

QUINSAM HATCHERY
OCEANS & COMMUNITY STEWARDSHIP PROGRAM

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Quinsam River Hatchery

HISTORY

The Quinsam Hatchery has been in operation since 1974. It is located on the Quinsam River, (which is a smaller tributary of the Campbell River), approximately 3 kilometres upstream of the confluence.

The hatchery was built as part of the Government of Canada's Salmon Enhancement Program (SEP), with the objective of "restoring the population of salmon to historic levels".

The Quinsam River location was chosen because of a significant source of excellent gravity fed ground water that was available. This water supply delivers 11,000 gallons of free flowing, high quality fish culture water to the facility. The site was also very close to the Campbell River and sources of brood stock for all the species that were considered for enhancement.

The purpose of the hatchery at that time was to stop the decline of Chinook Salmon in the Campbell River, and to enhance the populations of Coho and Steelhead in the Quinsam River to provide fishing opportunities. Prior to the hatchery operation, the average number of adult salmon returning to spawn were < 4,000 Coho, < 4,000 Chinook, and < 600 Steelhead. Intense commercial fishery interceptions in the late 70's caused rapid declines of Pink salmon as well. To return to historic averages of > 30,000 per year, this species was added to the production goals at Quinsam in 1979.

There are many reasons for declines of salmon in the Campbell & Quinsam Rivers. The following is a list of the main contributing factors:

HABITAT DEGRADATION

- A dam and hydroelectric facility was built on the Campbell River in the 1950's. Although the dam was situated above Elk Falls (which was impassable to adult salmon), it still had a significant negative impact on the

natural ecosystem in the lower river and in the lakes above. This has included:

- For over 50 years, high flows released through the dam and spill gates on the Campbell have almost completely removed gravel from traditional Chinook spawning areas. With a dam in place above, there is no recruitment of substrates to replace what has gone. This has been a leading cause to the near extinction of the Campbell River spawning Chinook.
 - Artificially high flows in the Campbell have impacted the rearing habitat of juveniles. Also, the temperature regime has changed in the fall and winter (higher), which has increased the development rate of incubating eggs. This has led to a much earlier migration of Chinook fry from the Campbell, compared to a non-reservoir system like the Quinsam. Early migrations of fry may have negative affects on survival due to low abundance of food items.
 - Various malfunctions and failures at the generating station have led to serious incidents on the Campbell, (flows shut off for lengthy periods, de-watering of habitat).
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- Estuary: Heavy use of the estuary for industry seriously impacted the Campbell estuary for the past 60 years or more. This ranged from log booming and loading, boat marina, dredging operations, barge loading, pile driving, lumber mills, and float plane base. This negatively affected the carrying capacity of the estuary for the smolts and fry that migrated down the Quinsam and Campbell Rivers.
 - In the late 70's and early 80's, heavy metal (lead, copper, cadmium) pollution from Westmin Resource's ore mine in the upper Campbell watershed had made it's way down to the lower Campbell River. Although it is not known how serious the impact was to the fish there, it is known that the levels found at that time were above the maximum allowed for various stages of salmonids.
 - Quinsam River Coal Mining: On the Quinsam River, open pit and underground coal mining have been occurring since the mid-80's. Sulphate levels in the upper watershed are now beginning to rise, and there are growing pollution concerns.

- Quinsam River flow diversions: When the Campbell River Hydro development was built in the 1950's, other watersheds were included by diverting water from areas in the upper watershed into the Campbell River reservoirs. The Quinsam was one of those systems, and has significant amounts of water diverted out of it and to the Campbell. During the fall of 2000, a long period of drought combined with a high diversion to seriously reduce the amount of water available to the lower Quinsam River during adult Pink spawning. This caused high mortality and low spawning success due to inability of fish to swim over obstacles, and not enough velocity to properly spawn in.

CATCH

- The Campbell River Chinook (or Tyee), is world famous and has been responsible for developing the renowned "Tyee Club" of Campbell River. Chinook and Coho from the Campbell & Quinsam Rivers support large sport fisheries all along the coast from Alaska to a terminal area in the river mouth.

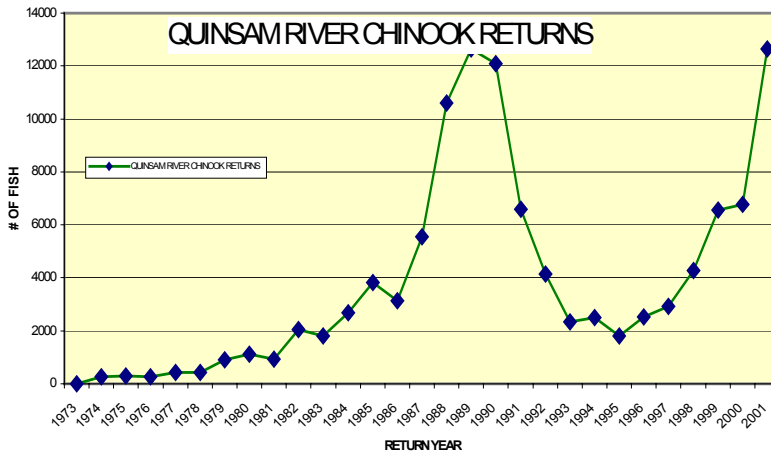
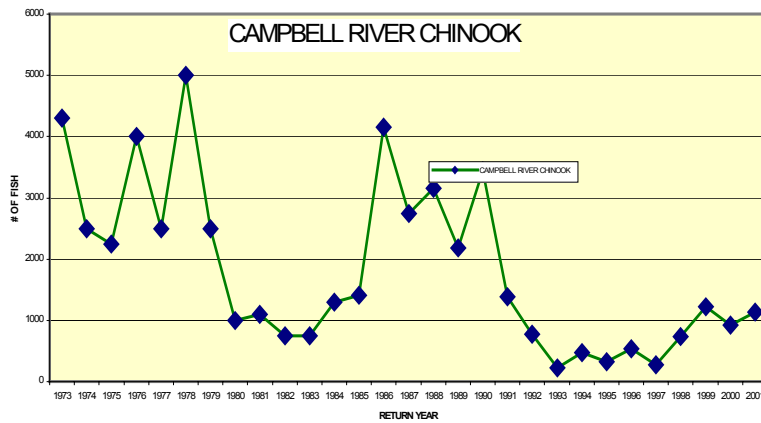
Through the 1980's, a very large commercial net fishery occurred in Johnstone Strait, just north of Campbell River. This fishery intercepted large numbers of Campbell/Quinsam bound fish. In recent years, this fishery has been severely restrained due to conservation concerns on other mixed stocks.

CURRENT ENHANCEMENT STRATEGIES & TARGETS

- Fisheries & Oceans consider the Campbell & Quinsam Rivers a "Key Stream" for assessment. To this end, intense effort is directed at marking large numbers of juvenile Chinook and sampling adults at the hatchery and in the river. In addition, all Chinook from the hatchery are otolith thermal marked to identify them as hatchery produced fish. This will provide valuable information on the contribution of hatchery raised fish to naturally occurring Chinook in the watershed.
- Quinsam hatchery Coho are part of the selective fishing strategy, with 900,000 smolts adipose clipped for recreational fishery retention. A portion is also "double index coded wire tagged/clipped" to compare survival rates between catch and released fish in the fishery. All of this data is very important for fisheries managers and planners.

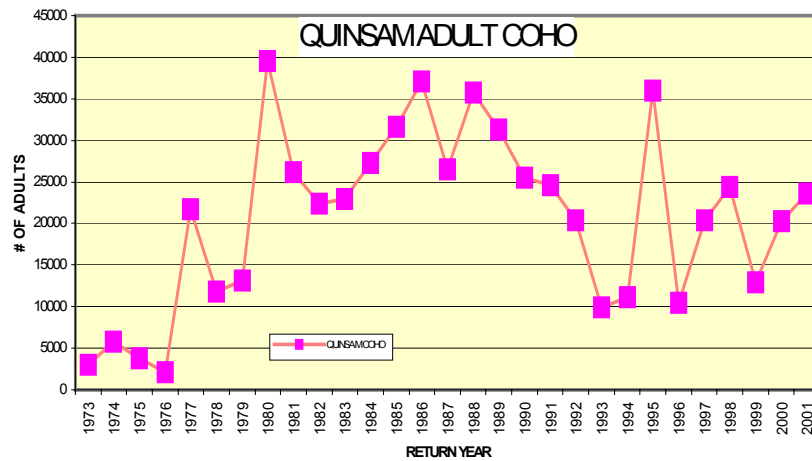
- Quinsam Steelhead are currently endangered. The population has declined drastically during the past 10 years despite enhancement efforts. Currently, the hatchery supports a captive brood program for this stock.. Wild smolts are captured during their Quinsam River downstream migration and reared to maturity at Duncan Trout Hatchery. The eggs and fry from these fish are reared at Quinsam Hatchery with smolts being released to the Quinsam River. The first adult returns are expected in winter, 2002/03.
- **CHINOOK:** The current focus at the hatchery is to restore habitat in the Campbell River in order to support native stock of Chinook (and other species). The Quinsam hatchery has kept this run from extinction during the past 25 years, and has built up a large escapement into the Quinsam River (where the fish are homing to the hatchery area). With gravel placement, spawning channels, rearing channels and estuary restoration on the Campbell, hatchery staff are attempting to get more Chinook returning to the Campbell (as they did 30 years ago). To this end, adult Chinook are captured in the Quinsam and trucked to spawning channels in the Campbell where they are held in with fences to initiate spawning. In addition, 500,000 eggs are taken at the hatchery, incubated to the eyed stage, then transferred to instream incubators that are located in a section of the Campbell River. Here they are incubated for 3 months and released at the fry stage to the rearing channel. *The hope is that these fish will home in on the Campbell water as adults, and utilise the habitat that has been restored.*
- Current Chinook production: Quinsam Hatchery is attempting to diversify production strategies in order to "not have all our eggs in one basket". Currently, 2.3m smolts are released directly to the Quinsam River as 8 gram smolts in mid-May (3.5 months of rearing), 200k released as fed fry to the upper Quinsam watershed, and 1.0m reared in seapens and released in the ocean. The fed fry group is being tried as an attempt to match a more natural size at release, utilise abundant habitat, and promote adults to home in on the upper river. These fry come from eggs that are incubated on river water, and are much more delayed than the production groups that are incubated on warmer ground water. Although survivals are significantly lower on smaller fry releases, returns of adults from these releases indicate a more natural age class composition of older and larger fish, (less young males). The fish are also tending to spawn in upper areas of the river. The seapen groups allow the hatchery to release a significant amount of smolts

into areas outside of the estuary so that there is no competition with wild smolts. The seapen groups also tend to survive at a higher rate and contribute significantly to a very important recreational fishery. Adult returns are improving significantly, (see "Campbell River Chinook" & Quinsam River Chinook" charts).



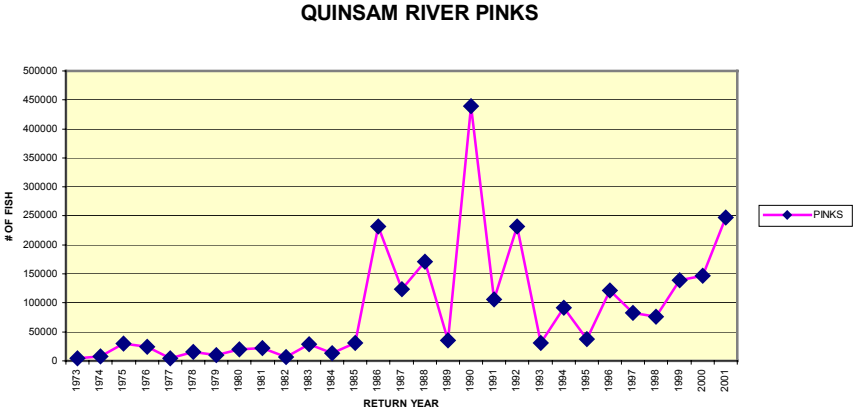
- **COHO:** Coho production at the hatchery has remained constant at 1.2m smolt release, (25 gram size by may 31st of 2nd year), and 250k fed fry

release by helicopter into upper watershed (above impassable falls). This combination of release strategies has utilised the facility and habitat to maximise adult returns and provide selective fishery opportunities. Size & Time of release studies done in the early 80's continue to direct release targets for hatchery smolts. Juveniles are transferred from Burrows ponds to earthen channels in December to allow fish to grow out and transition to a more natural rearing environment. Adult returns have been variable during the 90's, but are now showing an improving trend, (see "Quinsam Adult Coho" chart).



PINKS: Prior to the hatchery, Pink salmon returns to the Quinsam River were decreasing and highly variable, averaging at approximately 30,000 adults per year. Since enhancement work began in the early 80's, the run has increased to averages of over 100,000 per year, with peaks of 500,000. The hatchery has also played a vital role in assisting in rebuilding runs of Pink salmon in other systems on the east coast of Vancouver Island (such as the Puntledge, Tsolum and Oyster). It remains the only strong stock of Pinks remaining on the south-east coast of Vancouver Island.

Seapen rearing done in the 80's was a very successful strategy, increasing survival rates and adult returns significantly. With reduced fishing pressure in recent years, the runs have been stable, and seapen rearing is only done on a small scale with community partners to provide terminal recreational fishing opportunities. The Pinks are an important source of consistently large amounts of nutrients for the river. Current production is 5 to 7 million unfed fry released directly to the river from gravel box incubators.



STEELHEAD: Steelhead runs in the Quinsam River have declined drastically during the past 10 years, following similar trends with other east coast Vancouver Island Rivers. Three years ago, the Province started a "Living Gene Bank Program" (captive brood), to try and preserve the wild population from extinction. Wild smolts have been collected every spring from the hatchery counting fence and taken to Duncan Trout hatchery. Here, they are being raised to maturity, spawned, with the progeny returning to Quinsam Hatchery for rearing from eyed egg to smolt release. The rearing phases have been

successful to date, with the first adult returns expected winter of 2002/03. Current production target is 20,000 smolts released at 80 grams size May 1st of 2nd year.

CUTTHROAT: Sea-run Cutthroat trout are also enhanced at Quinsam. This stock was reduced to very low levels in the 80's, and has responded very well to enhancement. There are now significantly more adults and juveniles in the rivers reproducing naturally and providing catch and release fishing opportunities. Production target is 6,000 smolt release at 80grams size on May 1st of 2nd year.

HABITAT RESTORATION & MONITORRING: The focus of salmon enhancement on the Campbell & Quinsam has been to restore habitat for the hatchery & wild production to utilise for maximum benefit. To this end, significant habitat work has been done on the Campbell River over the past 15 years to compliment the hatchery production and restore natural production to the river. Over 5.0m dollars, (most of which came from private sector), has been spent on spawning and rearing channel construction, gravel placement, estuary complexing, riparian planting, and estuary land acquisition. The hatchery staff have been a key factor in all of this work, and are currently involved in assessing the results. In addition, staff are part of the Water Use Planning process with BC Hydro to come up with a plan for flows in the Quinsam & Campbell that will benefit fish.

EDUCATION & COMMUNITY STEWARDSHIP: Quinsam Hatchery has become the centre for these activities in the Campbell River area, providing school tours, classroom educational materials, presentations, work experience, meeting rooms, technical advice and assistance, equipment, storage, and resource centre. Hatchery staff are closely linked with all of the fisheries activities going on in the area, and are key members of working groups such as Stewardship committee, fisheries committee, sportfish advisory, water use planning, etc.. In addition, community groups sponsor net pen rearing of Chinook and Pink juveniles by providing funding and volunteers to do the work.