ANNUAL REPORT FOR TOBOGGAN CREEK HATCHERY OPERATIONS IN 1994/95

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 now just completed its tenth 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 1994/95 contract period our Society reared and released some 93,000 coho and 97,000 chinook salmon from the 1993 brood year. As well, we provided local P.I.P. projects and school classroom incubators with another 20,000 coho eggs and fry. Successful rearing of over 215,000 chinook and coho from the 1994 brood continues, with most releases set for the spring of 1996.

Egg targets for 1994 brood chinook from the upper Bulkley River were achieved and at the present we have approximately 115,000 fingerlings rearing at the hatchery. Chinook spawner escapements to the upper Bulkley were extremely poor in 1994, with only 286 salmon observed in the system. As has been the case for the past two years, close to half of the escapement in 1994 was made up of marked returns from smolt enhancement.

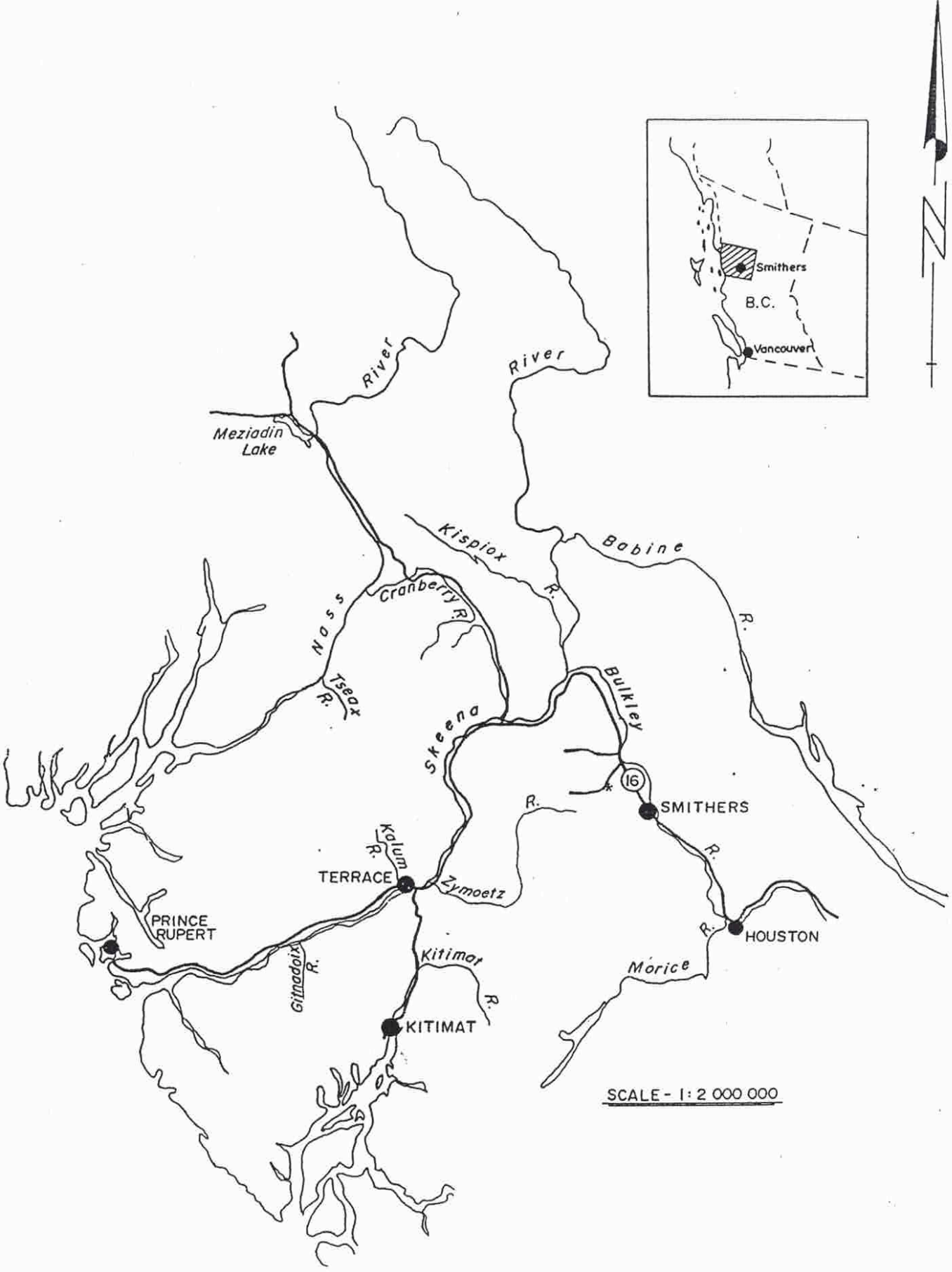


Fig.1 Location of Toboggan Creek Hatchery near Smithers, B.C. *

Coho returns to the upper Skeena tributaries in 1994 were better than in 1993 and a radio-tagging study funded through the Skeena Green Plan identified close to 20,000 coho in the Bulkley-Morice system last summer. Overall exploitation still is very high, especially in the commercial ocean fishery and in the Indian food fishery at Moricetown Canyon. Escapements to Toboggan Creek in 1994, at 2,400 spawners, were somewhat better than 1993 and 1992 but were still 20 percent below the 5 year average of 3,046 coho adults. Egg collection for 1994 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 100,000 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 ninth this year. This enabled an accurate assessment of our seventh major return of hatchery-produced coho to Toboggan Creek. The fence data indicated hatchery returns of 623 marked coho in 1994, from a release of 32,600 smolts this is a 1.9 % return. Preliminary coded-wire tag data from the northern troll and net fisheries indicate heavy exploitation of this stock after they reach the adult stage. The data indicate the total adult recruitment at 2,008 coho from the release, at 6.2 % survival this is one of our best results from smolt to adult. The rate of exploitation, unfortunately, remained extremely high this year, and 1,385 of the 2,008 coho produced were killed. The 69 % exploitation rate seen in 1994 may endanger wild stocks.

Over 26.6 % of the Toboggan coho seen in 1994 were finclipped fish of hatchery origin, many of the remainder were probably second generation hatchery coho from the 1990 and 1991 brood years. We feel our wild coho are predominantly 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 (1994/95)

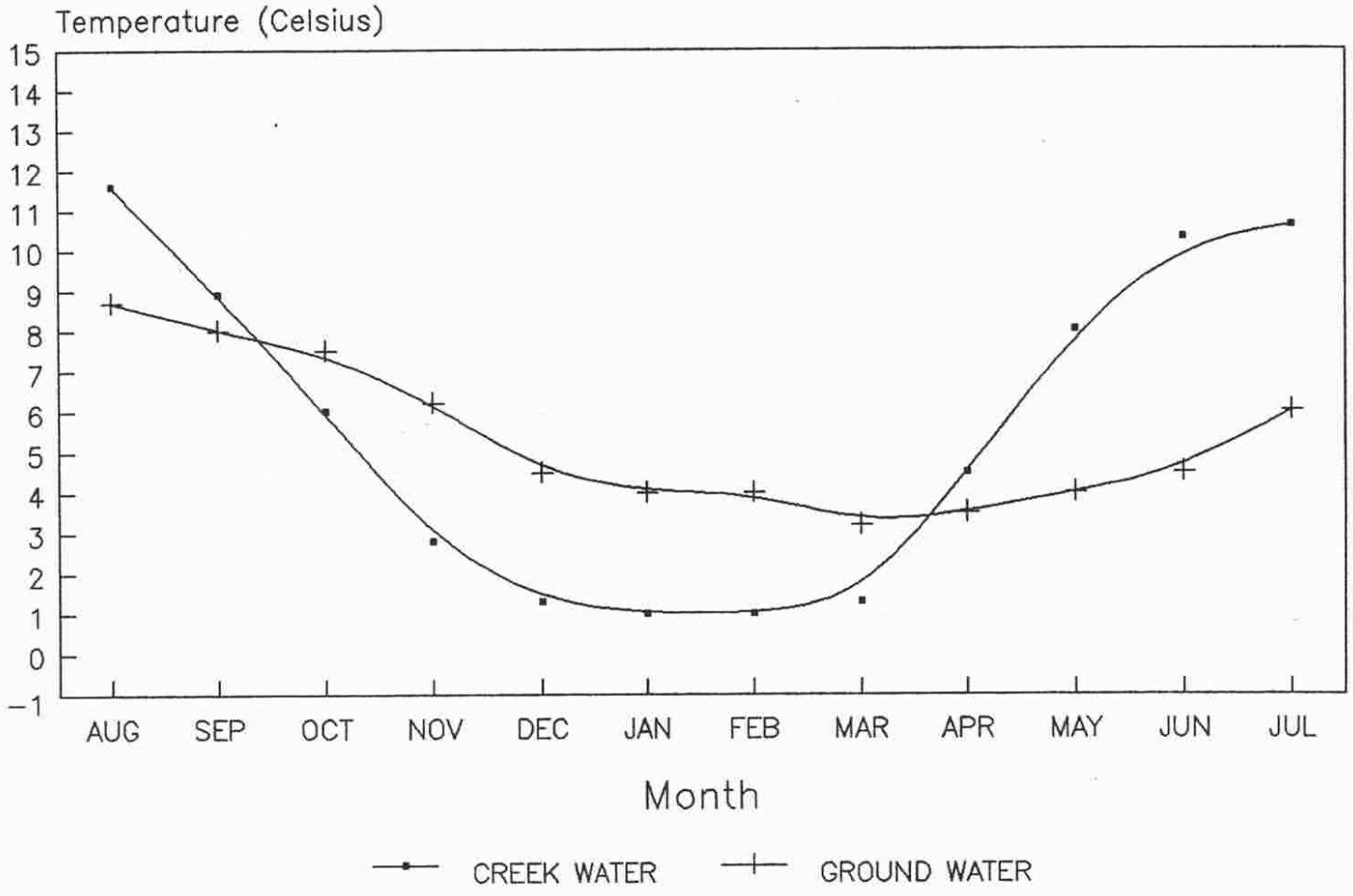
As for the previous nine years, average daily temperatures of the three hatchery water sources were recorded and average weekly temperatures have been calculated. We depend on two of the water sources for egg incubation and fish rearing, ground water from an underground collection system and surface 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

Average temperatures in 1994/95 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 1993/94 (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 1994, due in part to the fact that Toboggan Creek is glacier fed. Again, the levels of this year followed the pattern of 1993 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 1995. 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 (1994/95)



TOBOGGAN CREEK HATCHERY - SALMON BROOD YEAR SUMMARIES

Bulkley River Chinook (1993 brood)

Growth of the 1993 brood chinook fry was rapid from the first of August until freezeup in late November. These salmon had experienced relatively poor growth up until the end of July, averaging only 3.0 grams at that time, but growth accelerated from then on and by early November they averaged 10.3 grams.

Releases of the 1993 brood chinook smolts commenced April 12 and were completed April 21, 1995. A total of 84,829 chinook smolts were transported in batches of 9,500 fish to the upper Bulkley River near Houston, B.C. These smolts averaged 12.1 grams in weight. Due to the lower than normal spring runoff conditions we released the majority of these smolts in the vicinity of the bridge crossing at Topley, the remainder were planted in the groundwater channel, downstream of McQuarrie Creek. An additional 12,347 chinook from this brood year were released, as fed fry, prior to this. These fry averaged 4.5 grams at release, and all of these chinook were left-ventral clipped for future assessment purposes. These fed fry were released between August 11th and 15th, 1994 into the upper Bulkley River, above the falls. Locations of smolt releases this spring are as follows:

Topley road crossing	66,994
McQuarrie groundwater area	17,835
Total Released	84,829

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. Even more so than in previous years, we were able to keep density levels low due to the recent purchase of a 1,500 litre tank. Green egg to release survivals of this stock were 96.1 % over a 20 month period from mid August, 1993 to mid April of 1995.

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 not a factor in the outdoor channel this past year.

Bulkley River Chinook (1994 brood)

Broodstock collection for 1994 brood Bulkley chinook began on August 18, 1994 and by August 29 we had attained our target of 100,000 eggs. A total of 32 female and 58 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 4 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 analysis. All females tested negative for signs of BKD.

Chinook assessment was carried out in conjunction with these egg takes beginning with a helicopter count of spawners on August 17, 1994. A total of 286 chinook were observed between the highway crossing west of Houston and Topley, visibility into some of the deeper pools was not as good as in previous years. As a follow-up to this flight we sampled a total of 259 different chinook during and after broodstock collection, we also had 29 additional chinook recaptures as identified by operculum punches. Some of the deeper pools where few or no fish were observed from the helicopter were netted and found to hold considerable numbers of chinook. The composition of the run in 1994 was 57 % wild and 43 % adipose clips and we managed to attain our target of 50 heads from clipped fish.

Results of the helicopter count are as follows:

		Aug. 17
above Bulkley Falls	-	0 chinook
Meanwhile Creek	-	0 chinook
Topley	-	1 chinook
Richfield Creek	-	37 chinook
Perow Station	-	16 chinook
McQuarrie Creek	-	5 chinook
below McQuarrie Creek	-	153 chinook
below Knockholt	-	1 chinook
Houston	-	73 chinook
in Buck Creek	-	0 chinook
Total observed / flight	-	286 chinook

From these observations, and from previous years' experience, I would estimate the chinook escapement to the upper Bulkley River to be between 325 and 350 adults in 1994. We estimated to have captured and sampled at least 75 % of the chinook on the upper Bulkley spawning beds in 1994.

A total of 85 scale samples were taken from chinook spawners in 1994. These scale samples have been sent to the scale lab for analysis. The brood females averaged 26.4 inches hypural length and weighed 13.7 pounds. This is slightly smaller than our females broodstock in 1993.

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 1994 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 1994 brood Bulkley River chinook eggs was completed on October 05, 1994 at 280.0 A.T.U.'s. At this time the chinook eggs were transferred to Heath trays to hatch. Overall survivals to eyed stage were good and averaged 97.1 % (Table I). Volume estimates at eyed stage verified our spawning estimate of over 100,000 eggs collected.

Development of the eggs and alevins was similar to past years and ponding of this stock occurred during March of 1995. Good survivals were evidenced during hatch and ponding and the fry got on the feed very quickly. A total of 119,192 chinook were initially reared in two capilano troughs at an average size of 0.45 grams, were split into 3 troughs during April at 0.62 grams in weight and into 4 troughs in late May at 1.21 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 3.5 grams, and is only slightly ahead of last year's growth rate (Fig. 3). These fish are feeding very actively and, as was the case for the 1993 brood, we expect growth to accelerate before winter.

Coded-wire tagging occurred between June 12th and June 15th, 1995 and this tag group is now rearing in compartments "A/B" of the outdoor rearing channel. In total, 89,200 chinook were tagged and adipose clipped, average size at tagging was 1.5 grams and tag loss was less than 1.0 %. Since tagging we have culled out approximately 5,400 small chinook and clipped the right ventral fins of the remaining 22,000 surplus fry. These surplus chinook will be released in August of 1995.

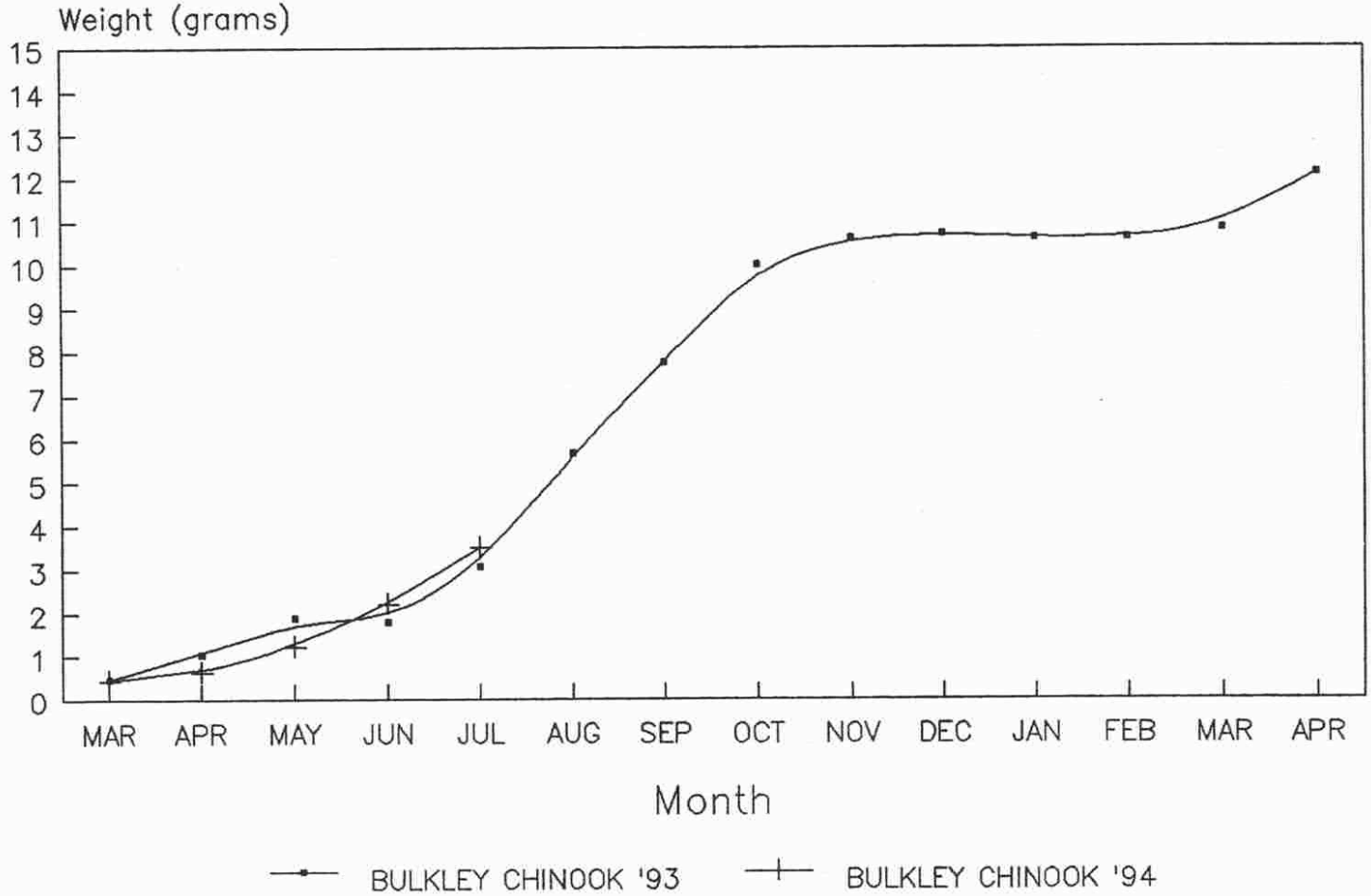
Data Code	Total Tagged	Fin Clip
18-12-40	89,200	adipose

Survivals since ponding have been excellent, 97.9 % as of the first of August, and smolt releases should number over 88,000 chinook in April of 1996.

Table I. Shocking and Picking Summary for 1994 Brood Bulkley River Chinook Salmon Eggs at Toboggan Creek Hatchery.

Tray#	Pre-shock	Post-shock	50 ml	Volume(mls)	Survival
M1-1	59	186	127(2.54)	3870	9644(97.5)
M1-2	41	128	130(2.60)	3620	9284(98.2)
M1-3	125	302	116(2.32)	3200	7122(94.3)
M1-4	117	366	132(2.64)	3320	8399(94.6)
M1-5	25	30	106(3.12)	3700	11514(99.5)
M1-6	36	51	108(2.16)	2710	5803(98.5)
SubTot	403(0.8%)	1063(2.0%)	120(2.40)	20420	51766(97.2%)
M2-1	74	271	110(2.20)	4320	9233(96.4)
M2-2	45	34	110(2.20)	2900	6346(98.8)
M2-3	48	183	106(2.12)	3180	6559(96.6)
M2-4	45	73	115(2.30)	2110	4780(97.6)
M2-5	89	444	120(2.40)	3120	7044(93.0)
M2-6	53	160	111(2.22)	3990	8698(97.6)
M3-6	96	231	112(2.24)	4080	8908(96.5)
M3-5	38	98	108(2.16)	4300	9190(98.5)
M3-4	123	63	118(2.36)	3230	7560(97.6)
SubTot	611(0.9%)	1557(2.2%)	112(2.24)	31230	68318(96.9%)
Totals	1014(0.8%)	2620(2.1%)	115(2.30)	51650	120084(97.1%)

Fig.3 Growth of Chinook Salmon
at Toboggan Creek Hatchery (1994/95)



Chinook Hatchery Returns (1988, '89, '90 and '91 broods)

Marked hatchery returns, again, made up close to half of the chinook escapement to the upper Bulkley River this year, an estimated 150 finclipped hatchery chinook and 200 unclipped wild chinook returned to this system in 1994.

These escapement estimates were determined as a result of the intensive assessment carried out by hatchery staff in 1994, 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 286 chinook in the upper Bulkley system.

A total of 259 different chinook were randomly sampled during and after broodstock collection by hatchery staff, the sample represented close to 75 % of the total estimated escapement. As a result of this sampling, we found that 43.0 % of these chinook spawners were of hatchery origin. No ventral-clipped chinook were observed in 1994, indicating poor survivals of surplus salmon clipped and released as 3.0 gram fed fry. The adipose clipped chinook observed, 111 in total, were randomly sampled for heads and pins, scales were taken for known age comparison. A total of 56 chinook heads were collected, with 53 found to carry pins, 1 pin was lost during dissection:

# of Chinook	Tag Code	Brood Year
4	02/11/56	1990
3	02/11/57	1990
9	02/04/59	1989
23	02/04/60	1989
6	02/63/13	1988
1	02/63/14	1988
6	02/63/15	1988

These coded-wire tag data indicate that escapement of adult chinook to the upper Bulkley in 1994 was predominantly 5 year old fish, making up 61.5 % of the adipose-clipped return. The 6 year old fish made up 25.0 % and 4 year olds 13.5 %. We saw almost no 3 year old chinook jacks in the system this year.

Based on this years data, it appears that we had 130 salmon return from adipose-clipped releases of 1989 and 1988 brood chinook, this represents smolt to spawner survivals of 0.19 % and 0.05 % for the 5 and 6 year old age classes respectively. This is less than half of the survival, comparitively, of the returns of 5 and 6 year adipose clips in the 1993 escapement. Most other Skeena chinook stocks showed similar low spawning escapements as well in 1994, as compared to 1993 and earlier.

Toboggan Creek Coho (1993 brood)

Growth of the 1993 brood Toboggan coho accelerated rapidly in August and September of 1994, from 2.9 grams near the end of July up to 8.0 grams by the third week of September (Fig. 4). This fast growth continued in October and then 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.

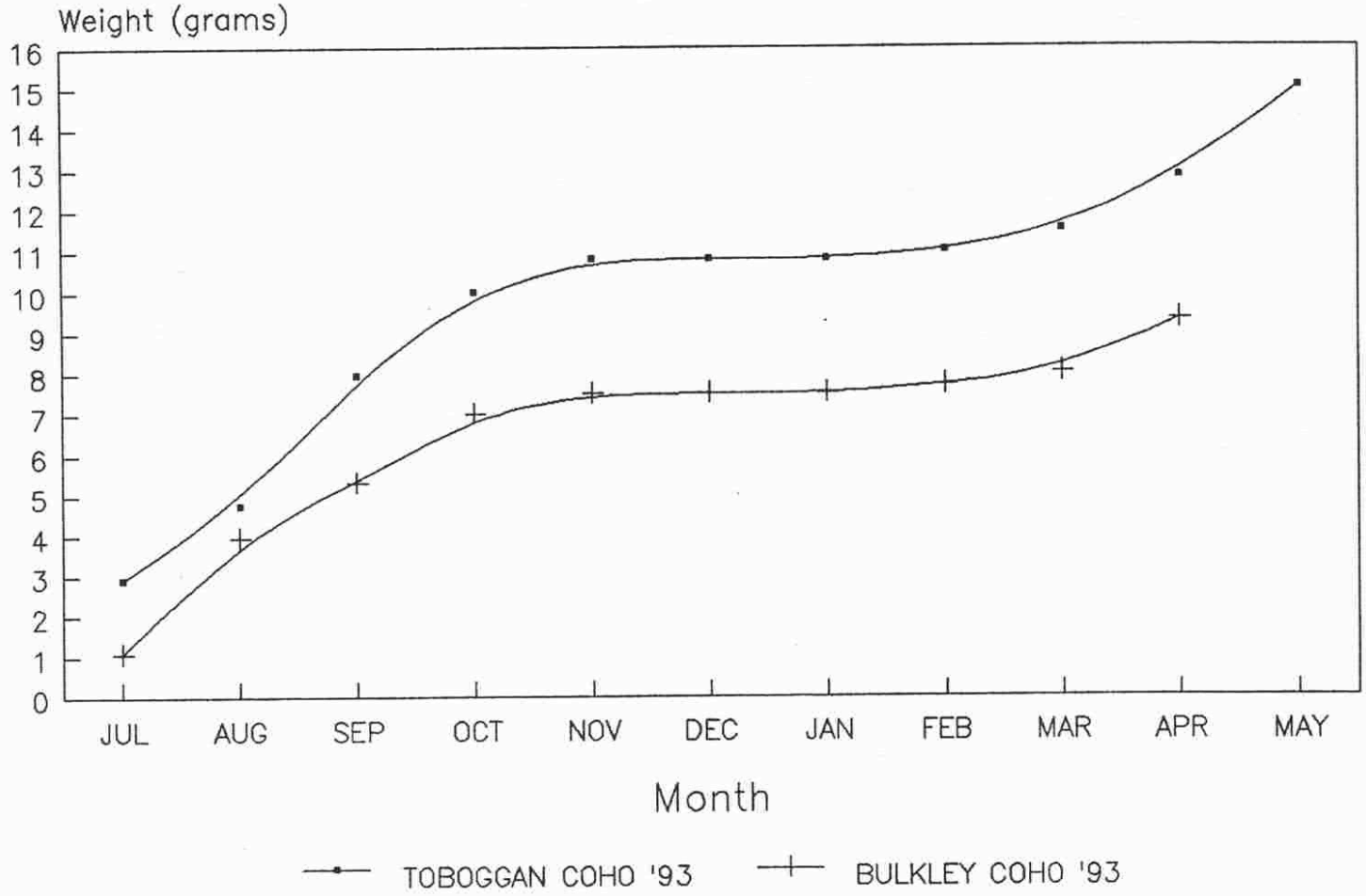
These coho fry were split into 3 capilano troughs in mid July and divided again into 4 troughs in late August, prior to the tagging crew's arrival. Overall fish health of this stock was very good throughout the rearing cycle, and salmon survivals from ponding to release were 96.7 %, a period of 13 months.

Coded-wire tagging of this stock was completed on the seventh and eighth of September, 1994. A total of 34,298 salmon were tagged and adipose clipped. Remaining Toboggan coho that were in excess to this group were right-ventral clipped prior to transfer to two P.I.P projects, at the Bulkley Valley Rod and Gun Club near Smithers, and Chicago Creek Enhancement Society near Hazelton. The coded-wire tagged group was transferred to compartment "C" of the outdoor rearing channel in September.

Tag code	# Tagged
18/07/04	11,721
18/07/05	11,648
18/07/06	10,929
Total Tagged	34,298

Survivals were excellent after tagging and through the winter period and we released 33,948 coded-wire tagged smolts during the spring of 1995, the screens were pulled on May 1st and most of these 15.0 gram smolts had migrated out by June 1st. Observations of smolts indicated a peak movement on May 20th. 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 on June 6th, 1995. These coho smolts averaged 20.0 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 1995 as well.

Fig.4 Growth of Coho Salmon
at Toboggan Creek Hatchery (1994/95)



Bulkley River Coho (1993 brood)

As with the Toboggan Stock, growth of the 1993 brood Bulkley coho accelerated rapidly in August and September of 1994, and they went from 1.1 grams near the end of July up to 5.3 grams by the third week of September (Fig. 4). This good growth continued through October and then slowed down in the months from November through March. In April of 1995 their growth accelerated again due to the increasing water temperatures, and this stock managed to get over 9.0 grams prior to release at the end of April.

These coho fry were split into 3 capilano troughs in mid July and divided again into 4 troughs in late August, prior to the tagging crew's arrival. Overall fish health of this stock was not as good as in previous years, and survivals from ponding to release were 93.1 %, over a period of 12 months. A problem with poor gills carried on from alevin stage through to early ponding and affected growth and survivals until August, 1994.

Coded-wire tagging of these coho was completed on the sixth and seventh of September, 1994. A total of 33,684 salmon were tagged and adipose clipped. Remaining Bulkley River coho that were in excess to this tag group were left-ventral clipped, with 19,500 done in July and 6,600 done in November of 1994. The coded-wire tagged group of Bulkley coho was transferred to compartment "D" of the outdoor rearing channel soon after the tagging operation was completed.

Tag code	# Tagged
18/07/01	11,407
18/07/02	11,247
18/07/03	11,030
Total Tagged	33,684

Survivals after coded-wire tagging, and right through to the release date of this tag group, were excellent, and exceeded 99.0 %. Releases of these smolts were completed on April 26th and 27th, 1995 and a total of 33,437 smolts were transported by truck to the upper Bulkley River at this time. Releases of the surplus Bulkley coho occurred in September of 1994, when we released 19,432 left-ventral clips at an average weight of 4.5 grams, and on April 26th and 27th, 1995 when we released approximately 6,500 left-ventral clips weighing 9.3 grams.

Coho Egg Collection (1994 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 1994/95 were as follows :

Kathlyn Creek	15,000
Toboggan Creek	40,000
Bulkley River	55,000
Total Egg Target	110,000

Kathlyn Creek Coho (1994 brood)

As in previous years no coho eggs were collected from Kathlyn Creek in 1994 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 eight years.

Toboggan Creek Coho (1994 brood)

All of our 1994 brood coho eggs collected from Toboggan Creek this fall were taken from adult coho intercepted at our fence operation. A total of 54 coho were collected and transported back to the hatchery for egg take purposes. We took eggs from coho broodstock during three different egg takes between the eleventh of October and the nineteenth of October, 1994. All of these eggs were disinfected with an iodine solution prior to being placed in the 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 9.1 lbs while overall the average length was 23.2 inches. The scales have been sent to the lab for analysis.

Shocking and picking of the 1994 brood Toboggan Creek coho eggs began on November 24, 1994 and the last batch was done on December first. Egg survivals to this stage were excellent and a total of 73,635 eggs survived (Table II). Fecundities of the Toboggan coho averaged 4,165 eggs per female.

These coho eggs began hatching at 442.0 A.T.U.'s and peak hatch occurred at 506.0 thermal units. The survivals during hatch were excellent. Ponding of this stock occurred between May 2nd and May 5th, 1995 at 640.0 A.T.U.'s. In total, 72,800 coho fry were ponded into one Capilano trough and they began feeding actively shortly after ponding. At present, these fry are averaging 3.3 grams in weight, are now spread into three troughs, and with a condition coefficient of 1.14 are feeding very actively.

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 1996. Up to 32,000 of these fish will be released into Toboggan Creek, as coded-wire tagged salmon, and another 20,000 smolts will be transplanted into the Kathlyn Creek drainage. A total of 20,000 coho were transferred to the Chicago Creek P.I.P. site on May 15, 1995. Another 5,000 surplus coho from this stock were moved to the Bulkley Valley Rod and Gun Club P.I.P. site in late July. All of these coho surplus to the coded-wire tag group of 32,500 will be ventral clipped prior to release. The c.w.t. tagging crew is scheduled to be here on August 10th.

Survivals of this stock have been excellent since ponding and they continue to appear very healthy.

Table II. Shocking & Picking Summary of 1994 Brood Toboggan Creek Coho Salmon Eggs at Toboggan Creek Hatchery.

Tray #	# of Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival (%)
M1-5	3.0	41	162	154(3.08)	3430	10402(98.1)
M1-6	3.0	93	245	161(3.22)	3420	10767(97.0)
M2-2	3.0	156	62	182(3.64)	3550	12860(98.3)
M2-3	3.0	170	141	161(3.22)	4340	13834(97.8)
M2-4	3.0	28	54	166(3.32)	4350	14388(99.4)
M2-5	3.0	80	101	148(2.96)	3880	11384(98.4)
Total	18.0	568(0.8%)	765(1.0%)	162(3.24)	22970	73635(98.2%)

Bulkley River Coho (1994 brood)

A total of 41 adult coho were collected from the Bulkley River during October of 1994. All of these fish were taken at the Bulkley River counting fence, which was operated by this hatchery in 1994 with money through the provincially-funded B.C. 21 program used to fund this count. All of these 41 coho were transported back to the Toboggan Creek Hatchery and were held until ripe in our covered capilano troughs. As with the Toboggan Creek coho these 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. There were only 141 coho counted through the Bulkley fence in 1994.

Eggs were taken from a total of 17 ripe female coho and sperm was taken from 23 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 6.7 lbs overall and average length 21.6 inches. The scales have been sent to the 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 1 female coho was left unspawned while all males were released after expression of sperm. Coho eggs were taken on two consecutive days on the twelfth and thirteenth of October, 1994.

Shocking and picking of the 1994 brood Bulkley River coho eggs began on November 24, 1994 and the last batch was done on December first. Egg survivals to this stage were excellent and a total of 59,820 eggs survived (Table III). Fecundities of the Bulkley coho were around 3,662 eggs per female.

Approximately 8,300 eyed eggs were transferred to Richfield Creek P.I.P. project, on the upper Bulkley River, in January. Hatching of coho eggs began at 430.0 A.T.U.'s with the peak hatch occurring at 480.0 thermal units. Ponding of coho fry from this stock occurred between May 2nd and May 5th, 1995 at around 665.0 A.T.U.'s. Survivals to ponding were very good and we began feeding 49,850 Bulkley coho fry, which initially were ponded in one Capilano trough. At the present time coho from this stock are averaging 2.46 grams with a c.c. of 1.08. Growth and health of this stock are significantly better than in 1993 and we expect them to achieve a 12.0 gram smolt size.

Approximately 32,000 of these coho will be reared to smolt at the hatchery, and released as coded-wire tagged fish in May of 1996. The remainder will be ventral clipped and released into the Bulkley River as fed fry in the fall of 1995. Coded-wire tagging of this stock will occur in early August, 1995.

Table III. Shocking and Picking Summary of 1994 Brood Bulkley River Coho Salmon Eggs at Toboggan Creek Hatchery.

Tray #	# of Females	Pre-Shock	Post-Shock	50 ml Sample	Volume (mls)	Survival (%)
M1-1	3.0	63	117	183(3.66)	2920	10570(98.3)
M1-2	4.0	80	242	205(4.10)	3490	14067(97.8)
M1-3	3.0	190	420	203(4.06)	2920	11435(94.9)
M1-4	4.0	83	148	205(4.10)	2890	11701(98.1)
M2-6	3.0	291	802	182(3.64)	3530	12047(91.7)
Total	17.0	707(1.1%)	1729(2.8%)	196(3.92)	15750	59820(96.1%)

Assessment of Coho Escapement in 1994

Toboggan Creek Fence

The Toboggan Creek coho counting fence commenced operation on August 9th, 1994. The fence was monitorred twice daily from this date through to November 2nd, 1994 at which time the aluminum panels were removed due to freezing conditions.

A total of 2,067 coho were passed through the fence, with the migration into the creek peaking in mid to late September. We had our most thorough count to date with fairly moderate flow throughout the migration and spawning cycle. In addition to our normal sampling we floytagged and operculum punched 2,019 salmon at the fence. Different colored tags were installed at intervals throughout the escapement. Later assessment, done visually, found 1,382 spawning coho, of which only 7.2 % were untagged. Weekly counts were done beginning on October 5th.

We were able to estimate the total number of coho which were in the creek by means of weekly spawner counts. Spawning was observed to have started on October 10th, 1994 and the peak spawn occurred in the third week of October. We also counted 209 spawning coho downstream of the counting fence on October 20th, and estimate that at least 350 fish spawned below the fence site. The highest concentrations of spawning coho were observed in Toboggan Creek near the hatchery grounds, and in Glacier Gulch Creek above Toboggan Lake. Of 13 untagged, dead coho sampled only one did not have an operculum punch, and is conclusive in proving that we missed less than 0.6 % of the coho that spawned upstream of the counting fence in 1994. The total spawner estimate, including the broodstock removed at the fence by hatchery personnel, and the 350 coho downstream of the fence, was 2,416 coho in 1994.

Approximately 26.0 % of the salmon handled at the fence were hatchery returns from the 1991 brood. This represents a total of 623 spawners returning from a release of 32,600 smolts, a 1.9 % return overall. Adipose-clipped coho made up 95.0 % of the marked coho escapement with the remainder being from releases of ventral clips, into Kathlyn Creek and the Bulkley River, which strayed into Toboggan Creek on their return run. Other fish observed during fence operation included 2 chinook and 14 steelhead. No pink salmon were observed in 1994.

Bulkley River Fence

The Bulkley fence operated from August until late October and a total of 141 coho were sampled. This was not a total count, due to vandalism on October 22nd. The total run was estimated at less than 200 wild spawners. Only 3 hatchery returns were seen in 1994, this due to no enhancement of the 1991 brood.

Coho Hatchery Returns (1991 brood)

Although all other upper Skeena waters were closed to harvest of coho in 1994 anglers were allowed to kill hatchery coho at Toboggan Creek. An opening for sportfishermen was advertised, a daily limit of one adipose clipped coho was initiated. As a condition of this opening the Toboggan Hatchery was required to conduct a daily creel survey to estimate the total catch and harvest of coded-wire tagged coho near the confluence of Toboggan Creek and the Bulkley River. This survey was carried out from August 1st until October 31st, 1994. 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 919 anglers interviewed, average time fished per angler was 3.5 hours, and during our survey we observed 76 coho and 60 steelhead landed. Twenty of the coho landed were adipose clips, of which 18 were killed. The total effort during this fishery was estimated at 3,577 angler hours, catch was estimated at 148 wild coho, 158 wild steelhead, 55 adipose-clipped coho and 3 clipped steelhead. Of the 55 hatchery coho caught 50 were harvested.

Head Depot returns of hatchery coho showed that 28 of the 50 heads were turned in by anglers, a 56.0 % compliance rate. Of 28 heads sent to J.O. Thomas and Associates for dissection 22 had pins located in them. Data from the dissected coho showed all heads came from 1991 brood salmon released in 1993. The dissection contractor did not provide a tag-code breakdown of our heads in 1994, as they have done in past, so individual tag data was not included in this report. Twenty one of these heads were identified as being from this facility, while one head was identified as being from a Kispiox Hatchery coho.

As a result of sampling done at the fence and on the spawning grounds we were able to collect 88 coho heads from Toboggan Creek coho spawners, of these 87 carried pins but one pin was lost during dissection. The extremely low no-pin rate of this sample, only 1.1 %, indicates the very high quality of tag insertion by Streamline Consulting, our tagging contractor.

No heads were taken from Bulkley coho in 1994. The breakdown of dissected heads was as follows:

# of Coho	Tag Code
23	02/12/32
36	02/12/33
27	02/12/34

All of these escapement heads are from 1991 brood coho salmon reared and released at this facility.

Exploitation of 1991 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 69.0% in 1994 (Fig. 5). Commercial catches by Canadian and Alaskan vessels were responsible for over 75.4 % of the harvest, Indian food fishermen took 14.0 % of the catch, while sportfishermen had a 10.6 % share. Coho spawning escapements to Toboggan Creek in 1994 were 31.0 % of the total adult stock. Exploitation could be much higher due to the fact that the Indian food catch estimate only includes the Moricetown Band catch, and none of the downstream catch.

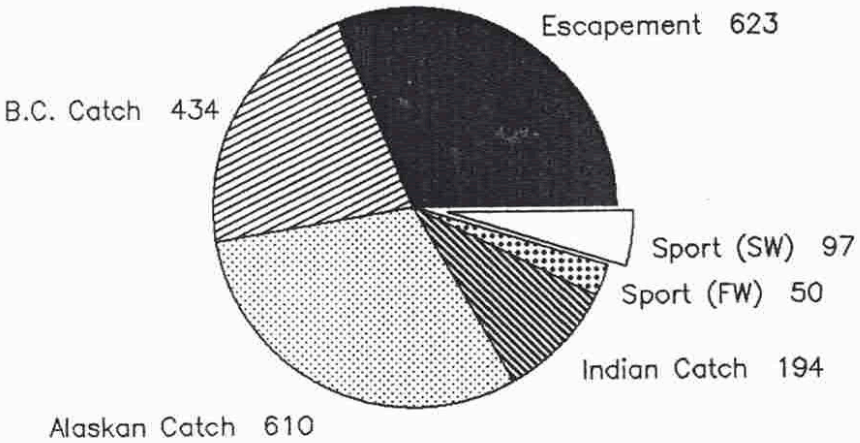
Alaskan commercial fishermen caught more coho than those that were reported by B.C. fishermen, with 610 and 434 coded-wire tagged hatchery coho respectively. The breakdown of Alaskan catches by gear type was not supplied to us this year but the B.C. catch was 67.0 % troll and 33.0 % net. This is almost a total reversal of the catch breakdowns of 1992 and 1993. This fact indicates that although net fishermen did forego catches of large numbers of Toboggan coho in 1994, the troll fishery and the Alaskan fishery kept the exploitation rate too high.

Survivals of hatchery-produced coho smolts from this facility were very high in 1994. Assuming the catch rates are accurate we saw smolt to adult survivals of 6.2 %, with 2,008 adults produced from a release of 32,600 Toboggan Creek coho smolts. This is likely our best result since releases began in 1987.

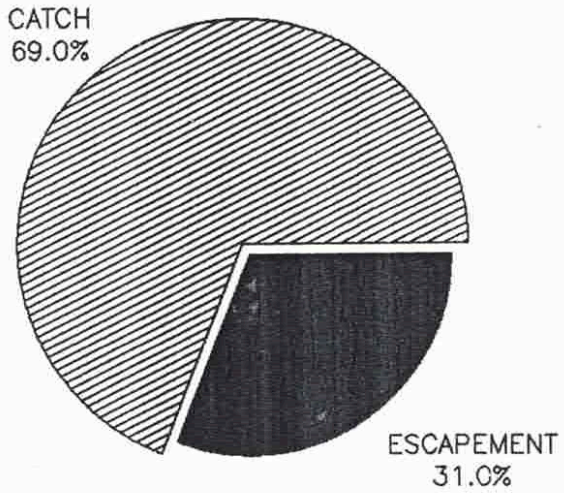
It appears that, despite severely restricting gillnet fishing time at the Skeena mouth in August of 1994, the exploitation rates of upper Skeena coho continue to be dangerously high.

Fig.5 Total Coho Catch (1994)

Toboggan C.W.T.'S



CATCH/ESCAPEMENT



EXPLOITATION RATE

Administration Report

This report covers hours spent from August 1, 1994 through to July 31, 1995. Last year's report covered a period of sixteen months, as a result of the shift of year ends from March 31st to July 31st in the 1993/94 contract year.

The following is a breakdown of hours spent carrying out the contract in 1994/95:

Activity	Man-hours
Project Management	835.0
Facility Operations	3489.0
Broodstock Collection	614.0
Assessment	433.0
Coho Fence	576.0
Statutory Holidays	288.0
Total Hours in 1994/95	6235.0

The contract went very well again in 1994/95 and our hours of work spent in each category were consistent in some areas and different in others. Hours spent doing broodstock collection and project management tasks were down compared to the last contract report for a 12 month period, which was in 1992/93. Hours spent carrying out assessment and coho fence counts are up substantially due to an increased focus on assessment. We spent virtually the same amount of time on facility operation as in 1992/93, this was our largest category by far. Hours spent on broodstock collection are less due to Morice coho no longer being enhanced by this facility. Project Management is showing less hours because there is just not the time left in the contract to complete some tasks as we did two years ago.

Total employment generated by the hatchery in 1994/95 was 220 work weeks, employing 16 different people for varying lengths of time during the twelve month period. These last figures include seperate contracts we have undertaken via CSERF, the Challenge Student Employment Program, the Skeena Green Plan and the Habitat Conservation Fund, during the 1994/95 period.

Labour costs were seven percent lower than budgetted, for the 12 month contract period, as were associated overhead costs. Cost of operations on the other hand were twenty five percent higher than budgetted. Overall, we were $ 3,100.00 over our contracted amount of $ 156,300.00. Labour costs are below the contracted levels due to the subsidization of some operations by the extra contracts we managed to secure last year. Costs of operations, however, rise yearly and it is becoming quite difficult to provide the same level of production when levels of funding for these operations remain the same. As we now understand it, the 94/95 overrun comes off the 95/96 funding.

The following is a summary of expenditures made in carrying out the 1994/95 contract:

Category	Expenditures	Contract
Direct Labour	87,207.90	93,715.00
Overhead Costs	21,801.96	22,500.00
Capital Equipment	0.00	0.00
Operations	50,387.60	40,085.00
Totals	159,397.46	156,300.00

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 1994, the Toboggan fence in the spring of 1995, student labor contracted through the Challenge '95 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 wooden header trough, which distributes water to the rearing troughs and incubation room, was taken out and replaced with an aluminum header and splash guard. The old header had been in place for 10 years and was starting to decay and leak. We also replaced the box that distributes groundwater from the aeration tower. Funding for this project came via Russ Doucet and the Engineering Department of D.F.O. and was $ 5,000.00.

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 two years. We have not seen much in the way of flooding for over a year now and as such the intake has been working well. We now flush out the water line 3 or 4 times per year.

iv.) Five students were hired for 3 weeks during the summer as a result of funding from the federal Challenge '95 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 1995. Close to 400 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 1994 to collect the coho eggs for the classrooms. Both activities were very successful and beneficial.

vi.) During the past three 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, this was done with H.C.F. funding of $8,000.00 to cover labour costs.

Operating Plan for 1995/96

As in previous years we will begin releasing the chinook and coho smolts in April and May. The 1994 brood Bulkley chinook will be the first to go in mid to late April, followed later by the 1994 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 32,000 smolts will go into the Toboggan Creek system. Also, 20,000 coho smolts from Toboggan stock will be transplanted into the Kathlyn Creek watershed in late May. Releases should take two or three weeks to complete in 1996.

Our chinook target is still at 100,000 eggs for 1995 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 1997.

Coho egg targets will stay the same as last year, and 110,000 eggs will be taken in 1995; 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 1997.

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 1996. We hope to incorporate a tagging program at the Toboggan Creek mouth just prior to the fence count, as we were able to do in 1995.

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 October 21, 1995 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 preferable 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 1996 will be restricted so that our enhancement goals can be realized. Coho returns to many tributaries continued to be poor in 1994 even though exploitation rates were supposedly 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 last year, but 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 2,248,369 salmon and steelhead smolts and fry. We have seen good returns of hatchery chinook and coho to the Bulkley and Toboggan systems over the past few years and this reinforces 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 provincial CSERF and HCF sources, by the Ministry of Fisheries and the Ministry of Environment, and DFO, through Skeena Green Plan, have allowed us to expand our 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 - 1994/95

FP94-5128

TOBOGGAN CREEK HATCHERY CONTRACT STATEMENT OF WORK FOR AUGUST 1, 1994 TO JULY 31, 1994

PAYMENT OF CLAIMS

PAYMENT SCHEDULE

1st Advance	: 20%	Upon signing the contract
2'nd Advance	: 25%	Upon receipt of Aug. and Sept. '94 claims
3'rd Advance	: 20%	Upon receipt of Oct., Nov., Dec., '94 claims
Final Advance	: 35%	Upon receipt of Jan., Feb., Mar., '95 claims

Note that the deadline for the Annual Report will be August 31, 1995. A $2500 penalty will be imposed on contractors who do not produce an Annual Report. Note of this deduction will be made on your September claim prior to the second advance being forwarded to you.

MONTHLY CLAIM/PROGRESS PAYMENT REQUEST

The claim for payment will be accompanied by a form which breaks all O & 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, 1995. March claims should be submitted to the Community Advisor no later than April 10, 1995.

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.

As per last year's procedures.

PROJECT MANAGEMENT AND ADMINISTRATION

Section 1.1. : Submit the annual report no later than August 31,

1995. If the report is not submitted, a $2500 penalty will be imposed.

Section 3. **FACILITY MAINTENANCE :**

Rip rap placement is required at the site of the intake in Toboggan Creek. This will ensure that flow is deflected towards the intake. The estimated cost of the rip rap placement is $1500.

Section 4. **FACILITY IMPROVEMENTS**

1. Aluminum Header Tank. The existing header tank for the rearing containers is of wood construction and requires replacement.

2. Large Diameter Rearing Tub. Due to a rearing bottleneck in the spring of each year, additional rearing space is required to ensure adequate rearing water quality. An eight foot diameter tub has been suggested using the brook pipeline as the water supply. Estimated cost is $2500.

Section 5. **REPORTING REQUIREMENTS**

Monthly reports of biological activities should include broodstock and mark recovery information, incubation inventories, rearing information, disease treatment information and any other pertinent information. The Toboggan Creek fence data is to be summarized on computer diskette and the diskette is to be submitted to the Community Advisor upon completion of fence operation. Also to be included in the monthly report is a financial accounting of the months expenditures and purchases of any equipment that fall into the capital equipment category i.e. purchases of equipment over $500 with a life expectancy greater than 1 year.

Section 6. **PRODUCTION PLAN**

1993 Toboggan Creek Coho

Continue rearing of the 52,000 Toboggan Creek coho. 34,000 are to be kept for yearling releases, 10,000 will be fed fry releases into Kathlyn Creek and an additional 8,000 fry will be transferred to the Chicago Creek Public Involvement Program. Any remaining excess fry will be intermediate reared at the B.V. Rod and Gun Club site.

1993 BROOD BULKLEY RIVER COHO

Continue rearing of the 60,000 Bulkley River coho. 34,000 will be retained for yearling releases and the remaining 26,000 will be ventral clipped for a fall release.

1993 BROOD SUSKWA RIVER CHINOOK

There were no Suskwa chinook eggs taken in 1993.

1993 BROOD UPPER BULKLEY RIVER CHINOOK

Continue rearing of the 103,000 Upper Bulkley River chinook. 83,000 will be retained for yearling releases and the remainder will be finclipped and released in the fall of 1994.

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 requirements are defined in the **ADULT SAMPLING MANUAL** distributed by the Program Coordination and Assessment Division and these guidelines are to be followed. **All** pertinent information as outlined in the Adult Sampling Manual is to be collected and forwarded to the Community Advisor. Adult collection and mark recovery data is to be summarized in the monthly reports. The data from the Toboggan Cr. fence is to be entered onto diskette and submitted to the Community Advisor.

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.

7.2 Incubation

The incubation room is to be prepared prior to egg takes occuring. 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.

Eggs will be incubated initially in moist incubators and will be transferred to vertical incubators, i.e. Heath stack type incubators at the eyed stage.

At the eyed stage, the eggs will be mechanically shocked, the dead picked out and enumerated and the live will also be enumerated. All data will be recorded on the appropriate record forms.

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

1994 BROOD EGG TARGETS

STOCK	SPECIES	NO. EGGS REQUIRED
Suskwa R.	chinook	10,000
Upper Bulkley	chinook	90,000
Toboggan Cr.	coho	60,000
Bulkley R.	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 preset.

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 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 fish 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. 1993 brood Toboggan Cr. coho : 30,000 AD/CWT and the remainder will be finclipped for fry releases.

2. 1993 brood Bulkley River coho : 30,000 AD/CWT and the remainder will be finclipped for fry releases.

3. 1993 brood Upper Bulkley River chinook : 80,000 will be AD/CWT and the remainder will be finclipped for a fall release.

7.5 Release

The 1993 brood Toboggan creek coho yearlings will be released into Toboggan Creek in the spring of 1995. The fry releases will be into Kathlyn Creek in late summer to early fall of 1994.

The 1993 brood Bulkley River coho yearlings will be released into the Upper Bulkley River in the spring of 1995. Fry releases will be into the Upper Bulkley River in late summer to early fall of 1994.

The 1993 brood Upper Bulkley River chinook yearlings will be released to the Upper Bulkley River in the spring of 1995. Fry releases will be into the Upper Bulkley River in the fall of 1994.

All stocks are to be enumerated and bulk sampled just prior to release.

Brood summaries are to be completed after releases and copies submitted along with the monthly reports.

The appropriate release records are to be completed and copies submitted along with the monthly reports.

7.6 ASSESSMENT

The Toboggan Creek fence will be operated as per last year's procedures. All fish will be enumerated at the fence, checked for marks and all fish put above the fence will be opercular punched. The appropriate number of adipose clipped adults will be sacrificed for tag decoding as per instructions in the Adult Sampling Manual distributed by the Program Coordination and Assessment Division.

The fence records will be entered onto diskette for analysis by the project Biologist.

Dead pitches will be conducted in the event that fence operation is interrupted.

Biological sampling will be carried out as directed by the Program Coordination and Assessment Division.

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

Section 8 **TRAINING**

Lotus 1-2-3- course for hatchery manager. Genetics course for hatchery manager if one is offered locally.

Section 9 **SPECIAL TECHNICAL ASSISTANCE**

A part-time Project Advisor will be assigned to the project on an as needed basis. The Project Advisor will provide bio-technical support to the contractor.

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

10. OTHER

Please note the following changes:-

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 an annual report by 30th September, 1994 **for the 1993/1994 contract year will result in a reduction of** $2,500.00 **from this contract. The deduction will be taken from the** October 1994 advance.

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

SCHEDULE

TERMS AND CONDITIONS
FOR PAYMENT OF ACCOUNTS

METHODS OF PAYMENT

(a) Payment by Her Majesty for the Work shall be made following delivery, inspection and acceptance of the Work, and following presentation of invoices and such other documentation as the Minister may reasonably require, and of which prior notice has been furnished.

(b) The period for payments shall be within thirty (30) days, calculated from:

- the date the invoice is received, or
- the date of the receipt of the goods or the completion of work,
- the date defined in the contract, whichever is the latest date.

(c) (i) Except as otherwise stated in the Contract, Her Majesty shall be liable to pay, without demand from the Contractor, simple interest at the Bank Rate plus 1¼ percent on any amount which is overdue from the day such amount became overdue until the day prior to the date of payment, inclusively; however, interest will not be payable nor paid unless the amount has been outstanding (unpaid) for more than 15 days following the due date. Interest will not be payable on overdue advance payments.

(ii) The Bank Rate shall be that prevailing at the opening of business on the date of payment.

NOTE: These terms and conditions supersede and cancel any other conditions concerning the payment of interest on overdue accounts shown on the procurement documents.

ANNEXE

MODALITÉS DE PAIEMENT
DES COMPTES

MODALITÉS DE PAIEMENT

(a) Le paiement pour l'ouvrage est fait par Sa Majesté après la livraison, l'inspection et l'acceptation de l'ouvrage, sur présentation des factures et autres pièces justificatives que le Ministre peut raisonnablement exiger, et dont avis a été donné au préalable.

(b) Les paiements sont faits dans les trente (30) jours à compter de:

- la date de réception de la facture, ou
- la date de réception des marchandises, ou la date d'échéance du travail
- la date stipulée dans le contrat, la dernière de ces dates étant à retenir.

(c) (i) Sauf stipulation contraire du Contrat, Sa Majesté est tenue de payer, sans que l'entrepreneur n'en fasse la demande, l'intérêt simple, calculé à l'aide de taux d'escompte plus 1¼ pour cent, sur tout montant en souffrance, et ce, à compter du jour où le montant est devenu échu jusqu'au jour précédent la date où le paiement est effectué, inclusivement; cependant, l'intérêt ne sera ni payable, ni payé à moints que le montant n'ait été en suspens pour plus de 15 jours suivant la date d'échéance. L'intérêt ne sera pas versé pour les avances en souffrance.

(ii) Le taux d'escompte est celui qui avait cours à l'ouverture des bureau, le jour du paiement.

NOTE: Les présentes modalités remplacent et annulent toute autre condition applicable au paiement de l'intérêt sur les comptes en souffrance indiquée sur les documents d'approvisionnement.