

**STRATEGIC STOCK ENHANCEMENT PROGRAM REPORT
UPPER SKEENA : 1998/1999/2000**



Report prepared by

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Strategic Stock Enhancement Program
Upper Skeena : 1998/1999/2000

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STRATEGIC STOCK ENHANCEMENT PROGRAM UPPER SKEENA : 1998/1999/2000

Introduction

The Strategic Stock Enhancement Program was initiated in the Upper Skeena watershed in 1998 and focused on Upper Bulkley River, Morice River and Babine River coho stocks. The original program objectives involved paired studies where enhanced fry production would be compared to wild production. In the Morice River system, coho from Owen Creek would be enhanced and released as coded wire tagged fry back into the Owen system. The production from those Owen Cr. fry would be compared to wild production in McBride Creek. Due to logistical problems, this paired study was dropped. However, there were two years of fry releases into Owen Lake.

The Babine River enhanced coho were to be compared to the Morrison River wild coho. This paired study was dropped and fry releases of both Babine R. and Morrison River coho occurred. The Babine River coho fry were incubated and reared at the Fort Babine Hatchery while the Morrison stock program occurred at the Fulton River hatchery.

The Upper Bulkley River coho are an extreme conservation concern. The objective for Upper Bulkley coho was to release up to 80K fry to rearing areas in the watershed that are currently under-utilized. Coho released as fry would be subjected to natural selection processes which could improve their overall survival.

All fry released were to be at a target release size of 2 grams and fry were to be released as early as possible. Due to growth rate and water temperature restrictions, fry were released at larger than 2 grams and were released later than the target release dates.

SSE Program Components

Babine River Coho

Additional coho eggs were taken in the fall of 1998 and the fall of 1999 for an 80K coded wire tagged fry release. The 1998 brood fry were coded wire tagged from August 1st to August 9th, 1999. In mid September 1999, approximately 80K marked fry were released into Babine Lake as far as Five Mile Cr. and into Babine River as far downstream as Smokehouse Islands. Fry were loaded into a boat transport tank (oxygenated water) and were "chummed" out at the release location. Fry were spread out during the release as much as possible.

The 1998 brood marking program occurred when water temperatures were between 14 and 18 degrees Celsius i.e. July 31st to August 9th. Marking had to occur from 0400hrs to 1200 hrs. in order to avoid higher water temperatures during the afternoon hours. Fish did not handle well and there was significant mortality in the weeks following marking.

Babine River Coho Cont'd

It should be noted, that due to warm summer water temperatures, marking at the Fort Babine Hatchery should not occur before the second week in September. By mid September, water temperatures are conducive to handling fish ie. fish could be marked in mid September and released from mid to late September.

The 1999 brood coho eggs died due to a sediment event in the Babine River in mid May 2000. The cassette incubators, which hang on the upstream sides of the floating raceways, became inundated with fines causing alevin suffocation. This sedimentation in the Babine River occurred for approximately one week from May 19'th to May 26'th, 2000.

Morice River Coho

Morice River coho adults were captured by angling and seine netting. Adults were captured from downstream of the Owen Cr. confluence to downstream of the confluence of Lamprey Creek. Coho adults were not abundant in this area. Although adults were more abundant at the Gosnell Creek confluence, Stock Assessment Division Biologists requested that coho broodstock not be removed from the Gosnell as Gosnell Creek is a wild indicator stream. Adult coho were transported to the Toboggan Creek Hatchery for holding.

1998 Brood Morice River Coho

In 1998 a total of 14,666 coho eggs were collected from 5 females. Seven males were used in egg takes in 1998. A total of 12,873 fry were ponded and 12,724 fry were released into Owen Lake (all coded wire tagged), at an average size of 4.0 grams/fry. The fry were released from a boat and were spread out in the lake.

1999 Brood Morice River Coho

In 1999, a total of 36,004 eggs were collected and 31,794 fry were ponded. A total of 24,222 Morice R. coho were coded wire tagged and 28,500 fry were released into Owen Lake (4,320 of those fry were unmarked). The fry were released on August 16 and 17, 2000 at an average size of 4.0 grams/fry. Fry were again released from a boat and spread out in the lake.

The Morice River program was cancelled for the 2000 brood year.

Upper Bulkley River Coho

The Upper Bulkley River is termed a "red zone" for coho. The UBR coho stock is an extreme conservation concern. Wild returns to the UBR are extremely low and the hatchery component in the escapement is well above the preferred level.

Upper Bulkley River Coho Cont'd

1998 Brood UBR Coho

Adult escapement was estimated to be 317 coho with hatchery coho making up 69% of the escapement. Refer to the "Bulkley River Fish Fence Report 1998" prepared by the Community Futures Development Corporation of Nadina.

In 1998, the total UBR coho egg target was 140,000 eggs. Approximately 40,000 eggs would be slated for the smolt release group and 100,000 eggs for a fry release group. A total of approximately 164,800 eggs were taken and 130,695 eggs remained after shocking and picking at the eyed stage. Of those eggs, 129,831 fry were ponded in May 1999. Of the 129,831 fry ponded, a total of 80,452 coho were coded wire tagged and released at a size of 4 grams in late August 1999. Approximately 36,500 coho were coded wire tagged and right maxillary clipped for a smolt release in May 2000.

The 80,452 coho were released by helicopter into Buck Creek upstream of Bridge #2, which is well upstream of the large cascade on Buck Creek but downstream of the impassable falls on Buck Creek. Some adipose clipped coho were captured during the 1999/2000 overwintering study at locations downstream of Bridge #2 i.e. approximately 2 kms. downstream from the lowest release point.

Buck Creek Juvenile Trapping Program

In the spring of 2000, a juvenile downstream migration program was conducted to determine the numbers of 1998 brood smolts migrating downstream. An eight foot diameter Rotary Screw Trap was installed just downstream of Buck Cr. Bridge #1. The Rotary Screw Trap was a little too large for the site it was installed in. The Buck Cr. Bridge #1 site was chosen due to good road access to launch the RST into the water and the bridge was used to anchor the RST. The eight foot RST would hit bottom when water level was less than 70 cms. (staff gauge readings show that the water depth is greater than 70 cms. only during high water events that normally occur from early to late June). To alleviate this problem, the support beam on the drum was wedged up and the pontoons were weighted down in the rear. The 8 foot diameter RST was not designed to operate this way, however, it was the only way the trap could be successfully operated. In late May 2000, a six foot diameter RST was purchased however by the time the new RST was delivered, the eight foot diameter trap was able to fish quite efficiently. The six foot trap was not used for this downstream study but was installed for the Buck Cr. Emigration Study 2000.

Upper Bulkley River Coho Cont'd

Approximately 16,000 ad/right maxillary coho and 2,400 right ventral clipped coho were released upstream of the RST. These fish represented the known marked group to conduct a Petersen mark-recapture population estimate. Using this known marked group, the total population estimate ranges from 47,997 to 55,282 coho. The Petersen estimate for adipose clipped/coded wire tagged coho that were released in August 1999 ranged from 30,667 to 35,322 coho. This represents a survival rate of 38.1% to 43.9%. This assumes that there was no emigration from Buck Creek prior to implementation of the study. Refer to the "Buck Creek Juvenile Salmon Trapping Program" report prepared by SKR Consultants Ltd. July 2000, for further information.

Buck Creek Emigration Study 2000

To answer the question of potential emigration from Buck Creek, a six foot Rotary Screw trap was installed during the summer through late fall 2000 on Buck Creek. The RST was originally set off of Buck Cr. Bridge #1 but due to extremely low water levels was moved downstream to a deeper pool. Due to extremely low water level and discharge, the six foot RST was limited in its operation. To determine if fish were moving, Gee minnow trapping was conducted at three index sites downstream of the fry release sites. Gee minnow trapping was conducted at the RST site. Six traps were set three times during the emigration study. An area downstream of the release site, but still within a large beaver dam complex was also trapped. (This area is just upstream of the red roofed house near hydro pole 229). Six traps were set in this location twice during the study. Coded wire tagged coho were caught in this beaver complex on October 12, 2000. A total of 48 coho were captured and five of these were over 100 mm. in length and 43 of the coho captured were under 100 mm. in length. Of the 43 coho that were under 100 mm. most of those coho were around 80 mm. in length and weighed about 5 grams. The fry that were released in early August were 63 mms. in length and weighed approximately 3 grams. All of the coho captured at hydro pole 229 had adipose clips.

It appears that marked fish did move downstream from the release location but did not move downstream as far as the RST i.e. they appeared to remain within beaver flooded areas.

In late October, water levels increased and the RST was operated. No adipose clipped coho were captured. Refer to "**Buck Cr. Juvenile Salmonid Emigration Program : Autumn 2000**" report for further details.

1999 Brood UBR Coho

In 1999, the coho count at the Upper Bulkley River fence was 1,073 adults. Approximately 80% of the coho counted were hatchery coho. Refer to the "Bulkley River

Bulkley River Fish Fence Report 1998



*Funded by Fisheries and Oceans Canada
Co-ordinated by the Community Futures
Development Corporation of Nadina*

*Data collected by:
Tom Magill, Jim De La Mare and Jennifer Ewasiuk.
Report written by Jennifer Ewasiuk*

1999 Brood UBR Coho Cont'd

Fish Fence Report 1999" prepared by the Community Futures Development Corp. of Nadina.

A total of 119,044 eggs were planted. Of those eggs 112,163 fry were ponded in mid May 2000. In early August, 2000, a total of 72,520 UBR coho fry were released into Buck Creek. Of those 72,520 fry, 69,720 were coded wire tagged and 2,800 were unmarked. Fish were released at a mean size of 63 mms. and 3 grams . Fry were released into the same release locations as for 1998 brood fry i.e. Buck Creek between Bridges #2 and #3 in large beaver complexes.

A downstream migration trapping program is planned for the spring of 2001 so that over-winter survival of the 1999 brood fry release can be determined. It has been recommended that a minimum of 3,000 and a maximum of 5,000 coho from the UBR smolt group be right maxillary clipped and released upstream of the Rotary Screw Trap. Those right maxillary marked fish will represent the known marked group for the Petersen population estimate.

2000 Brood UBR Coho

Upper Bulkley River Fence Design, Construction and Installation

A new fence was designed, constructed and installed for capture of Brood year 2000 coho. The new fence was designed by DFO engineering staff Ian Ross (engineer) and Sam McNeil (Eng. Tech.). Sam McNeil supervised installation of the sill and the new fence in August 2000.

The new fence consisted of aluminum, broomstick-type panels that were supported by "A" frames bolted to a wood planked sill. The fence panels consisted of two pieces, each approximately three feet by three feet. The panels slid down guides on either side of the "A" frame supports. The live box consisted of five aluminum broomstick panels, sides and bottom, and a solid, two piece, aluminum lid. The live box was assembled on land and was slid down the "A" frames into the water. The live box hooked into a special bottom panel that could be placed anywhere along the length of the fence.

At the top of the fence a walkway, complete with downstream-side safety railing, was installed. This allowed raking of the fence from the walkway, rather than raking from the upstream side of the fence while in the water, as was the case with the old fence.

Fence operations are detailed in the "Bulkley River Fish Fence 2000" report. Also included in that report are a series of recommendations for the 2001 Fence program.

Upper Bulkley River Coho Cont'd

Sperm Cryopreservation Program

A total of 39 males were used for the sperm cryopreservation program. Males were collected from the Upper Bulkley River fence during late September and October. Milt from thirteen males was collected at the UBR fence and transported on ice to the DFO office. Those 13 males were released upstream of the fence. Milt was cryopreserved as per the method stated in the "Salmon Gene Banking Theory and Practice" training manual prepared by World Fisheries Trust 1998.

The other males that were used for sperm cryopreservation were males that were used as hatchery broodstock.

All cryopreserved sperm was shipped to the World Fisheries Trust for storage.

Buck Creek Release Pond

The Buck Creek Release Pond was constructed in September 1999 but was not completed until September 2000. The purpose of the release pond was to have a controlled environment to release Upper Bulkley River coho smolts to. Upper Bulkley River hatchery coho show reduced survival rates as compared to Toboggan Creek coho releases. The release pond was intended to assist in increasing survival rate by improving the release technique.

In past years, Upper Bulkley River coho smolts would be released in mid May into the mainstem. During the spring, the mainstem is often high and quite turbid and does not provide an optimum release environment. The release pond is an earthen pond with water level and flow control structures. Coho were first released into the pond in early May 2000. The majority of the coho released into the pond tended to migrate out within 3 to 5 days. The marked coho yearlings that had been released into Buck Creek upstream of the release pond took considerably longer to migrate out i.e. were migrating through to the third week in June 2000.

The Buck Cr. Release Pond was designed and constructed by DFO engineering staff Ian Ross and Sam McNeil. The release pond sits on a Ministry of Transportation and B.C. Hydro right of way. This is considered to be a temporary pond. Pond construction involved excavating a channel off of Buck Creek just downstream of Bridge #1 on the Buck Flats Forest Service Road. A pipe (with valve) was installed from Buck Creek into an inlet channel. The inlet channel then flows into the earthen pond which is approximately 8 metres wide and 20 metres in length. The earthen pond has weir structures at the upstream and downstream ends. Water level in the pond can be adusted by adding or removing wooden stoplogs. Predator netting is installed to discourage

Upper Bulkley River Coho Cont'd

predation from birds. However, there is no predator control in place to deal with otter, mink etc...

The release pond was initially constructed with no cobble on the pond bottom and no cover for the released fish. It was thought that due to the lack of fish habitat complexing within the pond, the coho left the pond to seek refuge elsewhere.

In September 2000, the release pond bottom was cobbled (cobble diameter = 10 cm. to 15 cm.). Small woody debris was also installed i.e. root wads, to create further cover for fish. The release pond will be monitored over the 2000/2001 winter to determine if any wild fish have accessed the pond for the winter rearing phase.

The pond banks have been seeded and covered with Bio Mats. Willows and conifers have also been planted. Further seeding of the pond banks will be required in Spring 2001.

The water license for the pond should be amended so that some water can be trickled into the release pond over the winter. This may create some needed over-wintering habitat in Buck Creek. As of December 2000, a request to amend the water license has been submitted to the Water Management Branch.

Toboggan Creek Hatchery Operations

The Morice River and UpperBulkley River coho programs are operated by the Toboggan Creek Salmon and Steelhead Enhancement Society at the Toboggan Creek Hatchery. These programs involved producing a number of coho eggs over and above the rearing capacity at the hatchery. To alleviate some of the rearing bottleneck, three circular tubs and two linear, aluminum raceways were installed at the hatchery. The aluminum raceways replaced two lines (4) Capilano style rearing troughs. The new aluminum troughs increased the rearing volume inside the hatchery. The three circular tubs were installed outside beside the downstream raceway "D". The tubs can be utilized for holding adult broodstock or groups of juveniles. A security fence surrounds the outdoor tubs to protect against vandalism.

Even with the additional rearing containers, a rearing bottleneck exists at the pre-marking phase. Marking at the Toboggan Creek Hatchery occurs in mid June (chinook) to mid July (coho). Until fish are marked they must all be held in the indoor troughs/raceways.

To ensure appropriate rearing densities at the hatchery, there should be no more than 200,000 fry on site at the pre-marking stage. In order to continue this program at the Toboggan Cr. hatchery, the Morice River coho program was dropped, the Bulkley River chinook release target is 50,000 yearlings (down from 84,000 yearlings), the Toboggan Cr. coho target release stays at about 35,000, UBR coho yearling release remains at about 35,000 and the fry release target remains at 80,000.

Toboggan Creek Hatchery Operations Cont'd

When the hatchery rearing densities are exceeded, the incidence of fish disease increases causing mortality at the hatchery. Treating of fish is expensive due to additional labour costs, freight costs to send samples to PBS, Nanaimo and purchase of chemicals for treatment.

The marking program at the Toboggan Creek hatchery must be completed within a very narrow time frame. The chinook can be marked by mid to the third week in June, however, coho fry are not large enough to mark at that time. There must be flexibility in the marking contractor's schedule, so that fry can be marked when they reach a mean size of 2 grams.

Release timing of the Upper Bulkley River coho fry is dependent on water temperature. Although a release timing of late July is preferable, this is dependent on water temperature, marking schedule and fish health. Release time may be anywhere from late August to early September.

Table of Projected SSE Program Activities and Costs for 2001-2002

Date	Project	Description	Estimated Cost \$
May 1 – June 30	Owen Cr. Juvenile Trapping Program	Downstream trapping program using an RST or fence with live box on Owen Cr.	\$40,000
May 1 – June 30	Buck Cr. Juvenile Trapping Program	Downstream trapping program using a RST on Buck Creek	\$35,000
May 15 – July 30	Toboggan Cr. Hatchery Operations Fry rearing. (Based on 30K UBR coho eggs)	Ponding, feeding, sampling, labour for special programs(marking, disease problems)	\$4,000
July 30 – Sept 5	UBR Fry Release (Based on a fry release of 30K fry)	Helicopter releases to Buck Cr. and some truck transport	\$4,000
Aug 15 – Nov 10	Upper Bulkley River Coho Fence: Installation and Operation	Adult Assessment fence – first year of returns from SSE program will be 2001.	\$35,000
October	Adult Transport from UBR to TC Hatchery	Truck transport from UBR fence to TC hatchery	\$2,500
Oct –March	TC hatchery operations(based on 100K UBR coho eggs)	Egg takes, egg picking, adult sampling	\$5,000
October	UBR Sperm Cryopreservation	Sperm cryopreservation	\$3,500
Apr – Mar	Tech. Time	Time needed to assist Community Advisor with both Community Programs and SSE support	\$5,000
Apr – May	CA budget support	Vehicle mileage, telephone costs, operational equipment, meals and other associated costs	\$4,000
Apr – Mar	Overtime		\$2,500
Total			\$140,500.00

List of Reports : Strategic Stock Enhancement Program 1998-2000

Bulkley River Fish Fence Report : 1998, Community Futures Development Corp. of Nadina

Bulkley River Fish Fence Report 1999, Angus Glass, Community Futures Development Corp. of Nadina

Upper Bulkley River Coho Assessment Fence 2000, Angus Glass, Community Futures Development Corp. of Nadina

Annual Report for Toboggan Creek Hatchery Operations in 1998/99, Mike O'Neill, Toboggan Creek Salmon and Steelhead Enhancement Society

Buck Creek Juvenile Salmon Trapping Program, July 2000, SKR Consultants Ltd.

Buck Creek Juvenile Salmonid Emigration Program: Autumn 2000 : Greg Tamblyn, Community Futures Development Corp. of Nadina

List of Blueprints for SSE Projects

Upper Bulkley River Fence Structure : November 1999

Buck Creek Release Pond : July 1999

Financial and Administration of Upper Skeena SSE Program

Upper Skeena Operations : 50523 310 167 4107 54364

<u>Project Name</u>	<u>Funding Allotment</u>	<u>Contract or Purchase Order No.</u>	<u>Contract Dates</u>	<u>Funding Used</u>	<u>Comments</u>
UBR and Morice R. coho fry release	\$7,000	None	None	\$7,077.78	72K UBR fry released and 30K fry into Owen Lake
UBR Fence	\$25,000	F1678-0-0003	Aug 15 to December 15	\$29,000	Had to use a lot of volunteer labour and DFO staff time for fence operations
Sperm Cryopreservation on UBR coho	\$2,000	F1678-0-0006	Oct 1-31	\$1,405.00	Only had to use one nitrogen canister due to low number of males captured
Hatchery ops.	\$5,000	none	N/a	\$5,002.50	Includes feeding of fry, disease treatments, sampling, egg takes on adults, adult sampling, egg enumeration etc...
UBR Adult Transport	\$2000	F1678-0-0008	Sept 1 to Oct 31	\$2,040.00	Transported about 85 adults
CA support	\$4000	F1678-0-0007	May 00 to March 01	\$3,980.00	
Totals				\$48,505.28	(\$3,505.28)

Financial and Administration of Upper Skeena SSE Program Cont'd

Upper Skeena Bio-feasibility : 50523 310 167 4107 54365

<u>Project Name</u>	<u>Funding Allotment</u>	<u>Contract or Purchase Order No.</u>	<u>Contract Dates</u>	<u>Funding Used</u>	<u>Comments</u>
Buck Cr. Downstream	\$35000	FP1678-0-0001	May 5-23/00	\$8,154.25	Started program on a purchase order due to contract not yet being in place
		F1528-0-1702	May 23 to July 15/00	\$21,294.46	Contract in place to completion of program
Buck Cr. RST purchase	\$14300	F1528-001707/001/VAN	June 1/00	\$15,301.00	Purchase of a six ft. diameter RST
Buck Cr. Emigration Study	\$25000	F1678-0-0002	Aug 1 to Nov 30/00	\$11,874.04	\$6K can be added to the funding used as Fisheries Renewal B.C. paid for a portion of this program.
Toboggan Cr. marking	\$700	None	July 00 to Mar 01	\$0.00	Right maxillary clipping of 5K UBR smolts should be done to calibrate the RST on Buck Cr.

Financial and Administration of Upper Skeena SSE Program Cont'd

Upper Skeena Bio-feasibility : 50523 310 167 4107 54365

<u>Project Name</u>	<u>Funding Allotment</u>	<u>Contract or Purchase Order No.</u>	<u>Contract Dates</u>	<u>Funding Used</u>	<u>Comments</u>
CA support	\$0	None	N/a	\$1,800.00	To be journal vouchered into CA budget
Totals	\$75000			\$58,423.75	This does not include the \$6K put into the program by FsRBC.
Adjusted funding total				\$64,423.75	Includes the \$6K from FsRBC

Total Funds Used for Upper Skeena SSE Program = \$112,929.03

Total Funds Allocated for Upper Skeena SSE Program = \$120,000.00

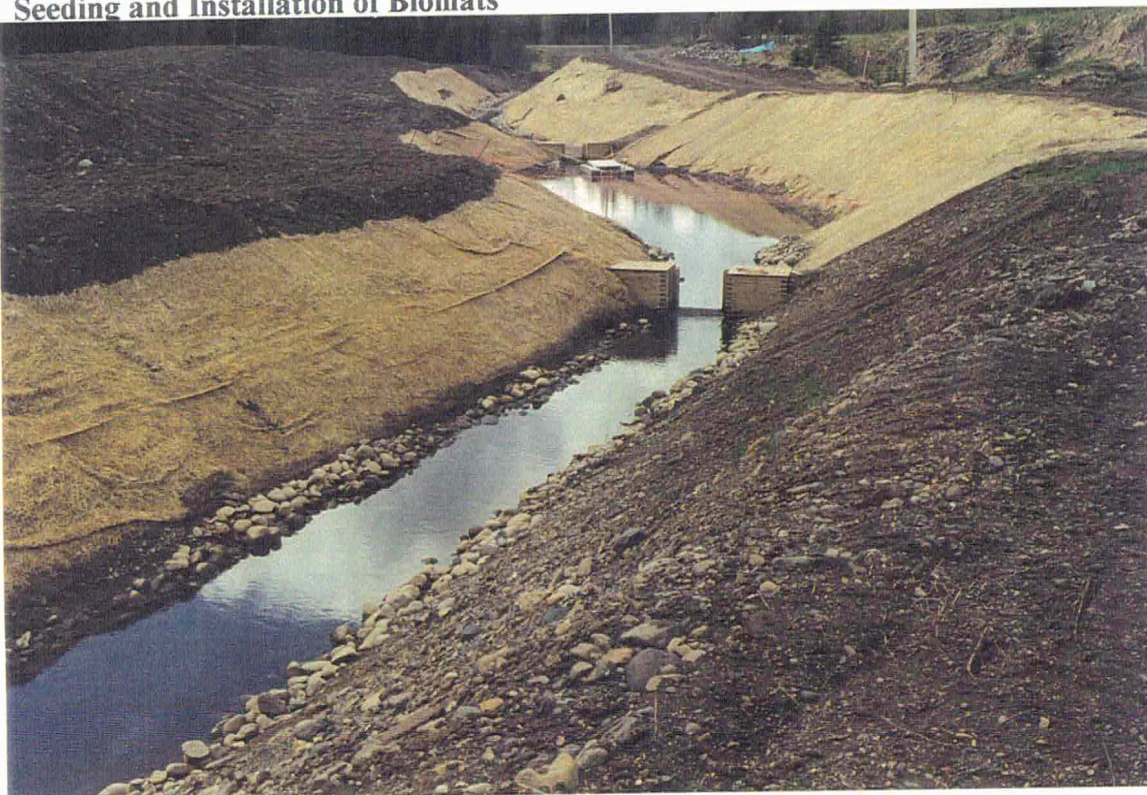
Note : this does not include Community Advisor wages.

Photographs of Upper Skeena SSE Projects 1999-2000

Buck Creek Release Pond Just After Construction(Looking U/S)



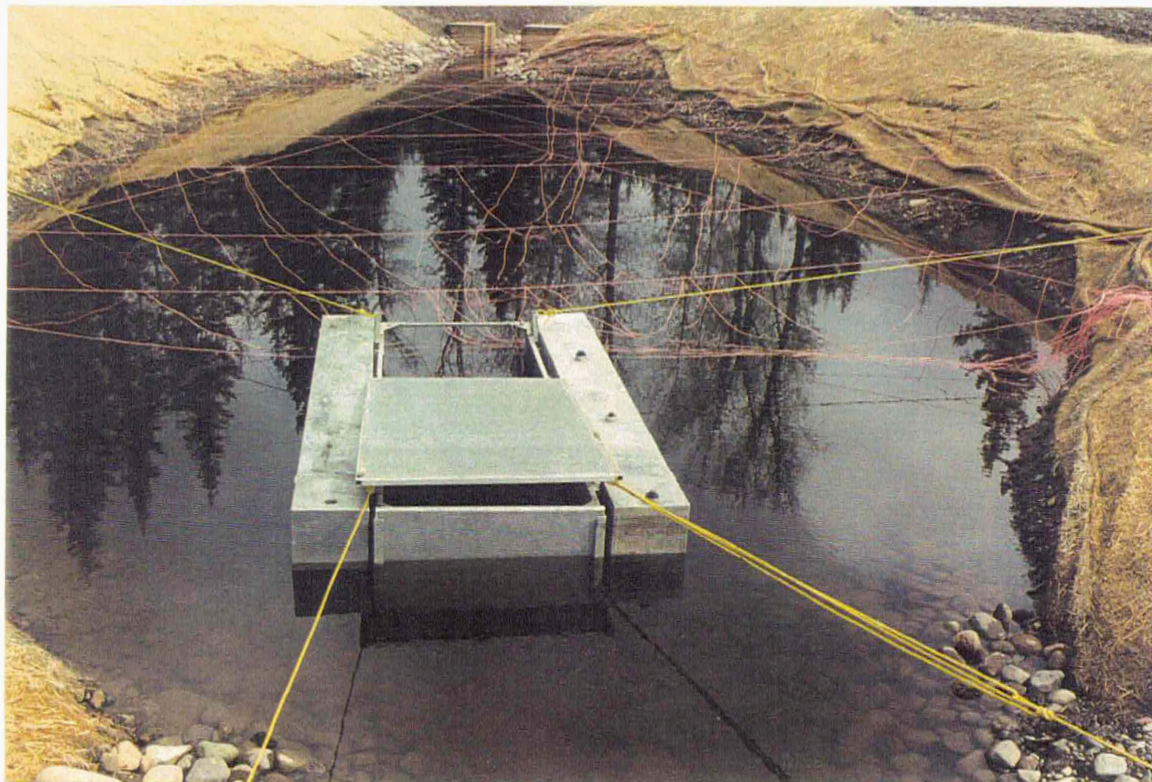
Seeding and Installation of Biomats



Buck Creek Release Pond : Biomats Complete Sept. 1999



Buck Cr. Release Pond : Note Predator Strings and Holding Pen For Fish to be Marked for RST Calibration



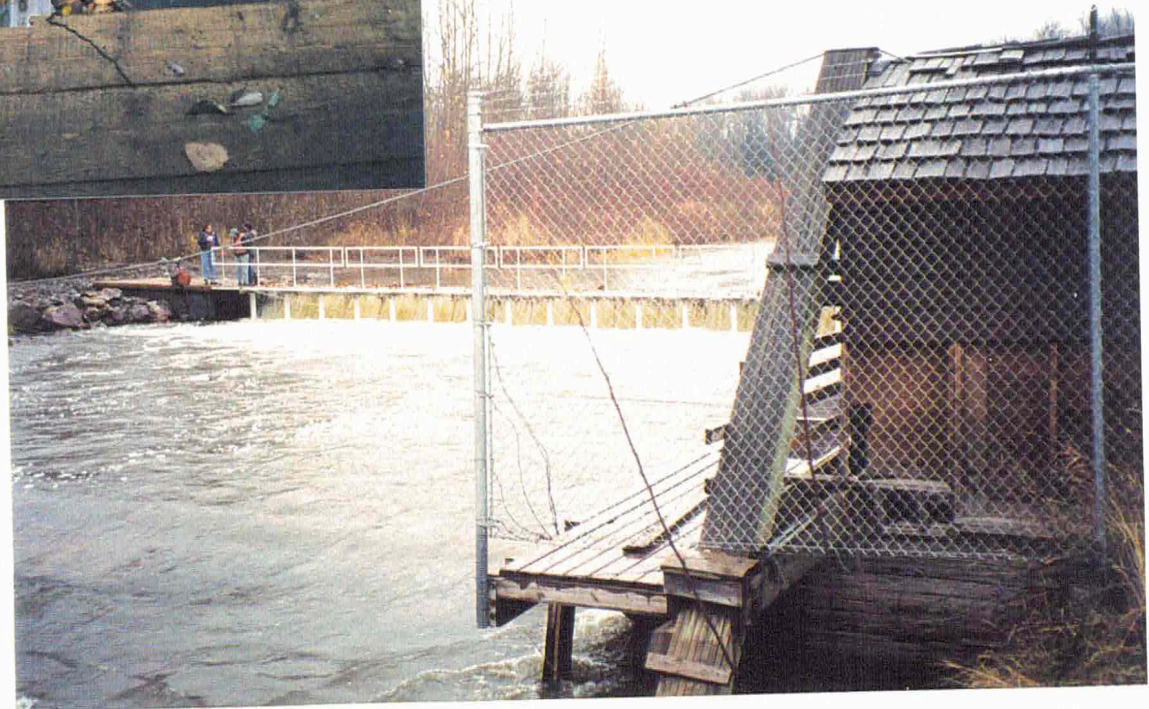
Rotary Screw Trap on Buck Creek : Spring 2000



**Upper Bulkley River Fence During Flood Conditions
October 2000**



**Upper Bulkley River Fence During Flood Conditions
October 2000**



Upper Bulkley River Fence Removal

November 21, 2000

Note : 10 people worked on fence removal. Eight of those 10 people not paid out of the UBR Fence Contract. Fence crew consisted of 3 DFO staff, 4 Gitskan Fisheries Program Staff, Habitat Steward, 2 staff from CFDC Nadina.



Bolts on "A" frames had to be loosened with wrenches. This required staff to dive under water.



Upper Bulkley River Fence : Walkway, "I" Beam and Safety Railing



Upper Bulkley River Fence "A" Frames



Upper Bulkley River Fence Live Box



Recommendations for the Strategic Stock Enhancement Program 2001-2003

Owen Creek Juvenile Trapping Program :Spring 2001

There have been two years of coded wire tagged fry releases into Owen Lake. There has been no data collected on lake released fish in the Upper Skeena and an opportunity exists to determine overwinter survival on a group of lake released coho.

There were about 12000 of the 1998 brood fry and about 30000 of the 1999 brood coho fry released into Owen Lake in summers of 1999 and 2000 respectively. It is not feasible to conduct an assessment on returning adults to the system, as the confluence of Owen Creek is often devoid of water flow until high water occurs in late October, thereby inhibiting coho adults from entering the stream.

However, a small Rotary Screw Trap or a smolt fence with live box could be operated on Owen Creek near the confluence. The juvenile trap would be calibrated for catch rate throughout the trapping program. The objective would be to conduct an enumeration on the coho smolts migrating downstream i.e. conduct a population estimate that would include a total estimate on coho smolt output and an estimate on the output of coded wire tagged coho smolts.

All coho smolts captured (wild plus adipose clipped) would be sampled for lengths and weights up to 100 fish per day. Information on condition factor could be analyzed as well as species composition i.e. there may be steelhead and chinook juveniles also migrating out of the Owen system.

I would be interested in comparing the Buck Creek overwinter survival rate to the Owen Lake overwinter survival rate. This information will assist in forming our fisheries enhancement strategies for coho in the Upper Skeena ie. perhaps we should be conducting lake releases rather than stream releases for fry.

Buck Creek Juvenile Trapping Program : Spring 2001

Approximately 72,000 of the 1999 brood UBR coho fry were released into the upper reaches of Buck Creek, a tributary to the Upper Bulkley River. The Spring 2000 Buck Creek Juvenile Trapping Program indicated that there may be a 50% overwinter mortality rate on the 1998 marked fry that were released into the creek.

A second year of data i.e. spring 2001, should be collected to determine overwinter survival of the 1999 brood fry release.

This program would be conducted as per the spring 2000 program. The spring 2000 program involved releasing approximately 18,000 differentially marked coho smolts upstream of the RST. That group of fish was used to calibrate the efficiency rate of the

Recommendations Cont'd

RST. I would recommend that we mark 3,000 to 5,000 of the UBR coho pre-smolts, currently holding at the Toboggan Creek hatchery to be used as our known marked group for RST calibration. This will allow us to be consistent in the way that we estimate total coded wire tagged coho population. Marking could occur in late March 2001 and would involve clipping the right maxillary on 3K to 5K coded wire tagged UBR coho currently holding in the earthen ponds.

The 2000 brood UBR coho fry that will be released(25,000) in summer of 2001, should be assessed by a downstream trapping program in the spring of 2002. This program should be conducted in the same way that the spring 2000 and 2001 programs were conducted.

Upper Bulkley River Fence 2001

The fence operations in the fall of 2000, allowed us to test the new UBR fence and identify shortcomings in the fence design. Recommendations will be passed on to the engineering staff so that the necessary adjustments/improvements are made to the fence structure in time for the 2001 fall program.

In the fall of 2001, the returns from the first year of Buck Creek fry releases will occur. There are two different groups of marked fish returning : adipose/CWT coho that were released as fry versus adipose/right maxillary coho that were released as yearlings. A comparison of total survival between fry releases and smolt releases can be done.

In 1998, approximately 370 coho returned to the UBR fence. Assuming that half of those adults are females approximately 120 females would have spawned naturally for an estimated egg deposition of 280,000 eggs. About 80,000 fry were released into Buck Creek and 33,000 smolts were released from the 1998 brood egg takes. Using a survival rate of 0.8% on the wild egg deposition and using a survival rate of 1% on the fry and smolt releases, the total return would be around 3030 coho. This could mean as many as 1000 adults returning to the UBR fence.

The 1999 brood UBR coho from the fry and smolt release programs will be returning to the UBR system in 2002. There were 72,000 fry and 34,000 smolts released from the 1999 brood eggs. The adult return to the UBR in 1999 was about 1,100 adults. In the 1999 brood year, both the smolt and fry release groups were marked with an adipose clip and coded wire tagged. For the 1999 brood year there will be no way to tell the two groups apart at the UBR fence. There could potentially be an extremely large return to the fence in 2002. The 2002 program would give us our second year of data on fry releases versus smolt releases in the UBR system.

We must devise a sampling program where some sampling of marked fish can occur at the UBR fence i.e. so we can tell the smolt versus fry groups apart.

Recommendations Cont'd

The 2000 brood fry released fish will return in 2003.

The 1998, 1999 and 2000 broods should be fully assessed i.e. using downstream traps, total catch information and fence enumeration data, in order for a survival comparison to be accomplished on fry vs. smolt releases. Once this data is fully analyzed, a direction for the enhancement program at the Toboggan Creek hatchery can be negotiated.

A comparison between stream released fry and lake released fry should also be done.

Strategic Stock Enhancement Program : Fry Release Summary

<u>Stock</u>	<u>Species</u>	<u>Brood Year</u>	<u>No. CWT Fry Released</u>	<u>No. Unmarked Fry Released</u>	<u>Total No. Fry Released</u>	<u>Release Location</u>	<u>Return Year</u>
Babine R.	Coho	1998	80000	0	80000	Babine R.	2001
		1999	0	0	0		
Morice R.	Coho	1998	12724	0	12724	Owen Lk.	2001
		1999	24180	4320	28500	Owen Lk.	2002
UBR	Coho	1998	80452	0	80452	Buck Cr.	2001
		1999	69720	2800	72520	Buck Cr.	2002

Strategic Stock Enhancement Program : Projected Releases for 2001

<u>Stock</u>	<u>Species</u>	<u>Brood Year</u>	<u>No. CWT Fry To Be Released.</u>	<u>Return Year</u>	
Babine R.	Coho	2000	80000	2003	
Morice R.	Coho	2000	0		Program discontinued
UBR	Coho	2000	25000	2003	Egg target not met

APPENDIX A : PROGRAM REPORTS

- **Bulkley River Fish Fence Report 1998**
- **Bulkley River Fish Fence 1999**
- **Upper Bulkley River Coho Assessment Fence 2000**
- **Annual Report for Toboggan Creek Hatchery Operations in 1998/99**
- **Buck Creek Juvenile Salmon Trapping Program**
- **Buck Creek Juvenile Salmonid Emigration Program : Autumn 2000**
- **Blueprint : Bulkley River Project : Fish Fence**
- **Blueprint : Buck Creek Release Pond**