ANNUAL REPORT FOR TOBOGGAN CREEK HATCHERY OPERATIONS IN 2003/2004

Prepared for : **Fisheries and Oceans Canada**

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JUNE, 2004

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Contract # : F1678-1-0002

Financial Code : 5G600-440-120-4107-50302

Contract Period : April 1, 2003 - March 31, 2004

Introduction

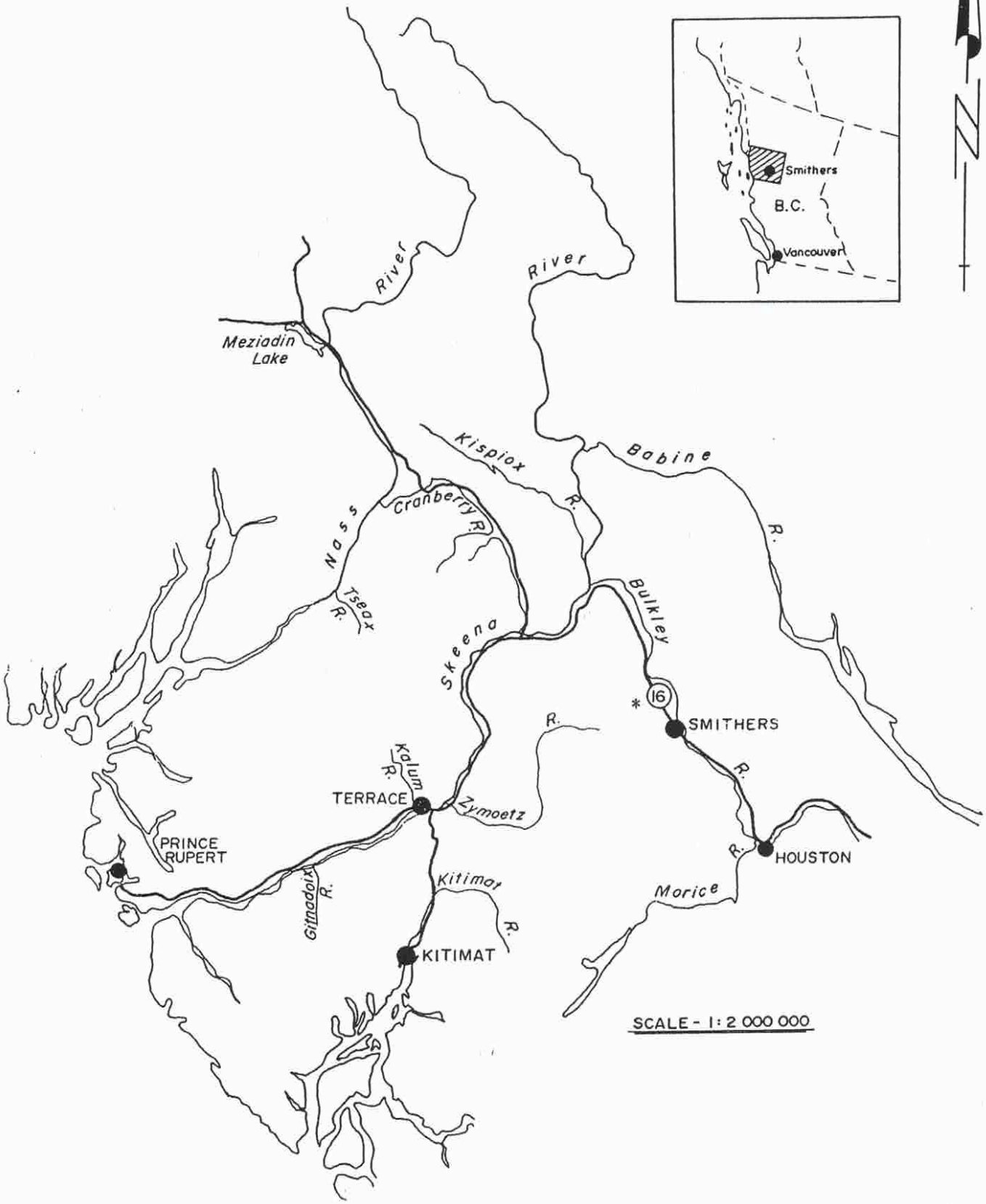
The Toboggan Creek Salmon Hatchery, under the direction of the Toboggan Creek Salmon and Steelhead Enhancement Society, has just completed its nineteenth year of successful operations. The Toboggan Creek Hatchery facility is located thirteen kilometers north-northwest of Smithers, British Columbia, on 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 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 stocks of both of the aforementioned salmon species. During the 2003/04 contract period our Society reared and released some 62,000 coho salmon smolts from the 2001 brood year, as well as 19,000 coho fry from the 2002 brood year. Successful rearing of another 67,000 coho and 57,000 chinook from the 2002 brood continues, with these salmon being reared through to smolt for release in the spring of 2004. We did not release any chinook smolts in 2003/04 as no eggs were taken in 2001, due to a record chinook escapement of 5,600 adult spawners.

Egg takes for the 2003 brood chinook from the upper Bulkley River went very well, and at present we have 61,000 chinook alevins incubating at the hatchery. Chinook spawning escapements to the upper Bulkley were reasonably strong this year, with 1,280 chinook adults estimated in 2003. The wild component of the chinook escapement was very good at 55 %.

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



Coho returns to the upper Skeena tributaries in 2003 were generally strong. The Toboggan Creek escapement in 2003 was 5,560 coho, representing our fifth consecutive large return. Escapements to the upper Bulkley River system were very strong with close to 5,400 coho estimated in 2003, and represents the third consecutive year of good returns. While the Bulkley return was high the fence captured less than 35% of the run. Our target of 40,000 Bulkley River coho eggs was attained from broodstock collected at the fence, which was funded and operated by DFO. Egg collection on Toboggan also went well, and the 40,000 target was easily achieved.

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 %, over 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 20th this year. This enabled an accurate assessment of our fifteenth major return of hatchery-produced coho to Toboggan Creek. The fence data indicated Toboggan hatchery returns of 1,222 coded-wire tagged coho in 2003, and from a release of 34,333 smolts this is a 3.6% return. The 2003 return is the third best on record, and continues the trend away from the very poor 1997 return of only 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 1,952 coho from the release, and at a 5.7% survival rate this is a somewhat above average. The rate of exploitation on the Toboggan CWT's was about 38% in 2003, with the Alaskan catch accounting for about 57% of the total. Previous exploitation rates, prior to 1998, have ranged from 55% to well over 70%.

Around 24.8 % of Toboggan coho handled in 2003 were adipose-clipped salmon, and we estimate the makeup of the stock was approximately the same. Marked coho in this return year were all hatchery coho, as 2002 was the last year of wild CWT returns to Toboggan Creek. Approximately 11% of the CWT's sampled in 2003 were identified as stray coho from the Bulkley River stock. As a result, it is estimated that hatchery coho from the Toboggan stock made up 89% of the marked return. Total estimates of Toboggan Creek coho escapement, exploitation and survival have been adjusted to reflect this.

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 (2003/04)

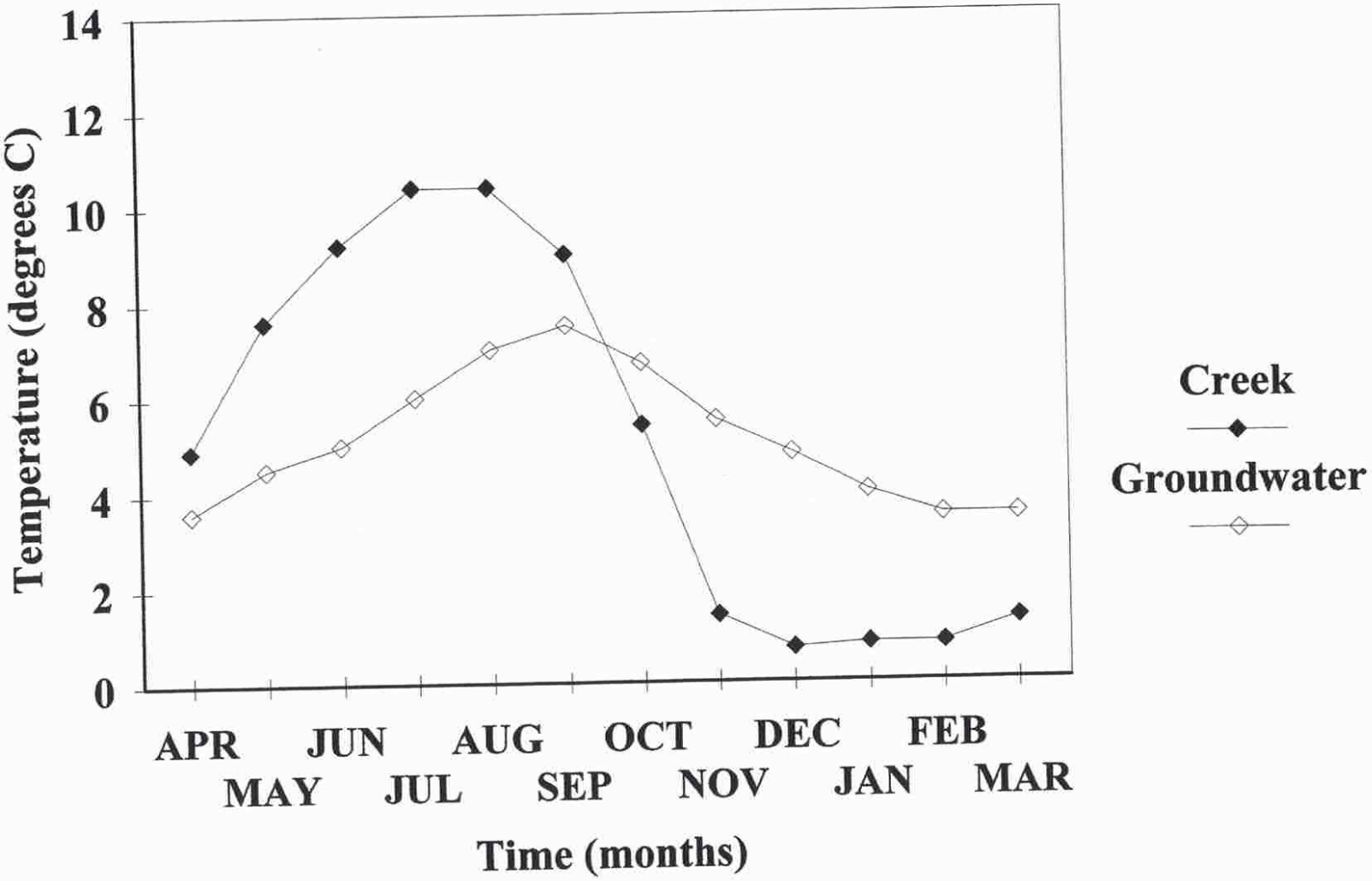
As for the previous years, the average daily temperatures of the three hatchery water sources were recorded and average weekly temperatures have been calculated. We depend on two of the water sources for egg incubation and fish rearing, ground water from an underground collection system and surface water 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 water temperatures in 2003/04 were fairly similar to those of past years. The creek temperatures increased more rapidly in the spring this year, as compared to last year. Average temperatures in the summer period were similar to most years, while fall 2003 creek temperatures were slightly below normal (Fig. 2). On average, the creek supply fluctuates in between 0.5 and 15.0 degrees and the ground supply from 3.0 to 8.0 degrees Celsius on a yearly cycle.

Water levels and flows were relatively stable during the summer and fall of 2003, and there were no extreme water events. The levels of this year followed the pattern of other years fairly closely, although they were generally lower through the late fall and early winter period due to cool temperatures and a lack of precipitation. Winter flows were quite low through this period and dewatering of coho salmon redds may have been a factor in 2003/04. Coho fry production should still be relatively good as a result of extensive spawning throughout the watershed. Flows during the steelhead spawning period, early May through June, were quite stable in the spring of 2003 which would have improved survival from the egg stage to the swim-up fry stage of this species. Many steelhead adults and fry were observed in Toboggan Creek this past spring, summer and fall. Freshwater production of steelhead in 2003/04 should have been excellent, as usual.

Fig. 2 Temperatures at Toboggan Creek Hatchery (2003/04)



TOBOGGAN CREEK HATCHERY - SALMON BROOD YEAR SUMMARIES

Bulkley River Chinook (2001 brood)

The 2001 return of chinook was the strongest we have seen since enhancement of this stock began in 1985. Over 5,500 adult chinook returned to spawn, and they were very well distributed throughout the Bulkley River system.

As a result of this strong return, which was predominated by wild fish produced from hatchery spawners that returned in 1996, it was decided by DFO to cancel the chinook egg take in 2001. There were no smolts released in the spring of 2003 due to this strong adult spawner return.

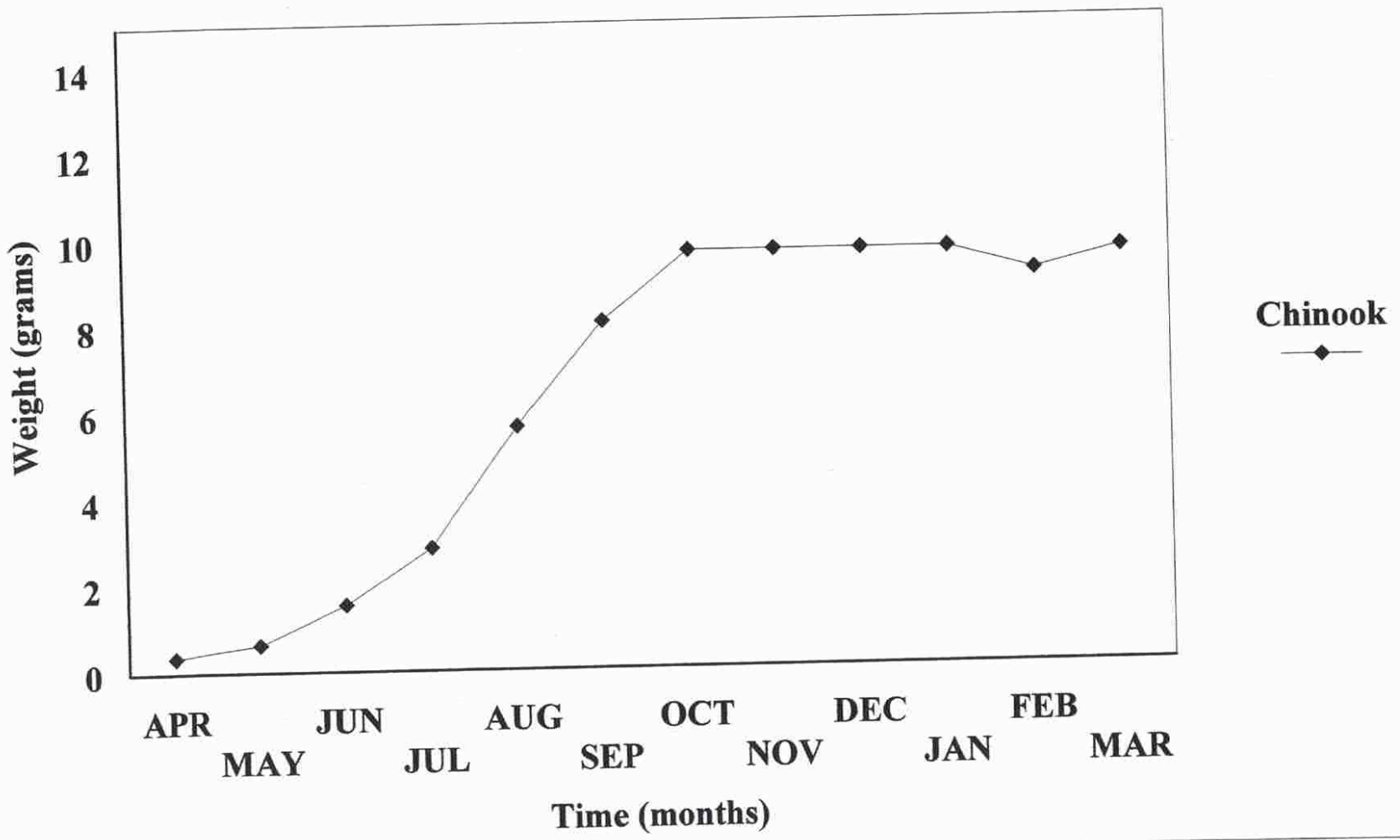
Bulkley River Chinook (2002 brood)

Ponding of the 2002 brood Bulkley River chinook fry commenced on April 7th and was completed by April 22nd, 2003. These 0.40 gram fry were ponded in one Capilano trough and feeding was initiated with #1 Ewos starter. Due to a problem, experienced province-wide with Ewos feed last spring, it became necessary to switch to Skretting feed shortly after ponding. The chinook got on the new feed quickly and very little pinheading was found. A total of 57,300 salmon fry were ponded and initial survivals were excellent. Green egg to ponding survivals were over 95.0 %

Growth of the 2002 brood Bulkley River chinook fry increased rapidly, commencing in mid April, in conjunction with warming water temperatures and these fish continued to grow at a healthy pace through the summer period (Fig. 3). The rate of growth in 2003/04 was similar to past years but dropped off dramatically during the winter period as a result of prolonged cold temperatures and ice cover on the outdoor channel, which prevented feeding for close to 5 months. At the present time these Bulkley River chinook smolts average 9.6 grams in weight, and we hope to have them at 10.5 to 11.0 grams prior to release in late April of 2004.

These chinook fry were split into 2 Capilano troughs in early May and there densities were reduced again in early June, when they were transferred to one of the large indoor troughs. We did not experience any serious problems during the initial indoor rearing of the 2002 brood chinook. Densities just prior to tagging were reduced by transferring some of the chinook to two of our outdoor circular tubs, when the indoor loadings reached 20.0 kilograms per cubic meter.

Fig. 3 Growth of 2002 Brood Chinook Salmon in 2003/04.



Coded-wire tagging occurred between August 14th and 16th, 2003. All of these tagged chinook fry were transferred to compartment "A" of the outdoor rearing channel immediately after tagging. Survivals during tagging were excellent as usual and a total of 56,745 chinook were marked.

Tag Code	# Tagged
18-48-07	28,373
18-48-08	28,372
Total Tagged	56,745

Survivals since ponding have been excellent and presently are over 98.5 %, green egg to release survivals may exceed 93.0 %. At present we have over 56,500 Bulkley River chinook remaining.

Bulkley River Chinook (2003 brood)

Broodstock collection for the 2003 brood Bulkley chinook began on August 19, 2003 and by August 26th we had attained our target of 60,000 eggs. A total of 19 female and 59 male chinook had eggs or sperm collected from them, all of the males were then released back into the river after use. Eggs were transported unfertilized back to the hatchery and each female's eggs were then fertilized using sperm from 8 different males. Prior to incubation all eggs were rinsed, water hardened, disinfected and screened.

Chinook assessment was carried out, in conjunction with these egg takes, including a helicopter count of salmon spawners on August 19, 2003. A total of 1,020 chinook were observed between the Morice River junction and the Bulkley Falls, with over 79 % occupying the section of river from Richfield Creek downstream to Knockholt. The salmon were well spread out through most of the river in this section. We sampled a total of 266 different chinook during our broodstock collection and assessment activities, and we also had 6 additional chinook recaptures identified by operculum punches. The overall composition of the sample this year was 55% wild and 45% adipose clips.

Assessment done during broodstock collection also allowed us to collect 56 heads from adipose-clipped chinook for coded-wire tag identification, and these were all taken from spawned-out fish.

Results of the helicopter count were as follows :

	Aug. 19th
Above Bulkley Falls	not flown
Meanwhile Creek	51 chinook
Topley	37 chinook
Richfield Creek	34 chinook
Perow Station	213 chinook
McQuarrie Creek	69 chinook
Below McQuarrie Creek	445 chinook
Below Knockholt	1 chinook
Houston	170 chinook
in Buck Creek	not flown
Total observed / flight	1,020 chinook

Visibility during the assessment flight was very good in most sections. Chinook that were actively spawning were clearly visible, with the exception of the Richfield section where the forest overstory is more prevalent. As in previous years, we did a comparative ground count in the vicinity of McQuarrie Creek and Richfield Creek to verify the accuracy of the aerial count.

From these observations, and incorporating the ground count carried out during the same period, it is estimated that the chinook escapement to the upper Bulkley River in 2003 was approximately 1,280 adults (four to six year old chinook). We observed only a few three year old jacks during broodstock collection and, as was the case in 2002, we sampled some very large fish for this system. The four-year old component of the run did not appear to be anywhere near as strong this year, and the wild adult escapement was dominated by five year olds in 2003. Looking at the aging information done at the head dissection lab, it appears that the five year old age class also dominated the hatchery escapement. The ages of the CWT escapement heads sampled were 90% five year olds, 8% four year olds, and with six year olds at 2%. The sport catch results were also dominated by five-year olds. Of 30 Bulkley River sport-caught heads decoded in 2003 there was one 3-year old (3%), two 4-year olds (7%), and twenty seven 5-olds (90%).

The condition of spawning chinook was very good again this year, and few pre-spawn mortalities were seen. Egg quality was very good as well, and the river was quite cool despite fairly low flows. Slightly over 50 % of the chinook captured this year were males, with many being very large fish. The average length (POH) of the brood females collected in 2003 was 667 m.m. and the average weight was 5.7 kilograms, they ranged from 620 m.m. to 750 m.m. in length.

Shocking and picking of the 2003 brood Bulkley River chinook eggs was completed in late September at 280.0 A.T.U.'s. All of the surviving chinook eggs were moved to heath trays after this event, and prior to the beginning of the hatch. Overall survivals to eyed stage were excellent and averaged 95.0 % in 2003 (Table I). Volume estimates done at eyed stage verified our spawning estimate of close to 60,000 eggs collected from the Bulkley River chinook stock. Hatching of these eggs peaked at 560.0 A.T.U.'s this year, and survivals since hatch have been very good. Presently we have approximately 61,000 chinook alevins still incubating.

Development of the 2003 brood chinook eggs was slowed down in the incubators to aim at a later ponding date, as has been done in previous years. This was done in an effort to reduce the stress from ponding in cold water. At this time it appears ponding will occur in mid to late April.

Table I. Shocking and Picking Summary for the 2003 Brood Bulkley River Chinook Eggs Incubating at the Toboggan Creek Salmon Hatchery.

Tray #	Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival(%)
M1-2	3	231	996	136(2.72)	4,120	10,213(89.3)
M1-3	3	25	157	128(2.56)	3,520	8,858(98.0)
M1-4	2	149	343	121(2.42)	2,780	6,388(92.8)
M1-5	3	16	214	127(2.54)	3,120	7,700(97.1)
M1-6	3	14	627	101(2.02)	3,290	6,019(90.4)
M2-4	1	11	49	119(2.38)	1,870	4,400(98.7)
M2-5	2	28	197	129(2.58)	3,210	8,085(97.3)
M2-6	2	25	177	129(2.58)	3,920	9,938(98.0)
Totals	19	499(0.8%)	2,760(4.2%)	125(2.50)	25,830	61,601(95.0)

Chinook Hatchery Returns (1997, 1998, 1999 and 2000 broods)

Marked hatchery returns made up close to 45 % of the adult chinook escapement (four to six year olds) to the upper Bulkley River this year, an estimated 576 finclipped hatchery chinook adults and 704 unclipped wild salmon returned to this system in 2003. There were very few three-year old jacks observed in the escapement last year.

These escapement estimates were determined as a result of the intensive assessment carried out by hatchery staff in 2003, 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 1,020 chinook in the upper Bulkley River system.

A total of 266 different chinook were randomly sampled during and after broodstock collection by hatchery staff, the sample represented close to 21 % of the total estimated escapement. As a result of this sampling it was found that 45 % of these chinook spawners were of hatchery origin. All of the clipped salmon observed in 2003 were adipose clipped coded-wire tags, none of the chinook sampled were ventral clipped. Adipose-clipped chinook were sampled for heads and pins and 56 chinook heads were collected, of these 53 of them carried pins.

# of Chinook	Tag Code	Brood Year
1	18-32-28	1997
48	18-32-44/45/46	1998
4	18-44-41/42	1999

These coded-wire tag data indicate that escapements of marked adult chinook to the upper Bulkley in 2003 were predominantly 5-year old fish, making up 90.5% of the adipose-clipped returns. Four-year old fish made up 7.6%, while six-year olds accounted for 1.9%.

Based on this year's data, it appears that we had over 520 adult salmon return from adipose-clipped releases of the 1998 brood chinook smolts. This adipose-clipped return represents smolt to spawner survivals of 0.73% for the 5-year old age class of the 1998 brood release. When combined with the four-year olds from the same brood year, which returned in 2002, the total survival to spawn is 1.04% for the 1998 brood smolts. These are fairly good survivals when it is recognized that this stock also contributes substantially to freshwater food and sport fisheries.

Toboggan Creek Coho (2001 brood)

Survivals were excellent during April and May of 2003, prior to this stock's release. A total of 34,234 coded-wire tagged smolts were released during the spring of 2003, the screens were pulled on May 13th and all of these 13.0 gram smolts had migrated out by June 15th. Growth of this stock of coho was very good from April 1st until release, increasing from 9.2 to 13.0 grams.

Observations of smolts leaving the channel outflow in the evenings indicated peak movements during the last week of May. These coho were in very good condition at time of release and were showing visible signs of smolting prior to the peak migration. Fry surplus to this group were released at a size of 9.7 grams on October 30, 2002 into Kathlyn Lake, they were unclipped.

Bulkley River Coho (2001 brood)

Releases of coho smolts from this stock commenced on May 20th and were completed on May 23rd. These releases in 2003 were delayed as per advice from DFO biologists. All of these coho were transported to the groundwater area along Highway 16 and released there. These smolts were exhibiting obvious signs of smolting prior to release.

Growth of this stock of coho accelerated in April and May, with the increasing water temperatures, and they went from 7.6 grams up to 9.8 grams in this two month period. The fry group from this same brood year was released during early October of 2002, as 6.1 gram coded-wire tags. They were released by truck and by helicopter into Buck Creek.

Toboggan Creek Coho (2002 brood)

Ponding of the 2002 brood Toboggan coho was completed by May 26th, 2003. Growth of these coho increased rapidly in the summer and fall of 2003, from 0.9 grams near the end of June up to 8.3 grams by the end of October (Fig. 4). This growth dropped right off during the winter period, from November through March. As the ice has now melted off of the outdoor channel we are able to feed again, and we expect growth to accelerate.

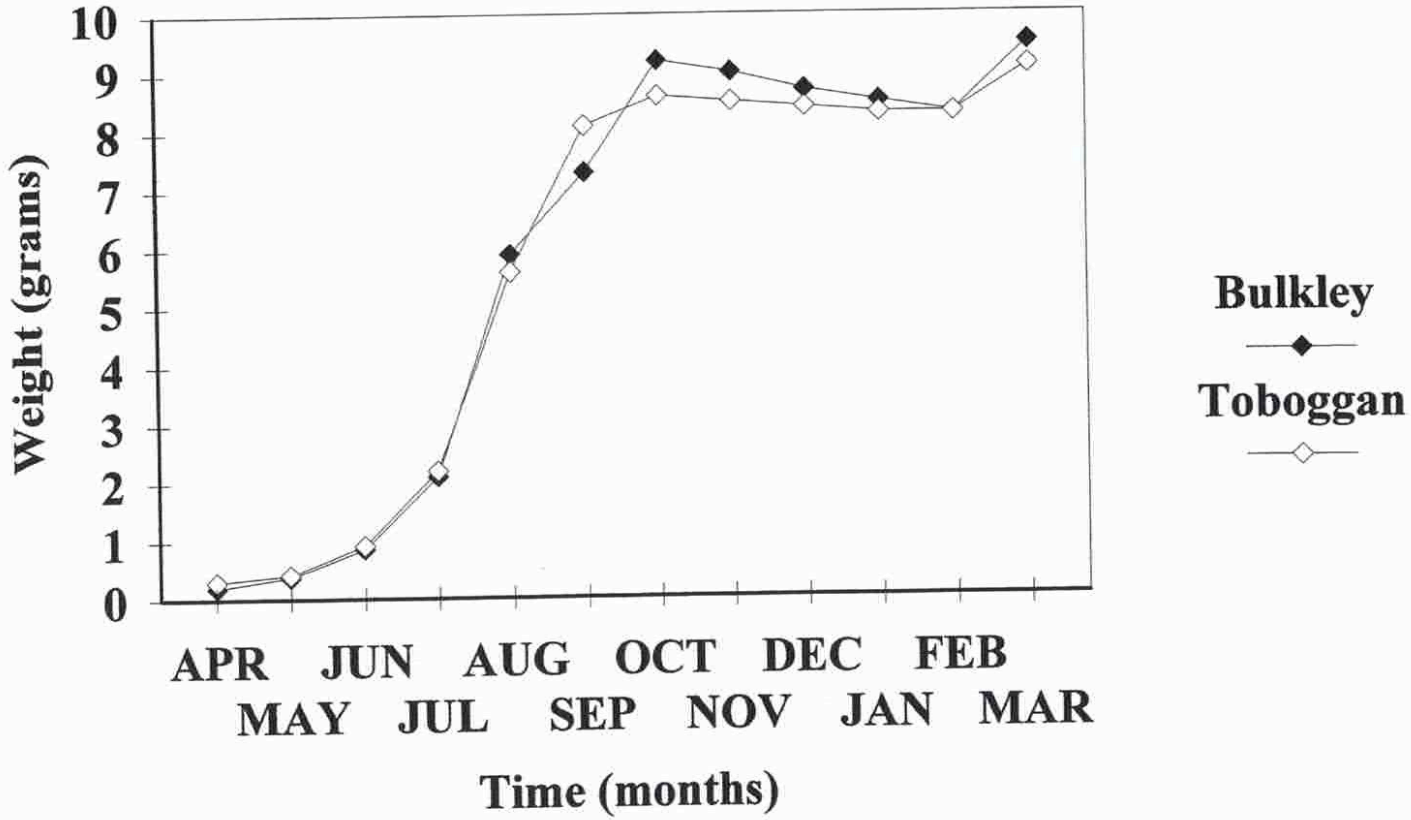
These coho fry were split into 2 Capilano troughs in early June and split again into four troughs in mid July. Some of these coho had to be moved to the outdoor rearing tanks prior to coded-wire tagging due to the late tagging dates for this stock in 2003. Overall health of this stock was excellent throughout the rearing cycle, and survivals from fry ponding in May, 2003 to smolt size in late March, 2004 were over 98 %. These are above normal survival rates for this coho stock.

Coded-wire tagging of this stock was completed August 16th through 18th, 2003. A total of 34,260 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 8,080 unclipped coho were released. These fry were released at 6.0 grams in weight on September 4th.

Tag Code	# Tagged
08-03-34	11,538
08-03-35	11,423
08-03-36	11,299
Total Tagged	34,260

Survivals were excellent after tagging and through the winter period and we expect to release 34,000 Toboggan Creek coho smolts in the spring. We plan on pulling the channel screens on or about May 1st, 2004 after the Bulkley River chinook smolts rearing downstream of them are released. The coho smolts will then be able to migrate out on their own timing.

Fig. 4 Growth of 2002 Brood Coho Salmon in 2003/04.



Bulkley River Coho (2002 brood)

Ponding of the 2002 brood Bulkley coho fry was completed by May 21st, 2003 and, as with the Toboggan stock, growth of these salmon accelerated throughout the summer and fall periods. They went from 0.9 grams near the end of June up to 9.2 grams by the end of October (Fig. 4). This very rapid growth came to a halt in the months from November through March when feeding was not possible due to ice cover on the rearing channel.

These coho fry were split into three Capilano troughs in mid June, and split again into the four large troughs in July to reduce densities. In August, 2003 the Bulkley coho were divided into five troughs, where they remained until tagging. Overall health of the stock was excellent this year and survivals from fry ponding in May, 2003 to smolt size in late March, 2004 were over 98 %, similar to the Toboggan stock. These are also above normal survival rates for this coho stock

Coded-wire tagging of this stock was completed on August 18th and 19th, 2003. A total of 32,822 coho fry were tagged and adipose clipped as two seperate and equal smolt release groups. The remaining Bulkley River coho surplus to the smolt group were adipose clipped and coded-wire tagged for a fed-fry release, a total of 11,156 surplus fry were tagged. The smolt groups were moved to the outdoor channel, while the fry group was kept inside until release. The releases for the coded-wire tagged Bulkley fry were completed on September 3nd, 2003. They were transported by truck and released into Bulkley Lake.

Tag Code	# Tagged
08-11-14	11,156
08-03-31	11,187
08-03-38	5,205
08-03-32	11,378
08-03-39	5,052
Total Tagged	43,978

Survivals after coded-wire tagging were good. We expect to release 32,500 Bulkley smolts, which will represent a tagging to release survival rate of over 99% for the 2002 brood. The smolts, which will be transported by tank truck for release, now average 9.6 grams in weight.

Toboggan Creek Coho (2003 brood)

Most of the 2003 brood coho eggs collected from Toboggan Creek this fall were taken from adult coho intercepted at our fence operation. A total of 85 coho were collected and transported back to the hatchery for egg take purposes. We conducted three egg takes between October 8th and October 28th, 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 14 ripe female coho and sperm was taken from 64 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. Kidney samples were taken from the female broodstock and sent to the Pacific Biological Station for analysis, and one female's eggs were destroyed as a result of a positive sample. Scales, weights and lengths were also taken from all of the brood females. Average weight was 3.7 kgs, while overall the average length was 560 mm. The scales from the brood females were sent to the DFO scale lab for analysis and, of the 14 scale samples read, 36% were aged at 4 years old and 64% were aged at 3 years old. Of 94 readable samples out of the total sample of 100 sent to the lab from the 2003 return we saw an age structure of 76% three-year olds and 24% four-year olds.

Shocking and picking of the 2003 brood Toboggan Creek coho eggs began on December 22nd, 2003 and was completed on February 12th, 2004. The coho egg survivals to this stage were excellent (97.7%), and a total of 41,940 eggs survived (Table II). Fecundity of the Toboggan coho averaged 3,300 eggs per female in 2003, as compared to 3,170 in 2002 and 3,330 in 2001.

As in some previous years, a few eyed coho eggs were transferred to local P.I.P. school projects in late 2003. The remaining eggs began hatching at 350.0 A.T.U.'s and peak hatch occurred at 410.0 thermal units. The survivals during hatch were excellent, and ponding of this stock will likely occur in early to mid May of 2004.

Coho from these egg takes will be reared at the hatchery to a size of 14.0 to 16.0 grams and released as smolts in May of 2005. Up to 34,000 of these fish will be released into Toboggan Creek, as coded-wire tagged coho smolts, and any remaining surplus coho fry will be transplanted into the Canyon Creek drainage after tagging is completed. The c.w.t. tagging crew is scheduled to show up in early August to tag and clip the 2003 brood coho stocks on hand.

Survivals of our Toboggan coho since hatch have been excellent and they continue to appear very healthy. We presently have over 41,800 coho alevins from this stock incubating at the hatchery.

Table II. Shocking and Picking Summary for the 2003 Brood Toboggan Creek Coho Eggs Incubating at the Toboggan Creek Salmon Hatchery.

Tray #	Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival(%)
M1-3	1	29	176	175(3.50)	1,070	3,565(94.6)
M1-4	3	43	268	187(3.74)	2,920	10,649(97.2)
M1-5	3	21	245	153(3.06)	3,090	9,214(97.0)
M2-3	2	5	24	177(3.54)	1,910	6,741(99.6)
M2-4	1	22	51	203(4.06)	780	3,117(97.7)
M2-5	3	24	72	158(3.16)	2,760	8,654(98.9)
Totals	13	144(0.3%)	836(2.0%)	170(3.40)	12,530	41,940(97.7)

Bulkley River Coho (2003 brood)

A total of 56 adult coho salmon (24 females/32 males) were collected in the Bulkley River during September of 2003. All of these fish were taken at the Bulkley River counting fence, which was funded and operated by Fisheries and Oceans Canada. All of these salmon were transported back to the Toboggan Creek Hatchery and were held until ripe in covered Capilano troughs and outdoor rearing tubs. Unlike the Toboggan Creek coho, the fish collected at the Bulkley fence were tight and had to be held for 3 to 4 weeks before we were able to take eggs. A total of 1,799 coho were captured at the fence this year, which represented only 30% of the stock, and the total estimated escapement to the Bulkley River in 2003 was close to 5,800 coho.

Eggs were taken from a total of 16 ripe female coho and sperm was taken from 32 males in 2003. The first coho broodstock were collected on September 15th , we took our first eggs on October 2nd and we completed our final egg take on October 16th, 2003. 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 3.0 kgs overall and the average length was 545 mm. Of the 10 scale samples sent in from the wild female broodstock there were five 3-year old coho and five 4-year olds. This was similar to the overall age breakdown of the Bulkley stock in 2003 where, out of 27 readable samples, 48% were 3-year olds and 52% were 4-year olds.

Shocking and picking of the 2003 brood Bulkley River coho eggs began on December 3rd, 2003 and the last batch was done on January 22nd, 2004. Egg survivals to this stage were good (96.7%) and a total of 46,780 eggs survived (Table III). Fecundity of the Bulkley coho averaged 3,020 eggs per female in 2003, up from the 2,840 eggs of 2002, and slightly lower than the 3,080 in 2001. All of the female coho used for broodstock in 2003 tested negative for BKD.

Hatching of these coho eggs began at 365.0 A.T.U.'s with peak hatch occurring at 408.0 thermal units. Survivals of the Bulkley coho eggs during hatch were excellent, and we expect to begin ponding coho fry from this stock in early to mid May.

Coho from these egg takes will be reared at the hatchery to a size of 11.0 to 12.0 grams and released as smolts in May of 2005. Up to 34,000 of these fish will be released into the Upper Bulkley River, as coded-wire tagged coho smolts, and any remaining surplus coho fry will be released into Bulkley Lake in the fall of 2004 after tagging is completed.

Survivals of the Bulkley coho since hatch have been excellent and they continue to look quite healthy. We presently have over 46,600 coho alevins from this stock incubating at the hatchery.

Table III. Shocking and Picking Summary for the 2003 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	3	51	276	185(3.70)	2,400	8,603(96.3)
M1-2	4	47	340	204(4.08)	2,490	9,823(96.2)
M1-6	4	116	545	238(4.76)	2,740	12,379(94.9)
M2-4	1	7	22	267(5.34)	830	4,411(99.3)
M2-6	4	28	158	205(4.10)	2,860	11,564(98.4)
Totals	16	249(0.5%)	1,341(2.8%)	213(4.26)	11,320	46,780(96.7)

Assessment of Coho Escapement in 2003

Toboggan Creek Fence

The Toboggan Creek coho counting fence commenced operation on August 20th, 2003. The fence was monitored a least twice daily from this date through to November 4th at which time the aluminum panels were removed due to freezing conditions.

A total of 5,269 coho were passed through the fence in 2003, with the first coho captured on August 26th and with the spawning migration into the creek peaking from September 26th through October 9th. No coho were captured after October 29th in 2003. In addition to our normal sampling, we floy tagged and operculum punched a large number of coho. A total of 550 coho were tagged at the fence in 2003, approximately one out of every ten coho captured. Weekly spawner counts began October 8th and carried on until November 5th, and a total of four different counts were conducted on the spawning grounds.

We were able to estimate the total number of coho which were above the fence by utilizing the weekly spawner counts. Spawning appeared to have started around October 1st, 2003 and peak spawn occurred in 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 3.9% of the coho spawned in this section of the creek. Of the adult counts conducted upstream of the fence a total of 3,187 coho were observed spawning, and it appeared that no more than 15 to 20% of the coho stock was actively spawning during any given week. While our counts indicated tagged proportions of approximately 7%, as compared to the 10% tagged during migration, it was not felt that many fish were missed. The complete Toboggan Creek escapement estimate in 2003 was 5,560 coho; including natural spawners above the fence (5,220), broodstock and coded-wire tag samples removed at the fence by hatchery personnel (126), and salmon spawning downstream of the counting fence (214).

Approximately 22% of the salmon handled at the fence were estimated to be coded-wire tagged hatchery returns from the 2000 brood Toboggan Creek smolt release group. This represents a total of 1,222 spawners returning from a release of 34,333 smolts, and a 3.6 % survival to spawn.

Bulkley River Fence

The Bulkley fence operated from August 25th until October 24th, 2003 and a total of 1,799 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 over 5,800 coho spawners in 2003, based on comparisons of Bulkley and Toboggan coded-wire tag abundances in the Moricetown Canyon sample. Bulkley CWT's were 110% as abundant in the Moricetown sample as Toboggan CWT's, but only 33% as abundant in the escapement. These data indicate the Bulkley River fence operations enumerated less than one third of this coho stock in 2003.

Coho Hatchery Returns (2000 brood)

All of the upper Skeena waters were closed to the harvest of coho at the beginning of the 2003 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 various areas of the mid and upper Skeena River, the Bulkley and the Morice Rivers to the retention of both hatchery and wild coho.

No creel surveys were conducted last fall but, based on head depot returns of coded-wire tagged coho in 2003, a catch estimate was developed. There were a total of 22 CWT-pinned heads turned in by anglers last fall, from coho captured in the Bulkley-Morice watershed, with 13 carrying pins that indicated they were from the Toboggan Creek stock. Seven CWT's were identified as Bulkley River stock, one was from Owen Creek and one from Chicago Creek tag groups. We estimated a participation rate of 35% (lower than normal due to the wider expanse of the area open to harvest) indicating a total harvest of 38 CWT's and 114 unmarked wild Toboggan coho in 2003. The total harvest as a direct result of the in-river angling opportunity this season accounted for between 2 and 3% of the available Toboggan Creek coho stock.

As a result of sampling done at the fence and on the spawning grounds we were able to collect 100 coho heads from marked adult spawners in Toboggan Creek during 2003, and of these 79 carried pins. Fourteen heads were also taken from Bulkley River coho used for broodstock purposes last fall and 13 of these carried pins, and all were 1999 and 2000 brood Bulkley CWT's. The proportions of the Toboggan Creek smolt group in the sampling, by code, were as follows :

# of Coho	Tag Code
22	18-35-54
25	18-35-55
23	18-35-56

Of these 70 pinned heads, all were from 2000 brood coho salmon reared and released at the Toboggan Creek Hatchery site. There were, however, 9 more heads that were collected from Toboggan that were identified as Bulkley coho (1999 and 2000 brood). 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 2000 brood hatchery release, while the relatively high proportion of no-pins was incorporated into the catch estimates.

Exploitation of 2000 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 B.C. sport catch give an indication of exploitation rates by each group. The Native food fish catch has also been studied to some extent and gives insight in this regard.

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

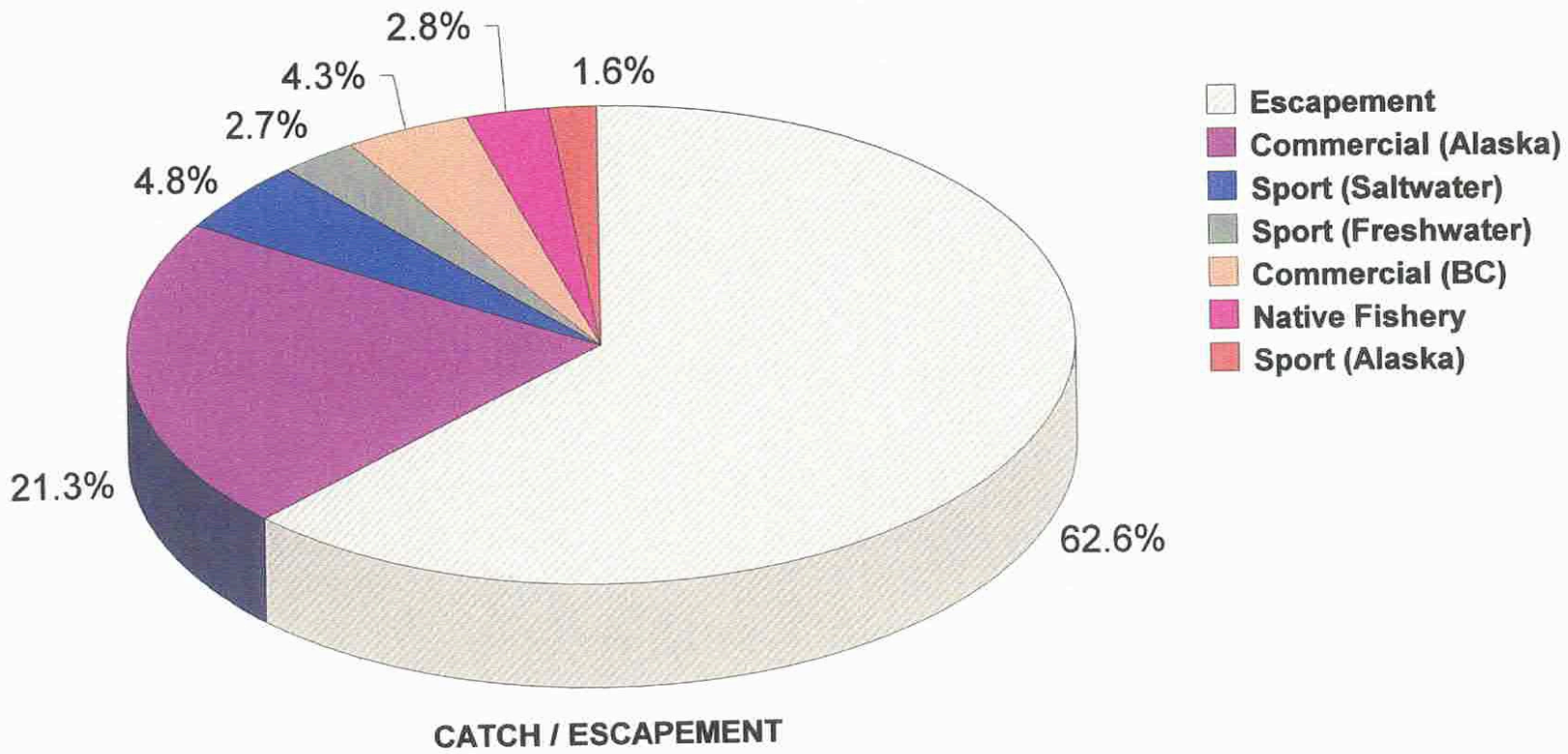
Escapement	-	Toboggan Hatchery
B.C. Commercial	-	Fisheries & Oceans Canada
Alaskan Commercial	-	Alaska Department of Fish and Game
B.C. Sport	-	Fisheries & Oceans Canada / Toboggan Hatchery
Alaskan Sport	-	Alaska Department of Fish and Game
Native Food	-	Fisheries & Oceans Canada / Toboggan Hatchery

Exploitation rates indicated by the data suggest that coded-wire tagged coho from the Toboggan Creek stock were harvested at a rate of approximately 38% in 2003 (Fig.5). Commercial catches by Alaskan vessels were responsible for 57% of the mortalities in 2003, BC saltwater anglers took 13%, BC commercial fishermen harvested 11%, in-river Native food fisheries accounted for 8%, BC freshwater anglers took 7%, and Alaskan anglers took 4%. This is the fifth lowest exploitation rate seen in recent years, and is the sixth consecutive year where exploitation of this stock was below 40%. The coded-wire tagged spawning escapement to Toboggan Creek in 2003 represented 62% of the total adult stock produced from our 2000 brood coho smolt releases.

Alaskan commercial fishermen caught many more coho than those that were landed by B.C. commercial fishermen, this due to non-retention in most Canadian fisheries and total closures in some areas. These data indicate that Alaskan interests were responsible for 83% of the commercial mortalities in 2003, the Canadian portion being due to targetted coho troll fisheries.

Survivals of hatchery-produced coho smolts from this facility were above average in 2003. Assuming the catch rates are accurate we saw smolt to adult survivals of just under 5.7% for the 2000 brood, with about 1,952 adult coho produced from a release of 34,333 Toboggan Creek smolts. These survivals are the fifth highest we have seen in the last fourteen years of sampling, 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 2003 of 1,222 adult hatchery spawners from the Toboggan Creek stock.

Fig. 5 Catch of Toboggan CWT Coho (2003)



Administration Report

This section covers hours spent from April 1st, 2003 to March 31, 2004. The 2003/2004 report represents the second full reporting year since a shift back to the March 31st operational year end.

The following is a breakdown of hours spent carrying out the contract in 2003/2004 :

Activity	Man-hours
Project Management	414.0
Facility Operations	3556.0
Broodstock Collection	480.0
Assessment	0.0
Coho Fence	860.0
Statutory Holidays	240.0
Total Hours in 2002/03	5,550.0

It is becoming more and more difficult to carry out the contract each year due to a lack of adequate funding, as we have not seen a reasonable increase in funds for over twelve years. In 2003/04 our hours of work spent in most categories were lower than, or close to the same as, in other years; with the exception of the coho fence operations category which was higher due to a large escapement of coho spawners handled in the fall of 2003.

Total employment generated by the hatchery in 2003/2004 added up to 140 full work-weeks, employing 12 different people for varying lengths of time during the twelve month period. These last figures include separate contracts we have undertaken via the federally-funded Stock Assessment Program.

Labour costs were almost $4,000.00 more than what was budgetted for in the contract period, as they were in the 2002/03 contract year as well. Our total deficit during the last fiscal year surpassed $9,600.00. This was due to the fact that the hatchery program has been subsidized by other contracts taken on by the Toboggan Creek Enhancement Society in the past. Without taking on extra contracts such as creel surveys and steelhead fence counts over the past few years we are consistently running a deficit. While labour, overhead and supply costs have risen dramatically over the past 12 years our direct DFO contract funding has remained unchanged.

The following is a summary of expenditures made in carrying out the 2003/2004 contract :

Category	Expenditures	Contract
Direct Labour	94,914.00	91,000.00
Overhead Costs	23,728.50	22,750.00
Capital Equipment	0.00	0.00
Operations	45,285.50	40,550.00
Totals	163,928.00	154,300.00

The labour and overhead portions of this table only include activities directly attributable to the main C.E.D.P. contract. They do not include time spent rearing and releasing extra Bulkley River coho for fry planting, assessment of coho juvenile migration and assessment of adult coho returns.

Development and Maintenance of the Facility

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

i) The outdoor rearing channel was again vacuumed out using one large sludge pump. The accumulation of fish waste and silt is difficult to move out of the channels and this appears to be the best way to address the problem. We now do this yearly.

ii) The settling pond was flushed again to spread out 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.

iii) The creek intake required some more maintenance this year as a followup to work done in previous years to stabilize the water intake feeding the settling pond. The creek has been scouring away the banks near the intake since a new bridge was installed recently.

iv) A "School Release Day" organized by the C.A., Brenda Donas, was carried out in May, 2003. Many schoolkids, who reared coho from egg to fry in classroom incubators, came out to release their fry. We also helped in October of 2003 to collect coho broodstock for the classrooms. Both activities were successful.

v) During ten consecutive years previous, 1993 through 2002, we have operated the Toboggan Creek counting fence for steelhead enumeration. In 1993 we estimated an escapement of 435 steelhead spawners, and in 1994 there were 237 steelhead spawners identified. No funding was provided for the 1993 assessment, while funding came from M.O.E. via the Habitat Conservation fund for the 1994 count. In 1995 we identified 330 steelhead above our counting fence, that was done with H.C.F. funding to cover labour costs. In 1996 funding came from Skeena Green Plan for the count, which identified 120 steelhead above the fence with many hundreds spawning below the fence. In 1997 we were unable to obtain funding but operated the fence again, 543 steelhead were estimated. The 1998 count was funded by the Habitat Conservation Fund and an estimated 381 fish spawned above the fence and many more spawned below. In 1999, we identified an escapement of 357 steelhead upstream of the fence, and in the year 2000 an estimated 286 steelhead spawned above the fence. In 2001, the fence operations indicated 414 spawning steelhead in the area upstream of the counting fence and in 2002 the estimate for the same area was 356 steelhead spawners. The funding for this came from Fisheries Renewal BC for all of the last four steelhead counts. Due to a lack of support by provincial steelhead bureaucrats this program has been discontinued, although the data generated has been referred to as the best and most consistent for the Skeena River watershed and its summer-run steelhead stocks.

Operating Plan for 2004/2005

As in previous years we will begin releasing our salmon smolts in April. The 2002 brood Bulkley River chinook will be the first to go in late April, followed by the Toboggan Creek coho and the Bulkley River coho in mid to late May. As in past years we will enumerate the salmon smolts while they are being loaded into the transport tanks. We will be taking close to 90,000 smolts to the Bulkley River and more than 34,000 smolts will go into the Toboggan Creek system.

Our chinook target has been reduced to 60,000 eggs in recent years, and eggs will only be taken if the escapement is under 5,000 spawners in 2004. We plan to continue with assessment of chinook returns whether or not egg takes occur. This year will be our thirteenth year of assessment of CWT and total chinook returns to the upper Bulkley River.

Coho egg targets will increase slightly from 2003 and 100,000 eggs will be targetted in 2004, with the Bulkley River target at 50,000 eggs and Toboggan Creek at 50,000. These coho will all be reared to smolt size, at 12.0 to 15.0 grams, and released in the spring of 2006.

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 do not intend on continuing with enumeration of steelhead trout spawners into Toboggan Creek in the spring of 2004. The spring of 2002 was our tenth consecutive year of assessing the steelhead return to Toboggan Creek, and there seems to be little interest from the provincial Fisheries Branch to continue documenting the large escapements indicated by locally initiated studies such as this. Steelhead tagged at Moricetown in recent years have also indicated very large runs of steelhead present in the Bulkley-Morice escapement.

As usual, we will attempt to keep the public in this area well informed of our activities, goals and accomplishments in the area of fish culture and assessment 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

We have had a successful year, as in previous years. 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 last year were reasonable, allowing for fexibility in our rearing program. Egg targets of no more than 180,000 should be maintained.

iv) Measures were taken in the past few 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 2003. 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 2004, 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.

These recommendations are the same as past 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 3,879,000 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 recent 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 nineteenth 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.