residents and visitors.

Until the recent distribution shift by coho and severe fishing restrictions, about 70% of the tidal recreational fishing in B.C. took place within the Strait of Georgia. Chinook and coho are the main target species of this fishery. While chinook are the glamour fish, until recent years coho have been the mainstay of this fishery because they were more abundant than chinook.

The recreational fishery is a significant harvester of coho from Georgia Basin streams in ‘inside’ years when a high proportion these fish are in the Strait of Georgia. During ‘outside’ years 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, 1992-93) was 0.75 million coho. In ‘outside’ years (1991, 1995-97) it was 0.16 million. Overall, including 1994, the average catch was 0.47 million. Up to 1996, the average sport catch of Georgia Basin coho elsewhere on the south coast was estimated to be 0.06 million.

Most coho normally resident in the Strait of Georgia have migrated to the west coast of Vancouver Island in the last five years. Combined with regulations prohibiting retention of caught coho and generally poor chinook fishing, the result has been low fishing effort in the Strait.

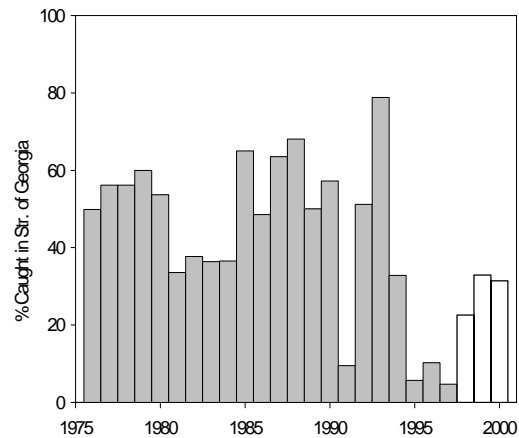


Figure 2. Average catch in the Strait of Georgia of several Georgia Basin stocks, expressed as a percentage of total catch. Percentages after 1997 are estimates of

what the percentage would have been had there been fisheries.

Stock Status

The conservation of Georgia Basin coho has been an issue since at least 1989 when the Pacific Scientific Advice Review Committee (PSARC) 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, marine survival rates began to decline soon after, to the point where even this lower target range was judged by PSARC to be clearly too high. Fishery management achieved its reduced target of 60% exploitation in 1995 and 1996 and lowered it further to about 37% in 1997. Exploitations have been only about 5% since then.

Responding to the much reduced exploitation, spawners generally increased from the very poor runs in 1996 to 1998. 1999 coho were the progeny of the poor 1996 return and, although we saw an improvement over the 1996 runs, there were generally fewer spawners in 1999 than in 1998. Runs in 2000 were about the same as 1999 overall, even though the parental escapement in 1997 was larger and fishing restrictions were almost as stringent.

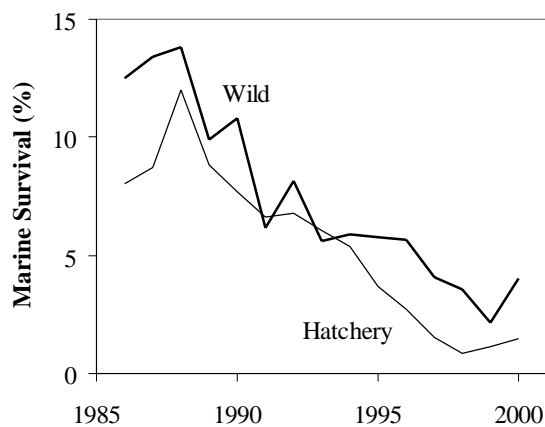


Figure 3. Marine survival of Strait of Georgia wild and hatchery coho.

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 declined to 1% or less in many stocks by 1998. For the first time since 1992, the survival of hatchery stocks improved in 1999 and wild and hatchery survivals improved a little more in 2000, providing hope that the downward trend has ended. Exploitation rates will have to accommodate these poor ocean conditions to prevent further decreases in escapements 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 with the increased numbers of people living in the area and the ever-increasing intensity of resource use. Low gradient streams within a hundred kilometres of the coast make up a significant proportion of the freshwater habitat for coho in British Columbia. These, of course, are the same areas where much of our activities occur. Logging, agriculture and urbanisation have resulted in stream degradation. Coho habitat is threatened throughout the Basin.

Fisheries and Oceans Canada (DFO) has a number of initiatives to involve communities in the protection and augmentation of streams and wetlands. This will be critical if we are to identify, protect and rehabilitate coho habitat within the south coast area.

Outlook

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

Scientists studying climate and fish stocks in the Strait of Georgia and more 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. Others believe that there is a cycle that will eventually see a return to cooler conditions in southern B.C., like 15 years ago when coho survived better. There is consensus among them that the short-term outlook for coho is a priority concern.

Management Considerations

Fishing mortality must be low to maintain generally adequate spawning levels during this period of extremely poor marine survival. The harvest management principle of being risk-averse applies here as elsewhere, meaning when we are not sure, we 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 (Johnstone Strait and Juan de Fuca Strait) and the west coast of Vancouver Island, with the importance of each area varying from year to year.

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