ANNUAL REPORT FOR TOBOGGAN CREEK HATCHERY OPERATIONS IN 1995/96

Toboggan Creek Salmon and Steelhead
Enhancement Society

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Introduction

The Toboggan Creek Salmon Hatchery, with the direction of the Toboggan Creek Salmon and Steelhead Enhancement Society, has just completed its eleventh year of successful operations. The Toboggan Creek 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 is in turn leased to Fisheries and Oceans Canada for a nominal fee for use as the fish hatchery grounds. Funding for this contract is provided yearly by the federal Department of Fisheries and Oceans under the Community Involvement Division of the Salmonid Enhancement Program.

Over the past 30 years, and in particular during the 1980's, stocks of steelhead, coho and chinook native to Skeena River tributaries were severely impacted by commercial and Indian food fisheries. Some coho stocks on the upper Skeena have had dangerously low escapements in recent years. Chinook have had somewhat better escapements in recent years although some are still at depressed levels. The upper Bulkley chinook stock, a genetically unique population of salmon, has seen as few as 190 to 200 wild spawners in recent years. This fish stock is heavily impacted by an Indian gaff fishery at the Moricetown Falls on the lower Bulkley River near Smithers, B.C.

The Toboggan Creek facility, constructed during 1984/85, has been attempting to preserve and enhance endangered stocks of the three aforementioned salmon species. During the 1995/96 contract period our Society reared and released some 87,000 coho and 110,000 chinook salmon from the 1994 brood year. As well, we provided local P.I.P. projects and school classroom incubators with another 30,000 coho eggs and fry. Successful rearing of over 200,000 chinook and coho from the 1995 brood continues, with most releases set for the spring of 1997.

Egg targets for 1995 brood chinook from the upper Bulkley River were achieved and at the present we have approximately 92,000 fingerlings rearing at the hatchery. Chinook spawner escapements to the upper Bulkley were extremely poor in 1995, with only 334 salmon observed in the system. As has been the case for the past three years close to half of the escapement in 1995 was made up of marked returns from smolt enhancement.

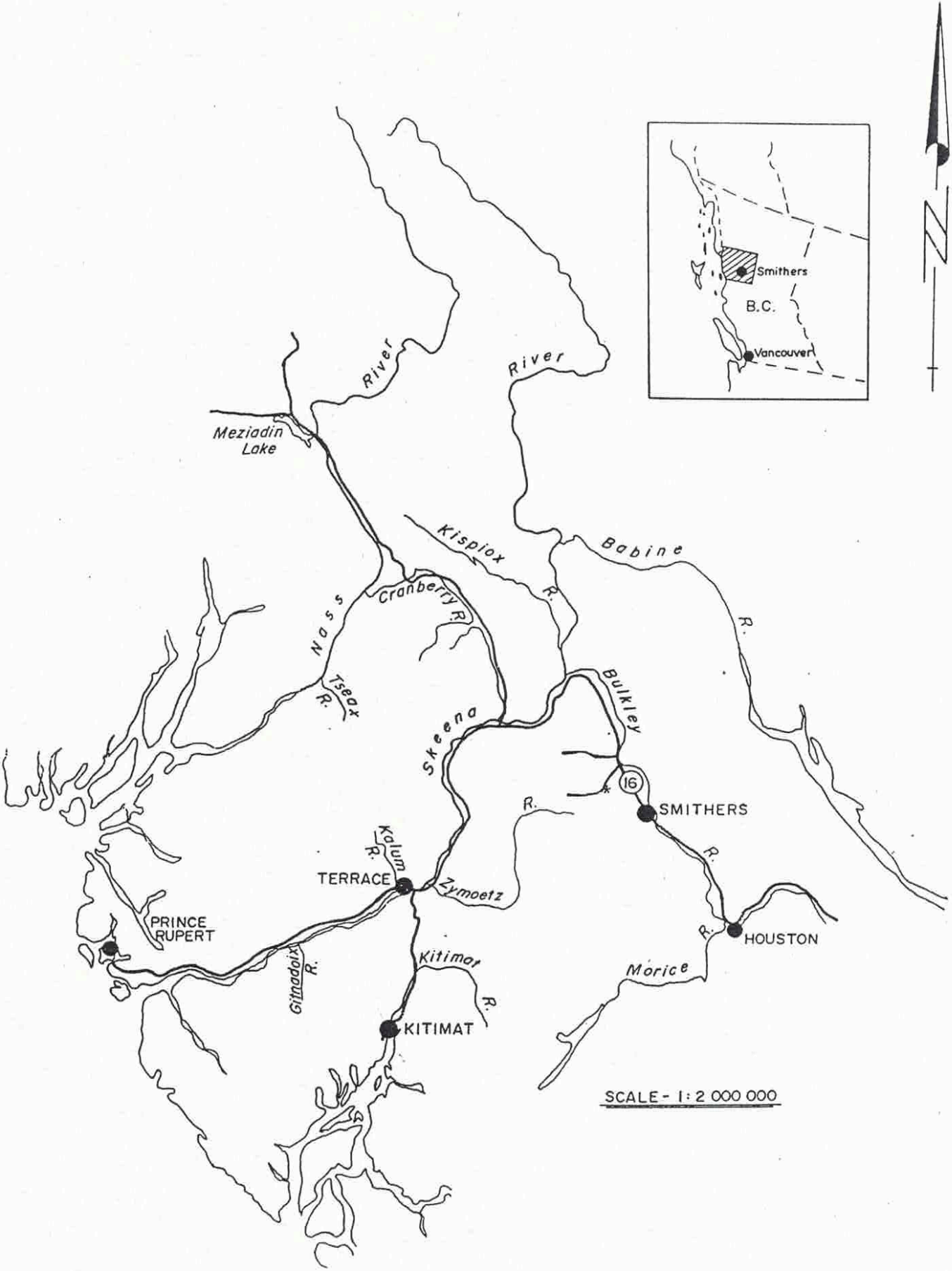


Fig.1 Location of Toboggan Creek Hatchery near Smithers, B.C. *

Coho returns to most upper Skeena tributaries in 1995 were down significantly from the previous summer, when a study for the Skeena Green Plan identified close to 20,000 coho in the Bulkley-Morice system. The overall exploitation of coho still is very high, especially in the commercial ocean fishery and in the Indian food fishery at Moricetown Canyon. Escapement to Toboggan Creek in 1995, at 1,762 spawners, was about the lowest we have seen in recent years, and fully 40% below the 6 year average of 2,938 coho adults. Egg collection for 1995 brood coho enhancement went well, with the assistance of both counting fences for adult broodstock collection, and we were able to attain our targets. Presently, we have 110,000 coho fingerlings rearing at the hatchery.

The Toboggan Creek Hatchery has the capacity to rear 155,000 coho and chinook salmon smolts from the Bulkley River system on a yearly basis. Initial incubation is accomplished using moist incubators and eggs are transferred to Heath stacks at the eyed stage, egg to fry survivals are usually over 97.0 %. 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 peak migration of wild smolts to the ocean. Ponding to release survivals usually exceed 95.0 %, a period of 12 months. Two full-time personnel are required to operate the facilty and extra manpower is hired during the summer and fall periods as needed.

The coho counting fence panels were installed on August first this year. This enabled an accurate assessment of our eighth major return of hatchery-produced coho to Toboggan Creek. The fence data indicated hatchery returns of 312 marked coho in 1995, from a release of 33,533 smolts this is a 0.9 % return. Preliminary coded-wire tag data from the northern troll and net fisheries indicate poor ocean survival of the stock after reaching the ocean as smolts. The data indicate a total adult recruitment of 550 coho from the release, at a 1.6 % survival it is among our poorest results from smolt to adult. The rate of exploitation, due to a lack of coho abundance and directed commercial effort, appeared to be less than 44.0 % in 1995. A marked reduction compared to 69.0 % the previous year.

Over 17.7 % of the Toboggan coho seen in 1995 were finclipped fish of hatchery origin, many of the remainder were probably second generation hatchery coho from the 1991 and 1992 brood years. We feel our wild coho are largely 4 year olds.

Our hatchery facility is frequented by over 2,000 visitors on a yearly basis and our Society encourages the public to learn more about the salmonid resource in British Columbia. Members of the Toboggan Creek Salmon & Steelhead Enhancement Society greatly appreciate the opportunity to be involved in efforts to enhance and conserve the wild salmon stocks of this area.

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 commercial fisheries.

iii) assess returns of 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.

iv) maintain a high public profile of the facility to inform the local population of the benefits and goals of the Community Involvement and Salmonid Enhancement Programs.

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 in the upper Bulkley - Morice drainages.

Water Supplies (1995/96)

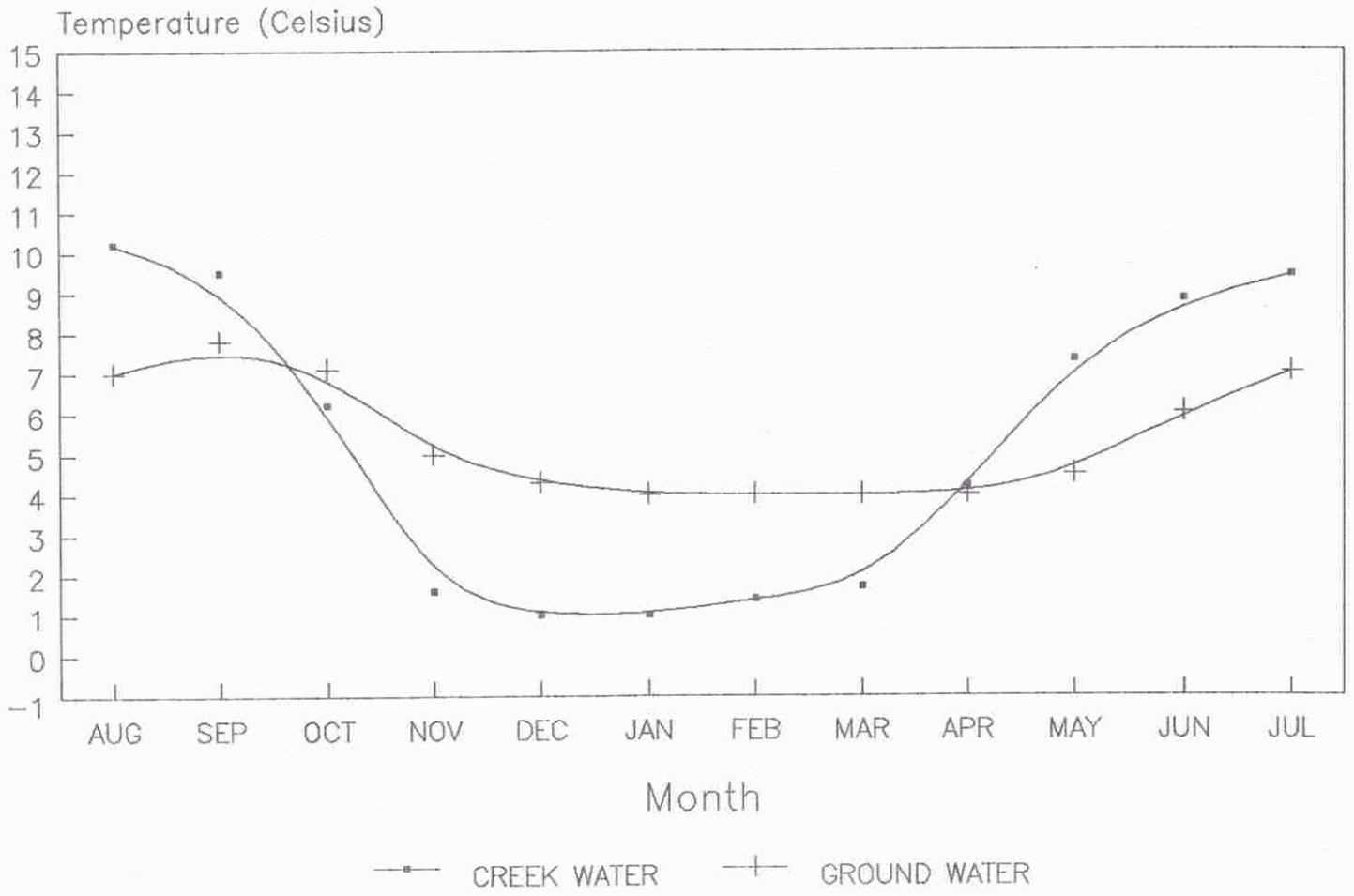
As for the previous nine years, average daily temperatures of the three hatchery water sources were recorded and average weekly temperatures have been calculated. We depend on two of the water sources for egg incubation and fish rearing, ground water from an underground collection system and surface water from Toboggan Creek. The third water supply, surface water of Brandt Brook, is used solely in emergency situations when the main creek supply is not operable. These three water supplies have proven very dependable over the years and we have never experienced a fish loss due to an interruption of flow.

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

Average temperatures in 1995/96 were similar to past years in most months. The creek temperatures increased quite rapidly in the spring this year, and declined just as rapidly in the fall period, which was extremely similar to the profile for 1994/95 (Fig. 2). On average, the creek supply fluctuates in between 1.0 and 12.0 degrees celsius and the ground supply is from 3.5 to 8.0 degrees celsius on a monthly basis.

Water levels and flows were stable overall during the summer and fall of 1995, due in part to the fact that Toboggan Creek is glacier fed. Again, the levels of this year followed the pattern of 1994 very closely with no substantial flooding in either the fall or the spring freshets. A lack of rain in the late fall, just prior to freeze up, left area streams lower than normal through the winter period and some dewatering of salmon redds was noticed in February and March of 1996. Flows during the steelhead spawning period, early May through June, were very constant and provided for excellent survivals from the egg stage to the swim-up fry stage of this species. Many steelhead fry were observed in Toboggan Creek in late July.

Fig.2 Rearing Temperatures
at Toboggan Creek Hatchery (1995/96)



TOBOGGAN CREEK HATCHERY - SALMON BROOD YEAR SUMMARIES

Bulkley River Chinook (1994 brood)

Growth of the 1994 brood chinook fry was good from the first of August until freezeup in late November. These salmon went from 3.4 grams in early August to 8.4 grams just prior to the winter period. An extremely long and consistently cold winter then stalled growth due to a lack of open water for feeding.

Releases of the 1994 brood chinook smolts commenced April 30 and were completed on May 06, 1996. A total of 88,058 chinook smolts were taken in batches of up to 9,800 fish to the upper Bulkley River, near Houston, B.C. These smolts averaged 10.3 grams in weight. As release conditions were fluctuating daily we spread the chinook out at our two main release sites, with some at the road bridge crossing at Topley, and the majority planted into the groundwater channel downstream of McQuarrie Creek. An additional 22,078 chinook from this brood year were released, as fed fry, prior to this. These fry averaged 3.1 grams at release, and all of these salmon were right-ventral clipped for future assessment purposes. These fed fry were released between August 1st and 3rd, 1995 into the upper Bulkley River, above the falls. Locations of smolt releases this spring are as follows:

Topley road crossing	31,330
McQuarrie groundwater area	56,728
Total Released	88,058

Releases took five work days to complete this year and we had one crew and two vehicles working, a total of 12 individual trips were required. Everything went very well on all of the releases and we observed very few mortalities in total. Using the new 1,500 litre transport tank again enabled us to speed up the releases and reduce stress on the smolts in transport. Green egg to release survivals of this stock were 93.1 % over a 20 month period from mid August, 1994 to early May of 1996.

This stock was enumerated prior to release by using standard subsampling 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 (1995 brood)

Broodstock collection for 1995 brood Bulkley chinook began on August 19, 1995 and by August 23rd we had attained our target of 110,000 eggs. A total of 32 female and 52 male chinook had eggs and sperm collected from them, all males were released back into the river after expression. Eggs were transported unfertilized back to the hatchery and each female's eggs were then fertilized using sperm from 6 different males. Prior to incubation all eggs were rinsed, water hardened, disinfected and screened. Kidney and spleen samples were removed from all females, and were then sent to the Pacific Biological Station for screening of bacterial kidney disease.

Chinook assessment was carried out in conjunction with these egg takes, beginning with a helicopter count of spawners on August 18, 1995. A total of 334 chinook were observed between the highway crossing west of Houston and Topley, visibility into the deep water was not perfect this year, and it appears that we missed a few chinook spawners. We sampled a total of 244 different chinook during and after broodstock collection, we also had 21 additional chinook recaptures as identified by operculum punches. The overall composition of the run in 1995 was 48 % wild and 52 % hatchery clips. During this assessment we managed to collect 62 c.w.t. heads from clipped chinook.

Results of the helicopter count are as follows:

		Aug. 18
above Bulkley Falls	-	not flown
Meanwhile Creek	-	0 chinook
Topley	-	0 chinook
Richfield Creek	-	45 chinook
Perow Station	-	17 chinook
McQuarrie Creek	-	3 chinook
below McQuarrie Creek	-	197 chinook
below Knockholt	-	5 chinook
Houston	-	67 chinook
in Buck Creek	-	not flown
Total observed / flight	-	334 chinook

From these observations, and from previous years' experience, I would estimate the chinook escapement to the upper Bulkley River to be around 360 to 380 adults in 1995. We estimated to have captured, and sampled, almost 65 % of the chinook on the upper Bulkley spawning beds this year.

A total of 120 scale samples were taken from chinook spawners in 1995. These scale samples have been sent to the scale lab for analysis. The 32 brood females averaged 658 mm in hypural length and weighed 5.8 kgs. This is slightly smaller than the females taken for broodstock in 1994.

These events along with the population estimates and the egg take results have been documented and were submitted to the D.F.O. office in Smithers at the conclusion of fieldwork.

All of the eggs collected in 1995 were taken in the field and transported to the hatchery prior to fertilization. After the eggs were fertilized they were disinfected and water hardened for one hour before being placed in the moist incubators for initial incubation purposes.

Shocking and picking of the 1995 brood Bulkley River chinook eggs was completed on September 26, 1995, at 280.0 A.T.U.'s. All of these chinook eggs were then moved to Heath trays for hatch. Overall survivals to eyed stage were good and averaged 97.3 % (Table I). Volume estimates at eyed stage verified our spawning estimate of approximately 110,000 eggs collected.

Development of the eggs and alevins was similar to past years and ponding was completed on February 19th, 1996. Very strong survivals were evidenced during hatch and ponding and the fry got on the feed very quickly. A total of 105,527 chinook were initially ponded into two capilano troughs at an average size of 0.45 grams, were split into 3 troughs during March at 0.52 grams in weight and into 4 troughs in April when 0.73 grams. Growth this year has, again, been slower than normal during early rearing, even though feeding methods remain consistent. As of the end of July this stock is averaging 3.3 grams, and is slightly behind the previou year's growth rate (Fig. 3). These fish are feeding very actively and, as was the case for the 1994 brood, we expect growth to accelerate before winter.

Coded-wire tagging occurred between June 12th and June 14th, 1996 and this tag group is now rearing in compartments "B/C" of the outdoor rearing channel. In total, 75,433 chinook were tagged and adipose clipped, average size at tagging was 2.0 grams and tag loss was less than 1.0 %. Since tagging we have left ventral clipped all of the remaining Bulkley chinook fry surplus to the coded-wire tagged group. These surplus chinook will be released in September of 1996 at 5.0 grams in weight.

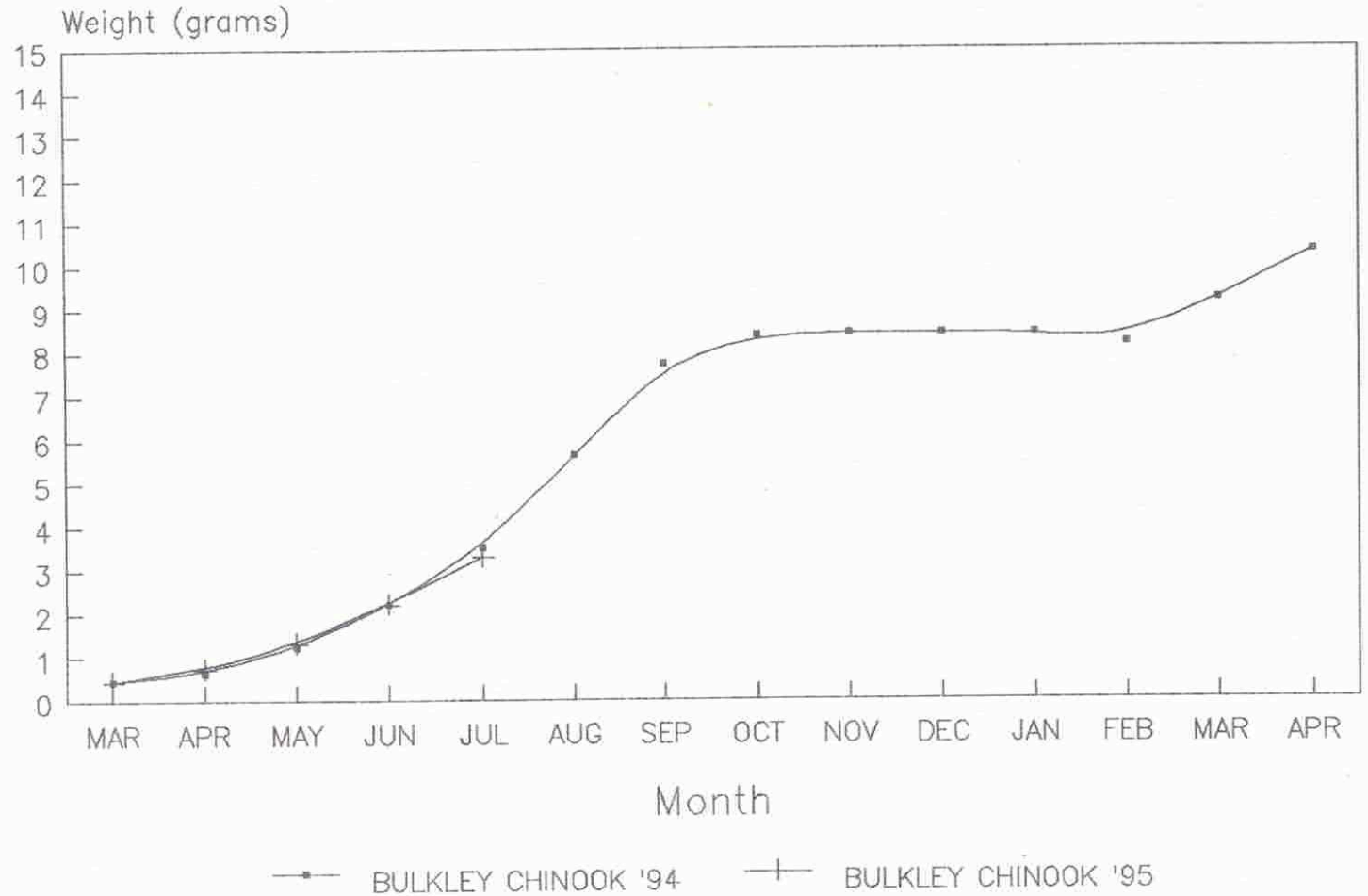
Data Codes	Total Tagged	Fin Clip
18-16-54/55/56	75,433	adipose

Survivals since ponding have been good, with the exception of losses due to a Pseudomonas infection due to water quality in the spring runoff. Survivals since tagging have been good and we presently have 75,410 coded-wire tagged salmon on hand.

Table I. Shocking and Picking Summary of the 1995 Brood Bulkley River Chinook Eggs at Toboggan Hatchery.

Tray#	Pre-shock	Post-shock	50 ml	Volume(mls)	Survival
M1-1	7	66	111(2.22)	3060	6727(98.9)
M1-2	9	193	120(2.40)	2990	6983(97.2)
M1-3	6	104	140(2.80)	2850	7876(98.6)
M1-4	0	22	104(2.08)	1670	3452(99.4)
M1-5	43	984	126(2.52)	2620	5618(84.6)
M1-6	5	5	112(2.24)	3180	7118(99.9)
SubTot	70(0.2%)	1374(3.5%)	119(2.38)	16370	37774(96.3%)
M2-1	5	48	143(2.86)	3730	10620(99.5)
M2-2	10	15	105(2.10)	3040	6369(99.6)
M2-3	32	209	144(2.88)	2370	6617(96.5)
M2-4	6	198	118(2.36)	2260	5136(96.2)
M2-5	13	235	155(3.10)	2970	8972(97.3)
M2-6	7	124	156(3.12)	2130	6522(98.0)
SubTot	73(0.2%)	829(1.8%)	137(2.74)	16500	44236(98.0%)
M3-3	36	316	130(2.60)	2770	6886(95.1)
M3-4	7	38	91(1.82)	1480	2655(98.3)
M3-5	21	103	131(2.62)	2620	6761(98.2)
M3-6	6	58	123(2.46)	3510	8577(99.3)
SubTot	70(0.3%)	515(2.0%)	118(2.36)	10380	24879(97.7%)
Totals	213(0.2%)	2718(2.5%)	126(2.52)	43250	106889(97.3%)

Fig.3 Growth of Chinook Salmon
at Toboggan Creek Hatchery (1995/96)



Chinook Hatchery Returns (1989, '90, '91 and '92 broods)

Marked hatchery returns, again, made up close to half of the chinook escapement to the upper Bulkley River this year, an estimated 198 finclipped hatchery chinook and 182 unclipped wild chinook returned to this system in 1995.

These escapement estimates were determined as a result of the intensive assessment carried out by hatchery staff in 1995, and with additional funding from D.F.O. biologists. The extra funding facilitated a helicopter survey of chinook spawning grounds on the upper Bulkley in mid August. This flight found an observed total of 334 chinook in the upper Bulkley system.

A total of 244 different chinook were randomly sampled during and after broodstock collection by hatchery staff, the sample represented close to 65 % of the total estimated escapement. As a result of this sampling, we found that 52.0 % of these chinook spawners were of hatchery origin. Only four ventral clips were observed in 1995, indicating poor survivals of the surplus salmon clipped and released as 9.0 gram fed fry. The adipose clipped chinook observed, 123 in total, were randomly sampled for heads and pins, scales were taken for known age comparison. A total of 64 chinook heads were collected, with 61 found to carry pins, no pins were lost during dissection:

# of Chinook	Tag Code	Brood Year
1	02/04/60	1989
23	02/11/56	1990
26	02/11/57	1990
3	18/05/31	1991
6	18/05/32	1991
1	18/10/06	1992
1	18/10/08	1992

These coded-wire tag data indicate that escapement of adult chinook to the upper Bulkley in 1995 was predominantly 5 year old fish, making up 80.3 % of the adipose-clipped return. The 4 year old fish made up 14.8 % and 3 year olds 3.3 %. We saw only one 6 year old chinook (1.6 %) in the sample this year.

Based on this year's data, it appears that we had 173 salmon return from adipose-clipped releases of 1990 and 1991 brood chinook, this represents smolt to spawner survivals of 0.30 % and 0.05 % for the 5 and 4 year old age classes respectively. The survival for the five year old component is 58.0 % better than the same year class in the 1994 escapement. Survivals of the four year old component were 32.0 % better than in 1994. Overall, 192 adipose clipped fish returned to spawn in 1995.

Toboggan Creek Coho (1994 brood)

Growth of the 1994 brood Toboggan coho accelerated rapidly in August and September of 1995, from 3.0 grams near the end of July up to 8.5 grams by the third week of September (Fig. 4). This growth slowed considerably in October and dropped right off during the winter period, from November through March. In April and May growth accelerated again due to the increasing water temperatures and enhanced feeding activity.

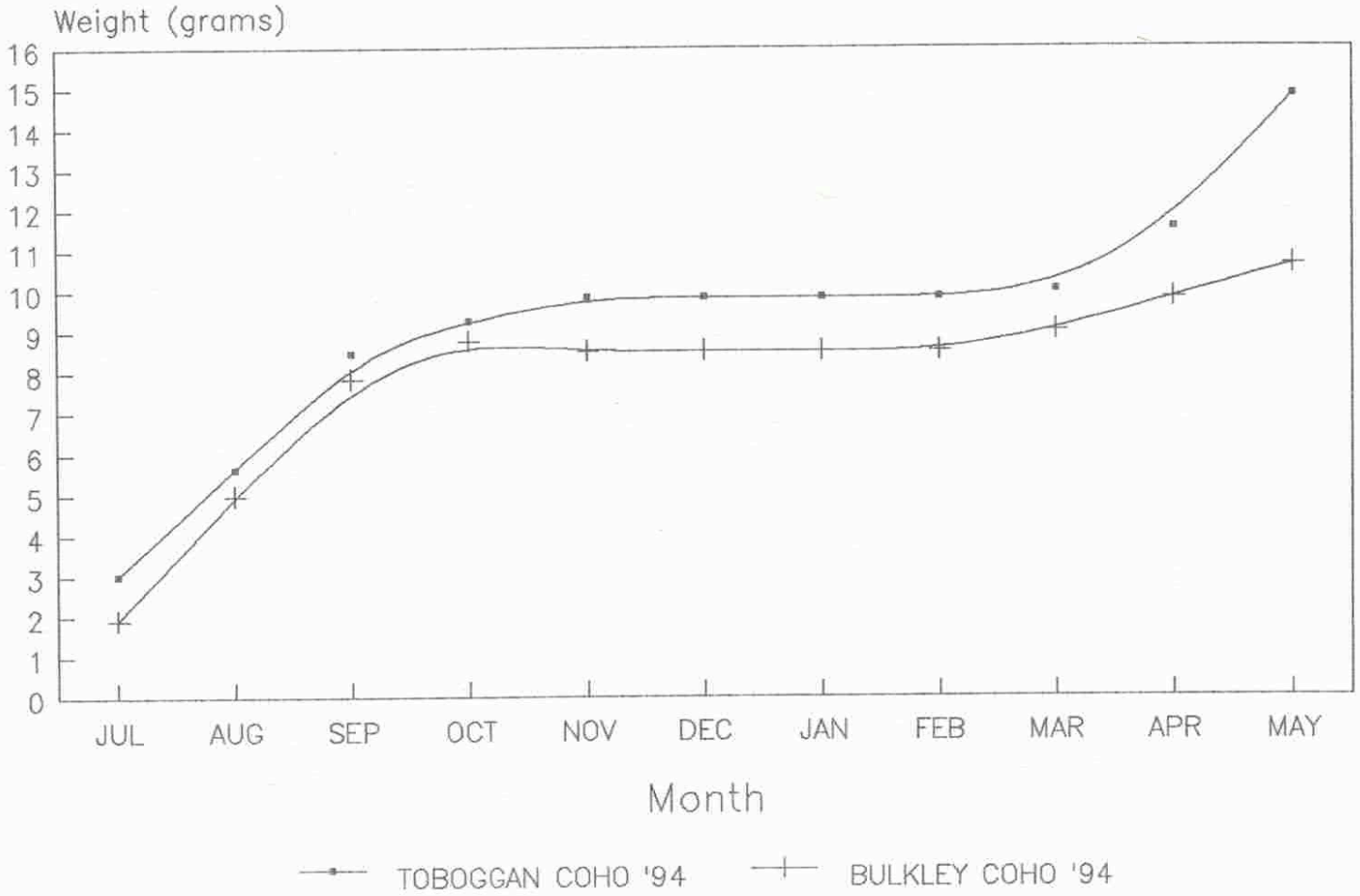
These coho fry were split into 3 capilano troughs in mid July and divided again into 4 troughs during August, prior to the tagging crew's arrival. Overall fish health of this stock was very good throughout the rearing cycle, and salmon survivals from ponding to release were 96.2 %, a period of 13 months.

Coded-wire tagging of this stock was completed on the ninth and tenth of September, 1995. A total of 32,561 salmon were tagged and adipose clipped. Remaining Toboggan coho that were surplus to this group were transferred to two P.I.P projects, the Bulkley Valley Rod and Gun Club near Smithers, and to the Chicago Creek Enhancement Society, near Hazelton. A total of 25,000 coho went to these two projects. The coded-wire tagged group was moved outdoors to the rearing channel in August. We also released a total of 13,500 surplus fry into Lake Kathlyn on September 27, 1995. These fry were 8.0 grams at release.

Tag code	# Tagged
18/11/35	10,853
18/11/36	10,982
18/11/37	10,726
Total Tagged	32,561

Survivals were excellent after tagging and through the winter period and we released 32,368 coded-wire tagged smolts during the spring of 1996, the screens were pulled on May 15th and all of these 16.1 gram smolts had migrated out by June 10th. Observations of smolts indicated a peak movement on May 28th. Hatchery staff assisted members of the Bulkley Valley Rod and Gun Club in the release of all coho smolts from their P.I.P. project on Club Creek in late May of 1996. These coho smolts averaged 18.0 grams in weight at release, and appeared to be extremely healthy and active. Surplus coho reared at Chicago Creek were released in the spring of 1996 as well.

Fig.4 Growth of Coho Salmon
at Toboggan Creek Hatchery (1995/96)



Bulkley River Coho (1994 brood)

As with the Toboggan Stock, growth of the 1994 brood Bulkley coho accelerated rapidly in August and September of 1995, and they went from 1.9 grams near the end of July up to 7.8 grams by the third week of September (Fig. 4). This good growth slowed down during October, then came to a halt in the months from November through March. In April, of 1996, their growth accelerated again, due to the increasing water temperatures, and this stock managed to get to 10.6 grams prior to release at the beginning of May.

These coho fry were split into 3 capilano troughs in mid July and divided again into 4 troughs during August, prior to the tagging crew's arrival. Overall fish health of this stock was good, and the Bulkley River coho stock survivals from ponding to release were 94.7 %, over a period of 12 months.

Coded-wire tagging of these coho was completed on the ninth and tenth of September, 1995. A total of 32,623 salmon were tagged and adipose clipped. Remaining Bulkley River coho that were in excess to this tag group were right-ventral clipped, with 8,900 salmon being clipped. The coded-wire tagged group of these Bulkley coho was then moved to a compartment of the outdoor rearing channel, soon after the tagging operation.

Tag code	# Tagged
18/11/38	11,358
18/11/39	11,238
18/11/40	10,027
Total Tagged	32,623

Survivals after coded-wire tagging, and right through to the release date of this tag group, were excellent, and exceeded 98.9 %. Releases of these smolts were completed from May 6th thru 7th, 1996 and a total of 32,290 smolts were transported by truck to the upper Bulkley River at this time. Releases of the surplus Bulkley coho occurred in Mid April of 1996, when we released 8,850 right-ventral clipped smolts, at an average weight of 11.6 grams. Overall smolt health was excellent.

Coho Egg Collection (1995 brood)

Coho egg targets over the past few years have included such stocks as Toboggan Creek, Bulkley River and Morice River. The Morice River coho enhancement program was discontinued during 1992 after three years of smolt production. The Bulkley stock is enhanced most years, depending on abundance of wild adult broodstock. The Toboggan stock has been enhanced yearly since we commenced operations in 1985. Coho egg targets for 1995/96 were as follows :

Kathlyn Creek	20,000
Toboggan Creek	40,000
Bulkley River	50,000
Total Egg Target	110,000

Kathlyn Creek Coho (1995 brood)

As in previous years no coho eggs were collected from Kathlyn Creek in 1995 due to nonexistent escapements of wild coho to this creek and, subsequently, a lack of wild genetic stock.

Escapements of hatchery produced coho to Kathlyn Creek have been good the past few years with adult coho returning in the hundreds. An accurate assessment of these returns hasn't been possible to date due to other priorities.

This system will again be the recipient of a coho transplant from wild Toboggan Creek broodstock, as has been the case for the past nine years.

Toboggan Creek Coho (1995 brood)

All of our 1995 brood coho eggs collected from Toboggan Creek this fall were taken from adult coho intercepted at our fence operation. A total of 65 coho were collected and transported back to the hatchery for egg take purposes. We took eggs from coho broodstock on October 17th, and the females surplus to our eggtake needs were released back into the stream. All of these eggs were disinfected with an iodine solution prior to being placed in the moist incubators.

Eggs were taken from a total of 18 ripe female coho and sperm was taken from 36 males. Each female's eggs were fertilized by using at least 2 different males and all eggs were water hardened for one hour prior to initial incubation using the moist incubators. Scales, weights and lengths were taken from the brood females. Average weight was 3.9 kgs, while overall the average length was 560 mm. The scales have been sent to the DFO scale lab for analysis.

Shocking and picking of the 1995 brood Toboggan Creek coho eggs began on January 1st and was completed January 2, 1996. Coho egg survivals to this stage were excellent, and a total of 62,269 eggs survived (Table II). Fecundities of Toboggan coho averaged 3,600 eggs per female in 1995.

These coho eggs began hatching at 420.0 A.T.U.'s and peak hatch occurred at 480.0 thermal units. The survivals during hatch were excellent. Ponding of this stock occurred between May 2nd and May 8th, 1996 at 680.0 A.T.U.'s. In total, 62,000 coho fry were ponded into one Capilano trough and they began feeding actively shortly after ponding. At present, these fry are averaging 2.7 grams in weight, are now spread into four troughs, and with a condition coefficient of 1.30 are feeding very actively and showing continued good survivals.

Coho from these egg takes will be reared at the hatchery to a size of 14.0 grams and released as smolts in May of 1997. Up to 33,000 of these fish will be released into Toboggan Creek, as coded-wire tagged salmon, and another 27,000 coho smolts and fry will be transplanted into the Kathlyn Creek drainage. A total of 5,000 surplus coho from this stock were moved into a rearing tub at the Bulkley Valley Rod and Gun Club P.I.P. site in late July. The c.w.t. tagging crew is scheduled to be here on September 17th, this is later than usual and has made for a crowding problem. Usually tagging is done in August.

Survivals of this stock have been excellent since ponding and they continue to appear very healthy. We presently have over 60,400 coho fry from this stock on hand at the hatchery.

Table II. Shocking & Picking Summary of 1995 Brood Toboggan Creek Coho Salmon Eggs at Toboggan Creek Hatchery.

Tray #	# of Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival (%)
M1-1	3.0	22	411	154(3.08)	3680	10923(96.2)
M1-2	3.0	42	284	158(3.16)	3900	12040(97.4)
M1-3	3.0	47	116	158(3.16)	3150	9838(98.4)
M1-4	3.0	64	375	151(3.02)	3100	8987(95.3)
M1-5	3.0	50	874	164(3.28)	3200	9622(91.2)
M1-6	3.0	19	249	153(3.06)	3630	10859(97.6)
Total	18.0	244(0.4)	2309(3.6)	156(3.12)	20660	62269(96.0%)

Bulkley River Coho (1995 brood)

A total of 39 adult coho were collected from the Bulkley River during October of 1995. All of these fish were taken at the Bulkley River counting fence, which was operated by the Nadina Community Futures Society with funding from the Skeena Green Plan being used to operate the fence. All of the salmon were transported back to the Toboggan Creek Hatchery and were held until ripe in our covered capilano troughs. As with the Toboggan Creek coho, the fish enterred the river in a fairly ripe condition and they did not have to be held long before we were able to take eggs. These 39 fish were the only coho counted through the Bulkley fence in 1995.

Eggs were taken from a total of 17 ripe female coho and sperm was taken from 20 male coho. The coho eggs were fertilized by using at least 2 different males per female, and were water hardened for one hour prior to initial incubation using the moist incubators. Scales, weights and lengths were taken from all of the brood females. Average weight was 3.4 kgs overall and average length 530 mm. These scale samples have been sent to the DFO scale lab for analysis.

After the last of the egg takes on this stock all of the coho remaining were transported back to the upper Bulkley River and released, to spawn at a later date. Only 2 females were left unspawned while all males were released after expression of sperm. Coho eggs were taken on two seperate days, October twenty fourth and twenty sixth.

Shocking and picking of the 1995 brood Bulkley River coho eggs began on January 3rd, 1996 and the last batch was done on January fourth. Egg survivals to this stage were excellent and a total of 50,760 eggs survived (Table III). Fecundities of the Bulkley coho were around 3,176 eggs per female.

Hatching of coho eggs began at 410.0 A.T.U.'s with the peak hatch occurring at 460.0 thermal units. Ponding of coho fry from this stock occurred between May 16th and May 19th, 1996 at about 700.0 A.T.U.'s. Survivals to ponding were very good and we began feeding 50,470 Bulkley coho fry, which initially were ponded in one Capilano trough. At the present time coho from this stock are averaging 1.81 grams with a c.c. of 1.22. Growth of this stock is somewhat slower than last year but we still expect them to achieve a 12.0 gram smolt size.

Approximately 33,000 of these coho will be reared to smolt at the hatchery, and released as coded-wire tagged fish in May of 1997. The remainder will be ventral clipped and released into the Bulkley River as fed fry in the fall of 1996. Coded-wire tagging of this stock will occur in September of 1996.

Table III. Shocking and Picking Summary of 1995 Brood Bulkley River Coho Salmon Eggs at Toboggan Creek Hatchery.

Tray #	# of Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival (%)
M2-2	2.0	114	294	166(3.32)	1780	5616(93.2)
M2-3	3.0	164	370	176(3.52)	2900	9838(94.8)
M2-4	4.0	147	655	168(3.36)	3500	11105(93.3)
M2-5	4.0	27	214	187(3.74)	3930	14484(98.4)
M2-6	4.0	770	471	174(3.48)	3100	9717(88.7)
Total	17.0	1222(2.3)	2004(3.7)	174(3.48)	15210	50760(94.0%)

Assessment of Coho Escapement in 1995

Toboggan Creek Fence

The Toboggan Creek coho counting fence commenced operation on August 1st, 1995. The fence was monitorred twice daily from this date through to November 1st, 1995 at which time the aluminum panels were removed due to freezing conditions.

A total of 717 coho were passed through the fence, with coho migration into the creek peaking during mid October. Due to very low flows the migration was delayed, and the majority of the spawners did not migrate past the fence. In addition to our normal sampling, we floytagged and operculum punched 691 salmon at the fence. Different colored tags were installed at intervals throughout the escapement. Later assessment, done visually, found 336 spawning coho salmon of which only 5.6 % were untagged. Weekly counts were done starting October 25th.

We were able to estimate the total number of coho which were above the fence, by means of weekly spawner counts. Spawning appeared to have started around October 15th, 1995, and peak spawn occurred in the last week of October. We also observed many spawning coho downstream of the counting fence and, as a result of a tagging program at the Bulkley River and Toboggan Creek confluence, we were able to achieve a total escapement estimate for the 1995 run. Of 14 untagged, dead coho sampled seven fish did not have an operculum punch, and is conclusive in proving that we missed less than 2.8 % of the coho that spawned upstream of the counting fence in 1995. The complete spawner estimate, including salmon broodstock removed at the fence by hatchery personnel and salmon spawning downstream of the counting fence, was 1,762 coho.

Approximately 17.7 % of the salmon handled at the fence were hatchery returns from the 1992 brood. This represents a total of 312 spawners returning from a release of 33,533 smolts, a 0.9 % return overall. Adipose-clipped coho made up 99.2 % of the marked coho escapement with only one ventral clipped fish observed in 1995, likely a coho transplanted in Kathlyn Creek which strayed into Toboggan Creek on its return run.

Bulkley River Fence

The Bulkley fence operated from August until late October and a total of 39 coho were sampled. This was not a total count, as many fish would not enter the trap. The total coho run was estimated at around 360 spawners. A total of 17 coho captured at the fence were clipped hatchery fish, indicating 56.4 % of the upper Bulkley escapement in 1995 were wild salmon.

Coho Hatchery Returns (1992 brood)

Although all other upper Skeena waters were closed to harvest of coho in 1995 anglers were allowed to harvest some coho at Toboggan Creek. An opening for sportfishermen was advertised, a daily limit of one wild or hatchery salmon was set. As a condition of the opening the Toboggan Hatchery was contracted to conduct a daily creel survey to estimate the total catch, and harvest of wild and hatchery coho near the confluence of Toboggan Creek and the Bulkley River. This survey was carried out from August 15th until October 15th, 1995. Funding for the creel survey was provided through the Skeena Green Plan.

As a result of this survey we determined the following: level of participation was very high with 450 anglers interviewed, average time fished per angler was 3.7 hours, and during our survey we observed 39 coho and 16 steelhead landed. Seven of the coho observed were adipose clips and we saw 32 wild fish. The total effort during this fishery was estimated at 3,869 angler hours, catch was estimated at 173 wild coho, 86 wild steelhead, and 38 adipose-clipped coho. A total of 92 coho were harvested, and 1,057 anglers took part in this fishery.

Head Depot returns of hatchery coho indicate that, of 11 coho adipose clips estimated to have been harvested, 8 heads were turned in. This represents a submission rate of over 72.0 %. Data from the dissected coho showed all heads came from 1992 brood salmon released in 1994. The dissection contractor did not provide a tag-code breakdown of our heads in 1995 as they have done in past, so individual tag data was not included in this report. All of these heads were identified as being from the Toboggan Creek Hatchery.

As a result of sampling done at the fence and on the spawning grounds we were able to collect 52 coho heads from Toboggan Creek coho spawners, of these 50 carried pins while 2 of them did not have pins found. The very low no-pin rate ssen in the sample, only 3.8 %, indicates the very high quality of tag insertion by Streamline Consulting, our tagging contractor.

Only 5 heads were taken from Bulkley River coho in 1995, all of which were identified as being 1992 brood coho released in 1994. Results of the Toboggan sampling were as follows :

# of Coho	Tag Code
18	02/12/41
13	02/12/42
19	02/12/43

All of these escapement heads are from 1992 brood coho salmon reared and released at the Toboggan Creek Hatchery site.

Exploitation of 1992 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 come to 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 Indian food fish catch has also been studied to some extent and gives insight as to coho harvested yearly.

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

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

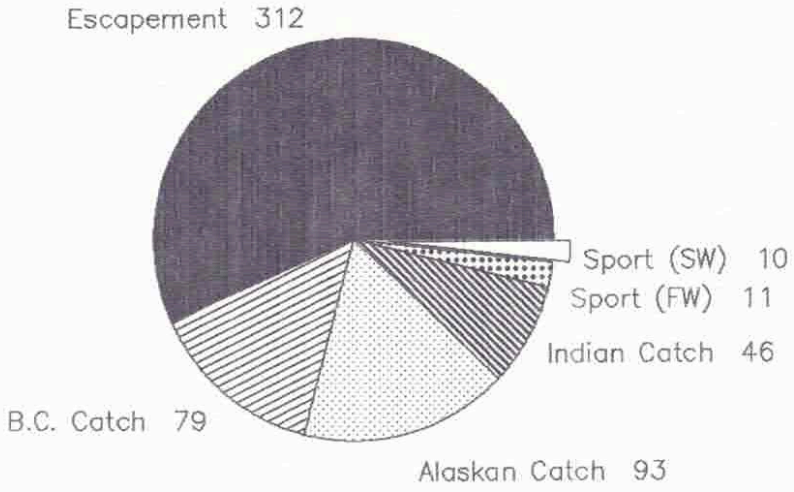
Exploitation rates indicated by this data suggest that coded-wire tagged coho from the Toboggan coho stock were harvested at rates of approximately 43.4% in 1995 (Fig. 5). Commercial catches by Canadian and Alaskan vessels were responsible for over 71.9 % of the harvest, Indian food fishermen took 19.3 % of the catch, while sportfishermen had a 8.8 % share. Coho spawning escapements to Toboggan Creek in 1995 were 56.6 % of the total adult stock. Exploitation could be higher than this due to the fact that the Indian catch estimate only includes the Moricetown Band catch, and none of the downstream catch.

Alaskan commercial fishermen caught more coho than those that were reported by B.C. fishermen, with 93 and 79 coded-wire tagged hatchery coho respectively. The breakdown of Alaskan catches by gear type was 6.5 % net and 93.5 % troll, the B.C. catch was 26.6 % troll and 73.4 % net. This is almost a total reversal of the catch breakdown of 1994 when the trollers had a 67.0 % share while nets had 33.0 % of the B.C. catch. This seems to be a factor of abundance, when coho are abundant the troll fishery dominates the catch, as thay did in 1994.

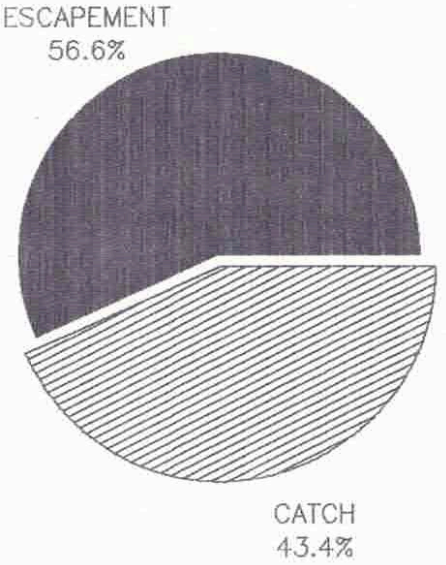
Survivals of hatchery-produced coho smolts from this facility were not high in 1995. Assuming the catch rates are accurate we saw smolt to adult survivals of 1.6 %, with just 551 coho produced from a release of 33,533 Toboggan Creek coho smolts. This is one of the poorest survivals we have seen, and these low ocean survivals were mirrored by the wild stocks as well.

Overall, the exploitation rates indicated by these data are the lowest we have seen. Given the extremely low abundance it is unclear whether this is a result of management shifts.

Fig.5 Total Coho Catch (1995)
Toboggan C.W.T.'S



CATCH/ESCAPEMENT



EXPLOITATION RATE

Administration Report

This report covers hours spent from August 1, 1995 through to July 31, 1996. This year, like last year, covers a period of twelve months, and is the second year of operations since the shift from the March 31st year end.

The following is a breakdown of hours spent carrying out the contract in 1995/96 :

Activity	Man-hours
Project Management	860.0
Facility Operations	3921.0
Broodstock Collection	510.0
Assessment	672.0
Coho Fence	700.0
Statutory Holidays	272.0
Total Hours in 1994/95	6935.0

The contract went very well again in 1995/96 and our hours of work spent in each category were consistent in some areas and different in others. Hours spent doing broodstock collection was reduced due to a greater reliance on the Toboggan Creek counting fence and the Bulkley River counting fence to catch coho broodstock, and less time spent in the field. Hours that we spent at the fence and doing assessment are higher. We had almost 500 hours more time spent on facility operations as in 1994/95, this was our largest category by far. Hours spent on project management are about the same as last year and, as we mentioned in the 1994/95 report, there is just not the time left in the contract to complete tasks as we did 2 years ago.

Total employment generated by the hatchery in 1995/96 was 196 work weeks, employing 12 different people for varying lengths of time during the twelve month period. These last figures include seperate contracts we have undertaken via a Challenge Student Employment Program, the Skeena River Green Plan, and the Habitat Conservation Fund, during the 1995/96 period.

Labour costs were thirteen percent higher than budgetted for the contract period. Cost of operations were within 5.0 % of the budgetted costs. Overall, we were $ 10,000.00 over our contracted amount of $ 151,300.00. Labour costs are above the contracted levels due to increased assessment activities, and general hatchery workloads. Costs of our operations are also rising and it is becoming quite difficult to provide the same level of production when levels of funding for the operations remain the same. Thanks to a contract amendment we were able to cover the overage in 1995/96.

The following is a summary of expenditures made in carrying out the 1995/96 contract:

Category	Expenditures	Contract
Direct Labour	101,145.40	89,897.00
Overhead Costs	22,500.00	22,473.00
Capital Equipment	0.00	0.00
Operations	37,699.99	38,930.00
Totals	161,345.39	151,300.00

The labour and overhead portions of this table only include activities directly attributable to the C.E.D.P. contract. They do not include time spent operating the Bulkley fence in 1995, the Toboggan fence in the spring of 1996, student labor contracted through the Challenge '96 Program, or the creel survey and coho tagging carried out under Skeena Green Plan.

Development and Maintenance of the Facilty

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

i.) The outdoor rearing channel was vacuumed out using two large sludge pumps. 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.

ii.) The settling pond was dredged again to remove the sand that accumulates at the end of the inflow pipe. This has become an annual maintenance procedure and we try to remove the buildup before it becomes a problem.

iii.) The creek intake took somewhat less effort to maintain than in the previous 3 years. We have not seen as much in the way of flooding for a few years now and as such the intake has been working well. We now flush out the main water lines 3 or 4 times per year.

iv.) Two students were hired for 6 weeks during the summer as a result of funding from the federal Challenge '96 Program. These students were instrumental during the summer period in providing public tours and in manning the hatchery during chinook broodstock collection, as well as helping out in the field.

v.) A "School Release Day" organized by our C.A., Brenda Donas, was carried out in May of 1996. Close to 300 of the schoolkids, who had reared coho from egg to fry in their classroom incubators, came out to release their fry. We also helped during October of 1995 to collect the coho eggs for the classrooms. Both activities were very successful and beneficial.

vi.) During the past four springs we operated the counting fence for steelhead enumeration. In 1993 we estimated an escapement of 450 steelhead spawners, in 1994 there were 300 steelhead spawners identified. No funding was provided for the 1993 assessment, while $5,000.00 came from M.O.E. via the Habitat Conservation fund for the 1994 count. In 1995 we identified 305 steelhead above our counting fence, that was done with H.C.F. funding of $8,000.00 to cover labour costs. In 1996 funding of $10,000.00 came from Skeena Green Plan for the count, which identifed 400 to 500 steelhead in the system.

Operating Plan for 1996/97

As in previous years we will begin releasing the chinook and coho smolts in April and May. The 1995 brood Bulkley chinook will be the first to go in mid to late April, followed later by the 1995 brood coho stocks which are released in May. As in past years we will enumerate all salmon smolts while they are being loaded into the transport tanks. We will be taking over 120,000 salmon smolts to the Bulkley River and more than 33,000 smolts will go into the Toboggan Creek system. Also, 5,000 coho smolts from Toboggan stock will be transplanted in to the Kathlyn Creek watershed in late May. Releases should take two or three weeks to complete in 1997.

Our chinook target is still at 100,000 eggs for 1996 to allow for a c.w.t. release group of 80,000 smolts. We generally take more eggs than this as we send samples to the Biological Station for B.K.D. screening. Egg takes will happen in late August and we plan to produce 15.0 gram smolts for release in April of 1998.

Coho egg targets will stay the same as last year, and 110,000 eggs will be taken in 1996; Bulkley River (55,000), Toboggan Creek (40,000), and Kathlyn Creek (15,000). These coho will be reared to smolt size, 12.0 to 15.0 grams, and released in the spring of 1998.

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

We intend on continuing with enumeration of steelhead trout spawners into Toboggan Creek in the spring of 1997. We hope to incorporate a tagging program at the Toboggan Creek mouth just prior to the fence count, as we have done previously.

As well, we will attempt to keep the public in this area well informed of our activities, goals and accomplishments in the area of fish culture on the Bulkley/Morice system. An " Open House " is planned for the fall of 1997 to encourage people to come out and view the facility, see the coho spawning and learn more about the salmon resource in the Bulkley Valley.

Recommendations

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

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 and coho salmon would be greatly improved if we could get some accurate data from the Moricetown Indian fishery in July and August. Each year tens of thousands of salmon are landed by this Indian band at Moricetown Falls on the Bulkley River. In the past few years we have observed many clipped hatchery fish in the catch at Moricetown Falls. A coordinated assessment program would provide an abundance of relevant information on stock timing and survival. As well, a move away from gaffing, and the high wounding rates, to a selective method would put many more fish on the spawning beds. Co-management funding has been provided to this band for the past few years for this type of progress, to date virtually nothing has been accomplished.

iii.) Coded-wire tagging of chinook should continue to be done in June and coho done no later than August 10, and preferably in late July, thus allowing us to keep salmon pre-marking densities at acceptable levels and reduce the amount of stress on the fish.

iv.) We are very dependant on the abundance of broodstock to supply us with the eggs to enhance each specific stock we work with. I would recommend, and hope, that ocean harvests in 1997 will be restricted so that our enhancement goals can be realized. Coho returns to many tributaries continued to show low numbers, even though exploitation rates are known to be reduced. It appears that during some years the combination of low ocean survivals and heavy Alaskan interception is not allowing a harvestable surplus of wild coho to reach B.C. coastal waters. For years the catch data of coho coded-wire tags from this facility have shown these stocks are being overexploited, to their detriment. A look at Bulkley River coho escapement records and the Toboggan Creek exploitation data prove this out.

These recommendations are the same as past years and they are still the most important things that affect our success.

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 2,478,813 salmon and steelhead smolts and fry. We continue to see good returns of hatchery-produced salmon to the Bulkley River and Toboggan Creek systems and it helps reinforce our resolve to continue with this worthwhile work. 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. Along with coded-wire tag recoveries from the commercial operations from B.C. and Alaska it should now be evident at what rate these coho stocks are being exploited, and whether catch reductions are necessary.

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, through Skeena Green Plan, has allowed us to continue our salmon assessment operations in the past year.

Within the scope of our operations perhaps the most valuable support we receive is from the local people of the Bulkley Valley. During our broodstock collection and smolt releases we quite often receive volunteer support from individuals in our local communities. From school students to members of our own society, many hours are annually donated for the benefit of the resource. The many tourists and locals who stop by for a tour of the facility are very supportive of our operations and this in itself is rewarding to us. Public awareness very definitely is increasing, and we continue to see this growing each and every year.

We look forward to our continued involvement with the program in the future!

Mike O'Neill, Hatchery Manager

TOBOGGAN CREEK SALMON & STEELHEAD ENHANCEMENT SOCIETY
R.R. # 1, SMITHERS, B.C., CANADA V0J 2N0 (604) 847-4458

APPENDIX "A"

Statement of Work - 1995/96

COMMUNITY INVOLVEMENT DIVISION - HABITAT AND ENHANCEMENT BRANCH

TOBOGGAN CREEK CEDP HATCHERY CONTRACT
STATEMENT OF WORK FOR AUGUST 1, 1995 TO JULY 31, 1996

PAYMENT OF CLAIMS

PAYMENT SCHEDULE

August Advance : 20% upon signing the contract and receipt of April to July claims.

October Advance : 25% upon receipt of August and September 1995 claims.

January Advance : 20% upon receipt of Oct., Nov. and Dec. 1995 claims.

April Advance : 35% upon receipt of Jan., Feb. and Mar 1996 claims.

Note that the deadline for the annual report will be September 30, 1996. A $2500 penalty will be imposed on contractors who do not produce an Annual Report by the September 30, 1996 deadline date.

MONTHLY CLAIM/PROGRESS PAYMENT REQUEST

The claim for payment will be accompanied by a form which breaks all O and M invoices into categories as per last years procedure. Claims must be submitted before advances will be made. Claims will not be processed by the Community Advisor unless both the financial and biological portions of the monthly claims have been submitted by the contractor.

This contract spans a fiscal year and there will be an accounting of expenditures on March 31, 1996. March claims should be submitted to the Community Advisor no later than **APRIL 10, 1996**. Please note that contract dollars advanced prior to March 31, 1996 must be spent by March 31, 1996 i.e. the August, October and January advances must be spent before March 31, 1996.

CAPITAL

There will be no Capital funds specifically allocated to the hatchery budget.

INVENTORY

At the end of each payment period, an inventory of any items with a purchase value over $500 will be included with the period end monthly report.

G.S.T.

G.S.T. will be claimed as per last year's procedures.

PROJECT MANAGEMENT AND ADMINISTRATION

Section 1.1. : Submit the Annual Report no later than September 30, 1996. If the report is not submitted by this date, a $2500 penalty will be imposed.

Section 3. FACILITY MAINTENANCE

1. The interior of the hatchery building is of wood construction. Due to the moisture in the hatchery the wooden interior is becoming rotten and requires replacement. Replace according to funding allotments.

Section 4. FACILITY IMPROVEMENTS
No funding available for improvements.

Section 5. REPORTING REQUIREMENTS

Monthly reports of biological activities should include the following information :

- broodstock capture with numbers and sexes of adults and location of capture
- assessment fence data
- marked adult capture : numbers, sex, location of captures
- numbers of females and males used in egg takes, egg take dates, numbers of eggs planted by species and stock
- dates of shocking and picking and eyed egg inventories by species and stock
- ponding dates and numbers of fry by species and stock
- live balance and size of all juveniles on hand by species and stock
- coded wire tag codes and number tagged once the marking program has been completed
- release information by species and stock i.e. numbers of juveniles released, date of release, size at release, number of marked fish released and release location
- all disease treatment information

Annual Report : should include all of the above information in summary form along with an introduction to the facility, project goals, an overview of the current status of the hatchery in relation to those goals, and comments regarding the broodstock capture, adult assessment, incubation, rearing and release programs. Any conclusions can also be included as well as a section of future aspirations.

Section 6. **PRODUCTION PLAN**

1994 BROOD TOBOGGAN CREEK COHO

Continue rearing of the 60,000 Toboggan Creek coho. 34,000 are to be kept for yearling releases, 10,000 will be fry releases into Kathlyn Creek and the remaining fry will be transferred to the Bulkley Valley Rod and Gun Club and the Chicago Creek Hatchery. Target size at release is 12 to 18 grams per fish.

1994 BROOD UPPER BULKLEY RIVER COHO

Continue rearing of the 50,000 Upper Bulkley River coho. Approximately 34,000 will be retained for yearling releases and the remaining fry will be ventral clipped for a fall release. Target size for the yearling release is 12 to 18 grams per fish.

1994 BROOD UPPER BULKLEY RIVER CHINOOK

Continue rearing of the 110,000 Upper Bulkley River chinook. Approximately 85,000 will be retained for yearling releases. The remainder will be finclipped and released in the fall of 1995. Target size at release is 12 to 18 grams per fish.

1995 BROOD TOBOGGAN CREEK COHO, UPPER BULKLEY COHO AND UPPER BULKLEY RIVER CHINOOK

1995 brood coho and chinook will be at the fry stage prior to termination of this contract. Rear as per standard hatchery procedure.

Section 7. **BIOLOGICAL STRATEGIES**

7.1 Broodstock Collection

The contractor is required to collect that number of adults which will satisfy egg take and mark recovery requirements. Mark recovery and adult sampling requirements will be fulfilled in accordance with requirements defined in the Adult Sampling Manual. This manual is distributed by the Program Coordination and Assessment Division. If these sampling requirements cannot be met, please contact the Community Advisor well in advance of the broodstock program.

The contractor is responsible for preparing all equipment required for broodstock capture and mark recovery programs.

The contractor is responsible for preparation of all necessary adult holding locations and for preparation of areas where marked heads are to be processed and stored.

The contractor is to inform the local Fisheries Officers of the initiation and termination dates of the broodstock and mark recovery programs. Information requested by the Fisheries Officers is to be submitted on a timely basis.

Section 7.2 Incubation

The incubation room is to be prepared prior to egg takes occurring. All incubators are to be thoroughly cleaned and disinfected. All tray screens are to be checked for tears and repaired. Flows are to be set to the appropriate levels. Eggs are to be surface disinfected using a standard Ovadine solution during water hardening.

Accumulated thermal units are to be recorded so that stage of development can be monitored.

Fungus will be treated using static salt baths in the incubators as per standard salt treatment procedures. These salt treatments will only be done to the eyed stage.

Chinook eggs will be initially incubated in moist incubators and then transferred to Heath stack incubators at the eyed stage.

Coho eggs are to be incubated as per chinook incubation techniques.

At the eyed stage, the eggs will be shocked and the dead picked out and counted. The remaining live eyed eggs will be enumerated. All data will be recorded on the appropriate data forms.

Subsequent dead picks will occur on an as needed basis and the appropriate records will be kept.

Fry will be ponded at the appropriate stage of development.

All pertinent data will be recorded. If possible, data should be recorded on diskette as this facilitates analysis.

Incubation data is to be summarized and reported in the monthly reports.

1995 BROOD EGG TARGETS

STOCK	SPECIES	NO. EGGS REQUIRED
Upper Bulkley	chinook	90,000
Toboggan Creek	coho	60,000
Upper Bulkley	coho	40,000

7.3 Rearing

All rearing units are to be thoroughly cleaned and disinfected in preparation for ponding. Endscreens should be fry proof, flows and water levels pre-set.

All rearing related equipment such as dipnets, feed containers, cleaning brushes etc... should be cleaned, disinfected and in good repair. Predator netting and/or covers should be in good repair.

All juvenile fish are to be fed according to feed manufacturers recommended feed rates and instruction by DFO staff.

Growth is to be carefully monitored such that release target sizes are met.

Keep daily records of water temperature, oxygen levels, mortalities and any pertinent observations i.e. abnormal behaviour, feeding response etc...

In the event of fish health concerns, contact the Community Advisor and the Disease Diagnostics Lab at the Pacific Biological Station.

Maintain the rearing facilities in safe, organized and sterile conditions.

Rearing information is to be summarized and reported in the monthly reports.

7.4 Marking

Marking is proposed as follows :

1. 1994 brood Toboggan Creek coho : 30,000 AD/CWT and the remainder will be finclipped.

2. 1994 brood Upper Bulkley R. coho : 30,000AC/CWT and the remainder will be finclipped.

3. 1994 Upper Bulkley River chinook : 80,000 will be AD/CWT and the remainder will be finclipped.

7.5 Release

The 1994 brood Toboggan Creek coho yearlings will be released into Toboggan Creek in the spring of 1996. The fry releases will be into Kathlyn Creek in the late summer to early fall of 1995.

The 1994 brood Upper Bulkley River coho yearlings will be released into the Upper Bulkley River in the spring of 1996. Fry releases will be into the Upper Bulkley River in the late summer to early fall of 1995.

The 1993 brood Upper Bulkley River chinook yearlings will be released into the Upper Bulkley River in the spring of 1996. Fry releases will be into the Upper Bulkley River in the fall of 1995.

All stocks are to be enumerated just prior to release.

Brood summaries and release forms are to be completed immediately after release and copies are to be forwarded to the Community Advisor with the monthly biological reports.

7.6 Assessment

The Toboggan Creek assessment fence will be operated and all fish will be enumerated as per usual procedure. All fish will be checked for marks and all fish put above the fence will be opercular punched.

The appropriate number of adipose clipped adults will be sampled as per instructions in the Adult Sampling Manual distributed by the Program Coordination and Assessment Division. If the suggested sampling plan cannot be met, the Community Advisor must be contacted so that the sampling program can be adjusted.

Any other biological sampling will be carried out as directed by the Program Coordination and Assessment Division. If the contractor feels that the sampling requirements cannot be met, the Community Advisor must be contacted so the sampling program can be adjusted.

The appropriate record sheets will be filled out and copies sent to the appropriate divisions as directed by DFO staff.

A summary of the assessment programs will be included with the monthly reports.

Section 8 **TRAINING**

Spreadsheet and wordprocessing programs for the manager.

Section 9 **SPECIAL TECHNICAL ASSISTANCE**

Bio-technical support will be available to the contractor on an as needed basis. This support will consist of the Community Advisor and technical staff.

Other support staff are available through the Resource Restoration Division. Any requests for this support are to be forwarded to the Community Advisor.

Section 10 **OTHER**

1. The contractor agrees that surplus funds unsupported by legitimate claims at the end of the contract period may be deducted from the first advance of a subsequent contract.

2. Failure to submit the Annual Report by **30th September, 1995** for the 1994/95 contract year will result in a reduction of $2,500 from this contract. The deduction will be taken from the October 1995 advance.

3. All movement of fish or eggs requires **Transplant Permit** prior to movement. Contact your Community Advisor on how to apply for a permit.