

**ANNUAL REPORT FOR TOBOGGAN CREEK  
HATCHERY OPERATIONS IN 2006/2007**

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## ANNUAL REPORT FOR TOBOGGAN CREEK HATCHERY ACTIVITIES, 2006/07

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### Introduction

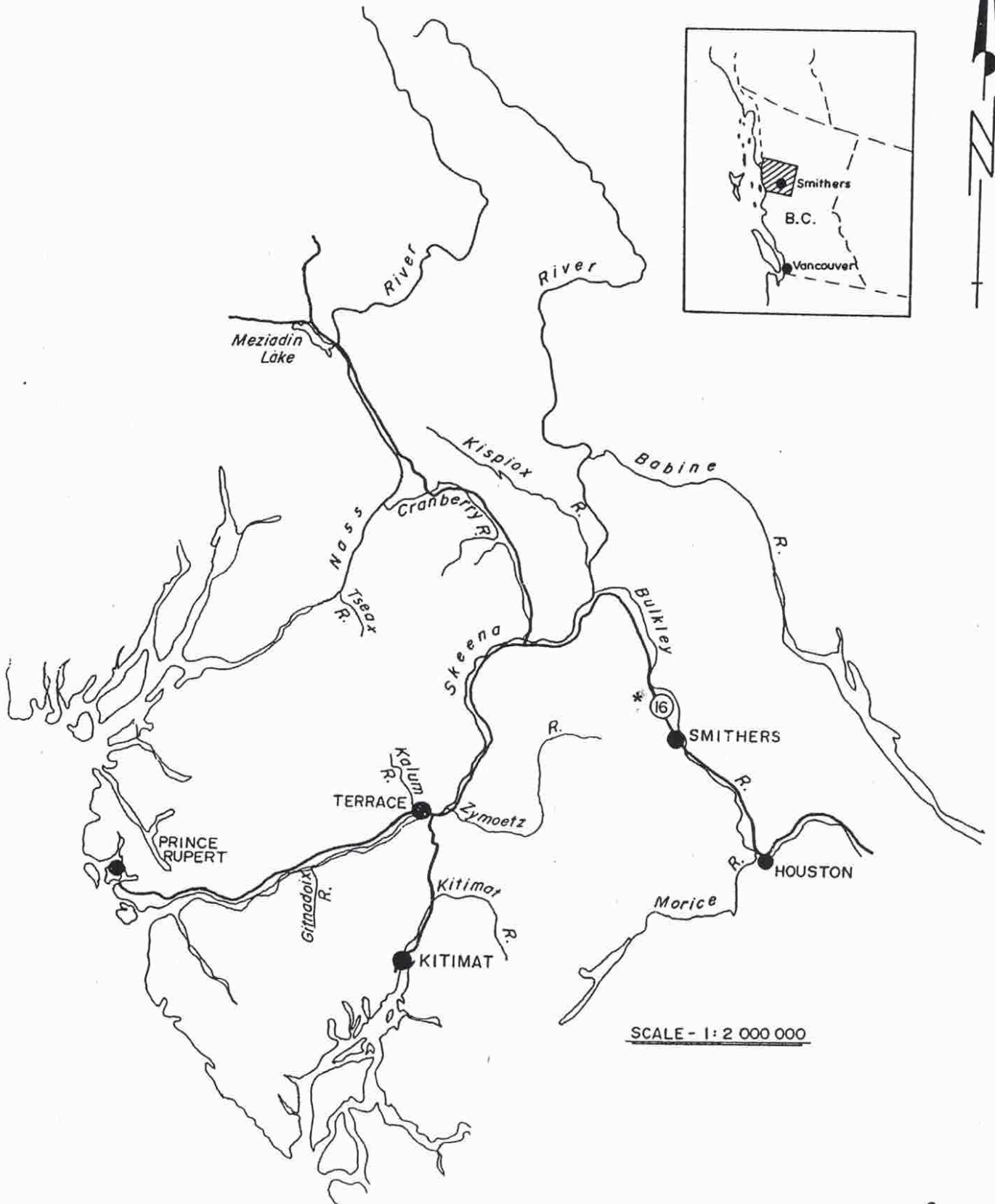
The Toboggan Creek Salmon Hatchery, under the direction of the Toboggan Creek Salmon and Steelhead Enhancement Society, has just completed its twenty-second year of successful operations. The Toboggan Creek Hatchery facility is located thirteen kilometers north-northwest of Smithers, British Columbia, 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. During the same period, Chinook stocks were showing increasing escapements. In more recent years however, since 2001, we have observed greatly improved Coho escapements and a decreasing trend for Chinook stocks. The upper Bulkley Chinook stock, a genetically unique population, had seen only 150 to 200 wild spawners in the mid 1980's. With enhancement this stock improved steadily until 2001, when 5,600 spawners escaped to the system. 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 2006/07 contract period our Society reared and released some 60,000 Chinook and 65,000 Coho salmon smolts from the 2004 brood year, as well as 5,000 Coho fry from the 2005 brood year. Successful rearing of another 54,000 Chinook and 30,000 Coho from the 2005 brood continues, with these salmon being reared through to smolt for release in the spring of 2007.

Egg takes for the 2006 brood Chinook from the upper Bulkley River went well, and at present we have 45,000 Chinook alevins incubating at the hatchery. Chinook spawning escapements to the upper Bulkley were poor again this year however, with only 770 Chinook adults estimated in the system. The low number escaping to the system in 2006 is a growing concern, given it is less than 14% of the 2001 brood-year count of 5,600 Chinook adults.

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





Coho returns to the upper Skeena tributaries in 2006 were fairly strong. The Toboggan Creek escapement in 2006 was 3,100 Coho, representing our eighth consecutive good return. Escapements to the upper Bulkley River system were not recorded this past year, although some CWT sampling at Moricetown by Wet'suwet'en Fisheries during the fall period indicated a strong showing for Bulkley Coho of hatchery origin. Our target of 40,000 Toboggan Creek Coho eggs was attained from broodstock collected at the counting fence. Enhancement of the Upper Bulkley Coho stock was discontinued in 2005 due to a lack of funding.

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 4<sup>th</sup> this year. This enabled an accurate assessment of our eighteenth major return of hatchery-produced Coho to Toboggan Creek. The fence data indicated hatchery returns of 705 coded-wire tagged (CWT) Toboggan Coho in 2006, and from a release of 31,060 smolts this is a 2.3% return. The 2006 return is the sixth best overall 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 1,360 Coho from the release, and at a 4.4% survival rate this is a slightly above average. The rate of exploitation on the Toboggan CWT's was approximately 49% in 2006, with the B.C. commercial catch accounting for the majority of the mortalities. Previous exploitation rates, prior to 1998, had ranged from 55% to well over 70%. In the five years previous to 2006 the average exploitation rate was 38%, and this year's estimate represents a noticeable increase.

Around 25% of Toboggan Coho handled in 2006 were adipose-clipped salmon, and we estimate the makeup of the stock was approximately the same. Marked fish in this return year were all hatchery Coho, as 2002 was the last year of wild CWT returns to Toboggan Creek. Approximately 8% of the CWT's sampled in 2006 were identified as stray Coho from the Bulkley River and Canyon Creek stocks. As a result, it is estimated that hatchery Coho from the Toboggan stock made up 92% 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 (2006/07)

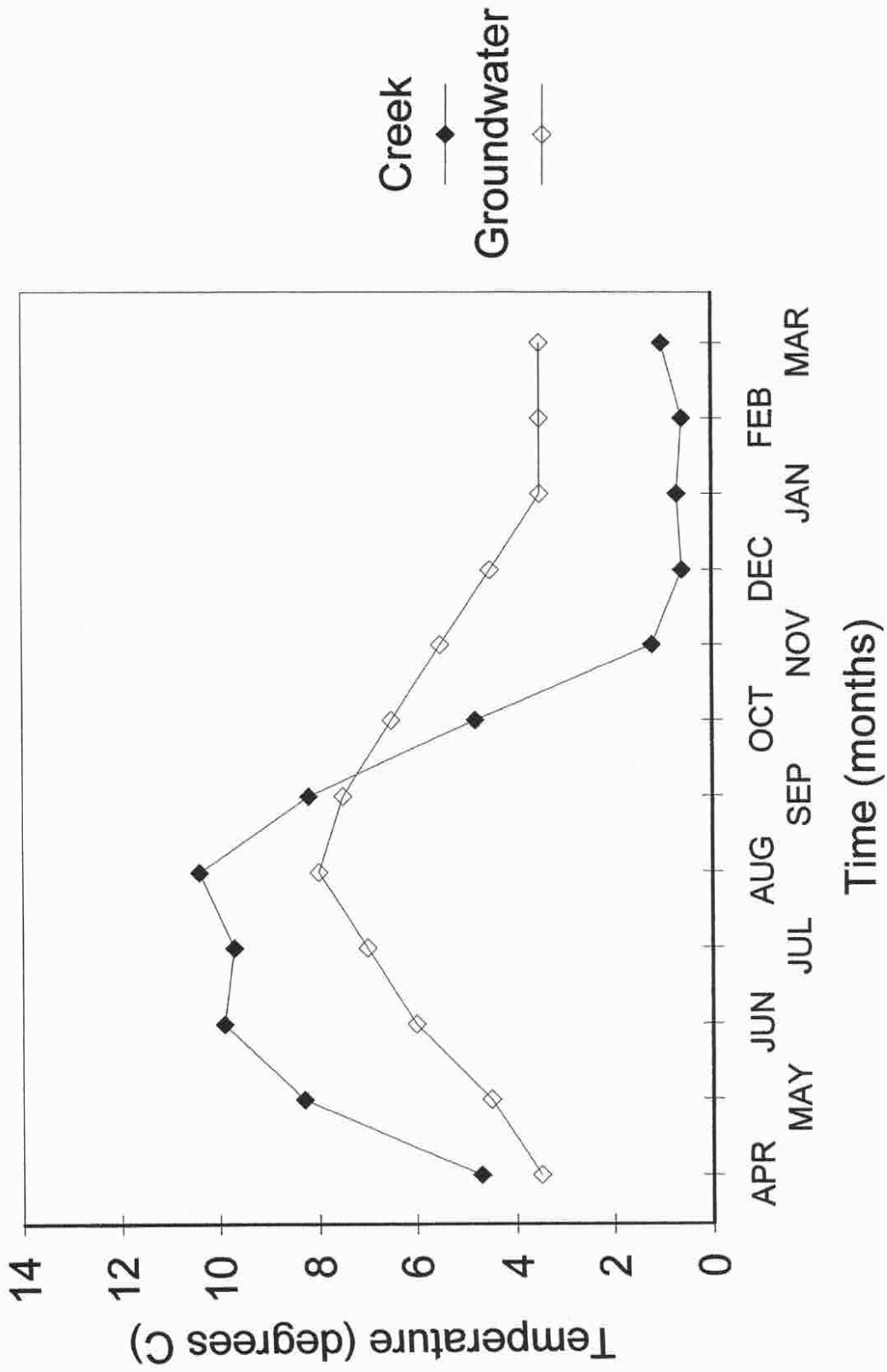
As for the previous years, the average daily temperatures of the three hatchery water sources were recorded and average weekly temperatures have been calculated. We depend on two of the water sources for egg incubation and fish rearing, ground water from an underground collection system and surface water 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 liters per minute, the normal operating flow is 1,600 to 1,800 liters 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 liters per minute and is used solely for incubation purposes and initial chinook ponding.

Average water temperatures in 2006/07 were similar to those of past years. The creek temperatures increased rapidly in the spring this year, and stabilized during the summer months. Temperatures during the summer period were similar to most other years, and peak temperatures occurred in August as usual (Fig. 2). The only anomaly in the summer of 2006 was a cooler than normal period in July. 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 2006, with only a few short periods of higher flows in May and June. The levels of this year followed the long-term average pattern of other years fairly closely, although they were generally lower through the fall and early winter period due to a lack of precipitation. The pattern in 2006/07 was very similar to that seen in the latter part of last year. Winter flows through this period were fair to good and dewatering of Coho salmon redds should not have been a factor in 2006/07. 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 2006 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 2006/07 should have been excellent.

**Fig. 2 Temperatures at Toboggan Creek Hatchery (2006/07)**



## TOBOGGAN CREEK HATCHERY - SALMON BROOD YEAR SUMMARIES

### Bulkley River Chinook (2004 brood)

Releases of the 2004 brood Chinook smolts commenced May 2<sup>nd</sup> and were completed on May 5<sup>th</sup>, 2006. A total of 59,690 Chinook smolts were taken in batches of up to 10,000 fish to the upper Bulkley River, near Houston, B.C. These smolts averaged 10.9 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	18,400
McQuarrie Creek confluence	19,270
Perow	22,020
Total released	59,690

Releases took four work days to complete this year, and we had just one crew and vehicle working. The releases took 7 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 92.1 % over a 20 month period from late August of 2004 to mid April of 2006. This group of smolts looked to be very 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 (2005 brood)

Ponding of the 2005 brood Bulkley River Chinook fry commenced on March 18<sup>th</sup> and was completed by March 27<sup>th</sup>, 2006. These 0.40 gram fry were ponded in one Capilano trough and feeding was initiated with #0 Skretting starter. The Chinook got on the starter feed quickly and were split into two troughs in April. A total of 54,275 salmon fry were ponded and initial survivals were excellent. Green egg to ponding survivals were over 96%

Growth of the 2005 brood Bulkley River Chinook fry increased rapidly, commencing in mid May, 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 2006/07 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 over 4 months. At the present time these Bulkley River Chinook smolts average 10.0 grams in weight, and we hope to have them at 10.5 to 11.0 grams prior to release in late April of 2007.

These Chinook fry were split into 3 Capilano troughs in mid May and their densities were reduced again in late June, when they were transferred to the two large indoor troughs. We did not experience any serious problems during the initial indoor rearing of the 2005 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 approached 15.0 kilograms per cubic meter.

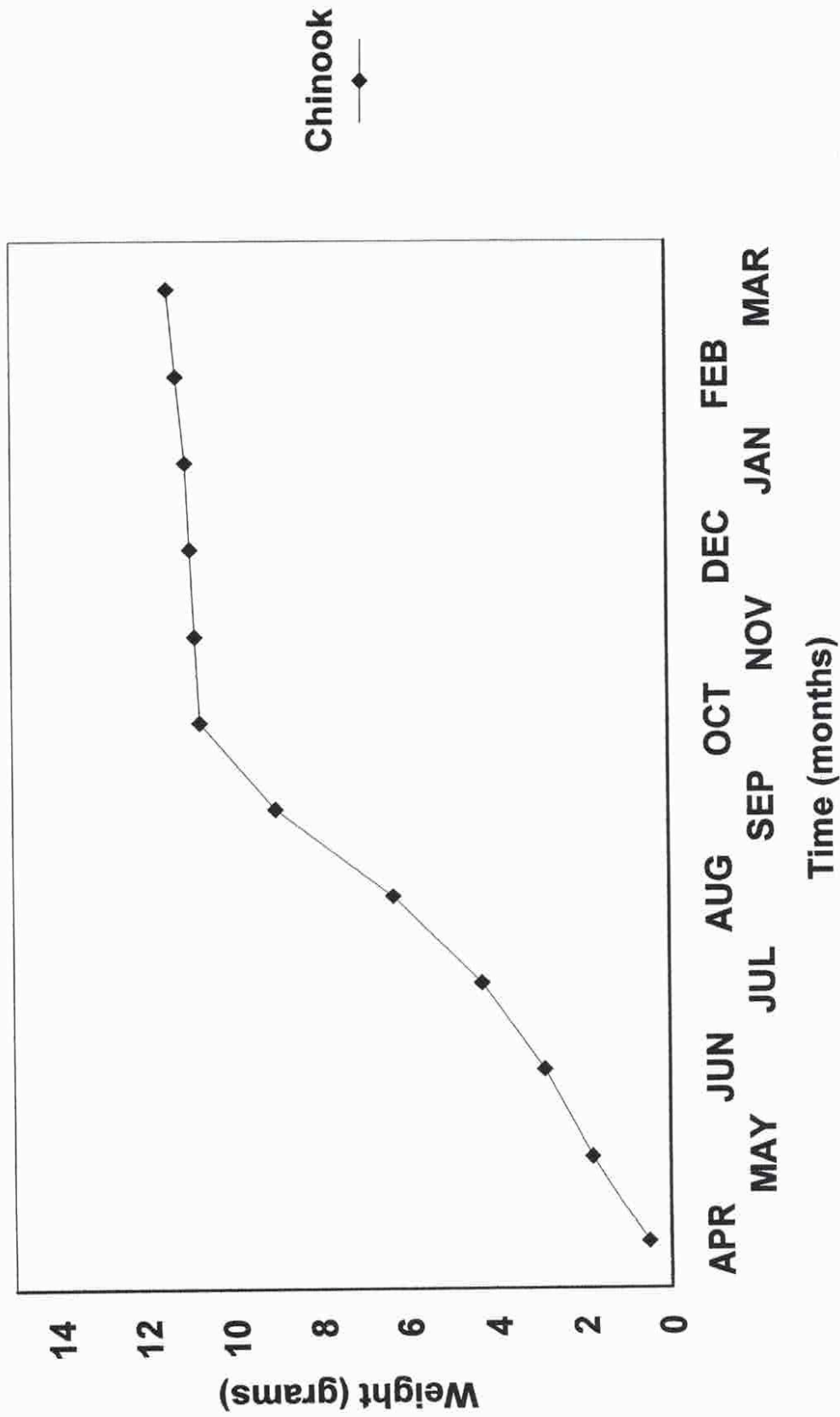
Coded-wire tagging occurred between August 9<sup>th</sup> and 11<sup>th</sup>, 2006. All of these tagged Chinook fry were transferred to compartments "A" and "C" of the outdoor rearing channel immediately after tagging. Survivals during tagging were excellent as usual and a total of 53,715 Upper Bulkley River Chinook were marked.

<u>Tag Code</u>	<u># Tagged</u>
18-54-05	26,896
18-56-56	26,819
Total Tagged	53,715

Survivals since ponding have been excellent and presently are over 98%. Green egg to release survivals may exceed 94% and we presently have over 53,500 Bulkley River Chinook remaining.



**Fig. 3 Growth of 2005 Brood Chinook Salmon in 2006/07.**



### Bulkley River Chinook (2006 brood)

Broodstock collection of the 2006 brood Bulkley chinook began on August 18<sup>th</sup>, 2006 and by August 22<sup>nd</sup> we had attained our target of 50,000 eggs. A total of 14 female and 50 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 17, 2006. A total of 711 chinook were observed between the Morice River junction and the Bulkley Falls, with over 67% occupying the section of river from Perow downstream to Knockholt. Very few spawners were found in the Richfield Creek section this year, which is usually a major area of consistent use. We sampled a total of 217 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 78% wild and 22% adipose clips. Given that this stock was not enhanced in 2001, due to a very large return, the hatchery component was relatively high. Male chinook made up 60% of the spawners sampled in 2006.

Results of the helicopter count were as follows :

	Aug. 17 <sup>th</sup>
Above Bulkley Falls	not flown
Meanwhile Creek	21 chinook
Topley	56 chinook
Richfield Creek	12 chinook
Perow Station	73 chinook
McQuarrie Creek	29 chinook
Below McQuarrie Creek	379 chinook
Below Knockholt	36 chinook
Houston	105 chinook
in Buck Creek	not flown
Total observed / flight	711 chinook

Visibility during the assessment flight was excellent. Chinook were easily counted in the pools, as well as on the spawning riffles, due to the very good light conditions. 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. Relatively 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 770 adults (four to six year old chinook). This is less than 14% of the year 2001 escapement of 5,600. Bulkley chinook are typically five years old at spawning.

The physical condition of the spawning chinook was fairly good this year, and few pre-spawn mortalities were seen. Egg quality was very good, and the females were observed to be covering the redds well after they had spawned out. There were a few heat-stressed fish observed in the upper reaches near Topley and above. The size of the male spawners in particular this year was well above average for their age groupings, with a large proportion of robust four-year old males present. Size of females appeared normal assuming a normal age structure (i.e. few four-year olds). Scales were taken from a random sample of spawners to verify age classes.

Considering that our largest-ever spawning escapement occurred in 2001 (5,600 chinook), there was a very poor showing of five-year olds this fall. This was similar to low numbers of four-year olds from the same brood year in 2005. The average length (POH) of the brood females collected in 2006 was 660 m.m. and the average weight was 6.8 kilograms, these salmon ranged from 590 m.m. to 740 m.m. in length.

Shocking and picking of the 2006 brood Bulkley River Chinook eggs was completed in late September at 280.0 accumulated thermal units (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 94.9 % in 2006 (Table I). Volume estimates done at eyed stage verified our spawning estimate of close to 50,000 eggs collected from the Bulkley River Chinook stock. Hatching of these eggs peaked at 600.0 A.T.U.'s this year, and survivals since hatch have been very good. Presently we have approximately 45,000 Chinook alevins still incubating.

Development of the 2006 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 April.

Table I. Shocking and Picking Summary for the 2006 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>
M1-2	1	172	511	98(1.96)	1,980	3,367(83.1)
M1-3	2	31	379	139(2.78)	3,050	8,100(95.2)
M1-4	1	35	264	125(2.50)	1,660	3,881(92.9)
M1-5	2	26	157	114(2.28)	3,100	6,917(97.4)
M1-6	2	47	382	111(2.22)	3,520	7,431(94.5)
M2-5	3	86	166	106(2.12)	3,200	6,618(95.3)
M2-6	2	24	120	120(2.40)	3,660	8,656(98.4)
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<u>Totals</u>	13	<u>421(0.9%)</u>	<u>1,979(4.2%)</u>	<u>116(2.32)</u>	<u>20,170</u>	<u>44,970(94.9)</u>
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### Toboggan Creek Coho (2004 brood)

Survivals were excellent during April and May of 2006, prior to this stock's release. A total of 32,640 coded-wire tagged smolts were released during the spring of 2006, the screens were pulled on May 18<sup>th</sup> and all of these 12 gram smolts had migrated out by June 6<sup>th</sup>. Growth of these Coho was excellent from April 1<sup>st</sup>, 2006 until release, increasing from 8.2 to 12.0 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 5.1 grams on August 31<sup>st</sup>, 2005 into Canyon Creek as part of a fed fry study. All 5,245 of these Coho fry were adipose clipped and coded-wire tagged.

### Bulkley River Coho (2004 brood)

Releases of Coho smolts from this stock commenced on May 30<sup>th</sup> and were completed on May 31<sup>st</sup>, 2006. These smolts were all part of a single release group, as the time-of-release study was completed last year. The Coho smolt tag group was released in a similar manner at Topley and at Perow. The 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 11.0 grams in this seven-week period. There were no Bulkley River Coho fry surplus to the tag group in 2006/07.

### Toboggan Creek Coho (2005 Brood)

Ponding of the 2005 brood Toboggan Coho was completed by May 4<sup>th</sup>, 2006. Growth of these Coho increased rapidly in the summer and fall of 2006, from 1.8 grams near the end of June up to 9.1 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.

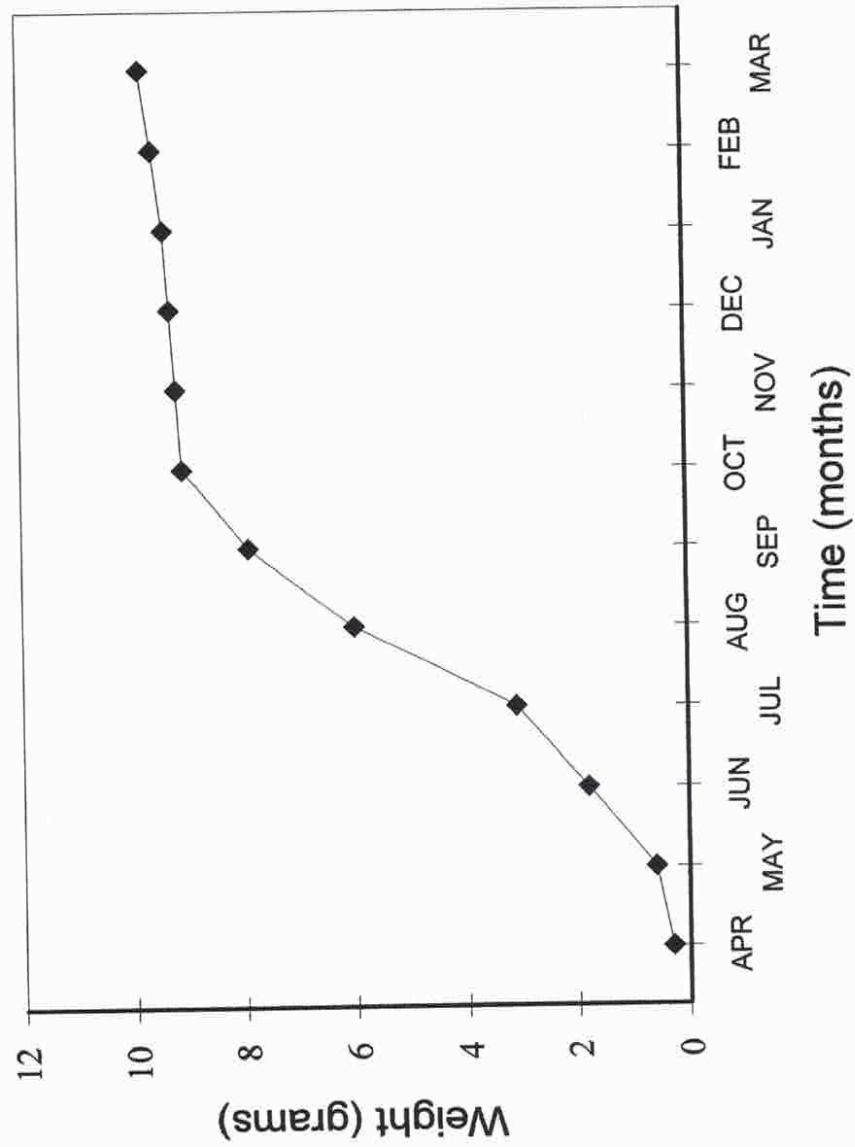
These Coho fry were split into two Capilano troughs in late May and split again into three troughs in June. We divided this stock into four troughs in July, and were able to keep these fry indoors until the tagging crew arrived. Overall health of this stock was excellent throughout the rearing cycle, and survivals from fry ponding in May, 2006 to smolt size in late March, 2007 were over 98 %. These are excellent survival rates for this Coho stock.

Coded-wire tagging of this stock was completed on August 8<sup>th</sup> and 9<sup>th</sup>, 2006. A total of 30,548 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 5,167 tagged and clipped Coho were released. These fry were released at 5.5 grams in weight on August 24<sup>th</sup>, 2006.

<u>Tag Code</u>	<u># Tagged</u>
18-48-05	25,611
08-29-63	4,937
08-03-47	5,167
Total Tagged	35,715

Survivals of the smolt group were excellent after tagging and through the winter period and we expect to release well over 30,000 Toboggan Creek Coho smolts in the spring. We plan on pulling the channel screens in early to mid May of 2007. These smolts will then be able to migrate out on their own timing.

**Fig. 4 Growth of 2005 Brood Coho Salmon in 2006/07.**



Toboggan



### Toboggan Creek Coho (2006 brood)

Most of the 2006 brood Coho eggs collected from Toboggan Creek this fall were taken from adult Coho intercepted at our fence operation. A total of 78 adult Coho spawners were collected and transported back to the hatchery for egg-take purposes. We conducted two egg takes, one on October 10<sup>th</sup> and one on October 17<sup>th</sup>, and all females surplus to our egg-take needs were released back into the stream. All of the eggs were disinfected with an iodine solution after fertilization, and prior to being placed in the moist incubators.

Eggs were taken from a total of 13 ripe female Coho and sperm was taken from 65 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 samples tested negative for BKD. Scales, weights and lengths were also taken from all of the brood females. Average weight was 4.0 kgs., while overall the average length was 570 mm. A total of 50 random scale samples were collected from both female and male Coho, as requested by DFO's Stock Assessment Division. Of 46 readable scale samples, taken only from wild Coho spawners, 32 (70%) were three-year olds and 14 (30%) were four-year olds.

Shocking and picking of the 2006 brood Toboggan Creek Coho eggs began on January 3<sup>rd</sup>, 2007 and was completed on January 11<sup>th</sup>. The Coho egg survivals to this stage were excellent (94.7%), and a total of 39,602 eggs survived (Table II). Fecundity of the Toboggan Coho averaged 3,200 eggs per female in 2006, as compared to 2,700 the year previous.

The 2006 brood Coho eggs began hatching at 380.0 A.T.U.'s and peak hatch occurred at 420.0 thermal units. The survivals during hatch were excellent, and ponding of this stock will likely occur in early May of 2007.

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 2008. Up to 30,000 of these fish will be released into Toboggan Creek, as coded-wire tagged Coho smolts, and any remaining surplus Coho fry may be transplanted into the Canyon Creek drainage after tagging is completed. The CWT tagging crew is scheduled to show up in early August to tag and clip the 2006 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 39,400 Coho alevins from this stock still incubating.



Table II. Shocking and Picking Summary for the 2006 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	1	4	35	166(3.32)	990	3,251(98.8)
M1-3	3	48	116	148(2.96)	3,350	9,796(98.4)
M1-4	3	92	580	165(3.30)	2,930	9,088(93.1)
M1-5	3	166	626	189(3.78)	2,540	8,978(91.9)
M1-6	3	170	361	165(3.30)	2,680	8,489(94.1)
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<u>Totals</u>	<u>13</u>	<u>480(1.2%)</u>	<u>1,718(4.1%)</u>	<u>167(3.34)</u>	<u>12,490</u>	<u>39,602(94.7)</u>
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## Assessment of Coho Escapement in 2006

### Toboggan Creek Fence

The Toboggan Creek Coho counting fence commenced operation on July 26<sup>th</sup>, 2005. The fence was monitored a least twice daily from this date through to October 27<sup>th</sup>, at which time the aluminum panels were removed due to freezing conditions.

A total of 2,781 Coho were passed through the fence in 2006, with the first Coho captured on August 19<sup>th</sup> and with the spawning migration into the creek peaking from September 24<sup>th</sup> through September 27<sup>th</sup>. In addition to our normal sampling, we floy tagged and operculum punched a large number of Coho. A total of 280 Coho were tagged at the fence in 2006, 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 2006 was 3,100 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 25% of the salmon handled at the fence were estimated to be coded-wire tagged hatchery returns from the 2003 brood Toboggan Creek smolt release group. This represents a total of 705 spawners returning from a release of 31,060 smolts, and a 2.3 % survival to spawn.

### Bulkley River Fence

The Bulkley River counting fence did not operate in the fall of 2006 due to a lack of funding, as well as the cancellation of the Bulkley River Coho enhancement program. Random sampling of adipose-clipped Coho at Moricetown Canyon in 2006 indicated a substantial return of Bulkley River CWT's however. Bulkley Coho were 1.2 times as abundant as Toboggan Coho in the sample, indicating 860 hatchery returns to the Upper Bulkley River last fall.

### Coho Hatchery Returns (2003 brood)

All of the upper Skeena waters were closed to the harvest of Coho at the beginning of the 2006 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 2006, a catch estimate was developed. There were a total of 6 CWT-pinned heads turned in by anglers last fall, from Coho captured in the Bulkley-Morice watershed, with five carrying pins that indicated they were from the Toboggan Creek stock. We estimated a participation rate of 35% (lower than some previous years due to the wider expanse of the area open to harvest) indicating a total harvest of 14 CWT's and 42 unmarked wild Toboggan Coho in 2006. The total harvest as a direct result of the in-river angling opportunity this season accounted for less than 2% 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 50 Coho heads from marked adult spawners in Toboggan Creek during 2006, and of these 49 carried pins (98%). The proportions of the Toboggan Creek smolt group in the sampling, by tag code, were as follows:

<u># of Coho</u>	<u>Tag Code</u>
45	18-54-51

Of these 45 pinned heads, all were from 2003 brood Coho salmon reared and released at the Toboggan Creek Hatchery site. There were, however, three more heads that were collected from Toboggan that were identified as Bulkley Coho (2003 brood) and one head that was identified as a Canyon Creek Coho (2003 brood). The portion of the marked escapement not attributable to the Toboggan Creek Hatchery smolt group (8.2%) was not included in any of the calculations of total escapement or survival for the 2003 brood release.



## Exploitation of Toboggan Coho in 2006

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:

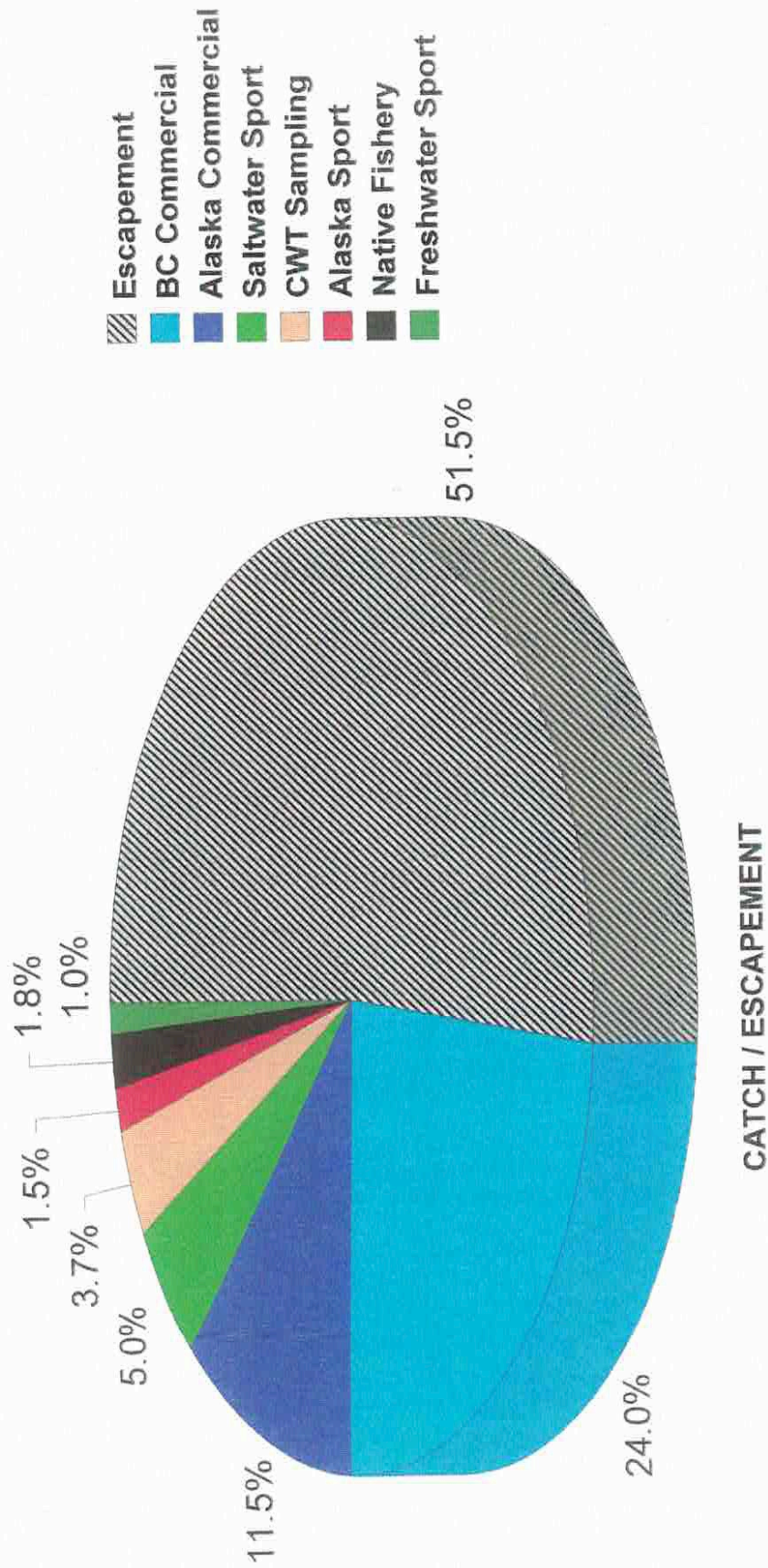
Escapement	-	Toboggan Creek Hatchery
B.C. Commercial	-	Fisheries & Oceans Canada / Toboggan Hatchery
Alaskan Commercial	-	Alaska Department of Fish and Game
B.C. Sport	-	Fisheries & Oceans Canada / Toboggan Hatchery
Alaskan Sport	-	Alaska Department of Fish and Game
Native Food	-	Wet'suwet'en Fisheries / 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 49% in 2006 (Fig.5). Of this total catch of approximately 663 Toboggan Creek Coho in 2006 it is estimated that Alaskan commercial vessels harvested 24%, BC saltwater anglers took 10%, in-river Native food fisheries accounted for 4%, BC commercial fishermen were responsible for 50% of the mortalities, BC freshwater anglers took 2%, and Alaskan anglers took 3%. As well, a coded-wire-tag sampling program at Moricetown Canyon removed 7% of the stock as part of a DFO assessment initiative. This result in 2006 is the second highest exploitation rate seen over the past nine years. The Toboggan Creek coded-wire tagged spawning escapement, estimated at 705 Coho in 2006, represented 51% of the total adult stock produced from our 2003 brood smolt releases.

Alaskan commercial fishermen harvested fewer Coho in 2006 than the estimated mortalities as a result of B.C. commercial fisheries, this due to an intensive net fishery targeting Skeena sockeye in Area 4 during July and August. Although the Area 4 commercial net fisheries were mandatory non-retention for Coho it is estimated that the associated mortalities accounted for 24% of the available summer-run stock. These data indicate that Canadian interests were responsible for over two thirds of the commercial mortalities in 2006, for the first time in many years.

Survivals of hatchery-produced Coho smolts from this facility were above average in 2006. Assuming the catch rates are accurate we saw smolt to adult survivals of just under 4.4% for the 2003 brood, with about 1,368 adult Coho produced from a release of 31,060 Toboggan Creek smolts. These survivals are the seventh highest we have seen in the last seventeen years of sampling, and indicate a recent increase in ocean productivity. This remains graphically different from a decade ago when, in 1997, we documented Coho smolt to adult survivals of only 0.5%.

**Fig. 5 Catch of Toboggan CWT Coho (2006)**





## Administration Report

This section covers hours spent from April 1<sup>st</sup>, 2006 to March 31, 2007.

The following table is a breakdown of hours spent carrying out the contract in 2006/2007:

<u>Activity</u>	<u>Man-hours</u>
Project Management	432.0
Facility Operations	3,764
Broodstock Collection	490.0
Assessment	60.0
Coho Fence	430.0
Statutory Holidays	184.0
<hr/> <u>Total Hours in 2006/07</u>	<hr/> <u>5,360.0</u>

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 fifteen years. In 2006/07 our hours of work spent were similar in most categories except facility operations, where they were down from last year. Volunteer hours also contributed to our operations last year, but should not be depended on to function properly.

Total employment generated by the hatchery in 2006/2007 added up to 120 full work-weeks, employing 9 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 of DFO.

Labor costs were more than what was budgeted for in the contract period, as they were in the previous four contracts as well. Our Society has been in a deficit position for the same period. The base contract deficits are 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 labor, overhead and supply costs have risen dramatically over the past 15 years our direct DFO contract funding has remained unchanged.

The following is a summary of expenditures made in carrying out the 2006/2007 contract :

<u>Category</u>	<u>Expenditures</u>	<u>Contract</u>
Direct Labor	95,296.00	91,000.00
Overhead Costs	23,824.00	22,750.00
Capital Equipment	0.00	0.00
Operations	35,180.00	40,550.00
<hr/>		
Totals	154,300.00	154,300.00
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The labor 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 Toboggan Creek Coho for fry planting, assessment of wild and hatchery juvenile Coho migration, and expanded assessment of adult Coho returns to Toboggan Creek.

Financial losses have not been reimbursed by DFO, and put undue strain on our program.

## 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. The channel abutments are in poor condition, and need to be replaced. This has been an action item for a few years now.
- 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 by hatchery staff this year as a follow-up to work done in previous years to stabilize the water intake feeding the settling pond. The intake structure is over 23 years old, and in need of replacement.
- 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 future years.



## Operating Plan for 2007/2008

As in previous years we will begin releasing our salmon smolts in April. The 2005 brood Bulkley River Chinook will be the first to go in late April, followed by the Toboggan Creek 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 53,500 Chinook smolts to the Bulkley River and more than 30,500 Coho smolts will go into the Toboggan Creek system.

Our Chinook target has been reduced to between 45,000-50,000 eggs in recent years, and eggs will only be taken if the escapement is under 5,000 spawners. We plan to continue with assessment of Chinook returns whether or not egg takes occur. This year will be our sixteenth year of assessment of coded-wire tagged and total Chinook returns to the upper Bulkley River.

Coho egg targets have been reduced as well, and between 35,000-40,000 Toboggan Creek Coho eggs will be targeted in 2007. The Bulkley River Coho program was cancelled in 2005/06 due to a lack of adequate funding from DFO. As usual, the 2007 brood Coho will be reared to smolt size, at 12.0 to 15.0 grams, and released in the spring of 2009.

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 had intended on continuing with enumeration of steelhead trout spawners into Toboggan Creek in the spring of 2007. Unfortunately a collection permit could not be acquired from the Ministry of Environment to do so. 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 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) The outdoor rearing channel is in desperate need of repair and upgrading. The treated wood abutments are rotting and heaving and need to be replaced. As well, the earthen channel is very hard to clean and disinfect after the smolts are released, and prior to the new fry being transferred in. Bacteria carryover is a large concern.
- ii) Assessment of returning coded-wire tagged Chinook would be greatly improved if we could get more accurate data from the in-river First Nation's and licensed angling food fisheries in the summer season. Each year thousands of Chinook are landed by participants involved in both of these fisheries on the lower Skeena and Bulkley Rivers. While local angler participation in the Coho fishery has been good, we are seeing less participation in the Chinook head recovery program. The data realized from this program are very relevant and provide information on stock timing and survival. We have noticed in the food fishery that the people in the communities 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 2006. Despite this, few if any CWT heads have been turned in by anglers and lodges participating in this ocean-based fishery. Conversely, in freshwater very limited opportunities have been made available but anglers have historically 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 scenario 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 for 2007 and onward, as well as encouraging retention of badly damaged fish caught by anglers and commercial fishermen. Otherwise, these salmon will not show up in either the catch or the escapement.

These recommendations are very similar to 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 4,280,000 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. A similar coded-wire tag program for an upriver Chinook stock would also prove very beneficial, and we were recently informed that funding approval through the Pacific Salmon Commission may enable this. A tag group of approximately 55,000 Morice River Chinook is planned.

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 especially the Stock Assessment Division of 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 base contract for over 15 years, and this issue will need to be positively addressed in the near future.

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 twenty-third 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.