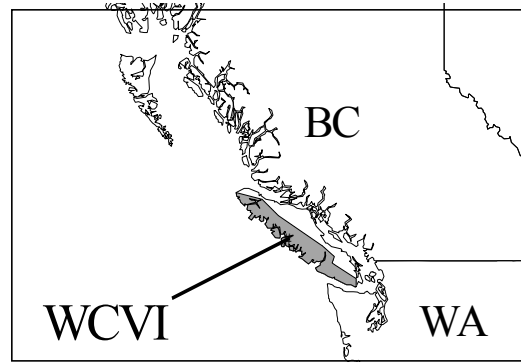
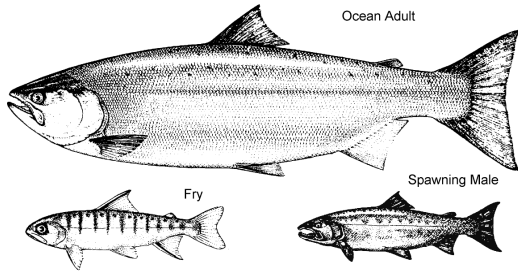




Pacific Region

Stock Status Report D6-06 (2002)



West Coast Vancouver Island Coho

Background

The coho salmon (Oncorhynchus kisutch) is one of six species of anadromous Pacific salmon found in British Columbia. Juvenile coho prefer low gradient streams with low water velocities and an abundance of cover. They occur in streams, sloughs, and ponds and along lake shores throughout the West Coast of Vancouver Island (WCVI).

Juveniles in streams are aggressive and territorial. Although often vibrantly coloured, with a large orange anal fin edged in black and white, sometimes they are difficult to distinguish from plainer chinook fry. In freshwater, juveniles feed on aquatic and aerial insects, plankton, and occasionally small fish. Young coho rear for one and sometimes two years in more than 700 streams on the WCVI. Most WCVI populations utilise smaller streams and have escapements averaging fewer than 200. Only the Somass and San Juan rivers have average escapements of over 5,000.

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. In the marine environment, 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.

Summary

- Marine survival of coho from the west coast of Vancouver Island is expected to be less than 5% in 2002, which is poor and less than 2001.
- Exploitation rates on WCVI coho should not be increased in expectation of poor coho abundances: in addition to the poor survivals expected, data suggest that there were few wild smolts in this generation.

The Fishery

The WCVI commercial troll fishery was the largest harvester of coho in British Columbia before 1997, averaging 1.65 million (M) salmon from 1985 to 1994. After 1995, the fishery was managed to a catch ceiling under the Pacific Salmon Treaty. Harvest ceilings were 1.75 M in 1985 and 1986; 1.8 M from 1987 to 1992; 1.7 M in 1993; 1.2 M in 1995 and 1 M in 1996 (there was no ceiling in 1994). The fishery was managed by a statistical strategy with closures and openings if in-season catches fell below or exceeded pre-determined levels. This coho fishery was closed after 1996 due to conservation concerns.

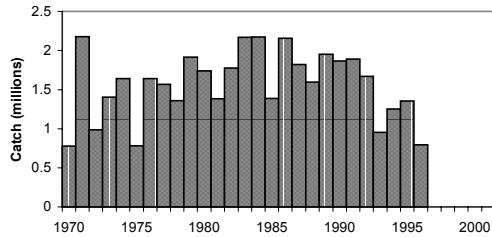


Figure 1. Total catch of coho in the WCVI troll, 1970 to 2001. Most of the harvest of WCVI coho before 1998 was in this fishery, which also caught coho from other areas in southern BC and the United States.

Since 1998, even more severe restrictions of salmon fisheries have been in place to protect depressed coho stocks, especially from the Strait of Georgia area and upper Fraser systems like the Thompson. Measures included a ban on retention of coho in commercial, sport and aboriginal fisheries and closure of commercial and sport fisheries for other salmon that were likely to cause unacceptable coho mortalities, particularly to the stocks of most concern. For the WCVI, salmon fishing has still been permitted in most inshore areas, with seasonal restrictions. No coho retention is allowed in the few commercial fisheries. Recreational fishers were not allowed to retain coho in 1998 with the exception of a hatchery-targeted fishery on the Somass River. Fishing was permitted for other species in most inshore areas but some SW Vancouver Island areas were closed to salmon fishing. These restrictions have been maintained with the additional allowance for retention for part of the year in some areas, such as Alberni Inlet, Clayoquot Sound and Quatsino Inlet. In 2001 the Alberni Inlet sport catch restrictions were relaxed so that a daily maximum of three hatchery and 1 wild coho were allowed (virtually all hatchery coho in this area came from Robertson Hatchery in the Somass system, where they were marked as smolts by removing the adipose fin. An unmarked coho was assumed to be wild).

Stock Status

Assessments of WCVI coho stocks rely on information gathered intensively from indicator stocks and from extensive surveys of juvenile and adult abundance on selected streams. There are two wild indicator streams and one hatchery indicator stock. The wild indicators are Carnation Creek and Kirby Creek located near Bamfield and Sooke, respectively. Both smolt and adults are enumerated on these streams using counting weirs. Carnation Creek has a 31-year time series of data whereas Kirby Creek was established in 1997. The hatchery indicator is Robertson Creek Hatchery. Annual counts of returning salmon are made at the Stamp Falls fishway downstream of the hatchery and escapement to the hatchery is also estimated. Before 1999, Robertson was the only stock whose smolts were being coded wire tagged, allowing estimates of catch, which, coupled with estimates of the tagged escapement, provided the only estimates of exploitation and survival rates for the WCVI region. Coded wire tagging of coho smolts at Kirby Creek began in 1999 and at Carnation Creek in 2001. Survival rates of Carnation coho are estimated by assuming an exploitation that is based on the measured Robertson exploitation. Catch distribution has also been monitored periodically from tagging programs at Conuma and Nitinat hatcheries. Starting in 1995, annual fry and adult surveys have been conducted on 30 to 40 WCVI streams in order to compare abundance in non-indicator systems. Most of the streams surveyed extensively have little or no stock enhancement.

FRY SURVEY

Density of juvenile coho stocks have generally improved since the period of extremely low marine survivals experienced during the warm water (El Nino) events of the early 1990's. The large spawner escapements in 1998 resulted in the highest

density of juveniles observed (1999) in this short data series. Fry densities were lower in 2000, mirroring the decreased spawner escapement in 1999.

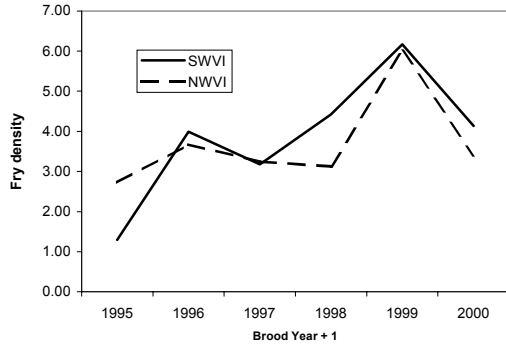


Figure 2. Mean Density of coho juveniles in WCVI systems. Sites with three or more years of data were included.

MARINE SURVIVAL

Marine survival rates continue to improve after the low levels of 1994. Generally the marine survival of hatchery stocks are lower than wild stocks, but in 2001 the survival rate of the Robertson River hatchery stock continued to be higher than the wild indicators at Carnation and Kirby Creeks. Wild survivals are still in the post 1994 range of 1-9% (mean 5.0%) which is lower than the previous 18 years (range 5-18%, mean 10.4%).

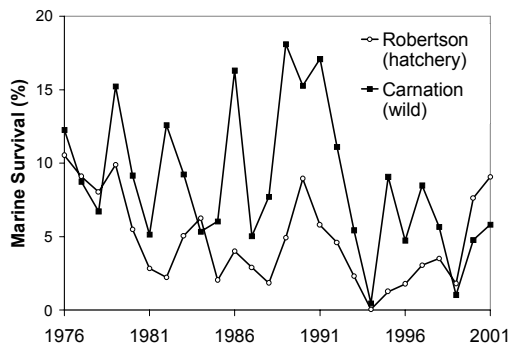


Figure 3. Estimated marine survival of Robertson Creek Hatchery, Carnation Creek and Kirby Creek indicator stocks from 1976 – 2001.

EXPLOITATION

Exploitation rates remain low due to the lack of directed commercial fisheries. The

exploitation rate of marked Robertson coho was 22% in 2001, virtually all in the Alberni Canal/Barkley Sd. sport fishery. The exploitation rate for unmarked Robertson coho was estimated to be 15% and this was probably about the exploitation of wild coho in the local area.

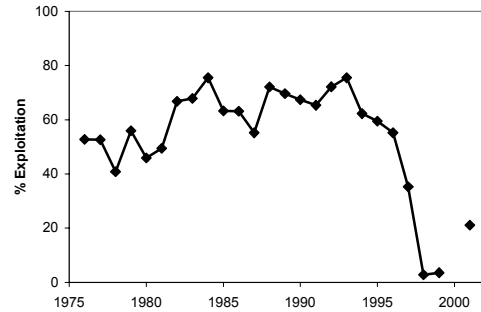


Figure 4. Exploitation rate of Robertson Hatchery coho (proportion of returning adult coho killed in fisheries). Increases in 2000 and 2001 are due to a terminal fishery, which largely targeted marked coho from this hatchery. Recent fishing mortality of most WCVI coho stocks was much less than measured at Robertson Hatchery.

ESCAPEMENT – WILD

In the absence of significant exploitation since 1998, escapements from 1998 to 2000 exceeded their parental escapements. The overall 2001 escapement decreased 11% from its brood year (1998). However, spawners in 1998 were relatively abundant so the total number of spawners estimated in monitored streams in 2001 still increased over 2000 by 29% (Figure 5).

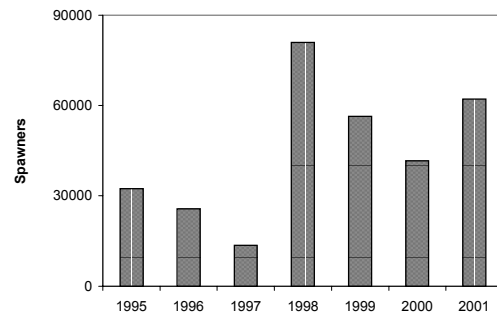


Figure 5. Summed escapement to selected WCVI streams with 7 consecutive years of data, 1995 to 2001.

ESCAPEMENT - HATCHERY

In contrast to the wild stocks the hatchery stocks at Robertson and Conuma experienced dramatic increases from the 1998 brood, 790% and 330% respectively. The smolt releases from the Robertson facility have remained constant at approximately 0.85 to 0.98 million smolts over the last four return years so the increase in escapement can be attributed to increased marine survival and low exploitation. Before the severe restrictions in 1997 and 1998, the exploitation rate of WCVI coho averaged approximately 70%. Since then, exploitation rates have probably been 5% or less over most of the WCVI. The exploitation of marked and unmarked coho in the Alberni Canal/Barkley Sound area is a special case, where the terminal fishery has resulted in an exploitation of marked coho from Robertson Hatchery of about 22% and an exploitation of unmarked coho in the area of about 15%.

Habitat Status

Loss and degradation of freshwater habitat is a factor in the probable long-term decline of coho stocks. On the WCVI, the most severe cause of degradation is forestry-related impacts such as reduced water retention, loss of stream habitat complexity, siltation and increased water temperatures. The Carnation Creek indicator is a major study of the effects of timber harvest practices. Although not necessarily the exclusive effect of logging, the abundance of this population has declined over the 31 years of the study, primarily since 1988. Detailed insights on the mechanisms involved have been determined by this study.

Over the past several years, the evolution of the BC Forest Practices Code has meant increased regulation at the provincial level of forest practices affecting fish-bearing streams. Forest companies have responded positively and modified their silvicultural

practices. Increased community and industry awareness of land-use impacts on fish populations is essential to ensuring long-term sustainability of the resource by sustaining a stewardship ethic. Along these lines, several projects involving the DFO and community partners have been initiated on the West Coast to monitor local stocks and rehabilitate habitat.

Outlook

Fishing restrictions implemented to conserve weak coho stocks have resulted in increased juvenile abundance and escapement. Survival has improved gradually over the past few years although the wild indicator is still below the long-term average. The forecast for 2002 is for survivals to decrease. Coupled with data indicating that smolt numbers were reduced in 2001, the outlook is for lower coho abundances in 2002.

Management Considerations

To date, improvements observed in juvenile and adult abundance over the last seven years are mostly attributable to reduced exploitation rates. While marine survival has slowly improved since the period of extremely low survival experienced during the El Nino events of the early 1990's, it still remains below long-term averages. Improved escapements have been partly the result of transfer of catch to escapement, i.e. abundances have not increased as much. As always, a precautionary approach towards increasing exploitation should be in effect.

Although the returns have been impressive to hatcheries, particularly Robertson Creek, wild stocks must be taken into consideration when developing fishing plans. Selective mark fisheries are a good solution, where more hatchery-marked coho than unmarked coho are allowed in the catch.

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