Northern Fund Projects 2004/05

The following is a descriptive list of the projects that are being funded by the Northern Boundary and Transboundary Rivers Restoration and Enhancement Fund Committee in 2004.

ENHANCEMENT

SOCKEYE SALMON

Trapper Lake Sockeye Access Improvement. Year 1

Project Lead: B. Mercer and Associates. Whitehorse. Yukon.
Project Cost: $65,000 CAN $49,599 US

Trapper Lake was identified as a potential sockeye salmon enhancement site in 1988 due to its under-utilised sockeye fry rearing potential. An enhancement program involving out-planted sockeye was initiated in 1990 and terminated five years later due to lower than expected fry to smolt survival. It was observed that returning sockeye salmon from this enhancement program were nearly successful at negotiating a partial barrier near the outlet of Trapper Lake.

This, coupled with the identified presence of non-anadromous sockeye (kokanee) suggested that Little Trapper Lake origin sockeye had negotiated the barrier in the past and may presently do so under certain water conditions. Improving the access for returning sockeye to Trapper Lake could result in a sustained increase in production from the system conservatively estimated to be between 10,000 to 40,000 adult sockeye. The subject of this proposal is a feasibility study which will: Outline appropriate measures to improve access; summarise existing biological data as well as collect additional baseline data during 2004; initiate applications for permitting approval; estimate costs and potential benefits, and; draft a schedule for implementation.

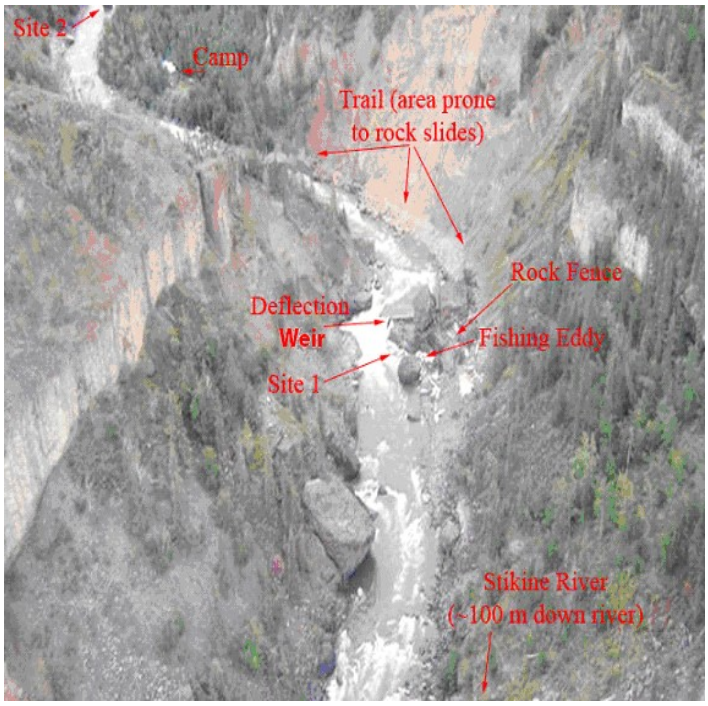
Trapper Lake Sockeye Enhancement Project. *Final Report*

Tuya Fish Harvest Structure. Year 1

Project Lead: Peter Etherton, Senior Technician Stock Assessment, DFO, Whitehorse.
Ron Josephson. Alaska Department of Fish and Game.
Project Cost: $582,330 CAN $444,357 US

Canada and the United States have undertaken a joint sockeye enhancement program on the Stikine River consistent with the Transboundary Annex provisions of the Pacific Salmon Treaty. The Stikine program involves taking broodstock in Tahltan Lake and transporting fertilized eggs to the Snettisham Hatchery in Alaska for incubation. Resulting fry are transplanted back into Tuya Lake and/or Tahltan Lake. The goal of this enhancement is to produce 100,000 additional sockeye from the Stikine River. Tuya Lake is currently inaccessible to returning adult sockeye due to migration barriers located in the Tuya River just upstream from its confluence with the Stikine River. Although some of the fish returning to the barrier have been harvested in a terminal *Excess Salmon to Spawning Requirements (ESSR*) fishery, fishing success has been less than originally planned or desired (catches have ranged from 200 to 7,000 sockeye). The

majority of the sockeye returning to the river are left to unsuccessfully continue to attempt to ascend the barrier, or to spawn in either the lower Tuya River or in other areas downstream in the Stikine River or it's tributaries. The difficulties encountered in terminally harvesting the fish and the inability of the remaining sockeye to ascend the barrier have prompted concerns on behalf of the Tahltan First Nation, other local residents and Transboundary River Panel members. The Transboundary Technical Committee has raised additional concerns associated with the straying of fish and potential genetic and other impacts of Tuya sockeye spawning in areas already frequented by wild spawning stocks. The crux of the problem is that in order to reach the goal of producing 100,000 enhanced sockeye on the Stikine there needs to be large out-plants in Tuya; however that creates large numbers of excess salmon at the barrier that with present methods can not be adequately harvested. The objectives of this project are to develop and implement an effective, cost efficient system of capturing a minimum of 80 per cent of the Tuya River sockeye near the mouth of Tuya River; and to harvest fish in concert with the construction of a fish trap facility.



Tuya River Sockeye Harvest Research, 2004-2005. *Final Report*

Tuya River Sockeye Straying

Project Lead: Peter Etherton, Senior Technician Stock Assessment, DFO, Whitehorse.
Ron Josephson. Alaska Department of Fish and Game.
Project Cost: $197,395 CAN $150,626 US

Canada and the United States have undertaken a joint sockeye enhancement program on the Stikine River consistent with the Transboundary Annex provisions of the Pacific Salmon Treaty. The Stikine program involves taking broodstock in Tahltan Lake and transporting fertilized eggs to the Snettisham Hatchery in Alaska for incubation. Resulting fry are transplanted back into Tuya Lake and/or Tahltan Lake. The goal of

this enhancement is to produce 100,000 additional sockeye annually from the Stikine River. Adult sockeye salmon originating from fry releases into Tuya Lake collect below an impassable natural fish barrier at the mouth of the Tuya River on their home migration. A portion of these fish later drop downstream and have been tracked to spawning areas of other stocks. This behaviour has generated concerns centred on the genetic integrity and health of Stikine River wild stocks (genetic and competition concerns) that may result from Tuya fish re-entering the Stikine River and spawning with and/or competing with mainstem sockeye salmon. Several prior studies have been conducted that have provided some information on the in-river distribution and migratory behaviour of Tuya Lake-origin sockeye salmon. There is no data to support or refute the spawning success of these fish, nor is there data that measures the mixing and intraspecific spawning of Tuya sockeye with other sockeye stocks, nor the degree of short-term or long-term genetic introgression of these fish into mainstem spawning stocks. This proposal increases the scope of past studies by better assessing the distribution and abundance of Tuya sockeye strays throughout the Stikine River drainage. Although it is recognized that more detailed studies would be needed to determine if long-term deleterious effects actually result from straying of Tuya fish, this proposed study will deliver a scientifically-based assessment on the extent of straying and a discussion of possible effects for consideration by the Transboundary Technical Committee.

Tuya River Sockeye Straying Study in the Stikine River, 2004-2005. *Final Report*

Feasibility of Sockeye Production from Hanging Lakes

Project Lead: Dave Peacock, DFO, Prince Rupert, BC.
Project Cost: $25,000 CAN $19,077 US

This project will develop a feasibility study to examine the potential of sockeye production from barren or underutilized coastal hanging lakes in northern British Columbia. Hanging coastal lakes in particular represent new opportunities for sockeye production where none currently exists. Extensive biological studies in past years have already identified specific hanging lakes within Canadian Statistical Areas 5 and 6 that appear to be good candidates for sockeye introductions, and technology exists for hanging lakes enhancement. However, both biological and social/policy issues associated with hanging lakes sockeye enhancement remain. For example, current public and agency support for non-native sockeye introductions into coastal hanging lakes needs to be assessed given well documented public concerns (both local and global) about the maintenance of biological diversity in ecosystems.

Feasibility of Outplanting Sockeye Salmon to Hanging Lakes in Central & Northern BC. *Final Report*

HABITAT RESTORATION

SOCKEYE SALMON

Little Klukshu Creek Salmon Habitat Restoration. Year 1

Project Lead: Linaya Workman, Champagne and Aishihik First Nations. Haines Junction. Yukon.
Project Cost: $15,500 CAN $11,828 US

The Champagne and Aishihik First Nations are working towards re-establishing sockeye salmon into the Little Klukshu area located above Klukshu Lake. In 1995, Champagne & Aishihik First Nations did an initial survey of the Little Klukshu Creek and Lake to determine if sockeye were present or not. Traditional Knowledge told us that at one time sockeye used this area for spawning and rearing. From 1999 to 2001 extensive beaver dam removal was completed in Little Klukshu Creek.

In the fall of 2002 and 2003, Champagne & Aishihik First Nations transplanted some adult sockeye into Little Klukshu Lake as a trial to determine if they would successfully spawn or if the eggs would successfully hatch. We were unable to capture any sockeye fry in Little Klukshu. The objectives of this project are (1) to complete another field season to monitor activity in the Little Klukshu and determine if spawning adults are entering and utilizing the creek or the lake; to determine if fry are present, and; to identify, map and remove beaver dams and beavers located on the Little Klukshu Creek to ensure that fish can move freely in and out of the Little Klukshu. (2) Habitat mapping and assessment of Little Klukshu Creek to determine where potential spawning areas are located and the extent of potential spawning habitat available. (3) Monitor the Little Klukshu Creek to determine what salmonid species are using the area and the extent of that use, and (4) Determine the best means to re-establish sockeye populations in the Little Klukshu area.

2004 Little Klukshu Creek Salmon Habitat Restoration Project. Final Report

CHINOOK SALMON

King Salmon Lake Monitoring and Assessment

Project Lead: Richard Erhardt. Fisheries Biologist. Taku River Tlingit First Nation. Atlin. BC.
Project Cost: $17,000 CAN $12,972 US

The King Salmon Creek sub-watershed, an area of 29,614 hectares, is considered one of the most ecologically diverse and productive sub-watersheds in the Lower Taku Watershed Unit. While most of the other large tributaries in the Lower Taku are of glacial origin (such as the Tulsequah River, Sittakanay Creek and Stuhini Creek); King Salmon Lake produces a clear water tributary with relatively stable channel morphology, warmed water and attenuating stream flow whose buffering effect facilitates increased productivity, diversity and migratory access for salmonids.

The creek is known to be used by chinook and coho salmon as well as being an important migration corridor for lake bound sockeye. King Salmon Lake is located 540 meters above sea level is approximately 230 hectares in surface area. The lake environs are a transitional area between the coastal and interior forests. The riparian vegetation on the south side of the lake at the outlet is a sedge wetland with remains of a non-active beaver dam. An obvious beaver influenced wetland is located in this area and is associated with an unnamed tributary that flows in from the south. There is extensive cover in King Salmon Creek dominated by overhanging vegetation and large woody debris. A series of more active beaver dams begins approximately 400 meters downstream of the lake outlet and may impede upstream migration of adult salmon at low water levels. The lake is utilized by spawning and rearing sockeye salmon as well as rainbow trout, dolly varden / bull trout and possibly kokanee. However, the level of sockeye escapement has been poorly documented. Anecdotal information from local sources suggests that sockeye escapement may have been relatively low during a period when the dam at the outlet was active. Two years ago local reports indicated a marked increase in the numbers of adult sockeye observed in the lake. This spurred the initiation of a pilot project by TRT Fisheries to investigate current levels of fish utilization and fish habitat characteristics in the area. The objectives of this project are to improve estimates of the current level of adult sockeye escapement to the lake by means of a temporary weir and an aerial index survey; to further assess and monitor the extent to which current natural barriers in the area impede sockeye migration, and; to develop site-specific methods for cost-effective access improvements.

King Salmon Lake Monitoring and Assessment Report 2004/05. Final R eport

MULTI-SPECIES

Kitwanga River Side Channel Habitat Improvements

Project Lead: Derek Kingston. Fisheries Biologist. Gitanyow Fisheries Authority.
Project Cost: $5,000 CAN $3,815 US

The rationale for this project is to provide juvenile rearing habitat for salmonids (especially coho salmon) and to expand pink salmon spawning areas. A side channel was excavated during the construction of the Kitwanga River Salmon Enumeration Fence in 2003. The side channel was excavated to divert the Kitwanga River around the permanent fence area during the construction phase of the project. It has been determined by GFA that the diversion channel could be utilized as spawning and rearing habitat once fence construction was completed. During juvenile coho synoptic surveys conducted on the Kitwanga River in 2000 it was determined that increased juvenile coho habitat in the Lower Kitwanga River would help to increase the production of wild coho salmon. One component of this side channel improvement project is to transplant native plants and seedlings along the banks of the side channel to provide cover and shade for juvenile salmonids.

The addition of the deep-rooted vegetation will also reduce the degree of sedimentation entering into the Kitwanga River from the site. During the permanent fence construction a temporary structure was placed at the outlet of the side channel to allow the passage of juvenile salmonids and prevent adult salmon from moving into the side channel. During high water events the water in the side channel would flow around the corners of the temporary structure. Therefore, the GFA is going to reinforce the corners of structure with riprap material to prevent erosion. Some large woody debris is also going to be removed at the intake of the side channel to allow for sufficient flow of water into the channel at all times of the year to increase juvenile salmonid and egg survival.

 *Kitwanga River Side Channel Habitat Improvement Project 2004.* *Final Report*

Kwiniak River Salmon Rearing Habitat Rehabilitation

Project Lead: Cheryl Stephens. Program Manager. Nisga'a Fisheries.
Project Cost: $32,000 CAN $24,418 US

This project will lead to improved in-stream habitat condition and stability within the Kwiniak watershed; and, will provide better spawning and rearing habitat for anadromous salmon and resident trout and char. Previous studies (overview watershed assessment, Level 1 FHAP and Level 2 prescription design) have identified the anadromous section of a tributary of the Kwiniak to be in relatively poor habitat condition as a result of previous road construction and pre-code logging practices. Large woody debris (LWD) cover and pool habitat is limited throughout the defined channel portions of the proposed restoration section, which is presently dominated by riffle and run habitats. The construction of LWD structures will create hydraulic scour and establish distinct pool habitat. The addition of LWD to the channel and stable beaver ponds would also improve cover for coho and trout rearing in the stream throughout the year. These enhanced conditions should lead to increases in survival and production during the freshwater life history phases of all salmonids. The proposed project is part of an overall strategy to rebuild and protect salmon habitat within the Nass watershed which provides fish stocks that are harvested by commercial, domestic and sport fisheries in Canada and USA.

 *Kwiniak River Salmon Rearing Habitat Rehabilitation.* *Final R eport*

Highway #16 and CN Rail Fish Passage Assessment in the Middle Skeena. Year 1

Project Lead: Lana Miller. Resource Restoration Biologist. DFO. Prince Rupert. BC.
Project Cost: $20,000 CAN $15,261 US

Many kilometers of critical habitat that used to support salmonids are inaccessible due to improperly designed and installed fish passage structures along Highway 16 and CN railway corridors in the North Coast of BC. More than 10 known barriers to fish passage have been identified in the middle Skeena River watershed as a result of linear development. Many more require assessment to determine feasibility of restoration. Several different assessments of highway and railway fish passage structures have been conducted in the Skeena, Kitimat and Nass River drainages within the past 5 years. Many of these assessments are missing important information such as 'culvert gradient' or 'amount of inaccessible upstream habitat'. It is therefore difficult to compare these assessments and prioritize projects for restoration. In 2002/03, a comprehensive assessment methodology, prioritization formula and database was developed/adapted by the provincial Ministry of Water Land and Air Protection (MWLAP) and

Ministry of Transportation (MOT). This project will utilize that methodology to assess middle Skeena River fish passage issues, update the current database and prioritize projects from Terrace/Copper River to Hazelton/Kispiox and further east if funding permits. In the longer term, an increase in fish habitat should correlate with an increase in fish production for various species. An increase in fish production will provide increased commercial, sport and food fishery opportunities in the North Coast.

Highway #16 Fish Passage Assessment in Middle Skeena Watershed.
Final Report 1 *Final Report 2* *Final Report 3* *Final Report 4*
Please contact PSC for additional information and project maps.

Machmell Flats Logging Debris Removal

Project Lead: Karl Wilson. Restoration Biologist. DFO. Port Hardy, BC.
Project Cost: $10,000 CAN $7,631 US

Owikeno Lake shore has been documented to provide habitat for adult and juvenile salmonids. Historic observations note the presence of lake shore spawning adults and in the recent past, beach seining near other river deltas in Owikeno Lake has confirmed use of this habitat by juveniles. There are several early run spawning populations of chinook salmon that utilize Owikeno Lake for part of their life cycle (as well as other salmonids such as sockeye, pink, chum, steelhead and cutthroat trout and Dolly varden char). These populations are only a fraction of their historic size though there is no targeted commercial or recreational fishery. As part of a larger general recovery plan developed in 2000/2001 a commitment has been made to look at the potential for habitat restoration in the Owikeno Basin, and Machmell Flats was identified for further consideration. River deltas such as Machmell Flats are at a premium in Owikeno Lake. The Machmell River flats, (adjacent to the Machmell River), has a significant build-up of large woody debris. The source of the debris is a combination of saw logs and wood from natural or human activity induced slide events and from a log dump facility just past the narrows. The predominant westerly wind on the lake causes debris to accumulate in this area. There is concern that the amount of debris impacts access to historic beach spawning areas by adult salmonids (including chinook) and prevents use by newly emergent and rearing fry due to the negative effects the debris has on beach and aquatic vegetation/productivity. The goals of the project are: to assess the flats and identify the best potential area for adult spawning and juvenile rearing, establish what the current use is (if any) of this habitat and explore whether or not debris removal might improve productivity. If debris removal is recommended, the habitat would be divided so comparisons could be made of “before & after” conditions. This project will provide a “case study” that can be used to inform the Watershed-based Fish Sustainability Planning (WFSP) process & Recovery Plan for Owikeno Lake as well as plans for Long Lake and other areas of B.C.

Machmell Flats Logging Debris Removal Study. *Final Report*

North Coast Marine Baseline Survey & Sea Lice Research Program. Year 1

Project Lead: Teresa Ryan. Director of Fisheries & Aquatic Resources. Tsimshian Tribal Council.
Project Cost: $40,000 CAN $30,523 US

The estuary and inshore marine areas adjacent to the mouth of the Skeena River are critical early rearing grounds for salmon. Very little study has occurred on the north coast to identify juvenile habitat utilization. The most recent comprehensive approach was a study in the summer of 1955 - we propose to build on that pioneering work in the summer of 2004. The field work will be conducted over a four month time frame from the beginning of May to the end of August dependent on funding. The focus of the project is to identify utilization of habitat and out-migration corridors by juvenile salmon by noting temporal and spatial patterns of habitat use through passages leading into Hecate Strait. Salinity and temperature at sampling depth and GPS positions will be taken at all sampling sites for profiling. Species identification, weights and lengths of the juvenile salmonids sampled throughout the area will be measured and recorded. Sea lice will be categorized by species, sex and life-history stage. This study provides a catalyst for future studies on habitat utilization and movement of juvenile salmonids, and on traditional ecological knowledge of salmon habitat use which together would provide a comprehensive knowledge base for use in many aspects of marine resource management. Improving knowledge of the behavior of juvenile stages may eventually assist in validating the stock assessments for adult salmon populations. All of the salmon populations on the North Coast are important to Aboriginal, commercial and recreational fisheries. The Skeena and Nass River's salmon are indicator stocks in the Pacific Salmon Treaty. The habitat area in the current project is used by all species of salmon in these two river systems and the estuary.

North Coast Marine Baseline Survey & Sea Lice Research Program 2004. Final Report

IMPROVED INFORMATION

SOCKEYE SALMON

Northern Boundary Area Sockeye Genetic Stock ID

Project Lead: Dave Peacock DFO & Glen Oliver ADFG
Project Cost: $1,242,373 CAN $948,376 US

In Canada this project provides two years of funding for on-water sampling (matched scale and DNA samples) of the seine and gillnet fleets in the times and areas not covered by the ongoing basic sampling program and for the subsequent analysis costs. Sampling requires charter boats (for gillnet sampling) and observers (for seine sampling) dedicated to providing these samples. In Area 4 additional samples would include 3 subareas for 6 weeks. In Area 3, two additional weekly samples would be obtained for eight weeks. An additional 20 un- or under-sampled Canadian escapement systems would be sampled over two years.

Some of the fisheries samples from both nations' fisheries will be analyzed in season to evaluate the potential to improve in-season abundance estimations.

In Alaska this project would provide funding for additional baseline escapement samples from Alaskan stocks as well as weekly samples from commercial catches in the District 101 gillnet fishery and District 104 seine fishery. Samples retrieved from existing agency collections, or collected in 2004 from un- or under-sampled Northern Boundary Area stocks as required to construct a representative baseline, will be analyzed by ADF&G in 2004. Samples collected from the 2004 District 101 gillnet fishery will be analyzed in 2004. Samples will also be collected from the District 104 seine fishery in 2004 but will not be analyzed until 2005 due to the time required to complete the baseline.

Northern Boundary Area Sockeye Genetic Stock Identification. *Final Report*

Skeena Sockeye Test Fishery DNA

Project Lead: Steve Cox-Rogers
Project Cost: $20,000 CAN $15,261 US

The Tyee gill-net test fishery at the mouth of the Skeena River provides daily estimates of the number of sockeye entering (escaping) into the Skeena River each year from mid-June through August. The annual escapement is comprised of numerous sockeye sub-stocks each with its own entry timing (early, mid, late etc). A key component of Skeena sockeye management is estimating exploitation rates on sub-stocks so that fisheries can be managed according to stock-specific productive capacities. Currently, estimating catch and escapement for each stock is very difficult as visual escapement assessments are of variable quality and estimates of the catch by stock in various fisheries are not complete. An alternative strategy is to sample (proportionate to abundance) sockeye captured at the test fishing site and determine their stock of origin using microsattelite DNA stock identification techniques (Beacham et al, 2004). Given escapement counts of known accuracy for several Skeena tributary systems, and known proportions of these stocks in the escapement samples from Tyee, allows estimation of escapement to each specific sockeye stock within the Skeena River drainage. As well, stock composition estimates from the Tyee test fishery allow for stock-specific run-reconstruction back through mixed-stock marine fisheries in the Canada and S.S.E Alaskan approach waters. These analyses provide reconstructed

run-timing distributions by stock which are vital to understanding migration routes, timing, and impacts by specific fisheries. To date, sockeye DNA analysis for the Tyee test fishery includes the years 2000-2003…continuation of this program through 2004 will allow continue to improve our understanding of migration and abundance dynamics of Skeena River sockeye sub-stocks.

Skeena Sockeye Test Fishery DNA (2004). Final Report

Kitwanga River Sockeye Salmon Enumeration. Year 1

Project Lead: Mark Cleveland. Head Fisheries Biologist. Gitanyow Fisheries Authority.
Project Cost: $50,000 CAN $38,153 US

The Kitwanga River is biologically rich, supporting populations of all six species of salmon found to inhabit the Skeena watershed, as well as various species of resident salmonids and coarse fish. A species of significant importance in the Kitwanga River are sockeye salmon. Historically, Kitwanga sockeye numbered in the 10's of thousands, and were actively fished for sustenance purposes by the Gitanyow and the Gitwangak who inhabited the watershed. However, today the stock is no longer fished for Food, Social and Ceremonial purposes because of conservation concerns. Drastic declines in stock abundance were observed in the 1960's and most in-river fishing sites had to be abandoned by the early 1970's. In response to conservation concerns for Kitwanga sockeye, the Gitanyow Fisheries Authority have initiated a rebuilding plan to preserve the genetic uniqueness of the stock. Studies have been on going since 1999 and among the highest priority tasks has been the collection of accurate adult escapement on a yearly basis. It is anticipated that with accurate adult escapement estimates, biologist will be able to implement adequate rebuilding initiatives and help ensure the stock persists for future generations. A permanent enumeration facility was constructed and tested by the Gitanyow Fisheries Authority from January – November, 2003. The project was deemed successful because accurate escapement estimates of abundance were acquired for chinook, sockeye, pink, chum and coho salmon. Several modifications to the facility are presently being undertaken to improve its operation. It is anticipated that the 2004 enumeration procedures will be even more successful than the 2003 undertakings, yielding more accurate escapement estimates of abundance for all 5 species listed above.

Kitwanga River Sockeye Salmon Enumeration, 2004. Final R eport

Clements Lake Sockeye Smolt Enumeration and Maintenance of Adult Fish Passage

Project Lead: Krystal Haaland. Bear River Salmonid Enhancement Society. Stewart. B.C.
Project Cost: $6,500 CAN $4,960 US

Adult sockeye observations in Clements Lake have dropped to alarming lows with last years count being 14 adults and the three previous years not much more. This is down comparably from the late 1960s where records indicate 5000 plus. A smolt out-migration enumeration of this "wild" isolated stock would help us develop a more complete understanding of the actual stock abundance and possibly assist in determining what factors are limiting abundance. In the course of this project the entire creek will be channeled into a fyke net which will be connected to a 6 inch pipe that feeds into a holding tank.

The holding tank will be checked in the morning and evening and also on rising water conditions. All fish will be identified and counted out twice a day. Lengths will be taken from 25 sockeye and 25 coho a day. Scales will be taken from 50 sockeye juveniles. In addition, creek will be walked when adult sockeye are migrating to ensure passage to Clements Lake. The creek has little flow in the summer months when adult sockeye are migrating so it is important to breach existing beaver dams to ensure passage to the lake.

The 2004 Clements LakeSockeye Smolt Enumeration – Summary Report. *Final Report*

CHINOOK SALMON

Chinook DNA Baseline Improvement

Project Lead: Ivan Winther. Fisheries Biologist. Prince Rupert.
Project Cost: $25,000 CAN $19,077 US

Attempts have been made to collect tissue samples from chinook in most North Coast systems in the past. Baselines exist for the systems that are more readily accessible or that have large chinook populations or that have crews working on them. The remaining systems have significant challenges to sampling chinook either due to their location or the size of the stock present. Most of these systems are small or glacial and the availability of chinook to sample is highly dependent on water conditions. Spawning populations of chinook salmon have been prioritized according to abundance and opportunity for sampling success. The short list includes:

- Area 3: Khutzeymateen, Ishkheenickh, Kiteen, Kitsault, Iknouk, Bell-Irving
- Area 4: Zymoetz (Copper), Skeena mainstem, Lakelse, Shegunia, Khyex, Kispiox tributaries (Nangeese, Sweetin, Stephens), Nanika, Kasiks
- Area 6: Kitlope, Kemano, Dala, Brim, Kowesas, Wahoo

Samples from the first 3 populations in each area may possible. Others have significant logistical constraints. Collection of baseline DNA data will assist in defining the basic population units for chinook stocks. This information is essential to an ultimate objective of defining stock specific fishery impacts and productivity estimates for each stock. Furthermore, DNA data are used to estimate fishery impacts on stocks of concern. Understanding stock compositions and rebuilding weak stocks assists in avoiding fishery closures and ensures stocks are perpetuated.

Collections of DNA Baseline Tissues from Chinook Salmon in the North Coast of British Columbia in 2004. *Final Report*

Chinook Stock Composition: Area 3 & 4 Seine Releases

Project Lead: Ivan Winther. Fisheries Biologist. Prince Rupert.
Project Cost: $35,000 CAN $26,707 US

Special seine fishing restrictions have been in place in Pacific Fishery Management Areas 3 and 4 since 1999. Under these restrictions seine fishing vessels must release all chinook salmon encountered in the fishery. The seine fishery targets sockeye and pink salmon destined for Nass, Skeena and surrounding watersheds. Chinook encounters in the seine fishery exceeded 10,000 pieces in 2001 when there were 20 and 15 days of seine fishing in Areas 3 and 4 respectively. This project will allow estimation of seine fishery impacts on chinook and allow mortalities to be assigned to the appropriate stocks for the purposes of accounting for Nisga'a Treaty entitlements and other local stock management issues (e.g. concerns for Kwinamass chinook). In addition, DNA analyses of tissues collected from this fishery will allow for comparison to stock composition parameters currently used in the PST chinook model.

Stock Composition of Area 3 Seine Fishery Encounters of Chinook Salmon in 2004. *Final Report*

North Coast Marine Sport Chinook DNA Stock Composition

Project Lead: Ivan Winther. Fisheries Biologist. Prince Rupert.
Project Cost: $18,000 CAN $13,735 US

The sport fishery in the Queen Charlotte Islands (Haida Gwaii) has grown such that the catch exceeds 50,000 chinook salmon annually. The QCI sport fishery is one of the fisheries defined within the Aggregate Abundance Based Management Regime by the PST. Coded wire tag (CWT) data support the chinook model currently used by the PST to set international chinook allocations. DNA analyses of tissues collected from this fishery will allow for estimates of stock specific impacts and comparison to CWT estimates of stock contributions to this fishery and to better estimate fishery impacts on stocks of concern. The sampling strategy is to collect 25 tissues per week from sites at Englefield Bay, Langara Island and Naden Harbour. These collections will be subsampled to best represent chinook catch during the June 1 to September 15 season.

Stock Composition of Chinook Salmon caught in the Queen Charlotte Islands Sport Fishery in 2004. *Final Report*

COHO SALMON

Fishery-Sampled In-season Coho Stock ID and Abundance Indicators

Project Lead: Joel Sawada. DFO Stock Assessment Biologist. Prince Rupert.
Project Cost: $40,000 CAN $30,523 US

Recent analysis of coded wire tag recoveries in Alaska demonstrated total returns to Canadian coho indicator stocks can be predicted in-season. Stock identification of coho caught in the Queen Charlotte Islands sport and troll fisheries throughout the fishing season is a further refinement of this process. Information about the stock component of the Area 1 and 2 coho fisheries will be collected. With run-timing information, the fisheries can be better managed allowing for

protection of weak stocks and increased exploitation on the most productive stocks. The Areas 1 and 2 fisheries are the focus because previous analysis has demonstrated a good correlation between catch per unit effort and adult coho returns to the Babine fence. Coho DNA samples will be taken from the sport caught fish utilizing the pre-existing creel survey performed by the Haida Fisheries Program and the volunteer efforts of participating lodges. Coho DNA samples will be taken from the troll fishery by the fishers. Both sampling programs will be designed to provide stock composition over the fishing season.

Fishery-Sampled Inseason Coho Salmon (Oncorhynchus kisutch) Stock Identification from the Queen Charlotte Islands in 2004. Final Report

Upper Bulkley River Coho Assessment Fence

Project Lead: Brenda Donas. Community Advisor. DFO. Smithers.
Project Cost: $20,000 CAN $15,261 US

The Upper Bulkley River (UBR) fence provides an indicator of the UBR coho stock strength. These coho are exploited in Alaskan fisheries as part of a mixed stock fishery which includes the Babine River sockeye run. Coded wire tag data collected at the fence during this project will give an important indication of stock strength and contribute data to the appropriate management of Upper Skeena coho stocks – especially when severely depressed stocks are subject to harvest. Also the local recreational coho fishery is driven by the strength of this coho stock. During times when this stock has been severely depressed, coho retention has been either prohibited or quite limited. It has been just recently, since stock strength as begun to increase, that anglers have had the opportunity to retain coho. A healthy coho fishery boosts the local economy on a seasonal basis i.e. increased tourist anglers and the revenue that is associated with their visits to the local communities. The fence is approximately 25 m wide and consists of a serious of aluminum broomstick panels and an aluminum live box. Daily activities include reading water temperature and water level at a pre-established limnology station, cleaning of the fence panels and enumeration and sampling of all captured fish. All coho are checked for the presence of a hatchery mark (adipose clip) and/or a dorsal fin tag. All fish are recorded on pre-formatted data sheets as to sex, mark type, dorsal fin tag color and number. About every 8'th marked coho is sacrificed at the pre-spawn stage for head de-coding. About every fourth wild coho is sampled for 5 scales up to a total of about 175 coho.

Upper Bulkley River Coho Assessment Fence Program Report for 2004.
Electronic version of Final Report unavailable please contact PSC for hardcopies.

CHUM SALMON

Genetic Tissue Sampling of Adult Chum Salmon from Streams Located in the Nass and Skeena Watersheds

Project Lead: Brian Spilstead. North Coast Salmon Stock Assessment Biologist. Prince Rupert
Project Cost: $15,000 CAN $11,446 US

Collection of chum DNA samples will be analyzed at the laboratory located at the Pacific Biological Station in Nanaimo and will improve information contained in the Pacific Region chum genetic baseline database. Genetic baseline data for these populations will add to important stock separation information which could assist current conservative stock management

approaches taken for chum stocks located in the Nass and Skeena encountered in commercial salmon fisheries of northern British Columbia. The ability to identify chum stocks encountered in such fisheries as well as information regarding run timing through fishing areas and stock proportions within a chum aggregate will benefit current stock management practices through improved knowledge of this species. The potential challenges encountered when field sampling chum salmon in the Nass and Skeena watersheds are the following:

1) remoteness/difficulty in accessing sampling sites.
2) low densities of chum salmon in relatively large rivers.
3) existing in-stream migration timing and spawning location and timing information is limited.

Departmental spawning and escapement records as well as local knowledge by Departmental staff and First Nations contacts will be accessed to determine potential survey sites and timing of visits.

North Coast Chum DNA Baseline Improvement. *Final Report*

Chum Stock Separation in Commercial Fisheries Operating in Statistical Areas 3 & 4

Project Lead: Brian Spilstead. North Coast Salmon Stock Assessment Biologist. Prince Rupert
Project Cost: $15,000 CAN $11,446 US

Commercial net fisheries operating in Statistical Areas 3 (Nass) and 4 (Skeena) will be sampled to obtain genetic tissue of chum salmon. Samples obtained from chum encounters would be submitted for laboratory analysis and compared to baseline data to determine region of origin and stock proportions. Analysis of weekly chum catch and effort data and consultation with the Departmental commercial fishery manager will determine survey areas and timing of the sampling program. There will be collaboration with the northern Canadian commercial fishing fleet to obtain genetic samples. The Community Fisheries Development Centre, Prince Rupert will provide sampling personnel. Stock separation information of chum salmon encountered in commercial net fisheries operating in Statistical Areas 3 and 4 will provide new information regarding chum stock composition and timing through northern B.C. commercial fisheries. The ability to identify chum stocks encountered in commercial fisheries will enhance current conservative management practices for this species.

Chum Fishery Stock Composition. *Final Report*