Lakelse Lake Sockeye Rehabilitation Program: Fry Outplant Program - Year 3

Prepared for:

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Executive Summary

Lakelse Lake sockeye salmon are one of the approximately 28 wild stocks in the Skeena River drainage and harvested in mixed stock fisheries in southeast Alaska and northern B.C. each summer. Lakelse Lake sockeye were noted as being at biological risk, even at relatively low levels of exploitation four years ago. (Cox-Rogers, DFO, 2004).

These stocks have undergone a decline from recorded numbers of thousands to documented numbers in the hundreds in the past 10 years. Fisheries and Oceans Canada Stock Assessment personnel still indicate the stocks on a decline relative to historical levels based on 2007 enumeration data. (Davies, S, DFO, 2007)

As part of the Lakelse Lake Sockeye Salmon Recovery Plan Program, Fisheries and Oceans Canada (DFO) applied for and received funding from Pacific Salmon Commission for a *Satellite Sockeye Hatchery: Fry Outplant Project Year 1* in an ongoing effort to conserve the critically declining sockeye salmon stocks in the Lakelse Lake watershed.

The long term goal of this particular project would be for at least four consecutive years to assess impacts to enhance one full cycle of sockeye while habitat projects are completed to support the returning stocks. Other Outplant projects should also be considered on other tributaries such as Scully and First Avenue. Within the Lakelse Sockeye Recovery program other restoration, habitat protection and assessment, and public awareness projects were ongoing.

The Snootli Creek Hatchery site at Bella Coola rated highest in an extensive evaluation process comparing feasible locations for rearing conducted in 2006 and 2007 for Year One funding. It had the necessary personnel, technical expertise, infrastructure and facilities already in place to maximize success and achieve a positive outcome. (Kujat, 2007) Williams Creek, the main sockeye spawning tributary to Lakelse Lake, was selected as the primary egg-take site. Year One (2006/2007) was a highly successful pilot year funded by the Pacific Salmon Commission which resulted in the release of almost 100,000 fry into Williams Creek in May 2007 (Kujat, 2007).

The logistics of the Year Three project were again jointly coordinated between the two sites and personnel. Snootli Hatchery staff worked in concert with the Sockeye Recovery Program Coordinator, the DFO North Coast Resource Restoration Biologist, the Terrace DFO Habitat Technician and Lakelse Lake Watershed Society volunteer members.

In August 2008, eggs and milt were collected from the Williams Creek (Lakelse area) and air lifted to the Snootli Creek Hatchery, Bella Coola, B.C. where they underwent fertilization and planting. The resulting fry were then ponded, marked (adipose fin clipped) and further reared until they reached a weight of approximately .7 grams. In a two day operation in early May 2009, they were airlifted back to Williams Creek - Lakelse Lake - and released.

Disease sampling was conducted at the time of the egg take and screened by the Pacific Biological Station.

Approximately 270,000 fry were released into Williams Creek on May 4th and 5th, 2009. This report summarizes the results of the Lakelse Fry Outplant Year 3 (2008/2009)

Acknowledgements

This project was funded by the Pacific Salmon Commission-Northern Fund and was a collaborative effort between Lakelse Watershed Society volunteers, Fisheries and Oceans Canada (DFO) in the Terrace area and personnel from Snootli Creek Hatchery, Fisheries & Oceans Canada in Bella Coola. Through a coordinated effort they provided personnel, labour, equipment and technical expertise as "in-kind" contributions. In addition, technicians from the Nuxalk First Nations were involved at various stages of the project in Bella Coola. Lakelse Watershed Society was contracted by DFO to conduct this project.

Project Personnel:

Lakelse Watershed Society – Principal Contractor (see list below)
Margaret Kujat – Technician – Project Coordinator
John Willis –Operations Manager – Snootli Creek Hatchery, Bella Coola (in-kind)
Marshall Hans – Hatchery Technician – Snootli Creek Hatchery (in-kind)
Lana Miller – Resource Restoration Biologist/OHEB– North Coast (in-kind)
Mitch Drewes – Habitat Technician/OHEB – Terrace (in-kind)
Ernie Tallio – Nuxalk Fisheries Department, Bella Coola, BC
Brandon Mack – Nuxalk Fisheries Department, Bella Coola BC
Jason Moody – Nuxalk Fisheries Department, Bella Coola, BC

Fisheries & Oceans Canada, through in-kind contributions, also provided support and access:
Russ Hilland – Watershed Enhancement Manager – Snootli Creek Hatchery
Marie Salome – Administration Officer – Snootli Creek Hatchery
Sandra Devcic – Resource Restoration Eng. Tech/OHEB. – North Coast
Rob Dams – Community Advisor - Terrace
Technical Staff – Pacific Biological Station, Nanaimo, B.C.
Kitimat Hatchery staff

Additional Government assistance:

Mike Leggat – Fresh Water Biologist, Ministry of Environment (MoE)
Chris Broster – Ecosystems Specialist – MoE
Jon Coutts – Park Ranger, BCParks

Field Crews and Project Contractor:

Ian Maxwell and Wilma Maxwell – Lakelse Watershed Society
Richard Olson and Melanie Olson – Lakelse Watershed Society
Wayne Epp and Beverly Epp – Lakelse Watershed Society
Ken Fraser – Lakelse Watershed Society

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Peter Barratt – Owner/Pilot

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1.0. Introduction

Sockeye salmon (Oncorhynchus nerka) are commercially the most valuable of the five species of Pacific salmon in British Columbia and historically the Lakelse area was considered the most productive salmon ecosystem in the Skeena watershed. (Rabnett, 2008).

From an archival perspective much is known about the Lakelse Lake sockeye compared to other systems. Various Fisheries and Oceans Canada projects have taken place in the area dating back to hatchery operations in the early 1920's, fish enumeration fences on two of its primary tributaries and extensive biological research in key spawning tributaries (Rabnett, 2008)

The sockeye salmon stocks in the Lakelse watershed have undergone tremendous ecological pressure and the effects are ongoing. These impacts stem from logging, linear development of highways, pipelines and hydroelectric lines, lakeside residential development, resulting channel modification and a newer influence – climate change and global warming. Beaver activity and lakeshore residential development also plays a factor restricting fish passage to former spawning areas and impacting habitat.

A drastic decline in the sockeye salmon population was noted by the Lakelse Watershed Society (LWS) back in 2003. They brought their concerns forward to Fisheries & Oceans Canada – North Coast area noting that stock escapements to Lakelse Lake had been depressed relative to historic levels. DFO's Stock Assessment Branch had also concluded in 2003 that lake densities of juvenile sockeye in Lakelse Lake were less than 5% of the rearing capacity, representing the offspring from just 750 spawners. Further work done in 2004 through 2007 indicated that the trend of stock decline still continues and escapements have not shown a positive rebound. (Davies, S, 2007) All causes of this decline are not fully understood.

The status of this stock, as in all other fisheries in the current day's environment, has biological, political, economic and social implications not just affecting the local Lakelse watershed but the larger global community. As a response to the concerns raised by LWS surrounding decline of this stock, the Lakelse Sockeye Recovery Program was developed and a Lakelse Sockeye Recovery Plan document formulated. The Lakelse Sockeye Salmon Recovery program was made up of numerous stakeholders: the Lakelse Watershed Society and Terrace Salmonid Enhancement Society (two non profit groups) Kitselas First Nations, as well as federal and provincial government agencies including Fisheries and Oceans Canada, BC Ministry of Environment, Ministry of Forestry, and BC Timber Sales.

Some of these stakeholders were involved in reviewing the status of stocks and habitat, identifying the limiting factors, developing potential projects and placing these projects in a logical sequence of priority. These projects were ranked on the basis of feasibility, cost effectiveness, cost-benefit analysis, potential for immediate help to the sockeye salmon and the project's ability to address the limiting factors affecting the sockeye in this system. Projects were identified in three different categories: improved information, habitat restoration and stock enhancement. *The Pilot Satellite Sockeye Fry Outplanting Project (Year 1 – 4)* was ranked first of three enhancement projects by this group in the developing framework of the Lakelse Lake Sockeye Salmon Recovery Plan.

In general, projects proposals made to the Pacific Salmon Commission undergo rigorous scrutiny from the initial conceptual proposals through to the more detailed second submissions. The panel of experts reviewing these projects do so on the merits of scientific analysis. In 2006, DFO applied for and received funding from the Pacific Salmon Commission for Year 1 of this project. Prior to submission this project had undergone extensive review and received input from a number of exerts in sockeye recovery and enhancement. Year 2 and 3 were similarly funded.

Artificial production of various fish stocks has been undertaken for decades and certainly within the sockeye salmon culture, Alaska is the noted authority. While there are many issues related to 'hatchery' raised fish versus wild salmon, of particular importance is the prevention of the horizontally transmitted infectious hematopoietic necrosis virus or IHN. In the late 70's almost 70% of the Alaskan sockeye production was lost due to this virus

(McDaniel et al., 1994) This disease typically causes high mortality within a juvenile population through the destruction of the major organs such as the kidneys and liver. Prevention of IHN transmission is therefore paramount and usually undertaken through stringent disinfection throughout the hatchery environment, disease screening, use of virus free water supplies and effluent disposal, and segregation of eggs and fry through the production process.

The other principal disease worth noting is bacterial kidney disease (BKD) which was also screened for during disease sampling of the Fry Outplant project. BKD is a systemic infectious disease that is slowly progressive, frequently fatal and seldom presents itself in fish until they are 6 - 12 months old. It readily cultures at 15–18 C and can be transmitted from female to eggs. Although it occurs mainly in freshwater, significant fish mortality can also occur in salt water (Banner, et al, 1983). As a result of infection, juvenile anadromous salmonids such as sockeye are unable to acclimatize to salt water and die.

The Lakelse Sockeye Recovery program has also successfully completed a number of other projects, funded by PSC and other sources, which include habitat restoration works on Scully, North Hatchery and Salmon Creeks. These projects have been collaborative in nature involving personnel from various government levels, First Nations (Kitselas, Gitanyow and Nuxalk) and the Lakelse Watershed Society – a non-profit volunteer organization. The Fry Outplant Year 2 particularly addressed capacity building at the Snootli Creek Hatchery site with respect to First Nations and their assistance with the sockeye rearing, feeding and marking programs. It is hopeful that this work will also further reinforce strong educational and stewardship opportunities within the surrounding community regarding this run of sockeye salmon.

The Lakelse sockeye population is significantly jeopardized. The Fry Outplant project's goal was to conserve this stock while the Lakelse Recovery Program stakeholders continue to target other projects relating to habitat protection and restoration. Recently, Fisheries and Oceans Canada indicated that further funding would not be available for projects in Lakelse, in addition to cut backs in staff, and therefore the Program (and perhaps the sockeye stock) is now in question.

Note: Due to global economic down turns in the fall and winter of 2008, Pacific Salmon Commission was also unable to provide funding for Year 4.

2.0 Study Area

Though historically all tributaries entering into Lakelse were prime spawning grounds for the Lakelse sockeye, recently this has been reduced to two main tributaries – Williams Creek and Schulbuckhand (Scully) Creeks. Focus by this project has therefore been placed on Williams Creek as it is the main spawning ground used by the remaining stocks.

Williams Creek is located near Lakelse Lake approximately 20 kilometres south of the City of Terrace in northern British Columbia. It drains a westward facing basin and flows into Lakelse Lake which, in turn, flows into the 18 kilometre long Lakelse River. Lakelse River is a Skeena River Tributary that enters the Skeena approximately 150 kms from its mouth.

Though there are several tributaries flowing into Lakelse Lake, Williams Creek is considered the main spawning area for this sockeye stock at the present time.

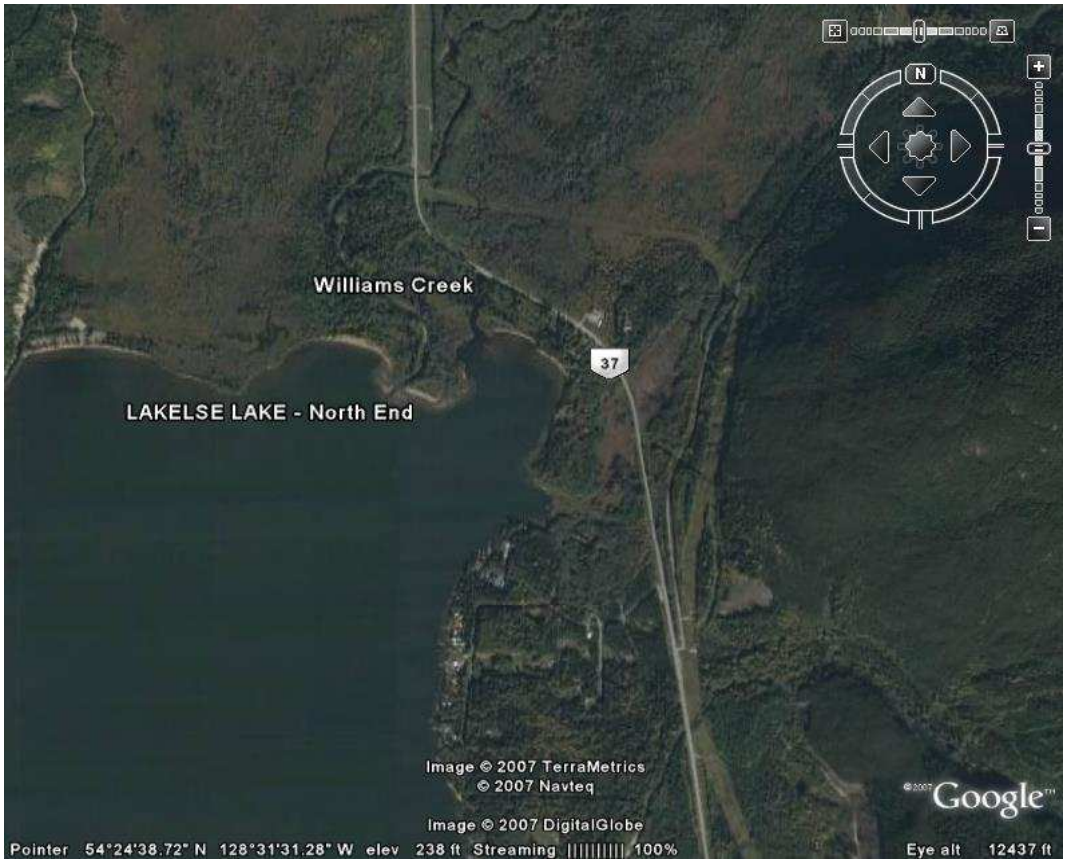

Figure 1. Illustrates Lakelse Lake, Williams Creek – south of Terrace, B.C.

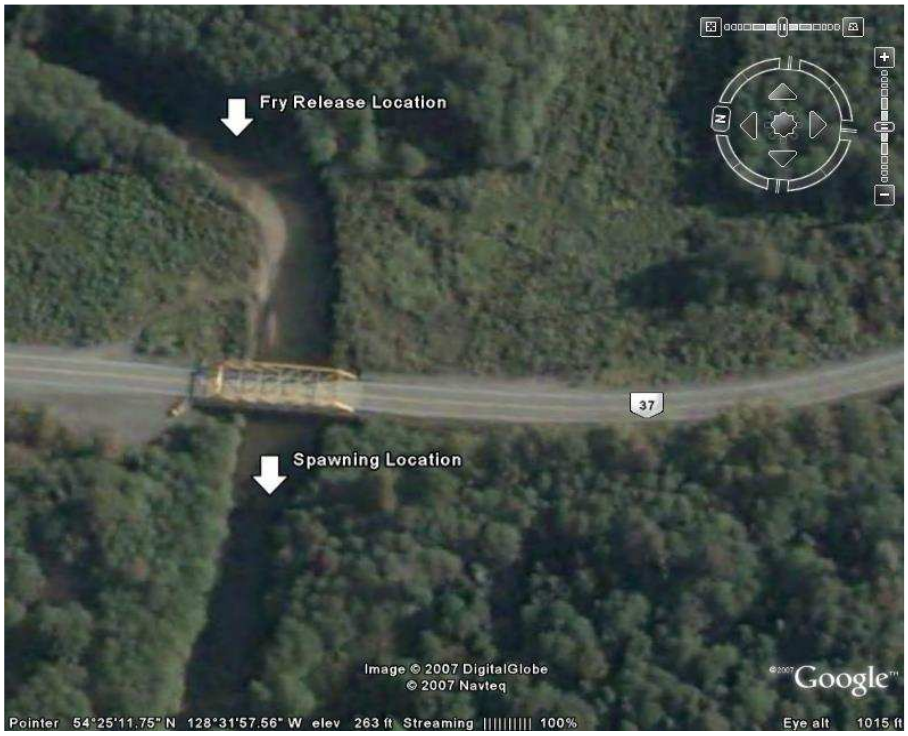

Figure 2. Illustrates Specific Spawning and Release Sites- Williams Creek – near Lakelse Lake

3.0. Methods

3.1. Pre-Operation:

Permits:
In July of 2008 a total of 6 "*Applications for the Introduction or Transfer of Fish*" were made and submitted for approval by the Transplant Committee for the transport of the eggs/milt and for returning fry. These permits allowed for approximately 350,000 sockeye eggs to be collected from various tributaries of the Lakelse watershed: Williams, Scully Ground Water, Scully Hot Springs, Hatchery, Granite and Salmon Creeks. Each permit was submitted separately for each creek to allow a portion of 350,000 to be collected if spawning stocks were available.

A seventh application was submitted for the potential contingency of returning some fry originating from Williams Creek and/or Scully Creek to re-seed stocks into Hatchery Creek off First Avenue. This application was declined.

The six applications for direct transfer of eggs to Snootli Creek Hatchery and return of fry to their identified natal stream were all approved by the Transplant committee by July 31, 2008.
These permits had received the compulsory review by both federal and provincial agencies with submission (Steve Cox-Rogers, Fisheries and Oceans Canada) (Mark Beere-BC Ministry of Environment).

Notification:
As a courtesy, BC Parks were informed of the project as Williams Creek project sites lay within Parks boundaries. The Provincial Ministry of the Environment - Conservation Officers were also informed of the egg take and the fry releases.
BC Parks responded with the commitment of two personnel for the duration of the operation.

Equipment Preparations:
Equipment required for brood stock collection, egg takes, disease sampling and other logistics for this project was readied or expedited by the contracted Project Coordinator prior to the egg take operations.

- Disease sampling equipment was specific for the collection of 2 ml of ovarian fluid per female to test for IHN. Fluid was removed from egg containers with individual pipettes (100) and transferred to sterilized screw cap vials. These were individually labelled and numbered prior to field operations. 100 vials were readied. BKD samples were collected and placed in individually labelled 'whirl-pak'- 4 oz. bags. (100) Each female was tagged with an individually numbered tag (1-100) and tagging gun.
- Spawning bowls were removed from the field each egg take. They were rinsed, washed in hot water and soap, disinfected in a solution of 1:100 iodophor, rinsed, dried and re-packaged for field use. (85)
- Egg containers were purchased and initially washed, rinsed, dried and individually numbered and packaged for field use. (100) Once they were shipped to Snootli Creek Hatchery with eggs, they were similarly treated as spawning bowls above and returned to the field for use.
- Milt was collected in individually numbered, 'whirl-pak' bags for field use (100). Sufficient male donors were used to enable a 2 X 2 spawning matrix at Snootli Creek Hatchery. Tangle nets, fish tubes and holding pens have been purchased through this project and are on hand.
- The gill net was destroyed during this project and will require restringing.
- Once removed from the field, all usable nets, cages and holding pens were immersed in a 1:100 iodophor solution, rinsed, washed and rinsed again prior to drying.

Logistics:
Consideration for the following was made prior to the field operations:

1) Schedule of field operation and returning spawning stocks
2) Liaison with Snootli Creek Hatchery re: schedule and availability of staff for in-kind support
3) Sufficient personnel for field operations to maintain Alaskan Sockeye protocols
4) Aircraft availability and scheduling
5) Training for additional personnel from the Hanging Lakes project (PSC funded)
6) Field support from DFO with respect to equipment transfer, personnel transfer
7) Coordination with PBS on disease sampling tentative scheduling
8) Liaison with Terrace-Kitimat Airport Authority for access to charter aircraft in restricted areas
9) Liaison with BC Parks due to field location

The Alaskan sockeye salmon protocols identify stringent procedures with respect to brood stock collection and ideally a team of 5 – 7 individuals are required to handle these steps separately in an efficient manner.
Because of the collaborative, interagency nature of this project, and the added dimension of a contractual arrangement with Lakelse Watershed Society (LWS) this year, sufficient personnel required needed to be established and maintained throughout this operation.

Sockeye spawners were reported in Williams Creek as early as August 6, 2008. Updates indicated increasing numbers by August 14. The full moon was August 16-17, 2008.

The egg take dates were tentatively scheduled for the week of August 18 – 23 and LWS Fisheries Director Ian Maxwell ensured volunteer participation sufficient to cover off the various tasks as per contract expectations and deliverables.

Other:
Similar to Years 1 and 2, expert technical staff from Snootli Creek Hatchery arrived in Terrace in August ahead of the egg take to help with the spawning and in order to accompany eggs/milt back to Bella Coola via air charter.

Year Three again provided the inclusion of personnel from the Gitga'at First Nations who were conducting a PSC funded sockeye program later in the fall of 2008 at Curtis Lake.

Prior to egg takes, a brief inspection of the Williams Creek site was conducted by the Project Coordinator with the DFO Terrace Habitat Technician to pre-plan the egg take and capture brood stock to be held until the following morning.

3.2. Brood Stock

August 18/08

Personnel from Lakelse Watershed Society, MOE, DFO, and Gitga'at and Gitga'ala First Nations participated in brood stock collection on August 18, 2008. Prior to the egg take, the contracted Project Coordinator discussed the sockeye protocols, safety issues and methods. Personnel on hand for this included Lakelse Watershed Society, MoE, BC Parks, DFO and Gitga'at and Gitga'ala First Nations.

Potential brood stock was captured in Williams Creek using 4 1/8" mesh tangle gill nets. 128 males were captured in nets as follows:

- 92 females were captured in nets
- None were adipose fin clipped.
- None were jacks

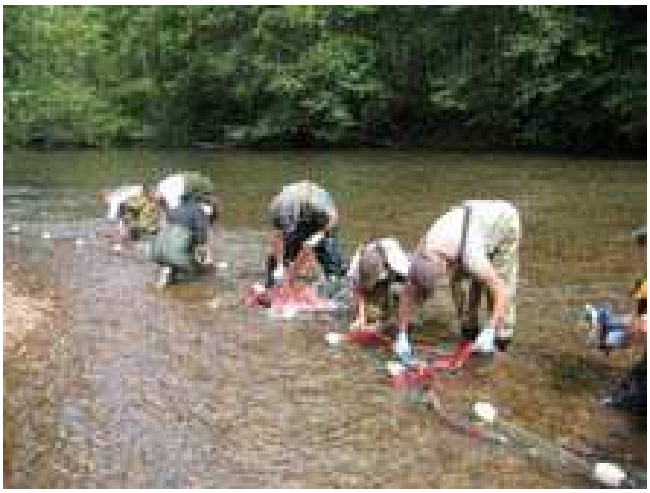

Figure 3: Sockeye Brood Stock Collection – Williams Creek

Twenty four ripe females were selected and held in cages overnight.

August 19/08

For the first time, weather was a significant factor in this year's operation. Early morning news of an impending storm forecasted to influence the central and north coast negated the charters with Bella Coola Air for the egg takes scheduled for August 19, 2008. Snootli Creek Hatchery staff had been unable to contact field personnel to relay the cancellation before all equipment and personnel had been mobilized to Williams Creek.

Alternatives were explored and discussed including fixed wing and helicopter charters out of Prince Rupert (Inland and Harbour Air) and a third option of a helicopter out of Bella Coola.

One final option investigated was to engage a helicopter company out of Port McNeill who, once aware of the situation, offered their services at a significantly reduced rate.

Egg takes for August 19 were able to proceed but double the number of eggs had to be collected to offset the cost of helicopter charter versus fixed wing.

Egg Take Collection was as follows:
August 19 – 67 females and 67 males; eggs/milt collected (one flight; helicopter)

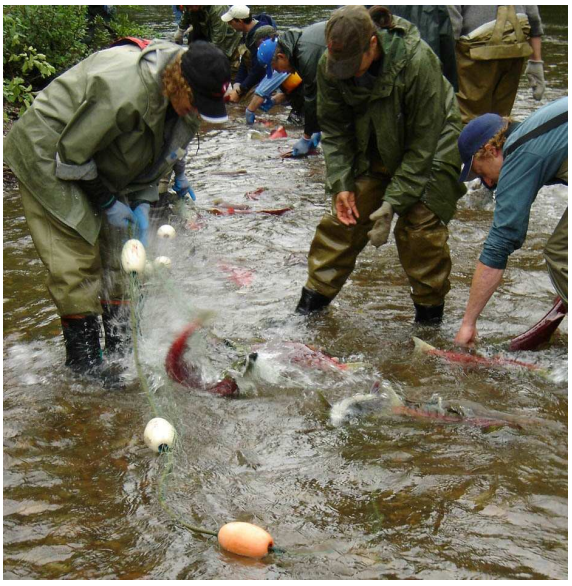

Figure 4: Sockeye Brood Stock Collection

Marshall Hans – (Technician) flew up on this helicopter from Bella Coola to replace John Willis who returned via helicopter to Bella Coola following the successful egg take operation.

The predicted weather front did not arrive until evening but weather continued to be an important and "new" consideration for the remainder of the week.

It was noted that the available stocks were significantly down from the numbers earlier suggesting that the run had already peaked and/or fewer fish had returned.

August 21

Prior to the egg take, the contractor once again discussed the protocols, safety issues and methods. Personnel on hand for this included Lakelse Watershed Society, MoE, BC Parks, DFO and Gitga'at and Gitga'ala First Nations. Target numbers were effectively reached with the addition of 30 females on that day.

30 females and 31 males; eggs/milt collected (one flight; fixed wing)

Total for two days was 97 females and 98 males.

Time from collection to fertilization including personnel transfer, flight, and fertilization: 5-6 hrs.

Last samples were sent via Bella Coola Air Charters. Marshall Hans returned with this flight.

Egg takes, disease sampling for BKD and IHN and other related procedures were conducted in a similar fashion to the previous day's operation.

Brood stock collection was significantly more difficult due to lack of stocks. Large numbers of kelts were present.

3.3. Egg Take/Spawning:

Spawning procedures adhered strictly to the Alaskan sockeye protocol (McDaniel et al, 1994) to reduce potential transmission of IHN virus and BKD. Almost all personnel who were assisting with the procedure had been previously trained and familiarized with these steps prior to the egg take. Other personnel joining the team, including the members of the Gitga'at contingent, received on site training before entering into the process.

Spawning was done in the field. Sufficient on-hand personnel provided primarily by the Lakelse Watershed Society allowed for simultaneous collection of milt from the males while egg-takes with females were done a short distance away. Eggs and milt were immediately stored in large ice filled 'coolers' and kept chilled enroute to Terrace-Kitimat Regional Airport onward to Bella Coola.

Throughout the procedure, a solution of 1:100 iodophor (Ovadine) was used between each fish to disinfect tools, equipment and personnel involved in the various procedures.

Where applicable, all personnel wore disposable, surgical-type gloves. Fresh gloves were used when handling each fish. Each step in the sockeye protocol procedure was done by one individual.

The females were dispatched with a sharp blow to the head. The ventral area was washed down with the disinfecting solution and a 'j-cloth'. This cloth was returned to the disinfecting solution and rinsed between each fish. The female was then immediately hung, tail up, on a portable spawning rack using lightweight twine "tailers", each on a single pegs appropriately spaced to ensure and maintain physical separation from each other. Individually, the females were then bled out by cutting the gills with a disinfected knife.

After being removed from the spawning rack, each female was held tail down by one technician while the vent area and belly was wiped down with dry paper towel by another. This second technician cut the fish anteriorally

from the vent upward carefully allowing the eggs to drop into a disinfected, smooth plastic collection bowl. Collection bowls were replaced between each fish with a clean, sterilized one.

The eggs were then transferred from the initial collection bowl to disposable, individually numbered plastic, lidded containers. Ovarian fluid (2 ml) was removed (see Disease Screening below) The lid was then secured and the container placed on crushed ice in a large portable cooler. This was intended to stabilize temperatures during the operation and throughout transportation. Each female fish was then tagged with a waterproof, sequentially numbered tag and transferred to the disease sampling area for collection of tissues samples related to BKD disease screening. (See also Disease Screening below for IHN procedures)

Males were handled with the same disinfecting protocols as the females. Individual personnel handled individual tasks relating to the fish handling. Gloves, j-cloths and paper towels were all replaced between each fish. Males were dispatched and had their vents swabbed with disinfectant solution and dried with clean, dry paper towels. They were then held, tail slightly down, and milt was physically expressed into an individually pre-labelled, sequentially numbered "whirl-pak" bags. Each bag was sealed and placed in the large cooler on ice in preparation for transport.

A total of 92 females and 94 males were collected and used for a target number of 300,000 eggs.

The portable cooler (containing a total of 67 eggs containers and 67 milt samples) and the Snootli Creek Operations Manager were then relocated from the field to the Kitimat-Terrace Regional airport and transported on a flight (approximately 1 hour and 20 minutes) back to Bella Coola via a chartered helicopter originating from Port McNeill, BC.

This operation was done over a two day period during peak spawning of the Williams Creek stocks. Brood stock operations occurred on August 19 and 21 in an area just downstream from the Highway 37 Bridge at Williams Creek. Spawning of the Lakelse Sockeye stocks was first noted on August 6th and continued until roughly the first week of September.

Figure 5. Females ready for disease sampling

3.4. Disease Screening:

For the purposes of disease screening for BKD, the females were tagged with a waterproof identification number immediately following spawning. They were laid on a flat surface in sequential order, protected from wind, sunlight and rain. A separate team of technicians, segregated from the spawning area worked on obtaining and packaging these tissue samples. Surgical scalpels used for sampling were initially disinfected in isopropyl alcohol. They were then further disinfected by flame using a small, portable butane torch. Once the blade had cooled, a posterior kidney sample was removed from each female, placed in sterilized, individually labelled whirl-pak bag

which was immediately put in a small cooler with frozen gel 'paks'. (Sample size is described as a coin "loonie size" – roughly ¼ inch thick by approximately 1¼ long) Disinfection occurred between each sampling throughout the process.

For the purposes of disease sampling for IHN, 2ml sterilized pipettes were used to collect ovarian fluid from each female's eggs. Fluid was drawn from the numbered egg containers and placed in corresponding numbered, sterilized, screw cap vials. These vials were then placed in a small cooler containing gel ice 'paks'.

The ovarian fluid samples and the kidney samples were kept chilled and shipped to Pacific Biological Station – Fish Pathology Laboratory, in Nanaimo, B.C. for processing. These samples are ideally received by fish pathology technicians fresh, chilled and within a 24 hour window of time. The samples must remain chilled (not frozen) and transportation logistics is important to maintain these parameters.

3.5. Fertilization and Planting

At the Snootli Creek Hatchery facility the fertilization took place in a segregated building under stringent disinfection procedures. Two technicians worked on samples as the eggs and milt underwent a 2 X 2 matrix fertilization procedure to promote genetic diversity.

The eggs from each female were divided evenly into 2 separate containers and each of these received half the milt from 2 individual males. These egg samples were then recombined and water was added to the eggs/milt mixture to activate fertilization. The samples were then rinsed with a 100ppm iodine solution. Disposable surgical type gloves were worn by the technician and were discarded between all samples.

The samples were then taken by an additional person waiting outside the facility to the incubation area. The eggs were place in individually numbered and labelled Heath trays containing 100ppm iodine. After 15 minutes, the tray was gently pushed back into place. Water flows were set at 15/lpm.

Segregation of each female's eggs is critical to the operational and Alaskan protocol process. Once information was received from Pacific Biological Station (PBS) regarding disease sampling results, eggs from females indicating a high indication of BKD or IHN were destroyed.

For the Lakelse Year 3 Project that represented one female sample indicating high indications of BKD. . (#35 2008) Her eggs were removed and destroyed. Those fish identified low-moderate BKD (3 females) remained segregated throughout the rearing process. The ability to segregate stocks was one of the critical factors in the overall selection of a facility for this project prior to Year One of the Fry Outplanting program.

3.6. Incubation

Water flows were monitored and maintained at 15/lpm in all heath tray stacks. Incubation temperatures were monitored with temperature recorders in the head boxes and selected Heath stacks. Eggs were noted as eyed between 301 and 305 Accumulated Thermal Units (ATU's). Average egg weight and diameter was assessed for each female. Dead eggs were removed, enumerated and discarded. Plastic "saddles were added to the Heath trays.

3.7. Ponding and Rearing

The fish were ponded between February 9 and 14th, 2009 into 7 tubs. The fry were graded according to size. Any fry related to females with BKD were reared separately.

Females #18 and 21 were low positive

Females 13, 22, 23 and 48 were just above the negative control value and therefore quarantined and also reared separately.

Female #56 was deemed medium positive for BKD – her eggs were used in a PSC Funded Incubation study (see Cambria Gordon Ltd, 2009 for DFO). 3200 additional eggs from the above females were used in the Incubation studies.

3.8. Marking

All Fry Outplant stocks were marked with an adipose "fin clip" to make them notable and distinct from the wild stocks. This would allow for future assessment of survival rates and returns. Adipose clipping was a significantly less expensive means of marking stocks.

3.9. Fry Release

Based on temperature data maintained on Williams Creek, the normal wild fry were calculated to emerge from mid-April through until the first week of May.

Pending feeding regimes, air craft availability and natural emergence of wild fry, the Lakelse fry were scheduled for release on May 4th and 5th provided there was suitable weather conditions for flights. Two aircraft originating from Bella Coola were chartered for the Lakelse fry transport and tightly scheduled over the course of two days.

Fry were removed from the ponding area at Snootli Creek Hatchery and transferred to 40 kg of water in 77 litre rubber containers complete with air stones. Oxygen was delivered from a portable cylinder through a flow meter and manifold system at a rate of .125 to 0.5 lpm. They were then ground transported to the Bella Coola Airport for flights to Terrace, B.C.. One technician accompanied the fry on each load. Once at the Terrace airport, the fry were off-loaded from the aircraft, the air supply reconnected to a portable oxygen cylinder, flow meter and manifold and then taken to Williams Creek. There they were transferred to in-stream holding pens for acclimatisation and released on both evenings.

4.0. RESULTS

4.1. Spawning

Approximately 324,000 eggs were transported to Snootli Hatchery for incubation and rearing. Average eggs per female were 3383. Operationally this phase of the project went very smoothly. DFO technicians from Snootli Creek Hatchery and the Terrace area worked with volunteer members of the Lakelse Watershed Society over a two day operation to collect the target number of eggs and milt within acceptable population limits. In addition, 3 members of the Gitga'at First Nations who were scheduled to do a Pacific Salmon Commission project near Hartley Bay (Curtis Lake) were also invited to attend and assist with this operation to gain knowledge of the Alaskan protocols and field experience.

Target numbers for Year 3 of this project were 300 - 350,000. The only fully viable spawning area for this stock remains at Williams Creek so the decision to take all brood stock from this location was made at the time of the project. Provisions for acquiring brood stock from all of the main tributaries to this watershed were made well in advance through the Transplant Application process. Stock could have been taken from Scully South three weeks later but it should be noted that no other stocks were available to collect during the window of time this operation took place.

4.2. Ponding and Rearing

Ponding occurred on February 9 through February 14, 2009 with results as summarized.

SUMMARY OF EGGTAKES AND INCUBATION SURVIVAL OF LAKELSE (WILLIAMS CREEK) 2008 BROOD SOCKEYE

Egg take Date	Brood stock used		Egg Target	Estimated # of Eggs	# of Eggs at Eyed	Inc, Morts	Total Ponded	% Eyed Survival	Egg Recovery Per female(adjusted)
	# - F	# - M							
19/21Aug	67/30	67/31							
TOTALS	97	98	300000	328,000	278,148	44,512	276,686	86.43	3383

Figure 6. Summary of Brood Stock – Snootli Creek Hatchery

SNOOTLI CREEK HATCHERY REARING SUMMARY – LAKELSE STOCK

Rearing Container	Initial Ponding Size (grams)	Initial Ponding #	Release Size (grams)	Release #	Release Biomass	Final Rearing Density Kg/M3	% Growth Per Day	# Days Reared
1			0.84	31,711	26.6	11.1		82
12			0.83	32,305	26.8	11.2		82
13	0.21	41501	0.90	29,088	26.2	10.9		82
14	0.21	41209	0.79	34,702	27.4	11.4		82
15	0.20	41076	0.84	30,398	25.5	10.6		82
16	0.20	41992	0.79	33,480	26.4	11.0		82
17	0.19	43241	0.71	37,591	26.7	11.1		82
18	0.17	47841	0.77	40,777	31.4	13.1		82
19	0.21	19826						82
		276,686		**270,052**	**217**		**1.75%**	

Figure 7. Rearing Summary

4.3. Marking

From April 6 to May 4, a total of 270,323 Lakelse Sockeye were marked with an adipose clip by a marking crew arranged by contract through the Nuxalk First Nations assisting with this program.

4.4. Release

Fry were flown from Bella Coola Airport to the Kitimat-Terrace Regional Airport May 4 and 5th using a loading of approximately 225 grams per litre of water. Oxygen was metered into each of the pails at about .125 to .5 lpm per bucket. Loads were transferred to a vehicle and trucked to Williams Creek were they were then transferred to in-stream portable pens and held until nightfall for acclimatisation. They were released at approximately 20:30 hrs. each night.

Figure 8. – Lakelse Fry ~ 9.0 kg per 70 litre bucket

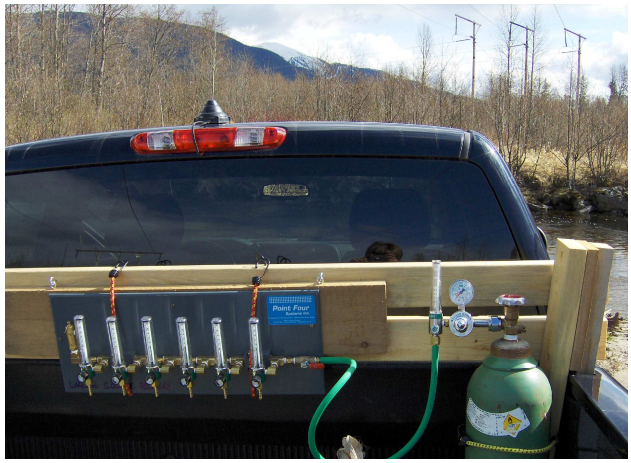

Figure 9. – Field Air Supply and Manifold

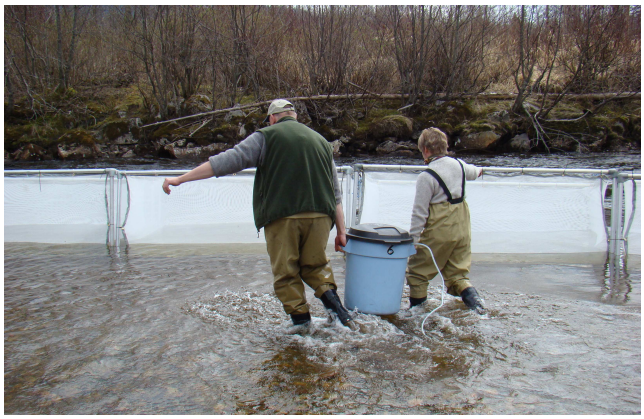

Figure 10. – Fry to Pens for acclimatisation

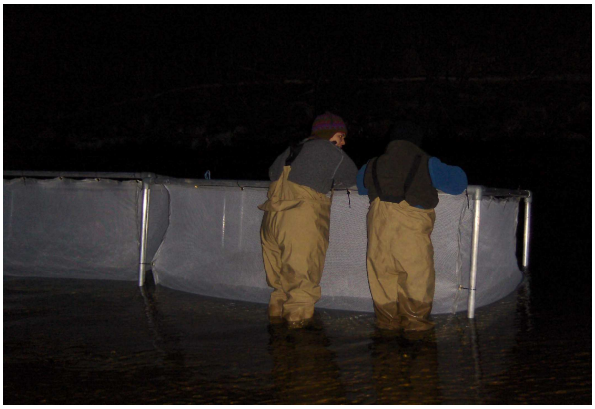

Figure 11. Nightfall release - 2008

5.0. DISCUSSION AND CONCLUSION

- Weather, for the first time, played a significant role in the logistics of this project and forced the need for alternate transport means for egg transfer to Bella Coola.

- Communications was an issue. Though there were a number of cell phones on site through DFO personnel, Bella Coola Air Charters and Snootli Creek Hatchery personnel had difficulty contacting field personnel.

- Staffing issues with DFO necessitated the project be contracted out to the Lakelse Watershed Society.

- The inclusion of the Gitga'at personnel allowed them to gain the necessary background information and technical experience with egg takes and disease sampling. This sharing of resources could also extend to joint cooperation with their funded projects at time and resources permit.

- The inclusion of the Nuxalk technical assistance should be noted. The support, capacity building and employment opportunities offered to the Nuxalk First Nations is a beneficial aspect of this Fry Outplant Program.

- Heightened security at the Terrace-Kitimat Regional Airport continues to require that the airport Authority must be contacted prior to chartered flights requiring access to the tarmac. Fees apply.

- Lakelse Sockeye Salmon stocks specifically noted by Snootli Creek personnel were:
    - the "best rearing results yet",
    - fry grew better this year than past years,
    - very few mortalities and
    - little evidence of pin-heads.

- Though approximately 270,000 were released into Williams Creek this May, issues such as predation, lakeshore use by residents and Park users and degradation of habit remain limiting, unmeasured factors. Unfortunately, natural emergence and this project's fry release occurs shortly before the May long weekend when recreational use of Lakelse Lake and Park visitors dramatically increases. Recreational use of motor boats, "sea-doos" and other similar activities could create some measure of hazard to the fry using the lakeshore environment.
- The outcome of this project is, as yet, unknown. While it is hoped and assumed that the fry migrate downstream to the Lakelse Lake and rear successfully with the wild fry, an assessment program through lake sampling or smolt sampling is currently not in place. At present the main assessment planned is through determining the mark-ratio of returning adults.

- Due to lack of funding and overall ability to support the Lakelse Sockeye Recovery program by some stakeholders in general, this and related Sockeye Recovery Plan projects are on hold pending a review.

/mk
June 2009

6.0. REFERENCES

Cox-Rogers, S. *Lakelse Lake Sockeye Salmon Recovery Plan, 2006*

Davies, S – *Internal Report – Lakelse Sockeye Enumeration - 2007*

Kujat, M. – *Lakelse Sockeye Recovery Program: Fry Outplant Year 1, 2006*
: Fry Outplant Year 2, 2007

MacWilliams – DVM, Christine – *Internal Memo, 2007*

McDaniel et al, *Alaska Sockeye Salmon Culture Manual*, A.D.F. & G. Special Fisheries Report #6

Morton, K.F., Williams, I.V., *Sockeye Salmon Utilization of Quesnel Lake, B.C.*, 1990

Rabnett, Ken, Lakelse Sockeye Spawning Habitat Rehabilitation Feasibility Project, 2008.

APPENDIX 1

PROPONENT INFORMATION

Proponent Information:

Department of Fisheries & Oceans Canada
Resource Restoration Unit
417 – 2nd Avenue
Prince Rupert, B.C. V8J 1G8
250-627-3441
Lana Miller – Restoration Biologist
MillerL@pac.dfo-mpo-gc.ca

Department of Fisheries and Oceans Canada
Snootli Creek Hatchery
Box 95
Bella Coola. B.C. V0T 1C0
250-982-2214
John Willis – Operations Manager
WillisJ@pac.dfo-mpo.gc.ca

Primary Contractor
Lakelse Watershed Society
3780 Lakelse Lake Lodge Road
Terrace, B.C. V8G 0G2
ianmax@telus.net

Project Coordinator
Margaret Kujat
3602 Eby Street
Terrace, B.C. V8G 2Z3
m.a.kujat@gmail.com

APPENDIX 2

Disease Screening Results

Fisheries and Oceans | Pêches et Océans

MEMORANDUM NOTE DE SERVICE

To / À: Margaret Kujat

From / De:
Christine MacWilliams, DVM
Pacific Biological Station
Nanaimo, BC
(250) 729-8377

Security Classification - Classification de sécurité **UNCLASSIFIED**
Our file - Notre référence **2007-127**
Your File - Votre référence
Date **September 28, 2007**

Subject / Objet: **2007 DISEASE SURVEILLANCE SCREENING RESULTS**

2007-127: Lakelse Sockeye - 34 kidney and ovarian samples were received on Aug 22, 2007 (numbered 1- 34); 41 samples were received Aug 24 (numbered 35-75); 17 samples were received Aug 28 (numbered 76-92)

BKD results as of Sept 28: samples 1 – 92 have been run:
- samples 7, 18 and 80 were low positive for BKD by ELISA
- sample 35 was high positive for BKD by ELISA
- all other samples were negative for BKD by ELISA

Samples 6, 77, and 84 were negative when re-run.

Virology results as of Sept 24:
- samples 1-92 are negative for IHNV by cell culture

Our current recommendations are to segregate any low positive eggs for separate rearing and early release as unfed fry. The egg lot from the female testing high positive should be destroyrd. These measures attempt to decrease the total pathogen load of *Renibacterium salmoninarum* in the hatchery and reduce the risk of an outbreak of BKD. Further results will be reported as soon as they are available. If there are any questions, please call me or Carl Westby (250) 756-7057.

Christine MacWilliams, DVM

APPENDIX 3

Transplant Permits

Fisheries and Oceans / Pêches et Océans

APPLICATION FOR INTRODUCTION OR TRANSFER OF FISH OR AQUATIC INVERTEBRATES

[Instructions Attached]

BC

Date Received: ________ **Introduction and Transfer Application #:** 11653

1. Company/Agency: Fisheries & Oceans Canada
   Contact Name: Margaret Kujat Phone: 250-631-3675
   Mailing Address: 5235 A Keith Ave Fax:
   Terrace, BC. V8G 1L2 E-mail: Margaret.Kujat@dfo-mpo.gc.ca

2. Purpose of Introduction or Transfer: Conservation Enhancement of Lakelse Sockeye in serious decline
   Purpose Code: (For office use only)

3. Species: Sockeye Salmon Genetic Status (if applicable):
   Stock Origin (strain if applicable): Lakelse Brood Year: 2008

4. Source Location of Fish: Scully Ground Water Channel Life Stage: Egg.
   Nearest Town: Terrace Transfer Date: Aug/Sept Number: portion of 350,000

5. List intermediate sites and transfer dates if any: Snootli Creek Hatchery, Bella Coola, BC. for transport.

6a. **If final introduction or transfer is to be released into natural waters:**
   Destination: Scully Creek Groundwater Channel Release Stage: Fry
   Nearest Town: Terrace, BC Release Date: Apr/May. 09 Number: Portion of 350,000
   List two waters downstream from the release location (unless permanently landlocked – check here ☐)
   1. Lakelse River 2. Skeena River
   Name federal and provincial fisheries staff who manage fisheries and assess stocks in the area and have been consulted and approve of this introduction or transfer. Please provide their comments on a separate sheet.
   (i) Provincial: Mark Beere. MOE Phone: 250-847-7297
   (ii) Federal: Steve Cox-Rogers. DFO Phone: 250-627-3440

6b. **If purpose is for aquaculture,** Aquaculture Licence # ________ Stage or size: ________
   Destination: ________ Transfer Date: ________ Number: ________

6c. **If final destination is a lab, hatchery or controlled experimental facility:**
   Destination: ________ Stage or Size: ________
   Nearest Town: ________ Transfer Date: ________ Number: ________
   (a) Will introduction or transfer be separate from other organisms in facilities with respect to tanks/ponds________, water supply ________, effluent discharge________? (Yes or No).
   (b) Will effluent be sterilized ________ and discharged directly to municipal sewer________, ground sump (100%)________, surface freshwater________, or ocean________ (Yes or No).
   (c) Final disposal of introduction or transfer? ________

Please follow the precautions and procedures outlined in items J and K of the application instructions (on the following page), to prevent introduction of undesirable flora/fauna and spread of disease/parasites.

If there is documentation in support of this application, especially in regard to risks, please attach.

Date of Application: ________ Signature: ________

MK 08

No. 11653
Page 1 of 2

Fisheries and Oceans / Pêches et Océans

APPLICATION FOR INTRODUCTION OR TRANSFER OF FISH OR AQUATIC INVERTEBRATES

BC

[Instructions Attached]

Date Received: Introduction and Transfer Application #: 1165-1

1. Company/Agency: Fisheries & Oceans Canada
Contact Name: Margaret Kujat Phone: 250-631-2673
Mailing Address: 5335A Keith Ave Fax:
Terrace, BC, V8G 1L2 E-mail: Margaret.Kujat@dfo-mpo.gc.ca

2. Purpose of Introduction or Transfer: Conservation Enhancement of Lakelse Sockeye in severe decline
Purpose Code: (For office use only)

3. Species: Sockeye, Salmon Genetic Status (if applicable):
Stock Origin (strain if applicable): Lakelse Brood Year: 2008

4. Source Location of Fish: Squally - Hot Springs Canal Life Stage: Egg
Nearest Town: Terrace Transfer Date: Aug/Sept Number: Portion of 350,000

5. List intermediate sites and transfer dates if any: Smooth Creek Hatchery, Bella Coola, BC, Air transport.

6a. **If final introduction or transfer is to be released into natural waters:**
Destination: Squally Hot Springs Canal Release Stage: Fry
Nearest Town: Terrace Release Date: Apr/May - 09 Number: Portion of 350,000
List two waters downstream from the release location (unless permanently landlocked – check here ☐)
1. Lakelse River 2. Skeena River
Name federal and provincial fisheries staff who manage fisheries and assess stocks in the area and have been consulted and approve of this introduction or transfer. Please provide their comments on a separate sheet.
(i) Provincial: Mark Beere - MOE Phone: 250-847-7397
(ii) Federal: Steve Cox - Rogues - DFO Phone: 250-627-3490

6b. **If purpose is for aquaculture,** Aquaculture Licence # Stage or size.
Destination: Transfer Date: Number:

6c. **If final destination is a lab, hatchery or controlled experimental facility:**
Destination: Stage or Size:
Nearest Town: Transfer Date: Number:
(a) Will introduction or transfer be separate from other organisms in facilities with respect to tanks/ponds, water supply, effluent discharge ? (Yes or No).
(b) Will effluent be sterilized and discharged directly to municipal sewer, ground sump (100%), surface freshwater, or ocean (Yes or No).
(c) Final disposal of introduction or transfer?

Please follow the precautions and procedures outlined in Items J and K of the application instructions (on the following page), to prevent introduction of undesirable flora/fauna and spread of disease/parasites.

If there is documentation in support of this application, especially in regard to risks, please attach.

Date of Application: Signature:

MC OK

No. 11654
Page 1 of 2

06/24/2008 13:40 FAX 250 615 6864 Fisheries Terrace 007/009

TRANSFER OF FISH OR AQUATIC INVERTEBRATES

DUPP

[Instructions Attached]

Date Received: Introduction and Transfer Application #: 11655

1. Company/Agency: Fisheries & Oceans Canada
   Contact Name: Margaret Kujat Phone: 250-631-3473
   Mailing Address: 5235A Keith Ave Fax:
   Terrace, BC V8G 1L2 E-mail: Margaret.Kujat@dfo-mpo.gc.ca

2. Purpose of Introduction or Transfer: Conservation Enhancement of Lakelse Sockeye in serious decline. Purpose Code: (For office use only)

3. Species: Sockeye Salmon Genetic Status (if applicable):
   Stock Origin (strain if applicable): LAKELSE Brood Year: 2006

4. Source Location of Fish: HATCHERY CREEK Life Stage: Egg
   Nearest Town: Terrace Transfer Date: Apr/Sept Number: Approx of 350,000

5. List intermediate sites and transfer dates if any: Snootli Creek Hatchery, Bella Coola, BC. Air transport.

6a. **If final introduction or transfer is to be released into natural waters:**
   Destination: HATCHERY CREEK Release Stage: Fry
   Nearest Town: Terrace, BC Release Date: Apr/May-09 Number: Approx of 350,000
   List two waters downstream from the release location (unless permanently landlocked check here ☐)
   1. Lakelse River 2. Skeena River
   Name federal and provincial fisheries staff who manage fisheries and assess stocks in the area and have been consulted and approve of this introduction or transfer. Please provide their comments on a seperate sheet.
   (i) Provincial: Mark Beere - MOE Phone: 250-847-7297
   (ii) Federal: Steve Cox-Rogers - DFO Phone: 250-627-3490

6b. **If purpose is for aquaculture,** Aquaculture Licence # Stage or size:
   Destination: Transfer Date: Number:

6c. **If final destination is a lab, hatchery or controlled experimental facility:**
   Destination: Stage or Size:
   Nearest Town: Transfer Date: Number:
   (a) Will introduction or transfer be separate from other organisms in facilities with respect to tanks/ponds, water supply, effluent discharge? (Yes or No).
   (b) Will effluent be sterilized and discharged directly to municipal sewer, ground sump (100%), surface freshwater, or ocean (Yes or No).
   (c) Final disposal of introduction or transfer?

Please follow the precautions and procedures outlined in items J and K of the application instructions (on the following page), to prevent introduction of undesirable flora/fauna and spread of disease/parasites.

If there is documentation in support of this application, especially in regard to risks, please attach.

Date of Application: Signature:

MK '08

No. 11655
Page 1 of 2

■ T ■ and Oceans Canada

TRANSFER OF FISH OR AQUATIC INVERTEBRATES

DUPE

[Instructions Attached]

Date Received: _____ Introduction and Transfer Application #: 11656

1. Company/Agency: FISHERIES & OCEANS CANADA
Contact Name: Margaret Kujat Phone: 250-631-3675
Mailing Address: 5235A KEITH AVE. Fax:
TERRACE, BC. V8G 1L2 E-mail: Margaret.Kujala@dfo-mpo.gc.ca

2. Purpose of Introduction or Transfer: Conservation Enhancement of Lakelse Sockeye in serious decline
Purpose Code: (For office use only)

3. Species: Sockeye Salmon Genetic Status (if applicable): _____
Stock Origin (strain if applicable): LAKELSE Brood Year: 2008

4. Source Location of Fish: WILLIAMS CREEK Life Stage: Egg
Nearest Town: TERRACE Transfer Date: AUG/SEPT Number: Portion of 350,000

5. List intermediate sites and transfer dates if any: Snootli Creek Hatchery, Bella Coola, BC, for transport.

6a. **If final introduction or transfer is to be released into natural waters:**
Destination: WILLIAMS CREEK Release Stage: FRY
Nearest Town: Terrace BC Release Date: APR/may-09 Number: Portion of 350,000
List two waters downstream from the release location (unless permanently landlocked -- check here ☐)
1. Lakelse River 2. Skeena River
Name federal and provincial fisheries staff who manage fisheries and assess stocks in the area and have been consulted and approve of this introduction or transfer. Please provide their comments on a separate sheet.
(i) Provincial: Mark Bowe - MOE Phone: 250-847-7297
(ii) Federal: Steve Cote - Rogers - DFO Phone: 250-627-3490

6b. **If purpose is for aquaculture,** Aquaculture Licence # _____ Stage or size: _____
Destination: _____ Transfer Date: _____ Number: _____

6c. **If final destination is a lab, hatchery or controlled experimental facility:**
Destination: _____ Stage or Size: _____
Nearest Town: _____ Transfer Date: _____ Number:
(a) Will introduction or transfer be separate from other organisms in facilities with respect to tanks/ponds_____, water supply _____, effluent discharge_____? (Yes or No).
(b) Will effluent be sterilized _____ and discharged directly to municipal sewer_____, ground sump (100%)_____, surface freshwater_____, or ocean_____ (Yes or No).
(c) Final disposal of introduction or transfer? _____

Please follow the precautions and procedures outlined in items J and K of the application instructions (on the following page), to prevent introduction of undesirable flora/fauna and spread of disease/parasites.

YEAR 3 - APPLICATION - previously approved in 2007 - Project.

If there is documentation in support of this application, especially in regard to risks, please attach.

Date of Application: _____ Signature: _____

MK '08

No. 11656
Page 1 of 2

Fisheries and Oceans Canada Pêches et Océans

APPLICATION FOR INTRODUCTION OR TRANSFER OF FISH OR AQUATIC INVERTEBRATES

BC

[Instructions Attached]

Date Received: Introduction and Transfer Application #: 11657

1. Company/Agency: Fisheries + Oceans Canada
Contact Name: Margaret Kujat Phone: 250-615-5675
Mailing Address: 5253A Keith Ave Fax:
Terrace, BC. V8G 1L2 E-mail: Margaret.Kujat@dfo-mpo.gc.ca

2. Purpose of Introduction or Transfer: Conservation Enhancement of Lakelse Sockeye, to secure decline
Purpose Code: (For office use only)

3. Species: Sockeye Salmon Genetic Status (if applicable):
Stock Origin (strain if applicable): Lakelse Brood Year: 2008

4. Source Location of Fish: Williams / Scully Creek Life Stage: Egg
Nearest Town: Terrace Transfer Date: 24/MAR/09 Number: Portion of 350,000

5. List intermediate sites and transfer dates if any: Smithers Creek Hatchery - Bella Coola, BC. for transport.

6a. **If final introduction or transfer is to be released into natural waters:**
Destination: Hatchery Creek Release Stage: Fry
Nearest Town: Terrace Release Date: APR/MAY-09 Number: Portion of 350,000
List two waters downstream from the release location (unless permanently landlocked – check here ☐)
1. Lakelse River 2. Skeena River
Name federal and provincial fisheries staff who manage fisheries and assess stocks in the area and have been consulted and approve of this introduction or transfer. Please provide their comments on a separate sheet.
(i) Provincial: Mark Beere - MOE Phone: 250-847-7497
(ii) Federal: Steve Cox - Rogers - DFO Phone: 250-627-3490

5b. **If purpose is for aquaculture,** Aquaculture Licence #: Stage or size:
Destination: Transfer Date: Number:

6c. **If final destination is a lab, hatchery or controlled experimental facility:**
Destination: Stage or Size:
Nearest Town: Transfer Date: Number:
(a) Will introduction or transfer be separate from other organisms in facilities with respect to tanks/ponds, water supply, effluent discharge ? (Yes or No).
(b) Will effluent be sterilized and discharged directly to municipal sewer, ground sump (100%), surface freshwater, or ocean (Yes or No).
(c) Final disposal of introduction or transfer?

Please follow the precautions and procedures outlined in items J and K of the application instructions (on the following page), to prevent introduction of undesirable flora/fauna and spread of disease/parasites.

If there is documentation in support of this application, especially in regard to risks, please attach.

Date of Application: Signature:

MK

NOT APPROVED

No. 11657
Page 1 of 2

Fisheries and Oceans Canada / Pêches et Océans Canada

APPLICATION FOR INTRODUCTION OR TRANSFER OF FISH OR AQUATIC INVERTEBRATES

BC

[Instructions Attached]

Date Received: Introduction and Transfer Application #: 11651

1. Company/Agency: Fisheries & Oceans Canada
Contact Name: Margaret Kujat Phone: 250-615-2673
Mailing Address: 5355 A Keith Ave Fax:
Terrace, BC V8G 1L2 E-mail: Margaret.Kujat@dfo-mpo.gc.ca

2. Purpose of Introduction or Transfer: Conservation Enhancement of Lakelse Sockeye in serious decline
Purpose Code: (for office use only)

3. Species: Sockeye Salmon Genetic Status (if applicable):
Stock Origin (strain if applicable): Lakelse Brood Year: 2008

4. Source Location of Fish: Granite Creek Life Stage: Egg
Nearest Town: Terrace Transfer Date: Aug/Sept Number: portion of 350,000

5. List intermediate sites and transfer dates if any: Snootli Creek Hatchery - Bella Coola, BC
Air transport -

6a. **If final introduction or transfer is to be released into natural waters:**
Destination: Granite Creek Release Stage: Fry
Nearest Town: Terrace Release Date: Apr/May - 09 Number: portion of 350,000
List two waters downstream from the release location (unless permanently landlocked – check here [ ])
1. Lakelse River 2. Skeena River
Name federal and provincial fisheries staff who manage fisheries and assess stocks in the area and have been consulted and approve of this introduction or transfer. Please provide their comments on a separate sheet.
(i) Provincial: Mark Beere - MOE Phone: 250-847-7277
(ii) Federal: Steve Cox-Rogers - DFO Phone: 250-627-3490

6b. **If purpose is for aquaculture,** Aquaculture Licence #: Stage or Size:
Destination: Transfer Date: Number:

6c. **If final destination is a lab, hatchery or controlled experimental facility:**
Destination: Stage or Size:
Nearest Town: Transfer Date: Number:
(a) Will introduction or transfer be separate from other organisms in facilities with respect to tanks/ponds, water supply, effluent discharge? (Yes or No).
(b) Will effluent be sterilized and discharged directly to municipal sewer, ground sump (100%), surface freshwater, or ocean (Yes or No).
(c) Final disposal of introduction or transfer?

Please follow the precautions and procedures outlined in Items J and K of the application instructions (on the following page), to prevent introduction of undesirable flora/fauna and spread of disease/parasites.

If there is documentation in support of this application, especially in regard to risks, please attach.

Date of Application: Signature: MK OK

No. 11651
Page 1 of 2

Fisheries and Oceans Canada / Pêches et Océans

APPLICATION FOR INTRODUCTION OR TRANSFER OF FISH OR AQUATIC INVERTEBRATES

(Instructions Attached)

BC

Date Received: Introduction and Transfer Application #: 11652

1. Company/Agency: Fisheries & Oceans Canada
Contact Name: Margaret Kujat Phone: 250-638-3673
Mailing Address: 5339 A Keith Ave Fax:
Terrace, BC V8G 1L2 E-mail: Margaret.Kujat@dfo-mpo.gc.ca

2. Purpose of Introduction or Transfer: Conservation Enhancement of Lakelse Sockeye in serious decline
Purpose Code: (For office use only)

3. Species: Sockeye Salmon Generic Status (if applicable):
Stock Origin (strain if applicable): Lakelse Brood Year: 2008

4. Source Location of Fish: Salmon Creek Life Stage: Egg
Nearest Town: Terrace Transfer Date: Aug/Sept Number: portion of 350,000

5. List intermediate sites and transfer dates, if any: Smeetli Creek Hatchery, Bella Coola - BC. for transport:

6a. **If final introduction or transfer is to be released into natural waters:**
Destination: Salmon Creek Release Stage: Fry
Nearest Town: Terrace, BC Release Date: Apr/May - 09 Number: portion of 350,000
List two waters downstream from the release location (unless permanently landlocked – check here ☐)
1. Lakelse River 2. Skeena River
Name federal and provincial fisheries staff who manage fisheries and assess stocks in the area and have been consulted and approve of this introduction or transfer. Please provide their comments on a separate sheet.
(i) Provincial: Mark Beere - MoE Phone: 250-847-7297
(ii) Federal: Steve Cope - Rogers - DFO Phone: 250-627-3490

6b. **If purpose is for aquaculture,** Aquaculture Licence #: Stage or size:
Destination: Transfer Date: Number:

6c. **If final destination is a lab, hatchery or controlled experimental facility:**
Destination: Stage or Size:
Nearest Town: Transfer Date: Number:
(a) Will introduction or transfer be separate from other organisms in facilities with respect to tanks/ponds, water supply, effluent discharge? (Yes or No).
(b) Will effluent be sterilized and discharged directly to municipal sewer, ground sump (100%), surface freshwater, or ocean (Yes or No).
(c) Final disposal of introduction or transfer?

Please follow the precautions and procedures outlined in items J and K of the application instructions (on the following page), to prevent introduction of undesirable flora/fauna and spread of disease/parasites.

If there is documentation in support of this application, especially in regard to risks, please attach.

Date of Application: Signature:

No. 11652 MK '08
Page 1 of 2