

**ANNUAL REPORT FOR TOBOGGAN CREEK
HATCHERY OPERATIONS IN 2004/2005**

Prepared for : **Fisheries and Oceans Canada**

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

JUNE, 2005

ANNUAL REPORT FOR TOBOGGAN CREEK HATCHERY OPERATIONS 2004/2005

Table of Contents

	Page
INTRODUCTION	1
OBJECTIVES	4
WATER SUPPLIES	5
SALMON BROOD YEAR SUMMARIES	7
Bulkley River Chinook (2002 brood)	7
Bulkley River Chinook (2003 brood)	8
Bulkley River Chinook (2004 brood)	10
Toboggan Coho Stock (2002 brood)	13
Bulkley Coho Stock (2002 brood)	13
Toboggan Coho Stock (2003 brood)	14
Bulkley Coho Stock (2003 brood)	16
Toboggan Coho Stock (2004 brood)	17
Bulkley Coho Stock (2004 brood)	19
ASSESSMENT OF COHO ESCAPEMENT IN 2004	21
COHO HATCHERY RETURNS (2001 BROOD)	22
EXPLOITATION OF 2001 BROOD COHO	23
ADMINISTRATION REPORT	25
DEVELOPMENT AND MAINTENANCE OF THE FACILITY	27
OPERATING PLAN FOR 2005/2006	28
RECOMMENDATIONS	29

List of Figures

	Page
Figure 1. Location of the Toboggan Creek Hatchery near Smithers, B.C	2
Figure 2. Rearing Temperatures at the Toboggan Creek Hatchery (2004/05)	6
Figure 3. Chinook Salmon Growth at Toboggan Creek Hatchery (2004/05)	9
Figure 4. Growth of the 2003 Brood Coho at Toboggan Creek Hatchery (2004/05)	15
Figure 5. Catch of Toboggan Creek CWT Coho (2004).....	24

List of Tables

	Page
Table I. Shocking and Picking Summary for 2004 Brood Bulkley River Chinook Eggs Incubating at the Toboggan Creek Hatchery	12
Table II. Shocking and Picking Summary for 2004 Brood Toboggan Creek Coho Salmon Eggs Incubated at the Toboggan Creek Hatchery	18
Table III. Shocking and Picking Summary of 2004 Brood Bulkley River Coho Salmon Eggs Incubated at the Toboggan Creek Hatchery	20

ANNUAL REPORT FOR TOBOGGAN CREEK HATCHERY ACTIVITIES, 2004/05

Contract # : F1678-1-0002
Financial Code : 5G600-440-120-4107-50302
Contract Period : April 1, 2004 - March 31, 2005

Introduction

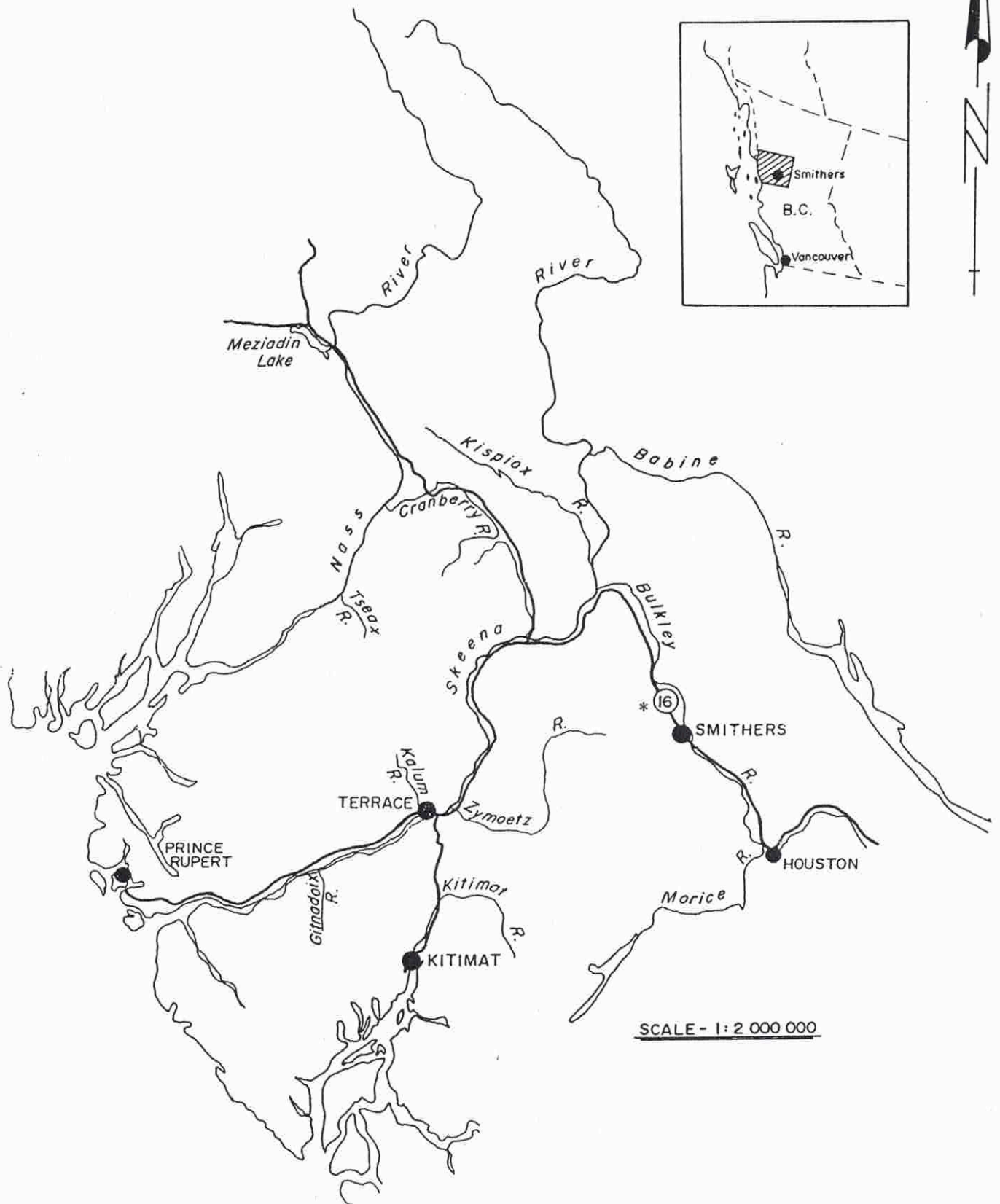
The Toboggan Creek Salmon Hatchery, under the direction of the Toboggan Creek Salmon and Steelhead Enhancement Society, has just completed its twentieth year of successful operations. The Toboggan Creek Hatchery facility is located thirteen kilometers north-northwest of Smithers, British Columbia, on 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 in-river net fisheries, a gaff fishery at Moricetown Falls, and by angling pressure. It also suffers from severely 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 2004/05 contract period our Society reared and released some 56,000 chinook and 66,000 coho salmon smolts from the 2002 brood year, as well as 22,000 coho fry from the 2003 brood year. Successful rearing of another 55,000 chinook and 63,000 coho from the 2003 brood continues, with these salmon being reared through to smolt for release in the spring of 2005.

Egg takes for the 2004 brood chinook from the upper Bulkley River went well, and at present we have 70,000 chinook alevins incubating at the hatchery. Chinook spawning escapements to the upper Bulkley were very poor this year however, with only 530 chinook adults estimated in the system. The low number entering into the system was largely attributable to the warm water conditions and very low flows experienced in the late summer and early fall of 2004.

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



Coho returns to the upper Skeena tributaries in 2004 were quite variable. The Toboggan Creek escapement in 2004 was 2,700 coho, representing our sixth consecutive good return. Escapements to the upper Bulkley River system were down considerably, with only 450 coho estimated in 2004. It appears the fence captured over 80% of the run last fall (380 coho), an unusually high proportion, and straying was not a factor. 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 3rd this year. This enabled an accurate assessment of our sixteenth major return of hatchery-produced coho to Toboggan Creek. The fence data indicated hatchery returns of 550 coded-wire tagged Toboggan coho in 2004, and from a release of 34,234 smolts this is a 1.6% return. The 2004 return is the sixth 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 1,100 coho from the release, and at a 3.2% survival rate this is a slightly below average. The rate of exploitation on the Toboggan CWT's was about 50% in 2004, with the Alaskan catch accounting for about 30% of the total. Previous exploitation rates, prior to 1998, had ranged from 55% to well over 70%. In the four years previous to 2004 the average exploitation rate was 37%, and 2004 represents a noticeable increase in this respect.

Around 20.7 % of Toboggan coho handled in 2004 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 2% of the CWT's sampled in 2004 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 98% 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 (2004/05)

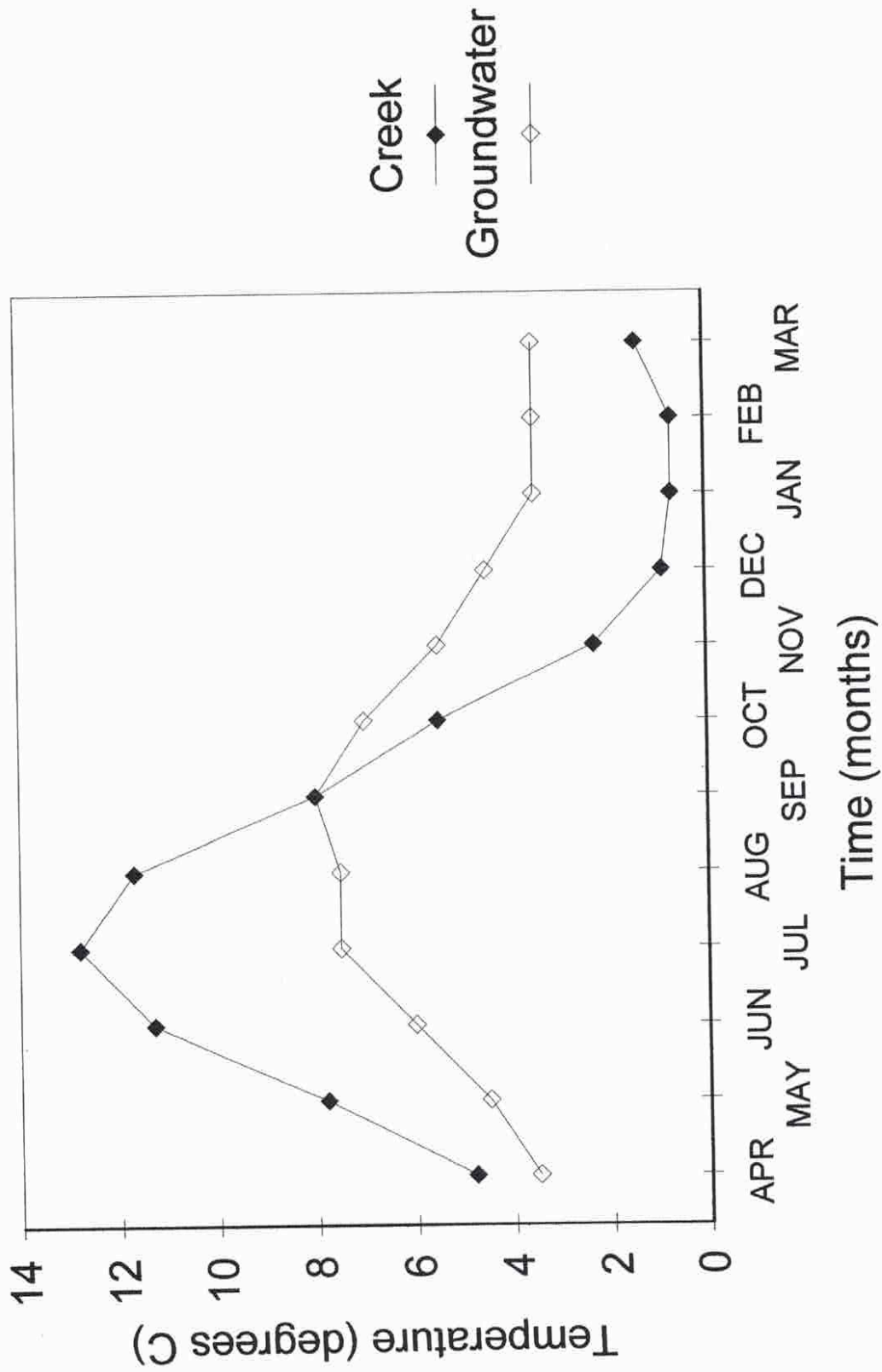
As for the previous years, the average daily temperatures of the three hatchery water sources were recorded and average weekly temperatures have been calculated. We depend on two of the water sources for egg incubation and fish rearing, ground water from an underground collection system and surface water 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 2004/05 were generally higher than those of past years. The creek temperatures increased very rapidly in the spring this year, as compared to most years. Average temperatures in the summer period were also higher than most years, while fall 2004 creek temperatures were closer to 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 spring and summer of 2004, and there were no extreme water events. The levels of this year followed the pattern of other years fairly closely, although they were generally higher through the late fall and early winter period due to precipitation events. Winter flows through this period were good and dewatering of coho salmon redds should not have been a factor in 2004/05. Coho fry production should 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 2004 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 2004/05 should have been excellent, as usual.

Fig. 2 Temperatures at Toboggan Creek Hatchery (2004/05)



TOBOGGAN CREEK HATCHERY - SALMON BROOD YEAR SUMMARIES

Bulkley River Chinook (2002 brood)

Releases of the 2002 brood chinook smolts commenced April 20 and were completed on April 22, 2004. A total of 56,504 chinook smolts were taken in batches of up to 10,000 fish to the upper Bulkley River, near Houston, B.C. These smolts averaged 9.9 grams in weight. As release conditions were good throughout the spring we spread these chinook smolts between three sites; the groundwater site along Highway 16 West, the mainstem site near Topley, and another site at McQuarrie Creek. All of the smolts released were coded-wire tagged.

Locations and numbers of the smolt releases this spring are as follows:

Topley road crossing	29,990
McQuarrie Creek confluence	22,054
Highway 16 groundwater area	4,460
Total released	56,504

Releases took three work days to complete this year, and we had just one crew and vehicle working. The releases took 6 individual trips to complete, everything went very well during all these releases and we observed very few mortalities in total. We have had good success using the 1,500 litre transport tank for releases, and we vary the amount of smolts taken on each trip depending on water temperatures and the length of the individual trip. Green egg to release survivals of this stock were 93.7 % over a 20 month period from mid August, 2002 to late April of 2004. This group of smolts looked to be extremely healthy at the time of release.

This stock was enumerated prior to release by using standard sub-sampling techniques. Results of this enumeration verified that our book estimates were accurate and indicated predation was again not a factor in the outdoor channel this past year.

Bulkley River Chinook (2003 brood)

Ponding of the 2003 brood Bulkley River chinook fry commenced on April 14th and was completed by April 23rd, 2004. These 0.40 gram fry were ponded in one Capilano trough and feeding was initiated with #0 Skretting starter. The chinook got on the new feed quickly and very little pinheading was found. A total of 60,940 salmon fry were ponded and initial survivals were excellent. Green egg to ponding survivals were over 94.0 %

Growth of the 2003 brood Bulkley River chinook fry increased rapidly, commencing in late 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 2004/05 was similar to past years and 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 10.0 to 10.5 grams prior to release in late April of 2005.

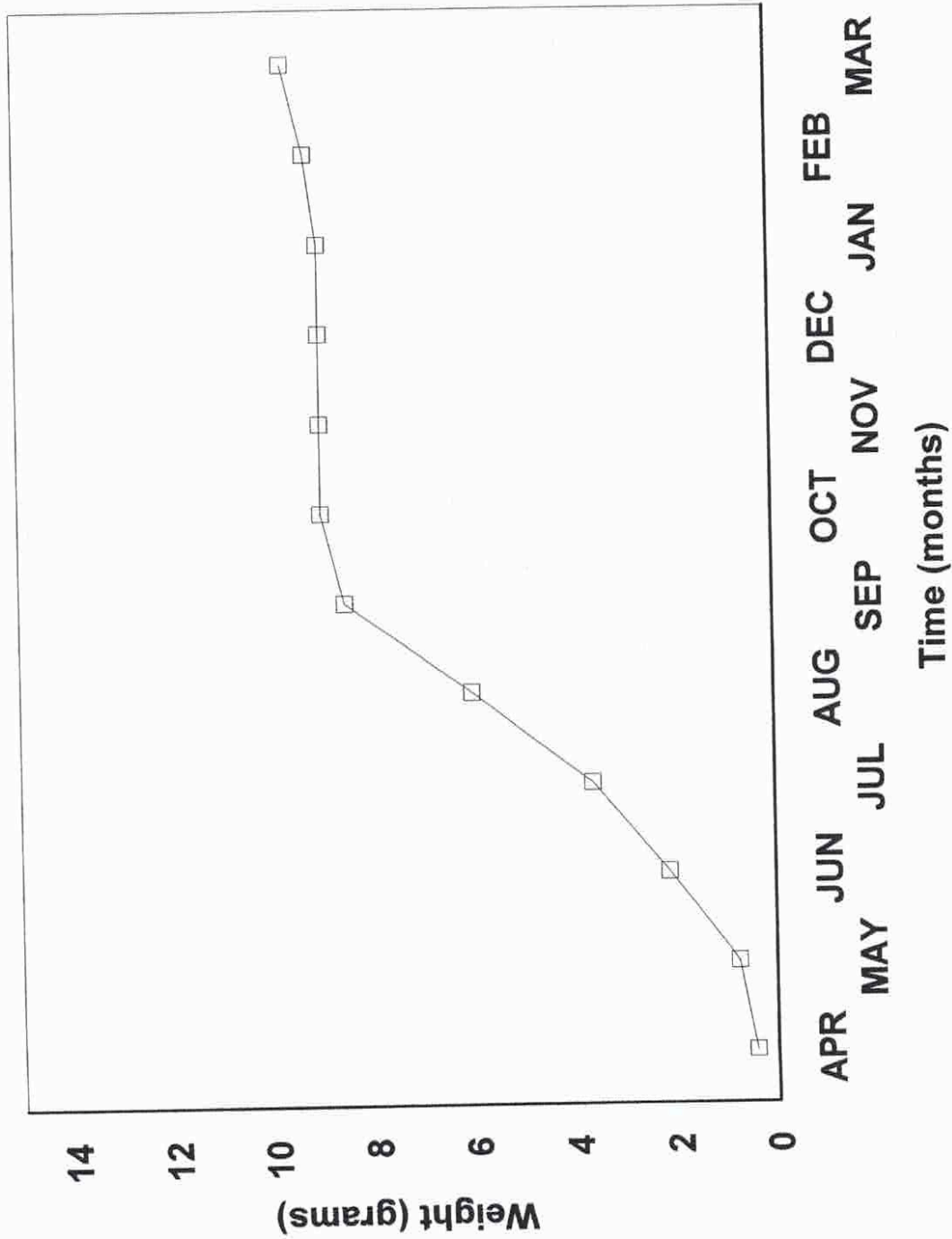
These chinook fry were split into 2 Capilano troughs in early May and their densities were reduced again in early June, when they were transferred to one of the large indoor troughs. We did not experience any serious problems during the initial indoor rearing of the 2003 brood chinook. Densities just 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.

Coded-wire tagging occurred between August 15th and 17th, 2004. All of these tagged chinook fry were transferred to compartment "B" of the outdoor rearing channel immediately after tagging. Survivals during tagging were excellent as usual and a total of 55,123 chinook were marked. The remaining surplus chinook are scheduled to be ventral-clipped prior to release.

<u>Tag Code</u>	<u># Tagged</u>
18-54-50	30,598
08-14-08	12,264
08-14-09	12,261
Total Tagged	55,123

Survivals since ponding have been excellent and presently are over 98.0 %, green egg to release survivals may exceed 92.0 %. At present we have over 54,800 Bulkley River chinook remaining.

Fig. 3 Growth of 2003 Brood Chinook Salmon in 2004/05.



Chinook

Bulkley River Chinook (2004 brood)

Broodstock collection for the 2004 brood Bulkley chinook began on August 23, 2004 and by August 31st we had attained our target of 60,000 eggs. A total of 19 female and 85 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 20, 2004. A total of 466 chinook were observed between the Morice River junction and the Bulkley Falls, with over 75 % occupying the section of river from Richfield Creek downstream to Knockholt. There were large sections of river with no spawners present. We sampled a total of 124 different chinook during our broodstock collection and assessment activities, and we also had 8 additional chinook recaptures identified by operculum punches. The overall composition of the sample this year was 65% wild and 35% adipose clips. Males made up almost 70% of the chinook sampled.

Results of the helicopter count were as follows :

	<u>Aug. 20th</u>
Above Bulkley Falls	not flown
Meanwhile Creek	14 chinook
Topley	8 chinook
Richfield Creek	95 chinook
Perow Station	97 chinook
McQuarrie Creek	45 chinook
Below McQuarrie Creek	113 chinook
Below Knockholt	0 chinook
Houston	94 chinook
in Buck Creek	not flown
Total observed / flight	466 chinook

Visibility during the assessment flight was fairly good in most sections. Chinook were not very active though with few fish spawning on the flight date, and this is thought to be as a result of the adverse environmental conditions experienced in 2004. In the uppermost river sections the fish were very lethargic, and these are all thought to have died prior to spawning. As in previous years, we did a comparative ground count in the vicinity of McQuarrie and Richfield Creeks to verify the accuracy of the aerial count. Few chinook were missed in this year's flight.

From these observations, and incorporating the ground count carried out during the same period, it is estimated that the chinook escapement present in the upper Bulkley River during the time of the count was approximately 530 adults (four to six year old chinook). The number of successful spawners in 2004 is likely in the range of only 20 to 30 females in the entire river section upstream of Knockholt. The great majority of the chinook that migrated into the upper Bulkley this year likely died during early August when water temperatures exceeded 24 degrees Celsius on consecutive days. Any remaining survivors were severely compromised in their ability to avoid predators and successfully dig redds to complete the function of spawning. Many of the chinook captured during our broodstock collection were so lethargic they were landed by hand.

The physical condition of the remaining chinook was very poor, and many pre-spawn mortalities were seen. Most of these were carcasses that were removed by predators as the fish lay in the shallow runs. Egg quality was generally poor also, and females that were very ripe were not attempting to even dig redds in many cases. The size of the spawners this year was quite variable, with a good proportion of four year old males and some very large females and males (possibly six year olds). The five year old component, usually dominant, was comparatively small. The average length (POH) of the brood females collected in 2004 was over 700 m.m. and the average weight was 7.4 kilograms, they ranged from 600 m.m. to 830 m.m. in length.

Shocking and picking of the 2004 brood Bulkley River chinook eggs was completed in early October 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 94.0 % in 2004 (Table I). Volume estimates done at eyed stage verified our spawning estimate of over 70,000 eggs collected from the Bulkley River chinook stock. Hatching of these eggs peaked at 560.0 A.T.U.'s again this year, and survivals since hatch have been very good. Presently we have approximately 69,000 chinook alevins still incubating.

Development of the 2004 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 early to mid April.

Table I. Shocking and Picking Summary for the 2004 Brood Bulkley River Chinook Eggs Incubating at the Toboggan Creek Salmon Hatchery.

<u>Tray #</u>	<u>Females</u>	<u>Pre-Shock</u>	<u>Post-Shock</u>	<u>50 ml Sample</u>	<u>Volume (mls)</u>	<u>Survival(%)</u>
M1-1	1	92	129	92(1.84)	2,510	4,489(95.3)
M1-2	2	45	189	106(2.12)	4,220	8,756(97.4)
M1-3	2	236	1,192	123(2.46)	4,360	9,532(87.0)
M1-4	2	112	129	107(2.14)	3,880	8,169(97.1)
M1-5	2	48	178	101(2.02)	3,640	7,174(97.0)
M1-6	2	40	514	118(2.36)	4,000	8,926(94.2)
M2-3	3	326	434	117(2.34)	3,060	6,720(89.8)
M2-4	1	91	172	119(2.38)	1,390	3,137(92.3)
M2-5	2	14	218	119(2.38)	2,410	5,518(96.0)
M2-6	2	30	154	105(2.10)	3,750	7,716(97.7)
<hr/>						
<u>Totals</u>	19	<u>1,034(1.4%)</u>	<u>3,309(4.4%)</u>	<u>112(2.24)</u>	<u>33,220</u>	<u>70,137(94.2)</u>

Toboggan Creek Coho (2002 brood)

Survivals were excellent during April and May of 2004, prior to this stock's release. A total of 34,050 coded-wire tagged smolts were released during the spring of 2004, the screens were pulled on May 3rd and all of these 11.7 gram smolts had migrated out by June 1st. Growth of this stock of coho was very good from April 1st until release, increasing from 8.3 to 11.7 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 6.0 grams on September 4th, 2003 into Kathlyn Lake, they were unclipped.

Bulkley River Coho (2002 brood)

Releases of coho smolts from this stock commenced on May 13th and were completed on May 28th. These releases in 2004 were delayed as per advice from DFO biologists. Both tag groups were released in a similar manner at Topley and McQuarrie Creek. These smolts were exhibiting obvious signs of smolting prior to release, especially the later release group.

Growth of this stock of coho accelerated in April and May, with the increasing water temperatures, and they went from 8.3 grams up to 11.7 grams in this two month period. The fry group from this same brood year was released during early September of 2003, as 6.1 gram coded-wire tags. They were released by truck into Bulkley Lake.

Toboggan Creek Coho (2003 brood)

Ponding of the 2003 brood Toboggan coho was completed by May 10th, 2004. Growth of these coho increased rapidly in the summer and fall of 2004, from 1.4 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.

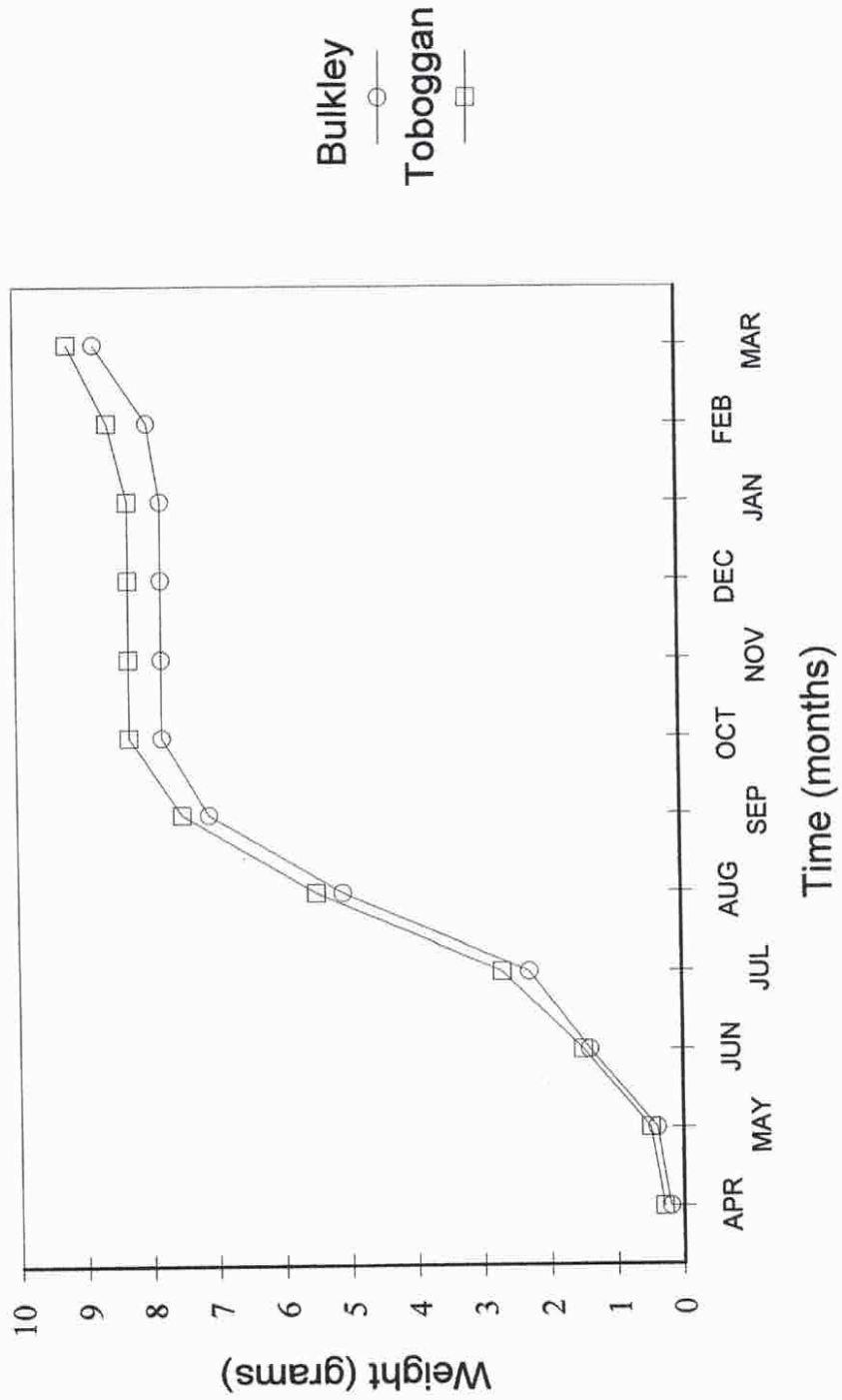
These coho fry were split into 2 Capilano troughs in early June and split again into four troughs in July. We were able to keep these fry indoors until the tagging crew arrived. Overall health of this stock was excellent throughout the rearing cycle, and survivals from fry ponding in May, 2004 to smolt size in late March, 2005 were over 94 %. These are normal survival rates for this coho stock.

Coded-wire tagging of this stock was completed August 13th through 15th, 2004. A total of 31,150 coho salmon fry were tagged and adipose clipped for our smolt release group. Some remaining Toboggan coho that were surplus to this group were also coded-wire tagged and released into Canyon Creek as fed fry, and a total of 11,282 tagged and clipped coho were released. These fry were released at 5.5 grams in weight on September 8th and 9th, 2004.

<u>Tag Code</u>	<u># Tagged</u>
18-54-51	31,150
08-03-33	11,284
Total Tagged	42,434

Survivals of the smolt group were excellent after tagging and through the winter period and we expect to release 31,000 Toboggan Creek coho smolts in the spring. We plan on pulling the channel screens around May 1st, 2005 after the Bulkley River coho smolts rearing downstream of them are released. These smolts will then be able to migrate out on their own timing.

Fig. 4 Growth of 2003 Brood Coho Salmon in 2004/05.



Bulkley River Coho (2003 brood)

Ponding of the 2003 brood Bulkley coho fry was completed by May 10th, 2004 and, as with the Toboggan stock, growth of these salmon accelerated throughout the summer and fall periods. They went from 1.3 grams near the end of June up to 7.8 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 two Capilano troughs in mid June, and split again into three troughs in July to reduce densities. In August, 2004 the Bulkley coho were divided into the larger troughs, where they remained until tagging. Overall health of the stock was excellent this year and survivals from fry ponding in May, 2004 to smolt size in late March, 2005 were over 94%, similar to the Toboggan stock. These are also normal survival rates for this coho stock.

Coded-wire tagging of this stock was completed on August 11th through 13th, 2004. A total of 31,979 coho fry were tagged and adipose clipped as two separate 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 11,075 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 3rd, 2004. They were transported by truck and released into Bulkley Lake at 5.1 grams in weight.

<u>Tag Code</u>	<u># Tagged</u>
08-14-10	11,075
18-53-53	16,042
18-53-54	15,937
Total Tagged	43,054

Survivals after coded-wire tagging were good. We expect to release 31,800 Bulkley smolts, which will represent a tagging to release survival rate of over 99% for the 2003 brood. The smolts, which will be transported by tank truck for release, average over 9.0 grams in weight.

Toboggan Creek Coho (2004 brood)

Most of the 2004 brood coho eggs collected from Toboggan Creek this fall were taken from adult coho intercepted at our fence operation. A total of 82 coho were collected and transported back to the hatchery for egg take purposes. We conducted two egg takes, on October 6th and October 14th, 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 54 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 all of these tested negative for BKD. Scales, weights and lengths were also taken from all of the brood females. Average weight was 3.9 kgs, while overall the average length was 560 mm. Of 107 readable samples out of the total sample of 120 sent to the lab from the 2004 Toboggan Creek return we saw an age structure of 60% three-year olds and 40% four-year olds.

Shocking and picking of the 2004 brood Toboggan Creek coho eggs began on December 1st 2004 and was completed on January 5th, 2005. The coho egg survivals to this stage were excellent (94.2%), and a total of 41,697 eggs survived (Table II). Fecundity of the Toboggan coho averaged 2,950 eggs per female in 2004, as compared to 3,300 in 2003 and 3,170 in 2002.

The coho eggs began hatching at 400.0 A.T.U.'s and peak hatch occurred at 415.0 thermal units. The survivals during hatch were excellent, and ponding of this stock will likely occur in early to mid May of 2005.

Coho from these egg takes will be reared at the hatchery to a size of 12.0 to 14.0 grams and released as smolts in May of 2006. 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 2004 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 41,400 coho alevins from this stock incubating at the hatchery.

Table II. Shocking and Picking Summary for the 2004 Brood Toboggan Creek Coho Eggs Incubating at the Toboggan Creek Salmon Hatchery.

<u>Tray #</u>	<u>Females</u>	<u>Pre-Shock</u>	<u>Post-Shock</u>	<u>50 ml Sample</u>	<u>Volume (mls)</u>	<u>Survival(%)</u>
M1-2	3	53	311	162(3.24)	2,390	7,436(95.3)
M1-3	3	39	115	168(3.36)	2,520	8,346(98.2)
M1-4	3	332	1,230	168(3.36)	2,670	7,738(83.2)
M1-5	3	112	182	159(3.18)	2,730	8,506(96.7)
M1-6	3	74	105	164(3.28)	2,980	9,671(98.2)
<hr/>						
<u>Totals</u>	<u>15</u>	<u>610(1.4%)</u>	<u>1,943(4.4%)</u>	<u>167(3.34)</u>	<u>13,290</u>	<u>41,697(94.2)</u>
<hr/>						

Bulkley River Coho (2004 brood)

A total of 24 adult coho salmon (13 females/11 males) were collected in the Bulkley River during September and October of 2004. All of the 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 6 weeks before we were able to take eggs. A total of 380 coho were captured at the fence this year, which represented over 80% of the stock, and the total estimated escapement to the Bulkley River in 2004 was only about 460 coho.

Eggs were taken from a total of 13 ripe female coho and sperm was taken from 11 males in 2004. The first coho broodstock were collected on September 23rd, we took our first eggs on October 14th and we completed our final egg take on November 9th, 2004. The eggs were fertilized by using at least 4 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. One female tested positive for BKD, and her eggs were destroyed. The average weight of the brood females was 3.3 kgs overall and the average length was 545 mm. Of the 18 scale samples sent in from the wild male and female broodstock there were seven 3-year old coho, ten 4-year old coho, and one 5-year old.

Shocking and picking of the 2004 brood Bulkley River coho eggs began on December 28th, 2004 and the last batch was done on February 13th, 2005. Egg survivals to this stage were good (95.2%) and a total of 34,387 eggs survived (Table III). Fecundity of the Bulkley coho averaged 3,010 eggs per female in 2004, slightly down from 3,020 eggs in 2003.

Hatching of these coho eggs began at 380.0 A.T.U.'s with peak hatch occurring at 410.0 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 2006. Up to 32,000 of these fish will be released into the Upper Bulkley River, as coded-wire tagged coho smolts.

Survivals of the Bulkley coho since hatch have been excellent and they continue to look quite healthy. We presently have over 34,100 coho alevins from this stock incubating at the hatchery.

Table III. Shocking and Picking Summary for the 2004 Brood Bulkley River Coho Eggs Incubating at the Toboggan Creek Salmon Hatchery.

<u>Tray #</u>	<u>Females</u>	<u>Pre-Shock</u>	<u>Post-Shock</u>	<u>50 ml Sample</u>	<u>Volume (mls)</u>	<u>Survival(%)</u>
M2-1	1	3	117	220(4.40)	750	3,190(96.4)
M2-2	1	14	51	180(3.60)	780	2,755(97.7)
M2-3	1	812	297	169(3.38)	460	1,261(53.2)
M2-4	3	8	99	244(4.88)	1,600	7,713(98.6)
M2-5	3	5	135	200(4.00)	2,380	9,390(98.5)
M2-6	3	22	180	212(4.24)	2,420	10,078(98.0)
<hr/>						
<u>Totals</u>	<u>12</u>	<u>864(2.4%)</u>	<u>879(2.4%)</u>	<u>210(4.20)</u>	<u>8,390</u>	<u>34,387(95.2)</u>
<hr/>						

Assessment of Coho Escapement in 2004

Toboggan Creek Fence

The Toboggan Creek coho counting fence commenced operation on August 3rd, 2004. The fence was monitored a least twice daily from this date through to November 2nd at which time the aluminum panels were removed due to freezing conditions.

A total of 2,590 coho were passed through the fence in 2004, with the first coho captured on August 11th and with the spawning migration into the creek peaking from September 21st through September 25th. No coho were captured after October 16th in 2004. In addition to our normal sampling, we floy tagged and operculum punched a large number of coho. A total of 260 coho were tagged at the fence in 2004, approximately one out of every ten coho captured. This was done to allow for an accurate estimate in case the fence needed to be laid down, which did not happen. The complete Toboggan Creek escapement estimate in 2004 was 2,700 coho; including natural spawners above the fence, broodstock and coded-wire tag samples removed at the fence by hatchery personnel, and salmon spawning downstream of the counting fence.

Approximately 21% of the salmon handled at the fence were estimated to be coded-wire tagged hatchery returns from the 2001 brood Toboggan Creek smolt release group. This represents a total of 560 spawners returning from a release of 34,234 smolts, and a 1.6 % survival to spawn.

Bulkley River Fence

The Bulkley River counting fence operated from August 19th until October 31st, 2004 and a total of 380 coho were sampled. The total coho run was estimated at only 460 coho spawners in 2004, based on comparisons of Bulkley and Toboggan coded-wire tag abundances in the Moricetown Canyon sample. Bulkley CWT's were 32% as abundant in the Moricetown sample as Toboggan CWT's, but only 27% as abundant in the escapement. These data indicate the Bulkley River fence operations enumerated over 80% of this coho stock in 2004.

Coho Hatchery Returns (2001 brood)

All of the upper Skeena waters were closed to the harvest of coho at the beginning of the 2004 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 hatchery and wild coho.

No creel surveys were conducted last fall but, based on head depot returns of coded-wire tagged coho in 2004, a catch estimate was developed. There were a total of 23 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. Three CWT's were identified as Bulkley River stock, and one from a Chicago Creek tag group. 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 37 CWT's and 179 unmarked wild Toboggan coho in 2004. The total harvest as a direct result of the in-river angling opportunity this season accounted for between 3 and 4% of the total available Toboggan Creek coho stock.

As a result of sampling done at the fence and on the spawning grounds we were able to collect 60 coho heads from marked adult spawners in Toboggan Creek during 2004, and of these 59 carried pins. Six heads were also taken from Bulkley River coho used for broodstock purposes last fall and 5 of these carried pins, and all were 2000 and 2001 brood Bulkley CWT's. The proportions of the Toboggan Creek smolt group in the sampling, by code, were as follows :

<u># of Coho</u>	<u>Tag Code</u>
17	18-35-27
21	18-35-28
20	18-35-29

Of these 58 pinned heads, all were from 2001 brood coho salmon reared and released at the Toboggan Creek Hatchery site. There was, however, one more head that was collected from Toboggan that was identified as a Bulkley coho (2001 brood). The portion of the marked escapement not attributable to the Toboggan Creek Hatchery smolt group (1.7%) was not included in any of the calculations of total escapement or survival for the 2001 brood release.

Exploitation of 2004 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

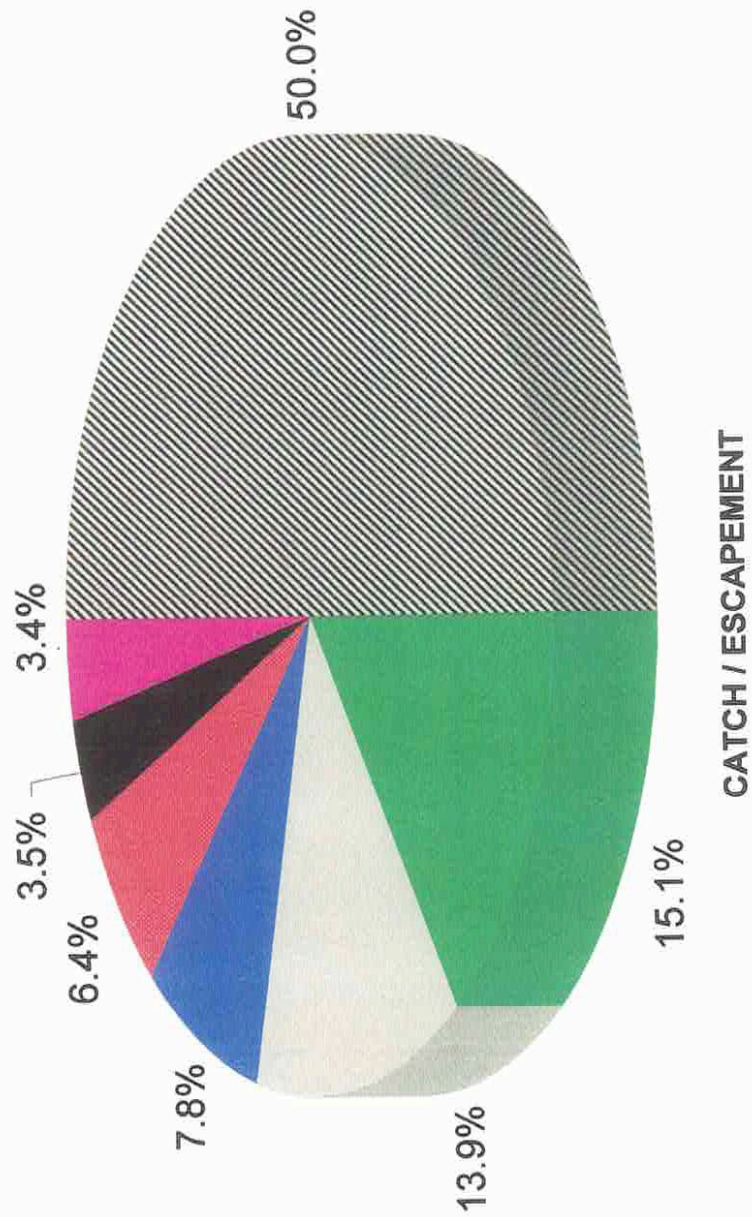
Exploitation rates indicated by the data suggest that coded-wire tagged coho from the Toboggan Creek stock were harvested at a rate of approximately 50% in 2004 (Fig.5). Commercial catches by Alaskan vessels were responsible for 30% of the mortalities in 2004, BC saltwater anglers took 28%, in-river Native food fisheries accounted for 15%, BC commercial fishermen harvested 13%, BC freshwater anglers took 7%, and Alaskan anglers took 7%. This is the highest exploitation rate seen in recent years, and is the first time in seven years that the exploitation of this stock was above 40%. The coded-wire tagged spawning escapement to Toboggan Creek in 2004 represented 50% of the total adult stock produced from our 2001 brood 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 70% of the commercial mortalities in 2004, the Canadian portion being due to targetted coho troll fisheries.

Survivals of hatchery-produced coho smolts from this facility were below average in 2004. Assuming the catch rates are accurate we saw smolt to adult survivals of just over 3.2% for the 2001 brood, with about 1,100 adult coho produced from a release of 34,234 Toboggan Creek smolts. These survivals are the eighth highest we have seen in the last fifteen years of sampling, and indicate a recent decrease in ocean productivity. This remains 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 2004 of 550 adult hatchery spawners from the Toboggan stock.

Fig. 5 Catch of Toboggan CWT Coho (2004)

- Escapement
- Commercial (Alaska)
- Sport (Saltwater)
- Native Fishery
- Comercial (BC)
- Sport (Alaska)
- Sport (Freshwater)



Administration Report

This section covers hours spent from April 1st, 2004 to March 31, 2005. The 2004/2005 report represents the third 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 2004/2005 :

<u>Activity</u>	<u>Man-hours</u>
Project Management	410.0
Facility Operations	3498.0
Broodstock Collection	620.0
Assessment	0.0
Coho Fence	570.0
Statutory Holidays	232.0
<hr/>	
Total Hours in 2004/05	5,330.0

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 thirteen years. In 2004/05 our hours of work spent in most categories were lower than, or close to the same as, in other years. The exception to this being broodstock collection which took more time in 2004.

Total employment generated by the hatchery in 2004/2005 added up to 133 full work-weeks, employing 10 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 Division.

Labour costs were much more than what was budgetted for in the contract period, as they were in the previous two contracts as well. Our total deficit during the last fiscal year surpassed \$25,400.00. 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 13 years our direct DFO contract funding has remained unchanged.

The following is a summary of expenditures made in carrying out the 2004/2005 contract :

<u>Category</u>	<u>Expenditures</u>	<u>Contract</u>
Direct Labour	109,260.00	91,000.00
Overhead Costs	27,315.00	22,750.00
Capital Equipment	2,600.00	0.00
Operations	40,525.00	40,550.00
<hr/>		
Totals	179,700.00	154,300.00
<hr/>		

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 expanded assessment of adult coho returns to Toboggan Creek.

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. In addition, an excavator was brought in to remove the surplus sand. This was paid by DFO enforcement fines that were supplied by Henri Ragetli of the Smithers office.
- 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.
- iv) 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. We may be looking at reviving this program in 2005/06.

Operating Plan for 2005/2006

As in previous years we will begin releasing our salmon smolts in April. The 2003 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 86,000 smolts to the Bulkley River and more than 31,000 smolts will go into the Toboggan Creek system.

Our chinook target has been reduced to 60,000 to 80,000 eggs in recent years, and eggs will only be taken if the escapement is under 5,000 spawners in 2005. We plan to continue with assessment of chinook returns whether or not egg takes occur. This year will be our fourteenth year of assessment of CWT and total chinook returns to the upper Bulkley River.

Coho egg targets will decrease slightly from 2004 and 70,000 to 90,000 eggs will be targetted in 2005, with the Bulkley River target at 30,000 to 40,000 eggs and Toboggan Creek at 40,000 to 50,000. These coho will be reared to smolt size, at 12.0 to 15.0 grams, and released in the spring of 2007.

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 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 2005. 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. We may become more involved in this assessment again in the next year or two.

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 we 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 flexibility 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 sport fishery in 2004. 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 North Coast in 2005, 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 long-term 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 4,023,000 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 with some of our salmon enhancement and assessment operations in recent years. Funding levels are a large concern for our Society, having had no increase in our contract for 13 years, and this issue will need to be positively addressed over the next few months

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.