

Chicago Creek Hatchery Operations



Final Report
May 31, 2000

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Cover Photo: Students from New Hazelton Elementary (front) and South Hazelton Elementary (background) visit Chicago Creek Hatchery, May 2000.

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Project Background:

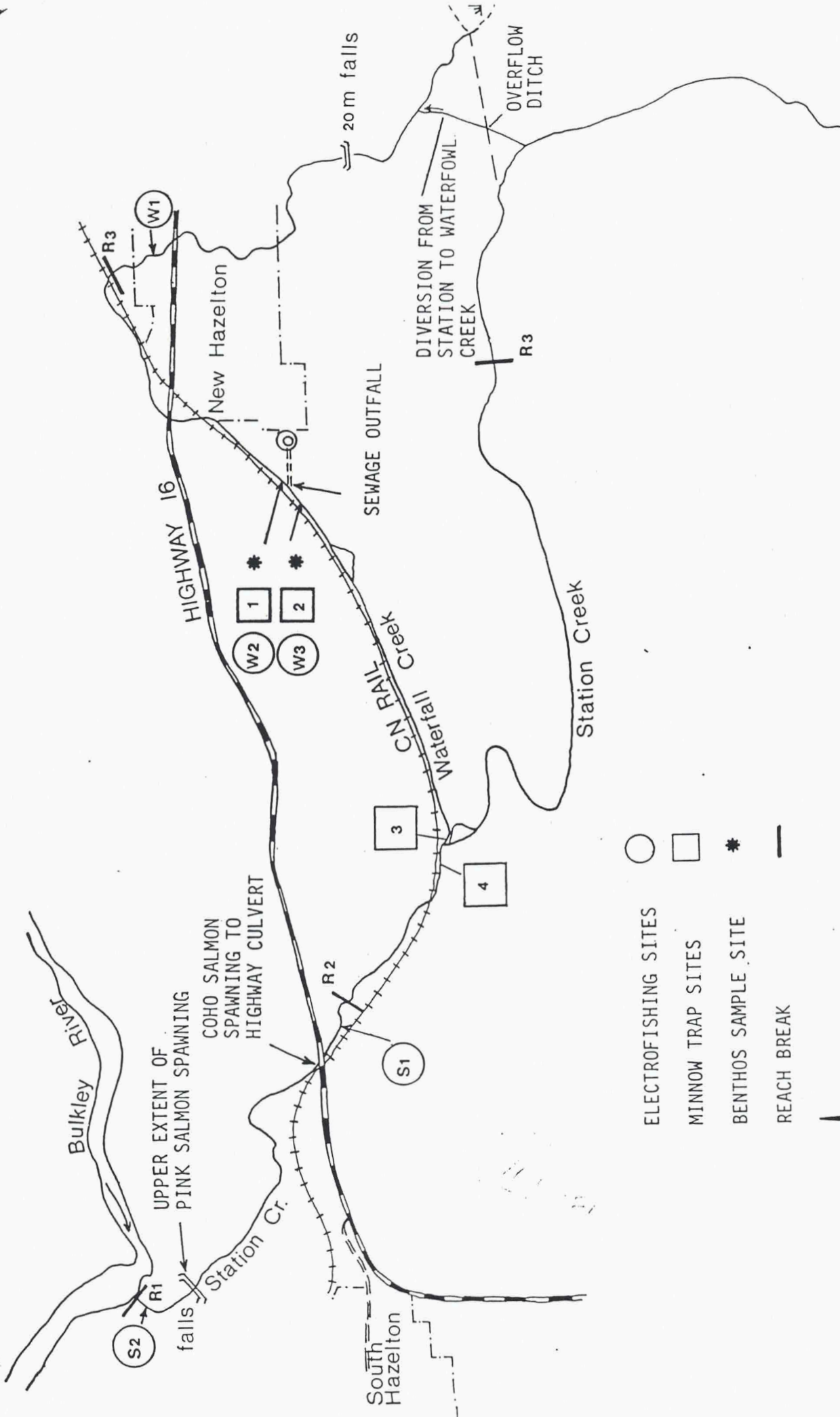
A. Waterfall Creek Stream Rehabilitation Project and New Hazelton Elementary Streamkeepers Program

Coho stocks in the Waterfall/Station/Mission Creek system (a tributary of the Bulkley River) had been wiped out in the late 1970s by improper installation of a culvert on Highway 16 between New Hazelton and South Hazelton. (See map, Figure 1, page ii) Since 1990, the Waterfall Creek Stream Rehabilitation Project had attempted to reintroduce Coho to the stream using surplus stocks transplanted from Toboggan Creek, near Smithers. The New Hazelton Elementary Streamkeepers program began in 1993 to assist the Stream Rehabilitation Program with the re-introduction of Coho salmon into Waterfall Creek in New Hazelton and to monitor activities along Waterfall Creek which might affect salmonids.

When the transplant license terminated, the project had to rely on salmon returning to the stream system for brood stock to rear and to maintain the Coho population in the system at sustainable levels. The program still requires the operation of a fish fence at the mouth of the stream system near the Bulkley River (which the Ministry of Highways designates as "Mission" Creek) and the trapping and transporting of adult spawners above the culvert in Highway 16. This situation will continue for the foreseeable future.

After failure of efforts to use an in-stream incubator due to winter freeze-up and the subsequent destruction of the incubator by vandals, Tim and Gladys Lemky offered the use of ponds on their property near South Hazelton, which had previously been used as a trout farm. It became clear that a permanent and reliable installation was required to ensure that a steady population of Coho could be supplied to the Waterfall/Station Creek system. This became more imperative as Coho stocks in the Bulkley River system dwindled and the numbers of Coho returning to the stream system declined.

The project has been recognized by the Federal Ministry of the Environment and the Canadian Wildlife Federation and has received financial assistance from BC 21, the Shell Environmental Fund, the Department of Fisheries and Oceans, the Ministry of Transportation and Highways, and Fisheries Renewal B. C.



- ELECTROFISHING SITES
- MINNOW TRAP SITES
- * BENTHOS SAMPLE SITE
- REACH BREAK



N 1:20,000

Source: Buxton & Assoc. (1986)

FIGURE 1: LOCATION OF SAMPLE SITES ON STATION AND WATERFALL CREEKS

Project Background:

B. The Chicago Creek Hatchery

The Coho enhancement program at Chicago Creek began in 1993-94 to assist the Waterfall Creek Stream Rehabilitation Program and the New Hazelton Elementary Streamkeepers with the re-introduction of Coho into Waterfall Creek in New Hazelton, B.C. After failure of efforts to use an in-stream incubator due to winter freeze-up and the subsequent destruction of the incubator through vandalism, Tim and Gladys Lemky offered the use of ponds on their property near South Hazelton which had previously been used as a trout farm. The Lemkys were in the process of rehabilitating the ponds which were overgrown and unused. (See photo 1) Initial efforts involved use of pond-based incubators and external tubs for rearing fry until they could be released into ponds. (See photo 2) Later experiments with exterior heath stacks failed.

In 1995, the Chicago Creek Community Environmental Enhancement Society was incorporated with the partial purpose of developing a hatchery on site that was capable of operating year-round and rearing Coho in sufficient numbers to ensure continuity of stocks. Although the ponds and grounds had been restored (see photo 3), the operation experienced ongoing problems with incubator freeze-ups, tub and drain washouts, and tub flotation due to high water table. It became clear that a more permanent and reliable installation was required to ensure that a steady population of Coho could be supplied to the target stream system.

When the creation of Fisheries Renewal B.C. was announced, the Chicago Creek Society joined the Bulkley-Morice Salmonid Preservation Group. In 1998, applications were made to:

- 1) construct a permanent incubation building on site to rear Coho eggs;
- and, 2) re-construct the system of piping and drains which fed water from the ponds to the tubs and troughs and to construct a building to enclose all hatchery equipment and structures.

This hatchery is now completed and, in the first two years of operation, has supplied about 32,000 Coho fry and smolts for release into the watershed. (Photo 4)

Note: Photos 1-4, following, have been previously used in the final report on Hatchery Completion, submitted March 31, 2000. Hence the date noted.

Photo 1: Chicago Creek Hatchery site during pond reclamation activities.



Photo 2: Site showing exterior tubs and troughs in background, before building commenced.



Chicago Creek Hatchery Completion
Final Report: March 31, 2000

Photo 3: Grounds and ponds after reclamation, but prior to erection of any hatchery buildings

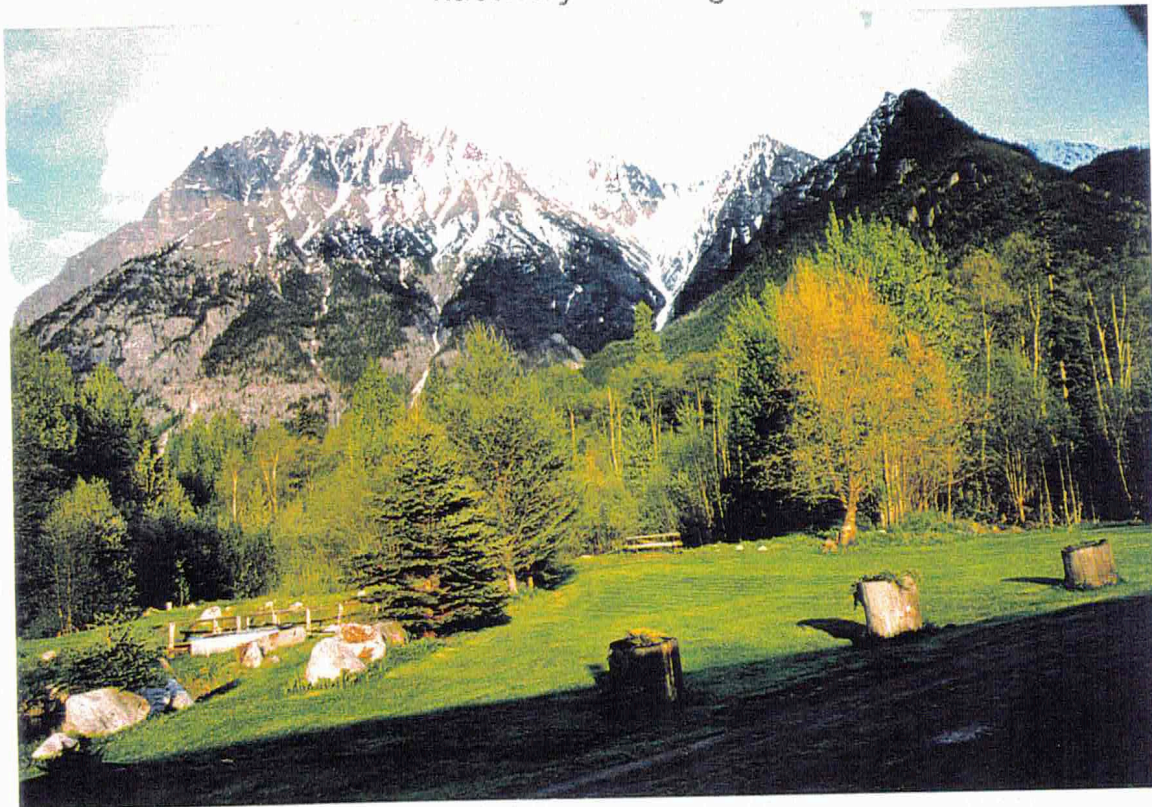


Photo 4: Grounds and hatchery building after completion of construction.



CHICAGO CREEK HATCHERY

The Chicago Cr. hatchery program was started in 1993. Originally, due to extremely low adult coho returns to Mission Creek, coho were transplanted from the Toboggan Cr. hatchery to the hatchery at Chicago Creek. The transplanted coho eggs were incubated in an incubator termed a "cassette" incubator. The eggs basically sit in-between two window screens that are held together by plastic fasteners. The cassette screens fit into an aluminum frame that has horizontal slots that the screens fit into. The cassette incubator was installed in an earthen pond at the hatchery and the eyed eggs stay in the cassette until they are ready to pond. Usually, we try to take about 25,000 eggs so that we end up with about 22,000 to 20,000 fry.

The fry are "ponded" into troughs and are fed a pelleted diet that contains all of the nutrition they require. The little fry when first ponded need to be fed about every 15 to 20 minutes. When the fry are first ponded, they weigh a mere 0.25 grams. Ponding usually occurs about mid May and by the end of June the fry are about 2 grams in size. Jack Williams is the main fish feeder and he has a special knack for getting the fish growing very quickly.

Once the fry reach a size of about 2 grams, the right maxillary is clipped off. The maxillary is a piece of cartilage that originates near the eye of the fish and curves down towards the upper jaw. We clip the fry so that when they return as adults, we can distinguish which of the coho are hatchery fish. We can then calculate survival from smolt to returning adult.

Once the fish have all been clipped, they are transferred from the rearing trough to an outdoor, earthen raceway. Once in the raceways the fish have access to natural food sources i.e. aquatic insects, terrestrial insects as well as man-made fish food.

The fish are reared in the earthen pond until the following May. The fish are released as yearlings in mid May each year. Our favourite release locations are Mission Creek at the Carr's property, Mission Creek near the helicopter pad and Mission Creek behind the Petro Canada gas station.

Coho return to spawn when they are three to four years old. Most of our coho return at four years of age. During September and October each year, the volunteers from the Chicago Creek Community Environmental Enhancement Society, install and operate a small fish counting fence near the mouth of Mission Creek. In the early years of this program, (1994-1997), there was very little funding available to build, install and operate the fence. In 1998 and 1999, the Ministry of Transportation and Highways has contributed funding as has Fisheries Renewal B.C.. The MOTH contributes so that the fence staff can transport adult coho upstream of the impassable Highway 16 culvert. They must do this under DFO Inspector's Order to create passage for fish. A portion of the coho adults captured at the Mission Cr. fence are transported to the section of Mission Creek (some folks call this portion of creek Waterfalls Cr.) that flows through New Hazelton. In past years adult coho have been observed spawning at the foot of 11'th avenue and throughout the creek in New Hazelton. Local people have been quite impressed with being able to watch coho adults spawn just about in their back yard!

A portion of the adults captured at the fence are released into Mission Cr. just upstream of the counting fence and they spawn naturally. Some adults (usually about 10 males and 10 females) are transported to the Chicago Creek hatchery where they are held until they are sexually mature. Once the adults are "ripe" the eggs and sperm are taken, eggs are fertilized and put into Heath tray incubators. The Heath tray incubators used to be out in the middle of the yard with a surface water line running to the trays. Now, compliments of Fisheries Renewal B.C., we have a small incubation building that contains the Heath trays. Before, we were prone to freezing but with the new building and water line, it is unlikely that they system will freeze during winter. Egg incubation usually commences between October 18 and 25'th.

The eggs cannot be disturbed until they develop their eyes. Once the eggs develop their eyes, then they can be handled. At the eyed stage, the dead eggs are picked out and the live eggs are enumerated. At regular

intervals right through until ponding, the dead are picked out. In late February to early March, the eggs hatch into alevins and by about mid May the alevins have developed into fry. Then away we go again.

The purpose of the hatchery program is to :

- Return the coho run into Mission Creek to levels such that the available habitat is seeded to capacity
- Educate local people about the salmon resource through field trips, hatchery tours and annual Open House events at the hatchery. Local people have the opportunity to learn about fish in a "hands-on" fashion. People volunteer time at the counting fence and at the hatchery. The people who participate develop a feeling of ownership for the resource. The students from the local elementary schools also participate by monitoring Mission Creek for water quality, fry presence/absence and other indicators of stream health such as aquatic insect surveys. The students also conduct stream clean-ups to help keep the fishes home clean.
- Encourage people to be ecosystem conscientious
- Encourage land and water users to conduct their uses in a fish friendly manner
- Provide information to companies/governments/activities that negatively impact salmon habitat

The hatchery has been funded by Community Programs –DFO since 1993. A small amount of funding has been provided by DFO for purchases of fish food, hatchery equipment and other services which are required for hatchery operations. In recent years, Fisheries Renewal B.C. has also provided funding which is spent on hatchery operations.

The volunteers at the hatchery formed a non-profit society called the Chicago Cr. Community Environmental Enhancement Society. Tim Lemky is the Society president and Jack Williams is the primary fish culturist at the hatchery.

Some of the accomplishments of the Society have been :

- Adult returns increased from a low of less than a dozen fish in 1994 to 165 coho adults in 1999.
- Natural egg depositions in the upper creek (upstream of the impassable highway 16 culvert) i.e. 27,000 eggs was the estimated natural egg deposition in 1998 and 90,000 eggs in 1999.
- Supply local elementary schools with coho eggs for the Salmonids in the Classroom program
- Education of local people through displays and printed materials at the annual Open Houses
- Participation in the Observe Record and Report program
- Assist MOTH with ensuring fish have access to the creek upstream of the impassable culvert
- Foster a stewardship ethic by enthusiastically encouraging people to participate and assisting in their "fishy" education

If we are ever fortunate enough, to get the coho run to the point where it is sustaining itself, then our hatchery egg target will decrease. However, we will raise a small number of coho salmon eggs for educational purposes at the hatchery for as long as the volunteers wish to do so.

<u>Year</u>	<u>Number of Coho Adults Counted</u>	<u>No. Eggs Taken</u>	<u>No. Yearlings Released</u>	<u>Mark Type</u>	<u>Size and Time of Release</u>	<u>Comments</u>
1993	3	20,000	4387	Some left ventral and some right ventral	May 10'th 1995 at 17.8 grams	Toboggan transplant Freeze-up of incubation caused some mortality
1994	6	20000	5789 rel. as fry/16500 rel. as smolts	Right Ventral	Oct. 12/95 @ 4 grams May 6/96 @ 19.9 grams	Toboggan transplant/ Freeze-up problems

<u>Year</u>	<u>Number of Coho Adults Counted</u>	<u>No. Eggs Taken</u>	<u>No. Yearlings Released</u>	<u>Mark Type</u>	<u>Size and Time of Release</u>	<u>Comments</u>
1995	20	18000	9800	Left maxillary	May 7/97	Mission Cr. stock/fish disease problems
1996	20	12000	9000	Right max.	May 4, 1998	Mission Cr. stock/ Pipeline broke
1997*	30	5000	75 fry released	unmarked	July 1998 @ 2.0 g	Mission Cr. stock Disease problems
1998	65	30000	11742	Right max.	May 14/00 @20.44 g	Mission Cr. stock New incubation building
1999**	161	33000		Right maxillary		Mission Cr. stock

* 1997 brood had poor ocean survival and the Bulkley watershed had the lowest historical returns.

**1999 brood coho currently on hand : 25,147 coho at about 2 grams (all right maxillary clipped)

Photo 5

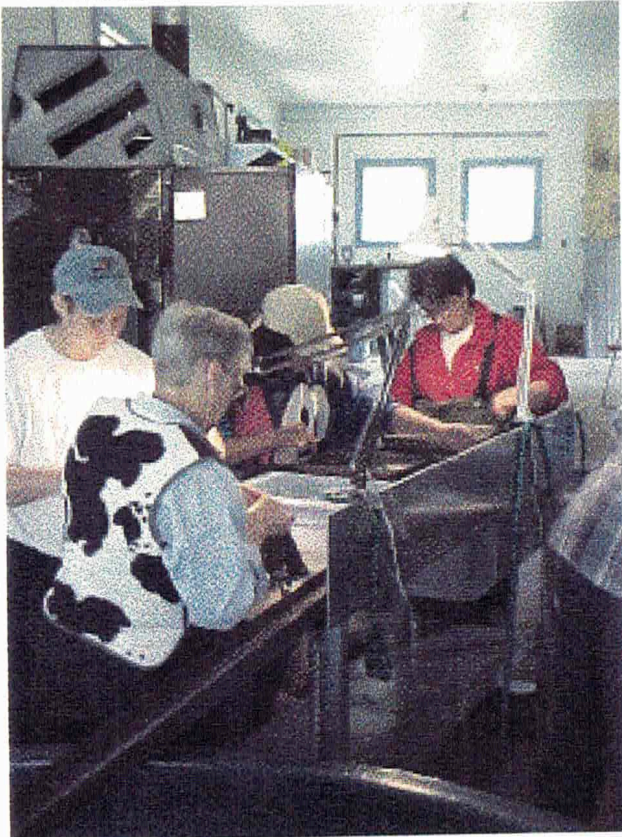
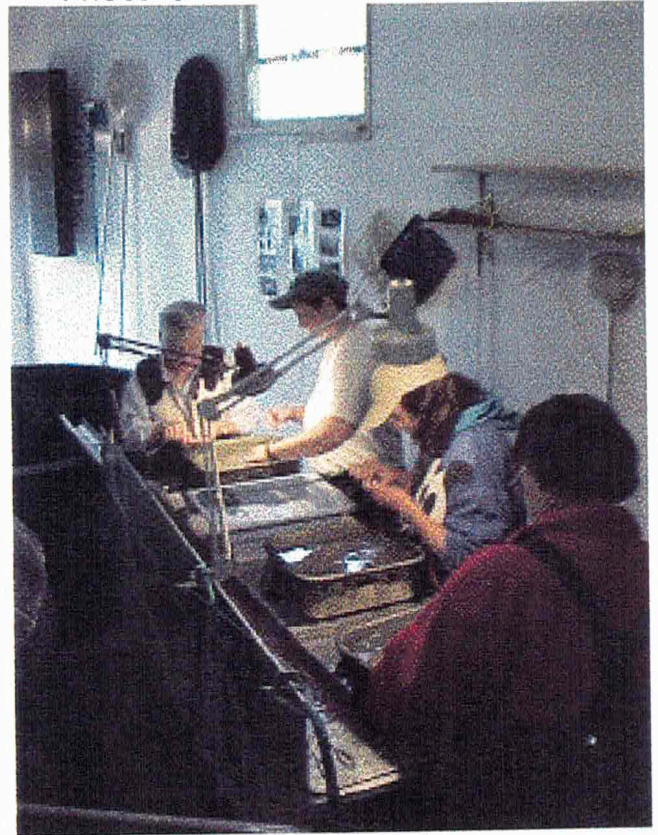


Photo 6



DFO personnel from the Community Advisor's Office in Smithers and Chicago Creek Hatchery's manager and volunteers max. clip Coho fry to mark them for identification when they return to spawn.

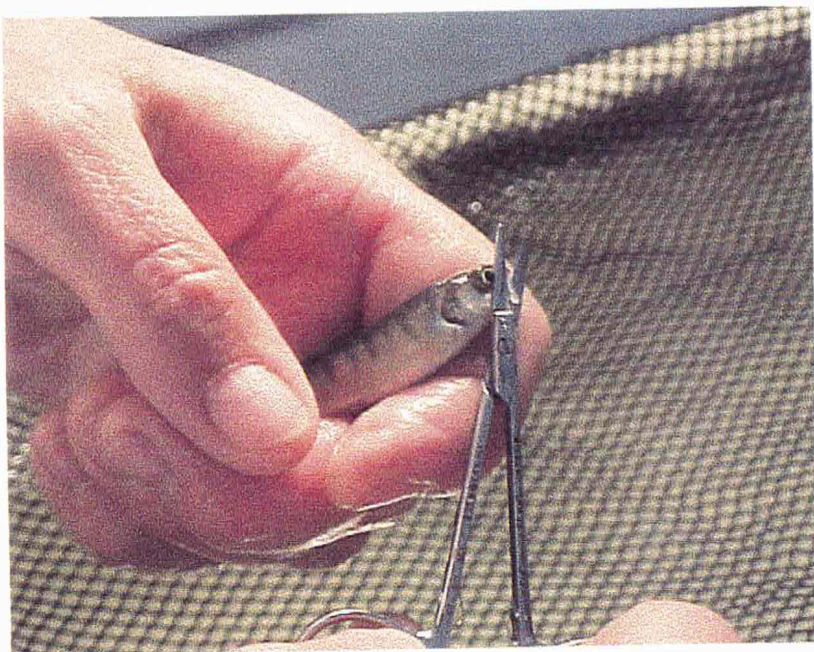


Photo 7, at left, shows a close-up of the maxillary clip used to identify fry released by Chicago Creek Hatchery. This mark helps to distinguish fish released by the hatchery from those which are spawned naturally by adults transported and released in New Hazelton, or wild adult Coho which may stray into the Mission Creek system.



Photo 8: DFO personnel and hatchery volunteers move adult spawners from Mission Creek Fish Fence to the transport tank, October, 1999.

Photo 9: Adult female spawner in transport tank.



Photo 10: DFO personnel, volunteers, and students watch egg take at Chicago Creek Hatchery, October 1999.

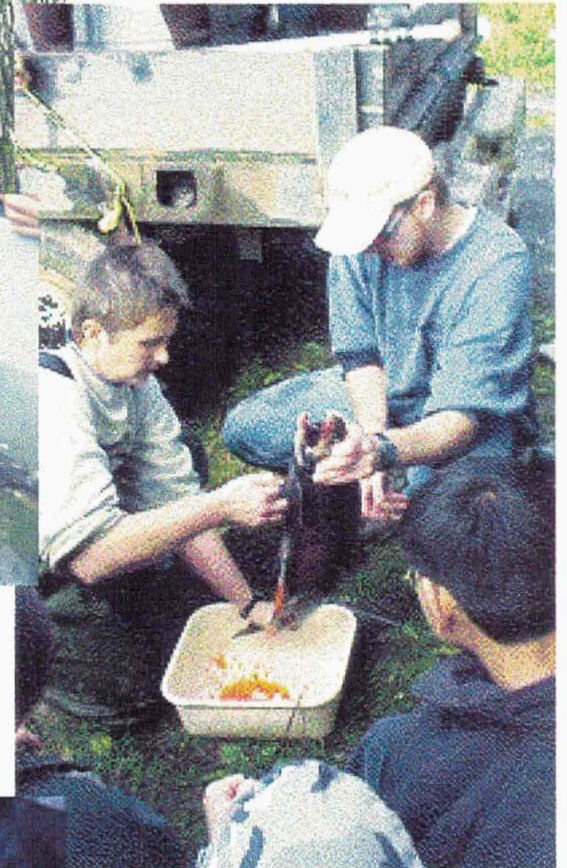


Photo 11: Students carry female spawner from tank to Waterfall Creek.

Photo 12: Male adult spawner is released into Waterfall Creek in New Hazelton for natural spawning.



Project Results:

The new incubation building operated successfully in both the winter months of 1998-99 and 1999-2000. Approximately 33,000 Coho eggs were incubated over the term of this contract. (See preceding table) Students from New Hazelton Elementary Streamkeepers participated in the taking of brood stock and the release of adult spawners to spawn naturally in Waterfall Creek in New Hazelton. (See Photos 8-12)

The fry from the 1999 season will be reared in the hatchery building until they are maxillary-clipped to mark them and are placed in one of the ponds. This is usually done in July. (See Photos 5-7)

Approximately 12,000 smolts which have wintered successfully at the hatchery were released into the watershed on May 14, 2000. The numbers are considerably below survival rates estimated in March of 2000 due to the activities of predators (otter and marten) in the pond over the winter months. The predators were eventually trapped, but approximately 5000 smolts were lost to them. (See Photos 19-21)

Students from New Hazelton Elementary and South Hazelton Elementary Schools, who study the life cycle of the Coho and maintain classroom incubators using Coho eggs supplied by the hatchery, visited the site on May 10, 2000, to participate in educational activities such as insect identification and distinguishing between species of salmon and trout. (See Photos 13-15)

An Open House was held at the Hatchery on May 13, 2000. Approximately 3 dozen people attended through the day. As well as taking in educational displays, participants assisted in the weight sampling of fry in the cap troughs, and of smolts in the ponds. The smolts were released the following day, with participation of society volunteers and DFO personnel. (See Photos 16-18)

In the past year of operation, the Society has increased its enhancement efforts dramatically, compared to the lowest prior years of activity, (See preceding table). Membership has increased from 7 to 20 members. With continued success in another full cycle of Coho spawning in the Waterfall/ Station/Mission Creek stream system, we hope to be able to reduce or curtail enhancement efforts on that system. We would then expect (with assistance and approval from MOELP and DFO) to target another stream for restoration and/or enhancement activity using the recently-completed facility as a base resource.

Photo 13: Students from New Hazelton Elementary School attempt to separate the trout from the salmon.



Photo 14: Students dissect adult salmon provided by DFO and attempt to identify different organs studied in their salmonid units.

Photo 15: Students from New Hazelton and South Hazelton perform a Coho life cycle skit using a diorama and puppets provided by DFO personnel.

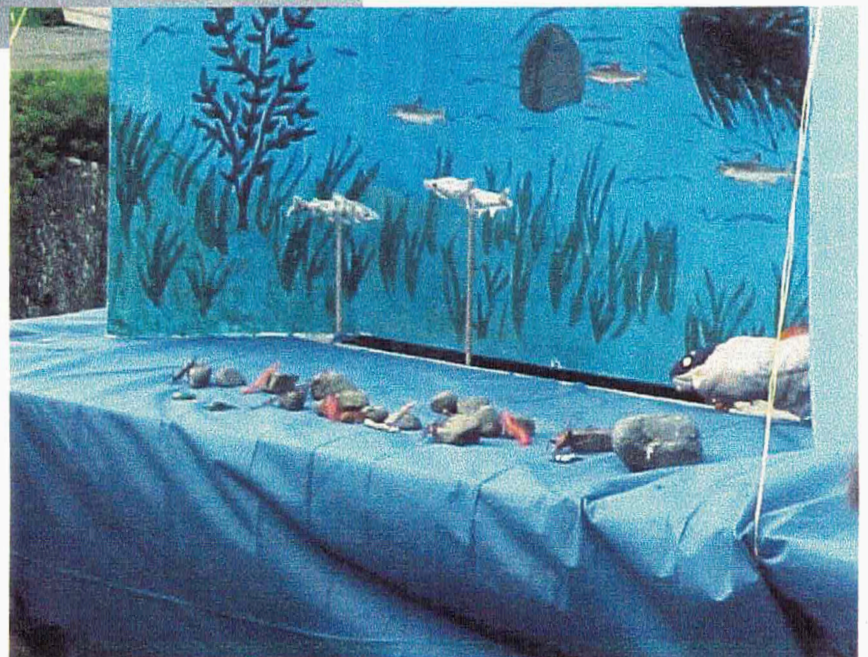




Photo 16: In the bright sunshine, visitors and volunteers enjoyed hot dogs and hamburgers, as well as educational displays and materials explaining the history of the hatchery and stream project it supports.

Photo 17: Visitors had an opportunity to talk to DFO advisors, as well as hatchery volunteers and staff.

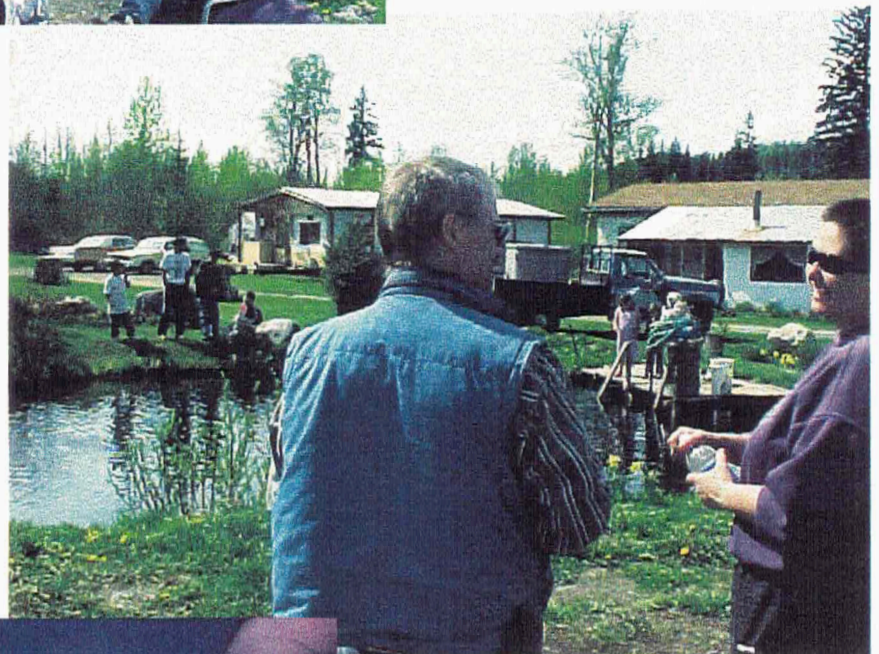


Photo 18: Visitors assisted DFO advisors with the weight sampling of fry in the hatchery building.

Photo 19: Visitors and volunteers assisted DFO personnel with weight sampling of smolts, due for release the next day.

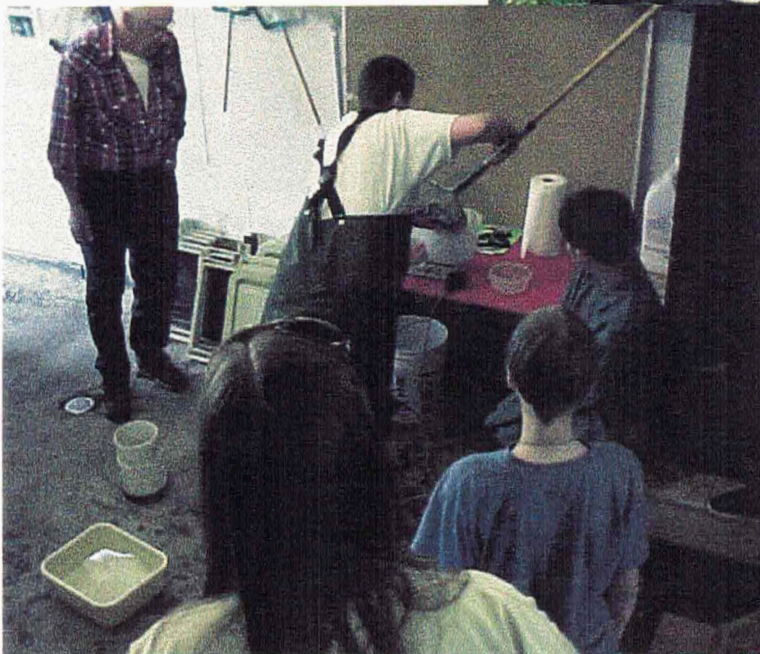


Photo 20: Weighing and counting smolts in the hatchery building to determine average weight.

Photo 21: Release of smolts in one of four locations in the Waterfall/Station/Mission Creek system on May 14, 2000. This location was in New Hazelton, close to where students released adult Coho to spawn in October, 1999.



Acknowledgements:

The Society wishes to acknowledge the contributions of the following groups or individuals for their assistance in the successful completion of this project:

- * Department of Fisheries and Oceans for biological advice and technical designs (especially Brenda Donas and Trace Joe for assistance beyond the call of duty);
- * Fisheries Renewal B.C. for project funding;
- * the Bulkley-Morice Salmonid Preservation Group and Nadina Community Futures for their moral and administrative support;
- * Tim and Gladys Lemky, for providing an irreplaceable site and their unstinting efforts.
- * Jack Williams, for keeping the operation going, even when funding and wages were not forthcoming.
- * The volunteers and members of the Society who have helped to keep the dream alive.



Photo 22: The Chicago Creek Hatchery sign on Highway 16 near South Hazelton, installed in May 2000.