ANNUAL REPORT FOR TOBOGGAN CREEK HATCHERY OPERATIONS IN 2001/2002

Prepared for : **Fisheries and Oceans Canada**

Prepared by : Mike O'Neill, Manager
Toboggan Creek Hatchery
Smithers, B.C.

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Introduction

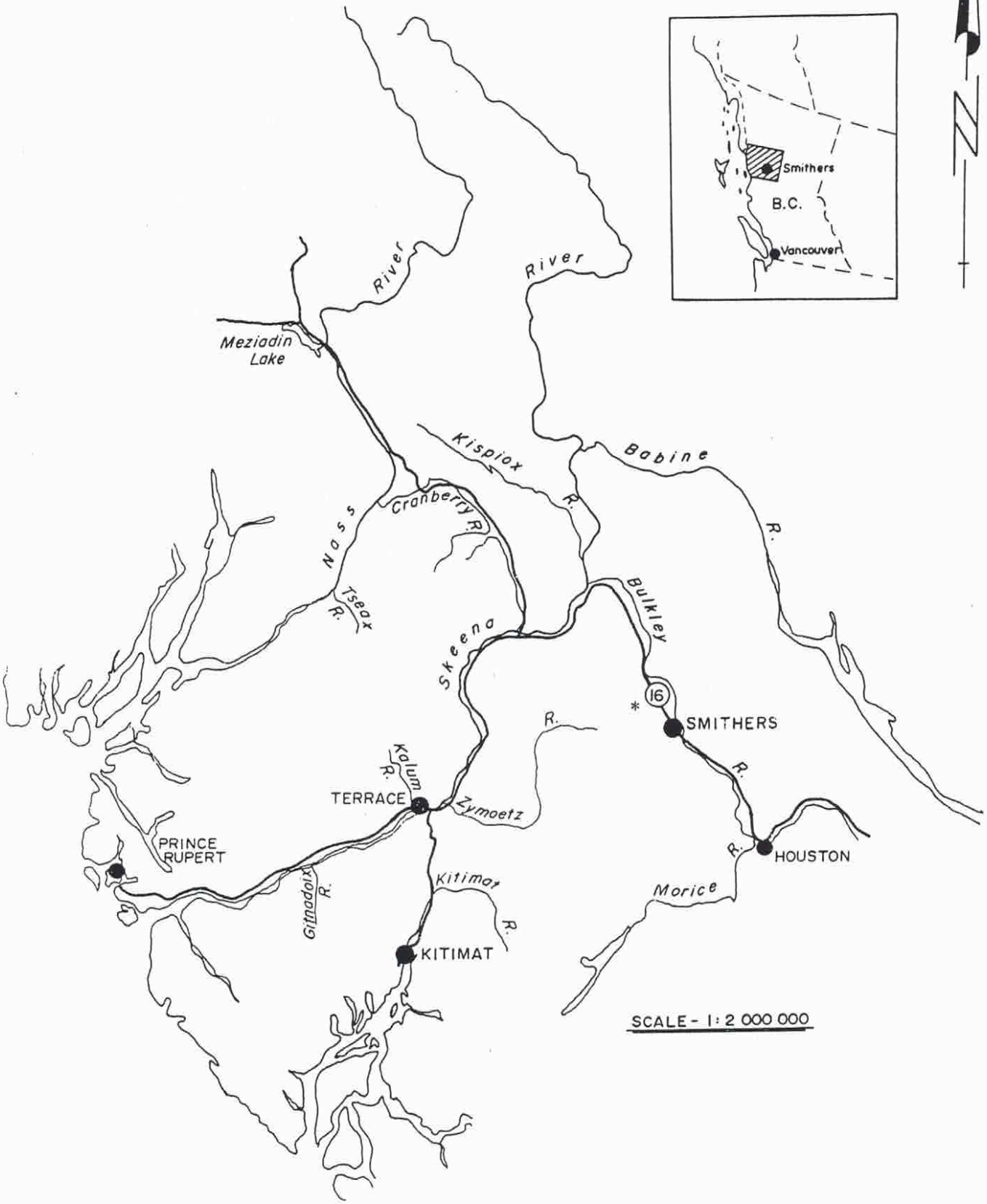
The Toboggan Creek Salmon Hatchery, under the direction of the Toboggan Creek Salmon and Steelhead Enhancement Society, has just completed its seventeenth year of successful operations. The Toboggan Creek Hatchery facility is located thirteen kilometers north-northwest of Smithers, British Columbia, on Highway 16 West (Fig. 1). The facility is located on C.N.R. right-of-way, which was purchased by the Society from C.N.R. in 1997. Funding for the hatchery contract is provided yearly by the federal Department of Fisheries and Oceans under the Community Involvement Division, and the Habitat and Enhancement Branch, of the Salmonid Enhancement Program.

Over the past three or four decades, and in particular during the mid 1990's, stocks of coho salmon native to the upper Skeena River tributaries were severely impacted by Alaskan and Canadian ocean fisheries. The situation became even more of an issue with coho due to very poor ocean survivals in the 1997 return year. Chinook have had somewhat better escapements recently although some stocks are still at depressed levels. The upper Bulkley chinook stock, a genetically unique population, had seen only 150 to 200 wild spawners in the mid 1980's. This stock has historically been impacted by a gaff fishery at Moricetown Falls and by angling pressure, it also suffers from degraded freshwater habitat conditions.

The Toboggan Creek facility, constructed during 1984/85, has been attempting to preserve and enhance endangered stocks of both of the aforementioned salmon species. During the 2001/2002 contract period our Society released just under 34,000 coho and 4,500 chinook salmon from the 2000 brood year. Successful rearing of another 122,000 chinook and coho from the 2000 brood continues, with all of these salmon being reared through to smolt size for release in April and May of 2002.

Egg takes for 2001 brood chinook, from the upper Bulkley River, were cancelled this year due to an extremely strong return of adults this past summer. Chinook spawning escapements to the upper Bulkley were the best ever this year, with 5,600 adult chinook salmon estimated in 2001 as compared to 2,560 spawners during 2000. The wild component of the escapement was 76 % in 2001, also the best we have seen in recent years.

Figure 1. Location of the Toboggan Creek Hatchery near Smithers, British Columbia *



Coho returns to most upper Skeena tributaries in 2001 were very strong, and surpassed all of our previous counts with the exception of 1999. The Toboggan escapement in 2001 was 6,040 coho, compared to 3,890 coho spawners in 2000. Escapements to the upper Bulkley River system were comparatively stronger, with 2,748 coho in 2001 as compared to 983 coho spawners in 2000. The Bulkley escapement last fall surpassed even 1999, when 1,550 coho were estimated to have returned. The Bulkley escapement reflects the success of increased enhancement initiated in 1998. Egg targets on both Toboggan Creek and the upper Bulkley River were both easily achieved this past fall, and over 190,000 coho alevins are presently incubating at the hatchery.

The Toboggan Creek Hatchery has the capacity to rear 155,000 coho and chinook salmon smolts from the Bulkley River system on a yearly basis. Initial incubation is accomplished using moist incubators and eggs are transferred to Heath stacks at the eyed stage, egg to fry survivals are usually over 93.0 %. Ponding and initial rearing is done in Capilano troughs and the fingerlings are transferred to an earthen rearing channel prior to the winter period to make way for the ponding of fry from the following brood year. Smolt releases occur in April and May to coincide with the peak migration of wild smolts to the ocean. Ponding to release survivals usually exceed 95.0 %, a period of 12 months. Two full-time personnel are required to operate the facility and extra manpower is hired during the summer and fall periods as needed.

The coho counting fence panels were installed on August 2nd this year. This enabled an accurate assessment of our fourteenth major return of hatchery-produced coho to Toboggan Creek. The fence data indicated Toboggan hatchery returns of 1,895 marked coho in 2001, from a release of 35,394 smolts this is a 5.4% return. This is our second best return, behind the 1999 escapement when 7.1% of the smolts returned as adult coho, and indicates a continued shift from the 1997 return of 73 CWT's (0.2%). This illustrates the dramatic yearly differences in ocean productivity and survivals that can occur. The data indicate a total adult recruitment of 3,108 coho from the release, and at a 8.8% survival rate this is well above average. The rate of exploitation on the Toboggan CWT's was about 39% in 2001, with the Alaskan catch making up almost two thirds of this. Previous exploitation rates, prior to 1998, have ranged from 55% to well over 70%.

Around 33.7 % of Toboggan coho handled in 2001 were adipose-clipped salmon, and we estimate the makeup of the stock was approximately the same. Marked coho in this return year were not all hatchery coho, and it was estimated from CWT sampling that clipped wild coho made up 4% of the escapement this year. As well, approximately 3% of the CWT's were identified as stray coho from the upper Bulkley stock. As a result, it is estimated that hatchery-marked coho from the Toboggan stock made up 93% of the marked return. Total estimates of Toboggan Creek coho escapement, exploitation and survival have been adjusted to reflect these findings in 2001.

The Toboggan Creek Hatchery facility is frequented by 2,000 to 3,000 visitors on a yearly basis and our Society encourages the public to learn more about the salmonid resource in British Columbia. Our community appreciates the opportunity to be involved in these continued efforts.

Objectives

i) enhance stocks of anadromous fish species in the Bulkley-Morice drainage which are identified as being below historic levels.

ii) provide coded - wire tagged groups of salmon from Bulkley - Morice stocks to aid in identifying the movements, timing and exploitation of these fish through the various ocean and river fisheries.

iii) assess returns of both wild and hatchery-produced salmon to the stream of origin to determine escapement of adult spawners, and therefore aid in identifying smolt to adult survivals and total exploitation rates on these stocks.

iv) maintain a high public profile of the facility to inform the local population of the benefits and goals of both the Community Involvement Program and Salmonid Enhancement Program of Fisheries and Oceans Canada.

v) provide employment and training for local school students in the Bulkley Valley area.

vi) develop a core of qualified local people that can be depended upon to accomplish the various goals and objectives with respect to progressive fish culture and stock assessment in the upper Bulkley - Morice drainages.

Water Supplies (2001/02)

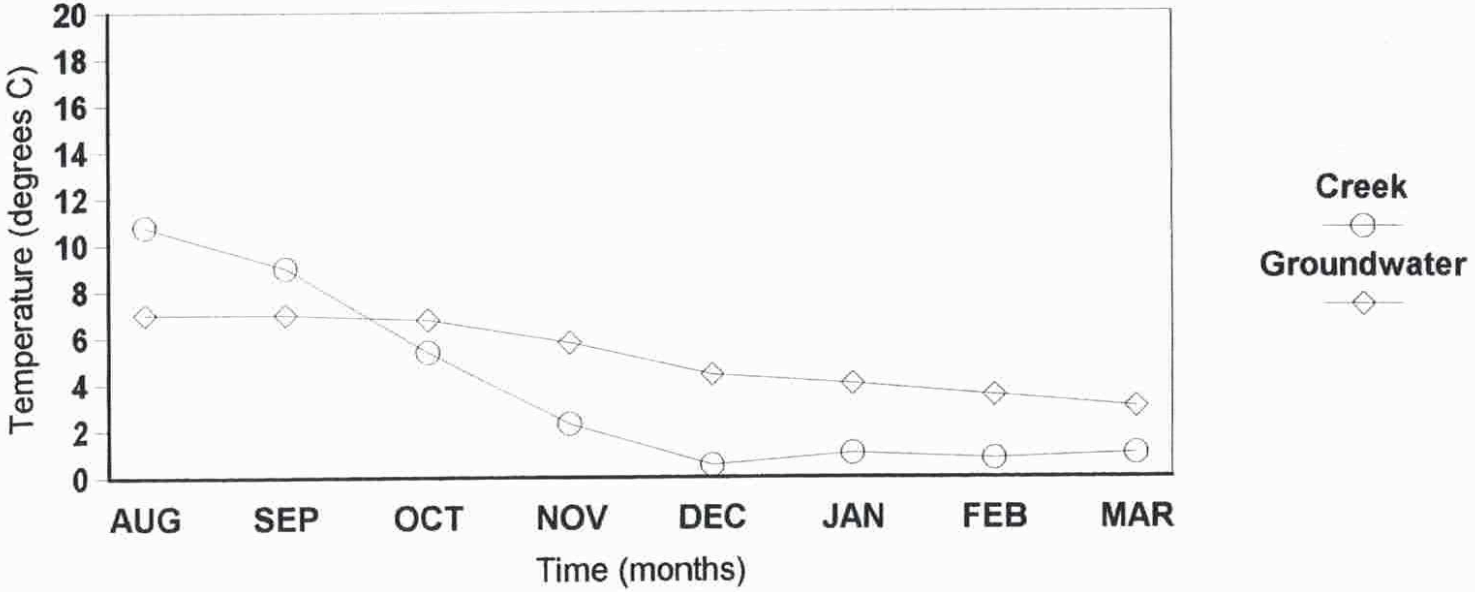
As for the previous years, the average daily temperatures of the three hatchery water sources were recorded and average weekly temperatures have been calculated. We depend on two of the water sources for egg incubation and fish rearing, ground water from an underground collection system and surface water from Toboggan Creek. The third water supply, surface water of Brandt Brook, has been used increasingly more often in recent years due to water quality concerns for the creek supply. The three water supplies have proven to be very dependable during the years and we have never experienced a fish loss due to an interruption of water flows.

The creek water supply is used for year-round rearing and has a maximum flow of approximately 4,500 litres per minute, the normal operating flow is 1,600 to 1,800 litres per minute. In most cases the creek supply is also used for egg incubation, the exception being during periods of silty runoff flow when the ground water supply is utilized. In cases where we would like to manipulate egg development the ground water supply is used, as it is warmer in the winter period and colder during the spring and summer. The ground water supply has a maximum flow of 100 to 150 litres per minute and is used solely for incubation purposes and initial chinook ponding.

Average temperatures in 2001/02 were similar to those for the same period of 2000/01. The creek temperatures peaked in August and then began to decline, as they did last year. Average temperatures in the fall and winter periods were slightly above normal last year (Fig. 2), which benefitted fish growth for most of our stocks on hand. On average, the creek supply fluctuates in between 0.5 and 12.0 degrees and the ground supply from 3.5 to 8.0 degrees Celsius yearly.

Water levels and flows were stable overall during the summer and fall of 2001, due in part to the fact that Toboggan Creek is glacier fed. Again, the levels of this year followed the pattern of 2000 very closely with no substantial flooding during the fall freshet. Winter flows seemed fair to good through the winter period and dewatering of coho salmon redds did not seem to be a large factor in 2002. Flows and stream conditions during the steelhead spawning period, early May through June, were not included in this report as we have shifted back to the March 31st year end.

Fig. 2 Temperatures at Toboggan Creek Hatchery (2001/02)



TOBOGGAN CREEK HATCHERY - SALMON BROOD YEAR SUMMARIES

Bulkley River Chinook (2000 brood)

Growth of the 2000 brood chinook fry was very good from the first of August until temperatures cooled in November. These salmon went from 4.6 grams in late July to 14.4 grams just prior to winter (Fig. 3). Our long and consistently cold winter then stalled growth, which is a normal pattern for the area. Once temperatures increased in late March growth increased again.

The smolts from the 2000 brood are now averaging over 15 grams in weight, and should reach 16 or 17 grams prior to the commencement of releases scheduled for late April, 2002.

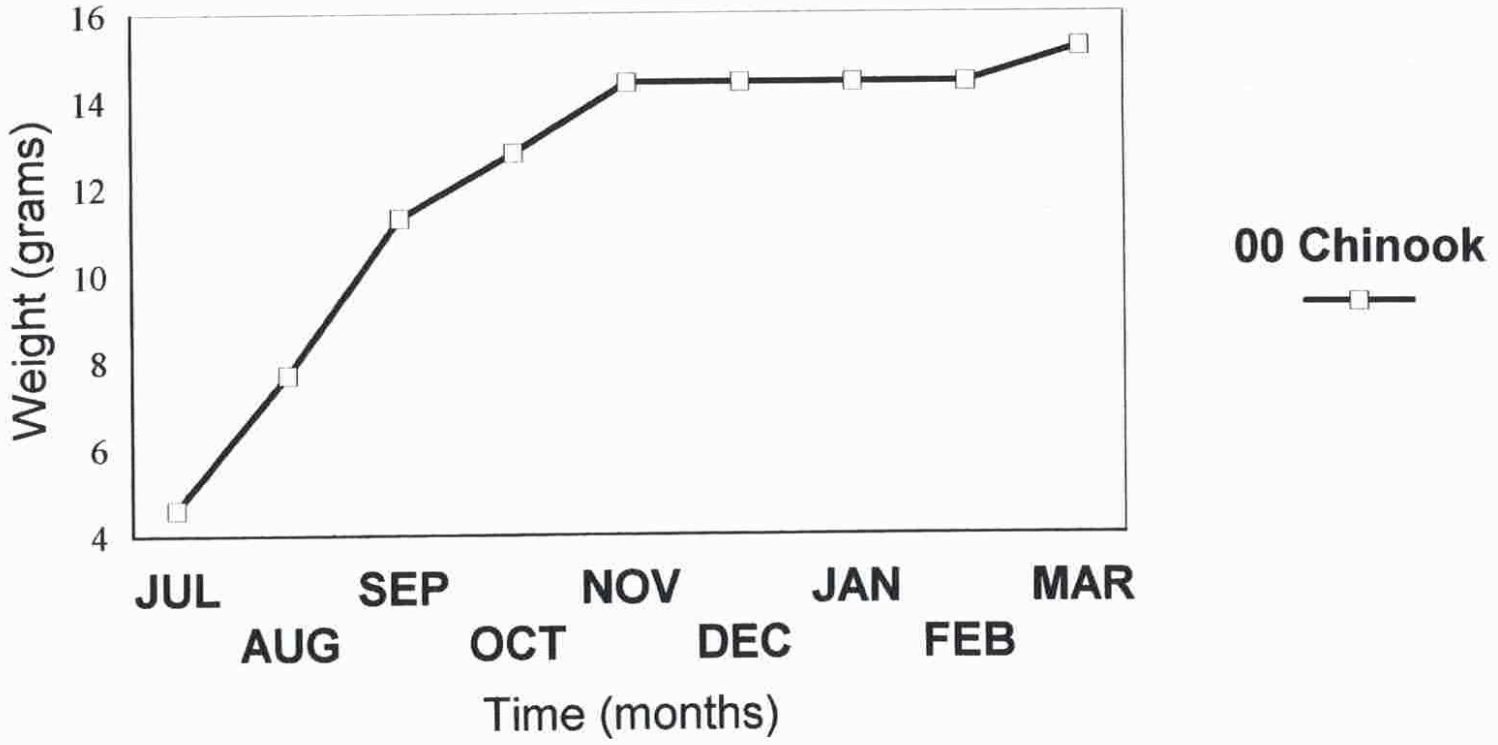
Bulkley River Chinook (2001 brood)

Broodstock collection and egg takes planned for the upper Bulkley chinook stock were cancelled in 2001, due to an extremely strong return of adult spawners this past summer and fall.

Despite cancellation of the 2001 egg take chinook assessment was carried out by two crews of hatchery staff this year, including a helicopter count of salmon spawners on August 17, 2001. A total of 3,343 chinook were observed between the Morice River junction and the Bulkley Falls, with over 71 % occupying the section of river from Richfield Creek downstream to Knockholt. The salmon were again well spread out into most of the spawning reaches this year, similar to last year's run, although no chinook were observed upstream of Bulkley Falls. We physically sampled a total of 503 different chinook during our assessment activities, and we also had another 438 chinook spawners that were visually identified by sex and mark type. The overall composition of the sample this year was 76 % wild and 24 % adipose-clipped chinook. This again indicates a very strong wild component to the run, and the overall success of the upper Bulkley chinook enhancement program, initiated in 1985.

Assessment activities also allowed us to collect 55 heads from adipose-clipped chinook for coded-wire tag identification, and these were all taken from spawned-out fish. No scale samples or DNA samples were requested by DFO biologists this year.

Figure 3. Growth of Chinook Salmon at Toboggan Hatchery (2001/02)



Results of the helicopter count were as follows :

	Aug. 17th
Above Bulkley Falls	0 chinook
Meanwhile Creek	327 chinook
Topley	345 chinook
Richfield Creek	235 chinook
Perow Station	245 chinook
McQuarrie Creek	347 chinook
Below McQuarrie Creek	1,559 chinook
Below Knockholt	53 chinook
Houston	183 chinook
in Buck Creek	49 chinook
Total observed / flight	3,343 chinook

Visibility during the assessment flight was generally good, being better in the lower end where there is less overstory. Chinook that were actively spawning were clearly visible and were easily counted, while fish holding in the deeper pools were quite difficult to get a total count on due to the large numbers of chinook spawners present. We did two comparative ground counts near the confluences of McQuarrie Creek and Richfield Creek to verify the accuracy of the aerial count.

From these observations, and incorporating the two ground counts carried out during the same period, it is estimated the chinook escapement to the upper Bulkley in 2001 was approximately 5,600 adults (four to six year old chinook). We observed a few three year old jacks during our assessment program as well, while the four-year old component of the run was nowhere near as abundant as in 2000. The great majority of chinook spawners in 2001 were five year old salmon.

The condition of spawning chinook was very good again this year, and very few pre-spawn mortalities were seen. The number of females in the run was high, making up over 50 % of the chinook that were sampled in 2001, and the average size of the fish sampled this year was relatively high as well. All this indicating the preponderance of five year olds in the escapement.

Looking at the aging information done at the DFO lab it appears that the five year old age class dominated the escapement in 2001. The ages of the CWT escapement heads sampled were 81% five year olds, followed by the four year olds at 17% and three year olds at 2%. This very strong showing of five year olds was predictable as there was a very good showing of three year old jacks in 1999, and a strong showing of four year olds in 2000. Of 48 sport-caught Bulkley River chinook heads decoded in 2001 there was one three year old (2%), 11 (23%) were four year olds, 36 were five year olds (75%). No sampled chinook were aged at six years old this past year.

Chinook Hatchery Returns (1995, '96, '97 and '98 broods)

Marked hatchery returns made up approximately 24% of the adult chinook escapement (four to six year olds) to the upper Bulkley River this year, an estimated 1,360 finclipped hatchery chinook adults and 4,240 unclipped wild salmon returned to this system in 2001. Some three year old jack chinook were evident in the escapement this past year, but they were not abundant.

These escapement estimates were determined as a result of the intensive assessment carried out by hatchery staff in 2001, and with additional funding from D.F.O. biologists. The extra funding facilitated a helicopter survey of chinook spawning grounds on the upper Bulkley in mid August. This flight found an observed total of 3,343 chinook in the upper Bulkley River system.

A total of 503 different chinook were randomly sampled during and after broodstock collection by hatchery staff, the sample represented close to 10% of the total estimated escapement. As a result of this sampling it was found that 24% of these chinook spawners were of hatchery origin. All of the clipped salmon observed in 2001 were adipose clipped coded-wire tags, no ventral clips were sampled this year. Adipose-clipped chinook were sampled for heads and pins and 55 chinook heads were collected, of these 53 of them carried pins.

# of Chinook	Tag Code	Brood Year
1	18-32-45	1998
9	18-32-28/29/30	1997
43	18-32-09/10/11	1996

These coded-wire tag data indicate that escapements of marked "adult" chinook to the upper Bulkley in 2001 were predominantly 5 year old fish, making up 83% of the adipose-clipped adult returns. Four year old fish made up 17%, while no six year olds were sampled. There were a few three year old jacks observed in the escapement in 2001, and one jack's head was decoded.

Based on this year's data, it appears that we had 1,360 adult salmon return from adipose-clipped releases of 1996 and 1997 brood chinook. No ventral clipped chinook were sampled in 2001 but this is likely attributable to the fact that no assessment was done in the Buck Creek drainage, where they were released in 1997 and 1998 as fed fry. The adipose-clipped return represents smolt to spawner survivals of 1.4% for the 5 year old age class of the 1996 brood release. The combined survivals for the 4 year old and 5 year old components of this same smolt release group were almost 2.0%. These are the best chinook survivals we have documented from smolt release to spawner return. The stock also contributed substantially to freshwater food and sport fisheries.

Toboggan Creek Coho (2000 brood)

Growth of the 2000 brood Toboggan coho increased rapidly in the summer and fall of 2001, from 2.8 grams near the end of July up to 10.9 grams by late October (Fig. 4). This growth slowed considerably at that time and dropped right off during the winter period, from November through March. At the writing of this report (April, 2002) these coho are averaging 12.5 grams in weight.

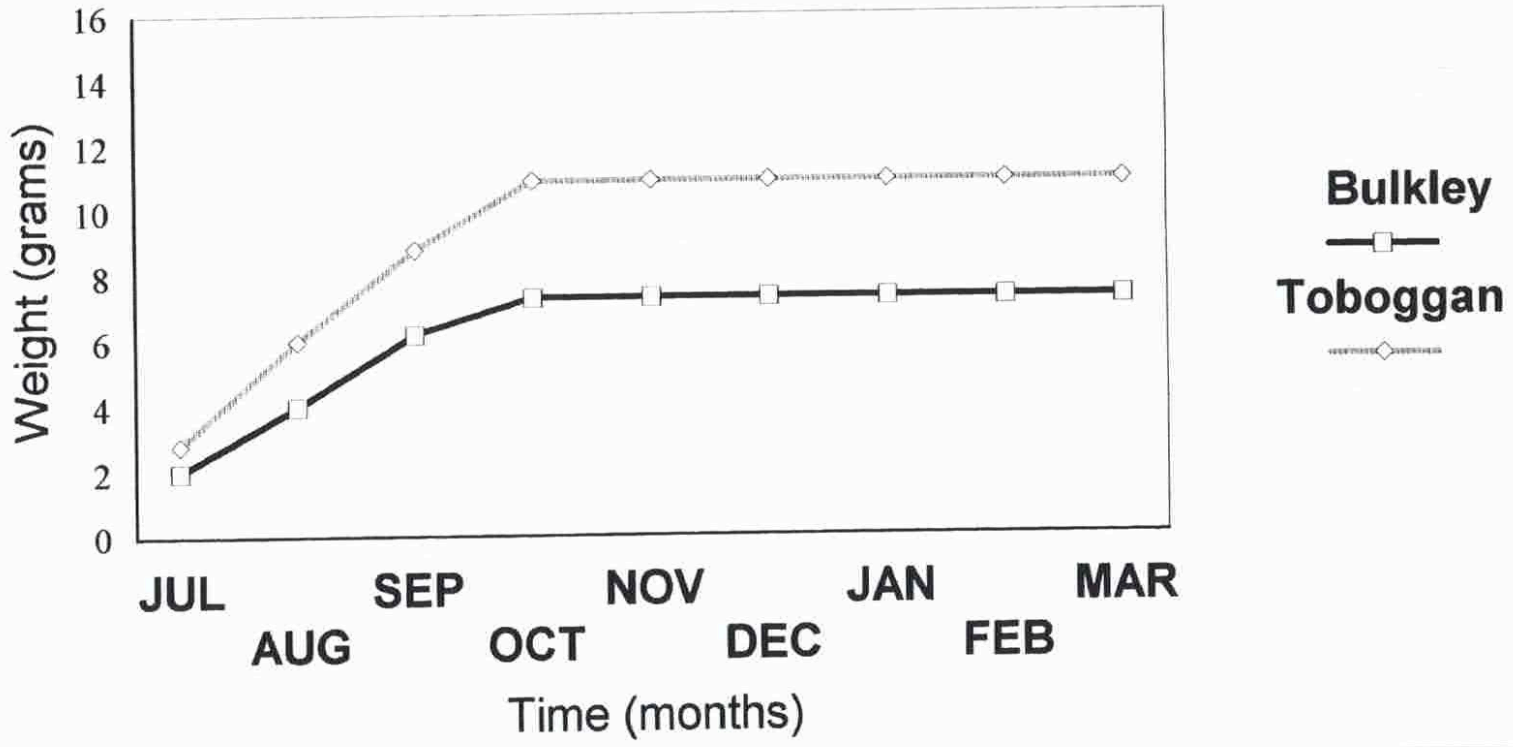
The Toboggan coho fry were split into 2 Capilano troughs in mid June and again into 3 troughs in July, 2001. They were then moved again into our outdoor rearing channel in late August, at the completion of coded-wire tagging. Overall fish health of this stock was very good throughout the rearing cycle, and salmon survivals from ponding to smolt size were 99.2 %, a period of 12 months. These are very good survival rates for this coho stock, and we expect to release over 34,000 smolts in mid to late May of 2002.

Coded-wire tagging of this stock was completed August 7th and 8th , 2001. A total of 34,357 coho salmon fry were tagged and adipose clipped. Some remaining Toboggan coho that were surplus to this group were released into Kathlyn Lake, as fed fry, where a total of 3,600 coho were released. These fry were released at 5.6 grams in weight on September 09, 2001. No surplus coho were reared to smolt size for release into Club Creek, as the coho stock in Club Creek now appears to be self sustaining as a result of previous smolt releases.

Tag Code	# Tagged
18-35-54	11,536
18-35-55	11,230
18-35-56	11,591
Total Tagged	34,357

Survivals were excellent after tagging and through the winter period. The outdoor rearing channel froze over in mid December, and remained that way until the end of March.

Figure 4. Growth of Coho Salmon at Toboggan Hatchery (2001/02)



Bulkley River Coho (2000 brood)

As with the Toboggan stock, growth of the 2000 brood Bulkley coho smolt group accelerated throughout the summer and fall periods and they went from 2.0 grams near the end of July up to 7.3 grams by the end of October (Fig. 4). The growth of this coho stock slowed down in November, then came to a halt in the months from December through March. Overall, the growth rate of the 2000 brood Bulkley coho was poor compared to the 1999 brood. At the same age last year the 1999 brood averaged 9.4 grams in weight, which is 30% larger than the 2000 brood. This may be attributed to the fact that the 2000 brood fry were maxillary clipped while the 1999 brood were not. Maxillary clipping may increase stress and reduce feeding effectiveness.

These coho fry were split into two Capilano troughs in mid May, and moved again into three troughs in June. They were then divided into the two large indoor troughs in July prior to the process of coded-wire tagging. Overall health of this stock was good and the Bulkley River coho survivals from ponding to smolt size were 95.8%, over a period of 11 months.

Coded-wire tagging of these salmon was completed during two separate time frames in 2001. A total of 30,224 coho fry were tagged and adipose clipped as a fry release group on August 5th through 7th. The remaining Bulkley River coho that were surplus to this group were adipose and right-maxillary clipped and coded-wire tagged on September 13th and 14th for a smolt release, a total of 30,362 coho fry were tagged for the smolt group. The smolts were moved to the outdoor channel shortly after tagging, while the fry group was kept inside for one week until release.

Tag Code	# Tagged
18-43-19	10,088
18-43-20	10,080
18-43-21	10,056
18-48-28	15,049
18-48-29	15,313
Total Tagged	60,586

Survivals after coded-wire tagging were excellent and exceeded 99.5 %. Releases of the fed fry were completed August 15th through 17th, 2001 when 30,222 fry were released into Buck Creek via helicopter at 3.2 grams in weight. The smolt releases are slated for mid May and mid June, to compare survival of varying release dates, and both tag groups of smolts have been kept seperated to facilitate this study. At the present time we have approximately 30,200 smolts still on hand.

Coho Egg Collection (2001 brood)

Coho egg targets over the past few years have included such stocks as Toboggan Creek, Bulkley River and Morice River. The Morice River coho enhancement program was discontinued in 2000 after two years of fry production, and the returns from this short program were excellent. The Bulkley River stock is enhanced most years, with levels of enhancement dependant on the numbers of adult coho captured at the fence. The Toboggan Creek coho stock has been enhanced yearly since we commenced operations in 1985. Egg targets for 2001/2002 were as follows :

Toboggan Creek	40,000
Bulkley River	140,000
Total Egg Target	180,000

The Toboggan Creek coho enhancement program is primarily done for stock assessment reasons, and this coded-wire tagged group of smolts is an indicator stock for the North Coast interior coho stocks in British Columbia. In recent years the abundance of Toboggan Creek coho has been accurately predicted in season, based on catch rates in the Alaskan fishery. This has benefitted all coho stocks in this area by enabling DFO to manage catch based on accurate and timely data.

The Bulkley River coho program is done more for stock rebuilding purposes, and has been quite successful in the past few years in increasing spawner returns. The 2001 egg takes represented the fourth consecutive year of accelerated enhancement of this stock. Up to 100,000 extra coho eggs have been collected, over and above the smolt group, for marked fry releases into the Bulkley River watershed. This is scheduled to be the last year of these increased egg targets.

Toboggan Creek Coho (2001 brood)

All of the 2001 brood coho eggs collected from Toboggan Creek this fall were taken from adult coho intercepted at our fence operation. A total of 84 coho were collected and transported back to the hatchery for egg take purposes. We conducted four egg takes between October 9th and November 5th, and all females surplus to our egg-take needs were released back into the stream. All eggs were disinfected with an iodine solution prior to being placed in the moist incubators.

Eggs were taken from a total of 15 ripe female coho and sperm was taken from 63 males. Each female's eggs were fertilized by using at least 6 different males and all eggs were water hardened for one hour prior to initial incubation in the moist incubators. Scales, weights and lengths were taken from all the brood females. Average weight was 3.8 kgs, while overall the average length was 560 mm. The scales from the 15 brood females were sent to the DFO scale lab for analysis, and of the 14 readable scale samples 79% were aged at 3 years old and 21% were aged at 4 years old. Of 140 readable samples, out of the total sample of 155 sent to the lab from the 2001 return, we saw an age structure of 85% three-year olds and 15% four-year olds.

Shocking and picking of the 2001 brood Toboggan Creek coho eggs began on November 21st and was completed by December 27, 2001. The egg survivals to this stage of development were excellent (94.4%), and a total of 47,199 eggs survived (Table I). Fecundity of Toboggan coho averaged 3,330 eggs per female in 2001, as compared to 3,250 in 2000 and 3,140 in 1999.

The 2001 brood Toboggan Creek coho eggs began hatching at 490.0 A.T.U.'s and peak hatch occurred at 560.0 thermal units. Survivals during hatch were excellent, and at the present time we have over 46,000 coho alevins from this stock on hand at the hatchery.

Coho from these egg takes will be reared at the hatchery to a size of 12.0 grams and released as smolts in May of 2003. Up to 34,000 of these fish will be released into Toboggan Creek, as coded-wire tagged coho smolts, and any surplus coho fry will be transplanted into the Kathlyn Creek drainage after tagging is completed. The c.w.t. tagging crew is scheduled to show up in early August, 2002 to tag and clip the 2001 brood coho stocks on hand.

Table I. Shocking and Picking Summary for the 2001 Brood Toboggan Creek Coho Eggs Incubating at the Toboggan Creek Salmon Hatchery.

Tray #	Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival(%)
M1-2	3	34	366	146(2.92)	3,250	9,124(95.8)
M1-3	3	35	799	169(3.38)	2,870	8,902(91.4)
M3-1	2	8	266	179(3.58)	1,870	6,429(95.9)
M3-2	2	12	270	174(3.48)	2,000	6,690(96.0)
M3-3	3	38	546	179(3.58)	3,260	11,125(95.0)
M3-4	2	7	387	194(3.88)	1,370	4,929(92.6)
Totals	15	134(0.3%)	2,634(5.3%)	170(3.40)	14,620	47,199(94.4)

Bulkley River Coho (2001 brood)

A total of 153 adult coho salmon (80 females/73 males) were collected in the Bulkley River during August, September and October of 2001. All of these fish were taken at the Bulkley River counting fence, with funding from Fisheries and Oceans Canada being used to operate the fence. All of these salmon were transported back to the Toboggan Creek Hatchery and were held until ripe in covered Capilano troughs. Unlike the Toboggan Creek coho, the fish collected at the Bulkley fence were tight and had to be held for quite some time before we were able to take eggs. A total of 2,197 coho were captured at the fence this year and the total estimated escapement to the Bulkley River in 2001 was 2,874 coho.

Eggs were taken from a total of 53 ripe female coho and sperm was taken from 55 males in 2001, and all of the surplus females were transported back to the Bulkley River to spawn naturally. The egg takes spanned a period of four weeks, and a total of six separate egg takes occurred between October 2nd and 29th this year. The eggs were fertilized by using at least 6 different males per female, and were water hardened for one hour prior to initial incubation in the moist incubators. Weights, lengths and kidney samples were taken from all of the brood females, with the kidneys being sent to PBS for analysis. The average weight of the brood females was 2.9 kgs overall and the average length was 535 mm. Scale samples were taken from a total of 46 wild coho. All of the scale samples were readable, with 45 (98%) being three years old and only 1 (2%) being four.

Shocking and picking of the 2001 brood Bulkley River coho eggs began on November 13th and the last batch was done on December 18, 2001. Egg survivals to this stage were good and a total of 155,794 eggs survived (Table II). Fecundity of the Bulkley coho averaged 3,080 eggs per female in 2001, up from the 2,915 eggs of 1999 but down from 2000 when they averaged 3,330 eggs per female. All of the female Bulkley coho used for broodstock in 2001 were tested for BKD, and two of the females tested positive. The eggs of these two female coho were destroyed.

Hatching of these coho eggs began at 470.0 A.T.U.'s with peak hatch occurring at 550.0 thermal units. At present we continue to rear approximately 146,000 alevins from the Bulkley coho stock.

Approximately 34,000 of these coho will be reared to smolt size at the hatchery, and released as coded-wire tagged fish in May of 2003. Coho surplus to the smolt group will be coded-wire tagged in early August, 2002 and released as 3.0 gram fed fry into Buck Creek two weeks later.

Table II. Shocking and Picking Summary for the 2001 Brood Bulkley River Coho Eggs Incubating at the Toboggan Creek Salmon Hatchery.

Tray #	Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival(%)
M1-1	5	18	196	239(4.78)	3,210	15,148(98.6)
M1-4	4	83	451	232(4.64)	2,810	12,587(95.9)
M1-5	4	340	770	219(4.38)	3,000	12,370(91.8)
M1-6	4	882	444	251(5.02)	2,670	12,959(90.7)
M2-1	5	88	501	242(4.84)	3,080	14,406(96.1)
M2-2	3	166	969	249(4.98)	1,730	7,647(87.1)
M2-3	3	19	225	239(4.78)	1,830	8,522(97.2)
M2-4	5	27	506	259(5.08)	3,080	15,140(96.6)
M2-5	4	10	366	250(5.00)	2,590	12,584(97.1)
M2-6	5	11	126	273(5.46)	2,600	14,070(99.0)
M3-2	2	17	280	235(4.70)	1,390	6,253(95.5)
M3-4	2	7	312	236(4.72)	1,110	4,927(93.9)
M3-5	2	7	195	235(4.70)	1,220	5,539(96.5)
M3-6	5	39	236	270(5.40)	2,570	13,642(98.0)
Totals	53	1,714(1.1%)	5,577(3.4%)	245(4.90)	32,890	155,794(95.5)

Assessment of Coho Escapement in 2001

Toboggan Creek Fence

The Toboggan Creek coho counting fence commenced operation on August 2nd, 2001. The fence was monitored a least twice daily from this date through to November 6th, at which time the aluminum panels were removed due to freezing conditions.

A total of 5,318 coho were passed through the fence, with coho migration into the creek peaking in the last week of September. There was also a smaller peak in migration during the second week of October. In addition to our normal sampling, we floy tagged and operculum punched a large number of coho. A total of 640 coho were tagged at the fence in 2001, approximately one out of every eight coho captured. Weekly spawner counts began October 11th and carried on until November 7th, and a total of five different counts were conducted on the spawning grounds.

We were able to estimate the total number of coho which were in Toboggan Creek by utilizing the weekly spawner counts. Spawning appeared to have started around October 1st, 2001 and peak spawn occurred during the third week of October. We also observed some spawning coho downstream of the counting fence and, as a result of counts done on the same dates as those upstream of the fence, we estimated that 562 coho spawned in this section of the creek. Of the adult counts conducted upstream of the fence a total of 5,904 coho were observed spawning, and of these there were 455 that were tagged. These proportions were somewhat different than those at time of marking (13.0:1 as compared to 8.3:1), and these data have been passed on to the DFO Stock Assessment Division. The total escapement upstream of the fence was 5,400 spawners. The complete spawner estimate, including broodstock removed at the fence by hatchery personnel and salmon spawning downstream of the counting fence, was 6,040 coho in the fall of 2001.

Approximately 31.4 % of the salmon handled at the fence were estimated to be coded-wire tagged hatchery returns from the 1998 brood Toboggan Creek smolt release group. This represents a total of 1,895 spawners returning from a release of 35,394 smolts, and a 5.4 % survival to spawn.

Bulkley River Fence

The Bulkley fence operated from August 21st until October 31st, 2001 and a total of 2,197 coho were sampled. This was not a total count, as the fence operation discourages fish entry and there is a displacement of spawners. The total coho run was estimated at 2,874 coho spawners in 2001, based on comparisons of Bulkley coded-wire tag abundances in the Alaskan catch and Toboggan Creek CWT's. Of the 2,197 spawners sampled a total of 1,424 coho were clipped hatchery fish, indicating that 65% of the upper Bulkley escapement in 2001 were hatchery-produced returns. Both the wild and the hatchery escapements were strong, indicating the success of the program.

Coho Hatchery Returns (1998 brood)

All of the upper Skeena waters were closed to the harvest of coho at the beginning of the 2001 season due to conservative management by DFO. When projections from Alaska in July indicated a strong return of Toboggan Creek coded-wire tags, based on good in-season catches in their commercial fisheries, the DFO managers opened up the fishery in the Bulkley River at the confluence of Toboggan Creek. This fishery opened on August 15th to retention of coho salmon.

A creel survey was carried out from mid August through to the end of September, 2001 at the Toboggan Creek confluence, with funding supplied by Fisheries and Oceans Canada. This study was contracted to J.O. Thomas this year, but data from this survey were not available at this writing (March, 2002). Based on Head Depot returns in 2001 a catch estimate was developed. There were a total of 36 heads turned in by anglers, and we estimated a participation rate of 65%, indicating a total harvest of 55 CWT's and 157 wild coho in 2001. Our most recent creel survey (Aug.-Oct., 2000) showed that total catch was approximately 2.8 times that of harvest, indicating a total catch of 154 CWT's and 440 wild coho last fall. Assuming a 5% mortality rate for coho released in this fishery the total mortalities as a combined result of harvest and catch and release would total approximately 230 coho in 2001, 60 coded-wire tagged fish and 170 wild coho. Anglers captured just under 9.5% of the Toboggan stock in 2001, and the total mortalities as a direct result of the angling opportunity this season comprised 3.7% of the available coho stock.

As a result of sampling done at the fence and on the spawning grounds we were able to collect 250 coho heads from marked adult spawners in Toboggan Creek during 2001, and of these 247 carried pins. Eighty seven heads were also taken from Bulkley coho and 82 of these carried pins, all were 1998 brood Bulkley CWT's. Results of the Toboggan Creek sampling were as follows :

# of Coho	Tag Code
69	18-36-34
84	18-36-35
77	18-36-36
3	No Pin

Of these 230 pinned heads, all were from 1998 brood coho salmon reared and released at the Toboggan Creek Hatchery site. There were, however, 7 more heads that were collected from Toboggan that were identified as Bulkley coho (all 1998 brood); and another 10 heads that were from a wild Toboggan smolt group marked in the spring of 2000. The portion of the marked escapement not attributable to the Toboggan Creek Hatchery smolt group was not included in any of the calculations of total escapement or survival for the 1998 brood hatchery release.

Exploitation of 1998 Brood Coho

With groups of coded-wire tagged coho returning to Toboggan Creek yearly, and having a fence installed on this stream, we are able to arrive at an accurate assessment of coho escapement during each year. As well, the coded-wire tag sampling of the B.C. commercial catch, Alaskan commercial catch, and the B.C. and Alaskan sport catch give an indication of exploitation rates by each group. The Native food fish catch has also been studied to some extent in the past.

Coho catch and escapement estimates have been provided and/or corroborated by the following agencies and groups:

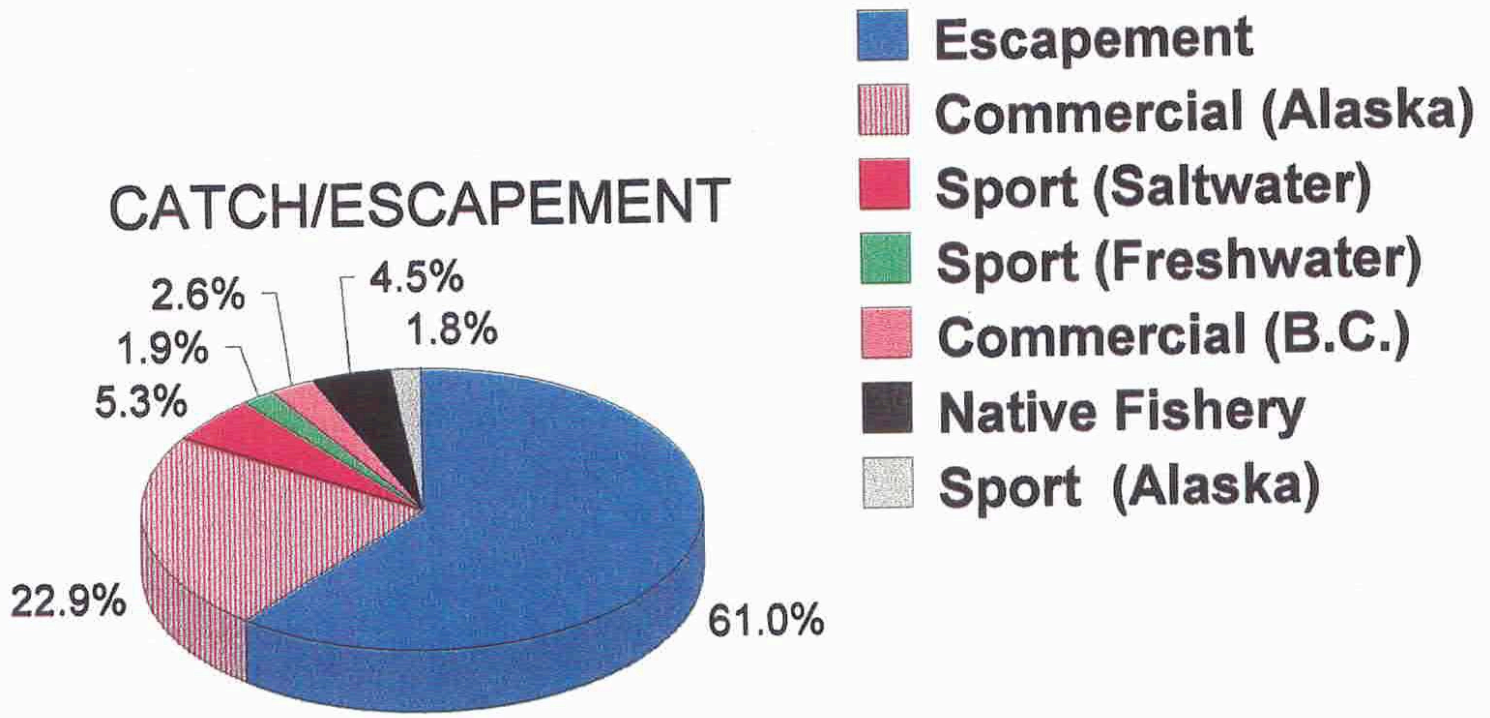
Escapement	-	Toboggan Hatchery
B.C. Commercial	-	Fisheries & Oceans Canada
Alaskan Commercial	-	Alaska Department of Fish and Game
B.C. Sport	-	Fisheries & Oceans Canada / Toboggan Hatchery
Alaskan Sport	-	Alaska Department of Fish and Game
Native Food	-	Fisheries & Oceans Canada / Toboggan Hatchery

Coho exploitation indicated by the data suggest that coded-wire tagged fish from the Toboggan Creek stock were harvested at a rate of approximately 39% in 2001 (Fig. 5). Commercial catches by Alaskan vessels were responsible for 59% of the mortalities, anglers in BC took 18%, BC commercial mortalities accounted for 7%, native food fishermen caught 12%, and Alaskan anglers took 4%. This is the fourth consecutive year at an exploitation rate of less than 40%. The coho spawning escapement to Toboggan Creek in 2001 represented 61% of the total adult stock.

Alaskan commercial fishermen caught many more coho than those that were landed by B.C. fishermen, this due to non-retention fisheries in Canada and total closures in some areas. These data indicate that Alaskan interests were responsible for 90% of the commercial mortalities in 2001. The breakdown of Alaskan catches by gear type was dominated by the troll fishery, which was responsible for 63% of their catch. The Alaskan purse seine and gillnet fisheries took 29%, while the sport fishery took approximately 8% of the total Alaskan catch in 2001.

Survivals of hatchery-produced coho smolts from this facility were well above average in 2001. Assuming the catch rates are accurate we saw smolt to adult survivals of just under 9% for the 1998 brood, with about 3,108 adult coho produced from a release of 35,394 Toboggan Creek smolts. These survival rates are the second highest out of the last thirteen years of data, and indicate continued strength in ocean productivity. This is graphically different from the 1997 return where we saw smolt to adult survivals of only 0.5%. Along with the higher exploitation rates evidenced back in 1997 we saw only 73 coded-wire tags back to the creek that year, as compared to a return in 2001 of 1,895 adult hatchery spawners from the Toboggan Creek stock.

Fig. 5. Catch of Toboggan CWT Coho (2001)



Administration Report

This section covers hours spent from August 1, 2001 through to March 31, 2002. The 2001/2002 report represents the first reporting year since a shift from the July 31st operational year end.

The following is a breakdown of hours spent carrying out the contract in 2001/2002 :

Activity	Man-hours
Project Management	360.0
Facility Operations	1782.0
Broodstock Collection	290.0
Assessment	770.0
Coho Fence	822.0
Statutory Holidays	168.0
Total Hours in 2001/02	4,192.0

The contract went quite well again in 2001/2002 and our hours of work spent in most categories were generally consistent with other years. Due to the change in year ends, and the fact that this report only covers eight months of operations, it is difficult to compare with last year's report. Hours spent completing broodstock collection were down due to cancellation of the chinook egg take in 2001, while coho counting fence hours were up due to the large coho spawner return.

Total employment generated by the hatchery in 2001/2002 added up to 130 full work-weeks, employing 12 different people for varying lengths of time during the eight month period. These last figures include separate contracts we have undertaken via the provincially-funded Fisheries Renewal BC initiative and the federally-funded Strategic Stock Enhancement program.

Labour costs were close to what was budgetted for in the contract period but, as was the case last year, this was only achieved by being able to utilize lower wage rates for many hatchery operations. Without taking on extra contracts such as the Toboggan Creek steelhead fence count we would have run a deficit. Overall costs charged to the contract in 2001/2002 were about $2,000.00 over the $101,000.00 budgetted, and this was due to the Society assuming the costs for the lease of the counting fence site.

Development and Maintenance of the Facility

In addition to general maintenance carried out as part of the contract requirement we also were involved in the following activities as well :

i) The settling pond was flushed again to remove the sand that accumulates at the end of the inflow pipe. This has become an annual maintenance procedure and we try to remove the buildup before it becomes a problem. This was done in the late fall period.

ii) The land surrounding the brook was revegetated with grass and willows to provide some more stabilization to the banks and shade for juvenile and adult salmonids that utilize this stream. This brook was cleared and channelized back in the late 1980's.

iii) We recharged the spawning platform on Kathlyn Creek with spawning rock. This area was developed years ago but the gravel had washed away over time. This clean rock will benefit coho salmon, pink salmon and steelhead trout that utilize the creek.

Operating Plan for 2002/2003

As in previous years we will begin releasing the chinook and coho smolts in April and May. The 2000 brood Bulkley chinook will be the first to go in mid to late April, followed later by the 2000 brood coho stocks which are to be released in May and June. The Bulkley coho stock has two CWT groups this year that will be differentially released to compare survivals of a late May release to a mid June release. As in past years we will enumerate all salmon smolts while they are being loaded into the transport tanks. We will be taking close to 88,000 salmon smolts to the Bulkley River and more than 34,000 smolts will go into the Toboggan Creek system. There will be no coho smolts transplanted into the Kathlyn Creek watershed in 2002.

The chinook target was cancelled for 2001 due to a huge return of spawners to the system last fall. Egg takes may occur in 2002 if escapements return to lower levels. We plan to continue with assessment of chinook returns whether or not egg takes occur. This year will be our eleventh year of assessment of CWT and total chinook returns to the upper Bulkley River.

Coho egg targets will be lowered from last year's levels and 80,000 eggs will be targetted in 2002, with the Bulkley River target at 40,000 eggs and Toboggan Creek at 40,000. No extra coho eggs will be taken for transplant into Kathlyn Creek. The Toboggan Creek coho will be reared to smolt size, 12.0 to 15.0 grams, and released in the spring of 2004. The strategy for the Bulkley coho may be for a smolt or a fry release, and will be decided by DFO staff after reviewing results from the previous year's survival success of the different smolt and fry tag groups.

We will continue with our assessment activities with the coho counting fence on Toboggan Creek and we will install the fence panels in early August this year, in an attempt to get a total count on coho salmon. We will again do a mark and recapture study to back up fence counts for coho.

We intend on continuing with enumeration of steelhead trout spawners into Toboggan Creek in the spring of 2002. This will be our tenth consecutive year of assessing the steelhead return to Toboggan Creek. Steelhead have been tagged at Moricetown in recent years, indicating for the past four years this stock has made up less than 1% of the Bulkley-Morice steelhead escapement.

As well, we will attempt to keep the public in this area well informed of our activities, goals and accomplishments in the area of fish culture on the Bulkley/Morice system. We are open to public tours year round and we encourage people to come out and view the facility, see the successes of the Society, and learn more about the salmon resource in the Bulkley Valley.

Recommendations

As in previous years, we have had a very successful year, and our survivals and fish quality were excellent. There are some areas where I believe changes can be made that will be beneficial to our operation, the public, and the salmon resource :

i) Predation of our salmon smolts in the outdoor rearing channel is a problem in some years, usually during March and April. A predator fence along the back of the rearing channel may help to alleviate this. Otter are the main problem but mink and mergansers can be a concern as well.

ii) Assessment of returning coded-wire tagged chinook would be greatly improved if we could get more accurate data from the Moricetown Native fishery in the summer season. Each year thousands of chinook are landed by the Native fishermen at Moricetown Falls, on the Bulkley River. In previous years there have been few clipped hatchery chinook turned in from the Moricetown Fishery. A coordinated assessment program would provide an abundance of relevant information on stock timing and survival. We have noticed an improvement in harvesting methods and reporting in the past few years, and the people of the community have taken a real interest in learning more about salmon escapements.

iii) Egg targets and fry densities over the past year were reasonable, and this was reflected in the survival and the quality of the fish produced. The stress effects noticed in 1999/2000 were not evident this year. These levels should be maintained.

iv) Measures were taken in the past four years to reduce coho exploitation and allow more spawners to reach the freshwater tributaries. Coho returns to many tributaries have shown up much stronger recently and returns to Toboggan Creek were good. Each year more opportunities have been given for coho harvest, especially in the ocean where large numbers of coho were harvested in the saltwater sportfishery in 2001. Despite this, few if any CWT heads have been turned in by anglers and lodges participating in this fishery. Conversely, in freshwater very limited opportunities have been made available but anglers have shown strong participation in the CWT head recovery program. As well, losses of coho through catch and release mortalities in all saltwater fisheries do not seem to be accounted for. This scenerio does not bode well for understanding the limiting factors affecting coho returns in the future. It would be of great benefit to improve the head recovery program for sport-caught salmon on the Northcoast in 2002, as well as encouraging retention of badly damaged fish caught by anglers and commercial fishermen. Otherwise, these salmon will not show up in the catch or the escapement.

Due to the change in contract reporting this year, with two reports completed in a span of three months, all recommendations are the same as last years. They are still the most important things that affect our longterm success, and will provide benefits to the resource and our communities.

Since this facility was constructed, and since the Toboggan Creek Salmon and Steelhead Enhancement Society took on the task of operating the hatchery, we have successfully reared and released over 3,618,000 salmon and steelhead smolts and fry. We continue to see good returns of hatchery-produced salmon to the Bulkley River and Toboggan Creek systems. The coho counting fence which we operate on Toboggan Creek is allowing for a better understanding of coho smolt to spawning survivals on interior systems in Northwestern B.C. As a result of the previous coded-wire tag recoveries from the commercial operations from B.C. and Alaska it is now quite evident at what rate these coho stocks were being exploited. Catch reductions have been initiated in recent years as a result of this documentation of the very high exploitation rates.

Our Society is very appreciative for the opportunity to be part of the Salmon Enhancement Program in northwestern B.C. We also appreciate the support we receive on a yearly basis from various people from the Community Involvement Division, the Resource Restoration Unit and many other factions of the Salmonid Enhancement Program and the Department of Fisheries and Oceans. Also, financial support from DFO, and other various initiatives, has allowed us to continue and expand our salmon enhancement and assessment operations in the past few years.

Our greatest support still comes from the general public. We continue to receive encouragement from the many people that stop by the hatchery to learn about the salmon resource, and we in turn attempt to raise awareness of the resource during the many tours we give each year. Going into our seventeenth season of operation we continue to get a wide range of students, both past and present, who express a sincere gratitude for the SEP and CEDP initiatives. They have been exposed to the needs and requirements of salmon stocks, and are now strong advocates for conservation, habitat protection and enhancement. This is a very rewarding aspect of SEP.

We continue to look forward to our involvement with the program in the future.