SCULLY CREEK RESTORATION PROJECT

2013

SCULLY WARM WATER CHANNEL LOWER REACH 2012 04

Prepared for: **March 2014**

The Pacific Salmon Commission

600-1155 Robson St.

Vancouver B. C. V6E 1B5

Prepared by:

Graywolf Resources Incorporated & Fisheries and Oceans Canada North Coast Area

Don Hjorth, P. Eng. , Lana Miller, R. P. Bio., Sandra Devcic, P. Eng. and James Powell, Eng. Tech.

ACKNOWLEDGEMENTS

Fisheries and Oceans Canada provided in kind contributions of design, assisted onsite supervision, personnel, labor, travel, material and equipment. They also provided for work on the lower reach by operating a photo record site to enumerate fish passage. Special thanks to: Sandy Devcic, James Powell, Lana Miller and Rob Dams.

The City of Terrace provided two loads of logs for materials to build two undercut bank refuges

Paul Rusch provided, in addition to a beaver trapping contract, volunteer: labor, local knowledge, wildlife photos and guiding during the project.

Far-Ko Contracting Limited Provided Contracting services and onsite labor for the project.

Ross Stenquist, machine operator reduced final costs by several thousand dollars by working very efficiently and by providing several excellent suggestions for ways to complete the work.

Billabong provided contracting services and flagging.

Quantum Helicopters provided two flights for air photos.

Dr. Pienaar provided assistance and opened beaver dams on the lower reach of Scully warm water channel.

The Lakelse Lake Watershed Society provided advice and guidance.

Mount Layton Resort provided local knowledge, help and environmental materials.

Project management, overall design, onsite supervision, EM field work, and financial administration by Graywolf Resources.

Johnny's Welding Ltd fabricated the 3rd fish way and the steel CMP refuge.

TABLE OF CONTENTS

SUMMARY

Scully Creek (Schullbuckand) Restoration project 2012/2013

Scully Creek Warm Water Channel (WWC) is located approximately 20km south of Terrace BC on Hwy 37S. It is a westerly oriented large ground water stream approximately 2km long that discharges into the east side of Lakelse Lake. Biological studies to determine practical solutions to reverse the decline of Sockeye stocks were carried out, resulting in a recovery plan. Previous attempts to improve/restore the warm water channel have been occurring since the 1980's with limited success mostly due to lack of funding. In 2006 a small spring fed test tributary was constructed above the ford to the Northwest that increased flows somewhat. Using the recovery plan model, the following changes were made to the warm water channel.

1. The 2006 feeder tributary was lengthened with several lateral collecting streams added to improve and stabilize flows.
2. A natural materials fish passage was installed at the feeder tributary confluence.
3. Sixteen abandoned beaver dams were opened up and a beaver control program was set up between Fisheries and Oceans Canada (DFO) and the trapper, Paul Rusch.
4. DFO committed to continuing the beaver control program when possible.
5. Three embankment refuge sites were installed by DFO and Graywolf Resources Incorporated. (GRI)
6. A third steep pass fishway was added at Highway #37 south.
7. Disturbed areas were treated by planting spruce trees.
8. Work was completed by Far-Ko Contracting, DFO staff and several volunteers. All onsite work was supervised by GRI and DFO staff.

The project was completed in July, 2013. The proponent is Graywolf Resources Incorporated (1982). Project management, overall design, onsite supervision, environment monitoring, field work, and financial administration was also done by Graywolf Resources. The 2013 Sockeye migration count at the DFO counting fence was in the thousands instead of in the hundreds in previous years. The final cost was well below budget (64%) mostly due to the excellent teamwork demonstrated by all involved.

INTRODUCTION

Site conditions in the proposed project area are governed by two geological factors. First, the reach from the waterfall to Highway #37 South on Scully Creek is situated on an alluvial fan. Second, the reach from Highway #37 South to Lakelse Lake is composed of a layer of organic soil above marine clay. The first condition has two influences on water flows. One, overland flows can meander widely and quickly. Two, large amounts of water can be obtained by trenching in the very permeable gravel's alluvial fan areas especially where hydraulic energy gradients rise above ground line in the form of springs or small marshes. The second condition: a thick layer of topsoil causes an amazingly productive habitat for a wide variety of vegetation, animals and fishes.

In the early 1900s all or most of the Main Scully flows were contained in the southernmost Warm Water Channel (MoTI records). During the 1960s an attempt was made to divert flows that had moved to the north side of the fan. A social conflict arose and the end result was that the Warm Water Channel became entirely spring/marsh fed, and flows didn't vary significantly during the year. This resulted in silt deposits which created problems for fish survival since the silt smothered a large percentage of the fish eggs. Also, beavers used the constant flow condition to build more than 16 dam sites prior to 2011. 2007 saw a proposal for a pipe to allow partial diversion of the Main Scully flows to the Warm Water Channel. This design was abandoned when a high freshet nearly change the flow regime in the BC Hydro right of way. The 2012 proposal was developed after eight years of discussions involving DFO staff and other interested stakeholders.

The above led DFO Staff to first propose routing larger flows of ground water to the Warm Water Channel as increased annual flows and increased spring freshets. And second to improve fish access to the upper reaches of the Warm Water Channel (WWC).

1.0 PRE-CONSTRUCTION HISTORY

Recent Biological History Post WWII . 1945

Sockeye stocks have been declining in Scully Creek from highs of several thousand in previous decades to lows of a few hundred in recent years. The decline is believed to be partly a result of physical changes/habitat impacts that have occurred in the watershed due to logging, linear development, agriculture and beaver activity. The Lakelse Lake Sockeye Recovery Plan (DFO, 2005) identified a lack of suitable spawning habitat as the main limiting factor for sockeye production in the watershed, and enumeration has been challenging in the past few years due to increased predation and safety concerns regarding bear encounters. North Coast Stock Assessment crews no longer walk Scully Creek, and attempts to enumerate stocks in this system using an underwater camera have occurred over the past two seasons.

One of the major impacts to Scully Creek was the complete diversion of surface water from Scully South (the former main stem and prime sockeye spawning area) to the fluvial fan and wetland, so that Scully South is now comprised of groundwater flow only. Absence of higher flushing flows has changed the sediment dynamics in Scully South by increasing deposition of finer sediments and decreasing recruitment of suitable spawning material (gravels). Beavers have also moved into this system and bears predate on fish held up behind dams. A lack of habitat complexity means that adults sockeye are vulnerable due to a lack of cover and holding areas while migrating and spawning in Scully Creek.

In 2006, DFO added a ground water channel and storage pond to increase baseline and flushing flows in Scully Creek, financed by the Northern Fund. Since that time, fish passage to the new channel has been limited by 15 beaver dams in the lower creek and bear activity appears to have increased in the watershed.

Project Results

This project involved improving access to quality spawning habitat by the removal of beaver dams and improved beaver management. Habitat complexity was improved through the creation of undercut banks and the addition of large woody debris to provide more adult cover and holding habitat.

The groundwater channel that was created in 2006 was extended to intercept additional sub-surface flows from the fan and wetland portion of the watershed and return it to Scully South. A figure showing the proposed work locations follows this document.

Tangible benefits of this project include:

a) An increase in amount and quality of accessible spawning habitat (water flows and substrate) for sockeye and other salmonids.

b) An increase in fry recruitment of sockeye and other salmonids to Lakelse Lake and watershed.

c) Continued partnership-building and stewardship of the Lakelse Lake sockeye resource.

Camera system and picket fence to enumerate adult sockeye in 2010 by Rob Dams (DFO) and the Lakelse Watershed Society.

Relevance and Significance to the Pacific Salmon Treaty*:*

The Lakelse Watershed has very high fisheries values, and is a major producer of sockeye, coho and pink salmon as well as supporting chum, chinook and steelhead populations. Skeena River sockeye are recognized as being a stock produced in Canadian waters that are subject to interception by American fisheries. As such, sockeye produced in tributaries of Lakelse Lake are part of a stock which is a high priority for conservation by the PST.

Also, steelhead, coho, and cutthroat trout which frequent this system support major sport fisheries in the area (Gottesfeld et al, 2002). In recent years, sockeye recruitment in the Lakelse system has fallen dramatically due to a lack of suitable spawning habitat in Lakelse lake tributaries (DFO, 2005).

For these reasons, the Lakelse Watershed has been given a value of "very high" within the strategic prioritization scheme developed through the regional Watershed-Based Fish Sustainability Planning (WFSP) process, a collaborative process aimed at supporting all fish conservation interests from an 'overview' Skeena Watershed perspective (Gottesfeld, et al, 2002). Within the WFSP process, initial selection of priority watersheds was made based on historic escapement information, which was used as an indicator of habitat quality, and is further refined by consideration of stocks at risk, habitat issues, development pressures, aboriginal values and interests, community interests, sustainability and availability of conservation and restoration efforts, and government priorities. Three high priority Skeena watersheds were selected for WFSP – Stage 2. These included the Lakelse, Kispiox and Morice watersheds. Unfortunately, funds were not available for the Lakelse Stage 2 WFSP to proceed.

In the summer of 2004, a Skeena Sockeye Workshop was held to bring together interested stakeholders with fisheries scientist to discuss the status of sockeye in the Skeena drainage. Study results were presented including significant scientific data indicating an alarming decline in Lakelse sockeye. Partly as a result of this workshop and previous watershed planning efforts, a committee was established to develop a recovery plan for Lakelse Sockeye. The plan was finalized in 2005 and the committee still meets regularly to review issues in the watershed and discuss continuing sockeye rehabilitation efforts.

The Lakelse Sockeye Recovery Planning Committee consists of representatives from various government agencies, community organizations and First Nations. The committee embarked on a collaborative planning process aimed at identifying and correcting the causes of depressed sockeye escapements to Lakelse Lake. A recovery document was completed in the spring of 2005 that outlined the status of sockeye stocks and habitat in the Lakelse watershed. The plan also identified limiting factors and a prioritized list of projects to address limiting factors. The Scully Creek Off-channel Habitat/Flow Augmentation Project successfully implemented in 2006 was listed as a high priority habitat restoration project in the Recovery Strategy section of the plan. As stated earlier in this proposal, some additional work is recommended based on post-construction monitoring to ensure access to created habitat, improve habitat quality and reduce predation on salmon migrating the upstream portions of Scully Creek.

The objectives of the Scully Creek project are consistent with the goals of the regional Stage I Watershed-based Fish Sustainability Planning (WFSP) process completed for the Skeena watershed in 2002 by the Skeena Fisheries Commission (Gottesfeld et al, 2002). This watershed planning process identified the Lakelse Watershed as a high priority candidate for further planning. Since that time, a significant amount of research and planning has taken place in the watershed. Archival research and a thorough literature review resulted in the production of an

informative backgrounder (Skeena Fisheries Commission, 2003) that outlined historical and current habitat impacts and threats to sockeye production. A 2004 North Coast sockeye workshop resulted in the inception of the Lakelse Lake Sockeye Recovery Plan Committee and completion of a recovery plan for the watershed (DFO, 2005). The recovery plan prioritized action plans and projects to address factors limiting sockeye production in Lakelse including this project to improve habitat in Scully Creek.

The objectives of this proposed project meet the purpose of the Northern Fund by promoting optimal salmonid production, development of productive community partnerships, and contributing to the overall stability and maintenance of a healthy ecosystem that supports high biodiversity (PSC, 2011b). The project specifically addresses the following objective outlined in Attachment E of the Pacific Salmon Treaty: "… restoration of salmon habitat and maintenance of adequate water quality and quantity (that) are vital to achieving improved spawning success, safe passage of adult and juvenile salmon and, therefore, optimum production of important naturally spawning stocks…"(Governments of Canada and the USA, 2009 – latest update).

Objectives Reached

1) Access Improvement: Beaver dam removal @ 80m upstream of Hwy 37N crossing plus 15 other dams, removal of sheet pile weir and installed a third section of type D Steep pass at highway

2) Extension of groundwater channel, habitat complexing (pool creation and lwd placement, undercut bank creation) and access improvement to existing groundwater channel.

3) Installation of two large log and Lock block and one smaller steel CMP fabricated under bank refuge areas.

3) Exploration of left bank and right bank ground water opportunity (test ditch or test pits if feasible).

4) Installed a "natural materials" fish pass at the junction of the improved tributary and WWC.

5) An existing Steel Sheet Pile dam on the ground water collection channel was removed

Areas of possible ground water sources were identified by use of air photos, local knowledge, casual observations of spring water during winter months and by finally walking the identified routes. An excavator opened test holes to specified depths to prove feasibility of left and right bank sources. Finished channels with 2 meter bottoms and 1.5 to 1 back slopes were installed. Three meter or larger diameter pools, one meter deep, with LWD were excavated at channel confluences. Rip rap was placed to avoid disturbance to the Warm Water Channel banks.

Stored water near the top end of the groundwater channel

Key Personnel:

Don Hjorth – Graywolf Resources Inc. Engineer 48 years total experience including 10 years with BC Fish and Wildlife, 10 years DFO, 11 years hydraulic structures and 4 years hydrology. Proponent, and responsible for engineering, records and construction supervision and EM duties.

Lana Miller – Resource Restoration Biologist, North Coast Area. Responsible for biology components including direction/co-ordination of all fish concerns, sampling, reporting and further continuation of other aspects of the Scully program. Supervisor of EM programs on project.

Sandra Devcic, Resource Restoration Engineer and James Powell /RRU Engineering Tech, - provided assistance with supervision, design, and materials as needed to support project objectives.

The proposed Scully Creek project is the result of a collaborative planning process that involved consultation/coordination between local groups and federal and provincial government agencies working

on the Lakelse Lake Sockeye Recovery Plan. The consultant, Don Hjorth (former DFO Resource Restoration Engineer) took the lead in preparing the project proposal with Fisheries and Oceans Canada and has worked closely with DFO biologists and engineers to develop the technical details of the project.

Private landowners and stakeholders such as the Ministries of Forests anf of Transportation and Infrastructure have been consulted in the past and have endorsed the project. Consultation with other (upstream) stakeholders such as BC Hydro and Pacific Natural Gas (as a courtesy) is part of this project.

Regulatory Requirements

Communications with government agencies are expected to include the following:

Fisheries and Oceans Canada (DFO) – letter of advice

BC Ministry of Natural Resource Management (MoNRO) - Section 7 Notification for Works in and About a Stream, permit to access and work on crown land and permit to alter beaver dams.

BC Ministry of Forests – Free Use Cutting Permit to remove trees in order to access site and extend groundwater channel

Construction plan/schedule and site sketches/maps were provided to the above agencies at least 45 days prior to the start of construction. All of these agencies will be informed of the project and will have the necessary paperwork well in advance of deadlines, to allow ample time for review and responses. Fisheries and Oceans is a project partner and the project proponent and partners have good relationships and a proven track record with these regulatory agencies.

Following the "guiding principles" of the Northern Fund, the Scully Creek Project has been a collaborative project from its inception, and will "foster a broader sense of stewardship increasing the economic and social benefits of the Fund".

All the projects undertaken in the Lakelse watershed as part of the Lakelse Sockeye Recovery Plan are the result of a collaborative partnership process involving many government agencies, community groups and some local industry. Stakeholders include Kitselas First Nation, the Lakelse Watershed Society, the Terrace Salmonid Enhancement Society, BC Ministry of Natural Resource Operations, BC Ministry of Forests and DFO Resource Management, Stock Assessment and Habitat Enhancement staff. These participants have been engaged in an ongoing planning process to implement the recovery plan, of which the proposed Scully Creek project is a part.

Relationships with local stakeholders on Scully Creek itself will be strengthened by ongoing and renewed communication and consultation as the project is implemented. The local stakeholders include adjacent or downstream landowners, Dr. Marius Pienaar and Bert Orleans who have supported projects on their properties in the past. Dr. Pienaar has supported (and provided power to) the recent fish counting camera at his property at the mouth of Scully Creek. Mr. Orleans has provided year-round access (including snow clearing) on his property for the installation of spawning platforms, an incubation study and a sediment study on his

property. Other stakeholders include Pacific Natural Gas (PNG) and BC Hydro who have infrastructure across Scully Creek fan. PNG has been supportive of other fish habitat improvement projects on this and other nearby systems, and BC Hydro has funded feasibility studies in Scully Creek (Fisheries and Oceans Canada, 2002). The BC Ministry of Transportation and Infrastructure have funded access improvements in Scully Creek through the installation of two fishways at Hwy 37S crossing, and may provide funding for a third fish way section if needed due to increased flows.

New stakeholders in the Scully Creek area may include the Regional District as they are moving forward with plans to develop a community refuse site for Terrace and Kitimat on Forceman Ridge, to the south of Scully Creek, and potentially the lease holder for the geothermal rights, if one exists, for the subsurface energy rights that the Province was tendering last year. In addition, a new trapper may have purchased the rights to remove beavers from the watershed. All of the existing, new and potential stakeholders will need to be confirmed prior to moving ahead with construction.

The completion of this project and the process of working together with project partners strengthens relationships and fosters stewardship of fisheries resources within other government agencies, industry and private landowners. In addition, the community awareness that will be raised by the completion of this project on such a high profile creek will promote increased interest among user groups and build relationships that could lead to future collaborative project planning.

Improved Water Flows

Before and after monitoring of water flows at an established station will provide a quantifiable measure of increased/improved flows to the system that are a direct result of the groundwater channel extension. Existing flows vary between ~3 and 5 cubic feet per second; any measured increase in baseline flows will be viewed as a positive result. Present flows are now approximately 10 cfs and the spring sources will probably self develop to produce more.

Objective standards/quantifiable criteria that will be used to assess the performance of this project include available bio-standards for production from off-channel (groundwater) habitat, large woody debris placement and improved access (obstruction removal) projects. The target species for this project is sockeye, but other species such as coho and cutthroat are expected to benefit. Coho and sockeye have not been observed upstream from the beaver dam structure for several years. A cutthroat density study conducted by BC Ministry of Environment staff in 2004 resulted in no coho juveniles sampled upstream of the dam (Lough, 2004) indicating that the structure is likely a complete barrier to anadromous salmon. Any observed presence of these species in previously inaccessible habitat will be considered one measure of success for this project.

Assessment of Adult Sockeye Returns

It is difficult to find reported bio-standards for sockeye production from restored habitat. Koning and Keeley (1997) report an 8.6-fold increase in returning adult sockeye to areas where spawning gravels had been improved by gravel catchment structures. This was calculated from studies conducted by various researchers between 1981 and 1986. Fry density biostandards from the same source are based on assumptions of 'fully seeded' habitat, defined as 1 female sockeye per 1.5m2 (or ~66 females per 100m2). Complete counts of adult returns to Scully have not been possible in recent years due to increased bear activity in the system. A camera has been employed at the mouth of Scully in 2010 and 2011 to try to enumerate returning adults. Overall returns to Scully will continue to be monitored in this way. Some stream walks will occur in the newly created habitat to document utilization and spawner density, however the risk to human safety will dictate the frequency of these counts.

Assessment of Emergent Sockeye Fry

Koning and Keeley adapted reported data to provide a performance bio-standard of 30,000 emergent sockeye fry per 100m2 (or 300 fry/m2) for habitat made available through obstruction removal. DFO is currently developing an internal document of updated bio-standards for restoration projects based on more recent (DFO) research and assessment of various project-types. The current draft recommends using 250 fry/m2 as a bio-standard for sockeye production from gravel placement, side channels and improved access projects, assuming the restored area is fully seeded by spawning females (MacFarlane, 2011 draft). An inclined plane trap will be employed to obtain an estimate of fry production from the newly accessible habitat to compare to these bio-standards.

Incubation Studies

Some assessment of incubation survival in the newly created habitat is planned for the future, likely in conjunction with a similar assessment in the Upper Williams Creek side-channel also in the Lakelse watershed (currently under construction). The results of these studies can be compared to previous assessment in 2009 in various parts of Scully Creek (Guimond, 2009), to hydraulic sampling conducted in 2002 by DFO (Fisheries and Oceans Canada, 2002) and to results obtained in other incubation studies in other watersheds such as the Puntledge River (Guimond and Burt, 2007).

Quality Control Measures

An as-built survey will be completed immediately following completion of work. This will involve a topographic survey of the channel extension and added habitat features such as undercut banks and large woody debris structures. This will provide a baseline for future

assessments of the stability of the placements. This, in conjunction with flow monitoring, adult enumeration and incubation studies will help to determine whether or not habitat has been improved and the project is maintaining function and supporting optimal egg survival and fry recruitment.

Looking downstream from the ford crossing, upstream of the highway

An increase in the productive spawning habitat in Scully Creek should result in increased fry recruitment to the lake and eventually to improved adult returns to that system. These benefits can be expected to last for several cycles as long as improved access and habitat are monitored for effective function on an annual basis. Monitoring of the restored habitat by project partners should ensure that any maintenance requirements are identified. Monitoring and maintenance will be provided in-kind by project partners who are committed to the Lakelse Watershed for the long term. If more extensive funds are required for maintenance, outside funds will be sought for this work. The Lakelse Sockeye Recovery Plan is a living document and the implementation of the recovery plan is a long term endeavor with all partners supporting several years of study, restoration, enhancement and monitoring/evaluation.

Water Flow Monitoring

Water levels in Scully South are currently being monitored by staff gauge readings and periodic flow calculations using a velocity meter at a monitoring station. This water level and flow monitoring will be continued after the project is completed to monitor increases in flows to Scully South. Measurement of flows from the constructed habitat will also be monitored in the new channel using the same methodology.

Adult Sockeye Returns

Stream walks to enumerate adult sockeye have been conducted for many years in Scully Creek. Due to increased bear activity and human safety risk, this assessment method was discontinued in Scully 2007. In 2010, a fence with a camera and recording device was installed during sockeye migration at the mouth of Scully Creek by DFO Community Advisor, Rob Dams with help from local Lakelse Watershed Society volunteers. It was a successful pilot year and a partial count was obtained. In 2011, a more complete count was obtained and this method will continue to be the main assessment method to document numbers of spawning sockeye returning to Scully South. Spawning has not been observed upstream of the large beaver dam ~80m upstream of Highway 37 in several years. Any increase in spawning activity in this system will be viewed as a success, particularly above this dam, once removed. Presence of spawners in the newly created habitat will demonstrate that the habitat is being utilized. Spawner density can also be examined and compared to appropriate bio-standards. In conjunction with the proposal to enhance sockeye stocks in Lakelse through artificial propagation, some areas in Scully South (including the newly created habitat) may be seeded with enhanced fry to improve sockeye returns. There are also plans to capture and move some sockeye spawning in the lower reach of Scully Creek into the newly created habitat to help seed it.

Assessment of Emergent Sockeye Fry

An inclined plane trap (IPT) will be employed to obtain an estimate of fry production from the newly accessible habitat to compare to appropriate biostandards. Some baseline fry production data will be collected in the year prior to project implementation as a pilot and for future comparison.

Incubation Survival

Incubation studies (hydraulic sampling and test incubation boxes) to examine egg/alevin survival is a quantifiable method of measuring the effectiveness of the improved water flows and newly accessible spawning habitat. Incubation survival in the improved spawning reaches can be compared to survival in the other reaches of Scully Creek, to other Lakelse tributaries, to other gravel improvement projects and to known biostandards developed by DFO assessment biologists.

Previous Studies

In 2001/02, an incubation study using hydraulic sampling was conducted by DFO Resource Restoration staff in the Scully Creek channels to examine spawning success in the watershed and to identify limiting factors to sockeye production (Fisheries and Oceans Canada, 2002). Egg survival was excellent in Scully South ground water channel, and very poor in the agricultural channels of Scully Mid surface water channel.

To address the poor survival in the surface water channel where salmon were spawning in poor substrate, gravel spawning platforms were installed in 2008 through the PSC-funded project "Lakelse Lake Sockeye Rehabilitation Program: Spawning Channel / Improved Spawning Habitat Project" (Fisheries and Oceans Canada, 2011). As part of that project, an incubation study using Jordan-Scotty incubation boxes was conducted to compare egg survival in Scully South ground water channel to egg survival in the new gravel placements on the agricultural channel, Scully Mid (Guimond, 2009). Again, egg survival was good in the ground water channel, Scully South, and poor in the surface water channels of Scully-Mid, even in the newly placed gravel. This lead to a hypothesis that observed high sedimentation and water quality may be affecting egg survival in the agricultural channels, rather than substrate quality.

The previous work and research has directed further restoration efforts away from Scully Mid channel to concentrate on the more successful Scully South groundwater channel (location of this proposed project).

Engineering/Physical

A survey was conducted using air photos because most of the works would be poorly represented by very expensive line surveys. Also all of the existing drawings are included in this report.

Groundwater collections channel, constructed in 2006

The Scully Creek Access and Habitat Improvement Project will provide economic and social benefits to the commercial fishing industry and to local aboriginal and non-aboriginal residents. Conservation and ecological benefits will also be realized.

An increase in productive spawning habitat should result in eventual increases in fish production from the Lakelse watershed. Economic benefits stem from the potential for increased commercial salmon harvests. Social benefits include an increase in salmon available for aboriginal food fisheries, increased awareness of watershed stewardship activities within the local community as well as improved co-ordination between government agencies, community interest groups, and First Nations. Increased adult returns will result in an increase in nutrients to the local ecosystem which help support the maintenance of biodiversity. Ecological benefits will be realized by forest vegetation and wildlife as future spawner numbers improve and upstream access is extended.

Aside from the benefits to fisheries, forest and wildlife, this project will also be a highly visible habitat restoration project in high profile tributary that is very important to residents of the Lakelse community. The Lakelse Watershed Society as well as the Lakelse Community Association recognize the benefits of public understanding and involvement and ecological stewardship. This project provides the opportunity to showcase recovery activity in an area of high community interest.

Potential end-users of the project results have been identified as the local public at large, as well as special interest and user groups identified in the WFSP stage 1 document, such as the Northwest Stewardship Society, Terrace Rod & Gun Club, Terrace and District Angling Guides Association and many others (Gottesfeld et al, 2002). The Scully Creek Project plan for communication to all potential end-users includes:

1. Publication of an information article in local and regional papers.

2. Publication of project updates and details in the Lakelse Watershed Society's newsletter, which is distributed to local residents. Updates will also be announced at the Society's public meetings.

3. A press-release faxed and mailed out to community groups as identified in the WFSP stage 1 document (Gottesfeld et al, 2002).

4. In the longer term, potential development of a trail network where the project is located, in order to improve public access to the site and facilitate assessment work such as adult enumeration and potential maintenance.

Upstream of Hwy 37S, Scully Creek, typical.

Previous works

Prior to the development of this proposal, two separate studies were conducted to determine the feasibility of a project to improve water flows to Scully South. A partnership study in 2001/02 was funded by BC Hydro ($8,000.00) and in-kind support from LWS, DFO and MOF to explore several options to increase flows to improve spawning habitat in Scully South (final report is included in this submission). In 2004/05, a study to assess the feasibility of a channel that would increase subsurface flows was conducted with funding from BC Hydro of

3,000.00), the Pacific Salmon Foundation ($3,700.00) and in-kind support from DFO and LWS (final report is included in this submission).

Multiple sources of in-kind contributions and volunteer support have been established and are essential to the success of this proposal. The Lakelse Watershed Society, representing 5 community associations of lakeshore residents, has offered volunteer labor and in-kind support valued at ~$25,000.00 CDN. Fisheries and Oceans Canada will provide staff support and labour valued at ~$25,000 including transportation and equipment costs valued at $6,500.00 CDN. Kitselas First Nation will also provide expertise and labor as their time permits valued at ~$4000.00 CDN.

Scully Creek, immediately upstream of the crossing at Hwy 37S.

Long-term needs of the project consist of regular monitoring of the effectiveness of access improvements, adult cover and holding features and channel function for rearing, spawning and incubating salmonids. A staff gauge installed at the Hwy 37 South crossing will continue to be used to monitor flow levels in the creek. Ongoing monitoring will be undertaken by Fisheries & Oceans Canada and by project partners which should ensure that any maintenance requirements are identified. Monitoring and maintenance will be provided in-kind by project partners. If more extensive funds are required for maintenance, outside funds will be sought for this work. We have received funding in the past from industry groups such as BC Hydro and funding sources such as the Pacific Salmon Foundation as well as government agencies. We will continue to seek funds from these and other potential sources.

The Lakelse Watershed Society is committed to the watershed for the long term and members frequently visit the project area. The Lakelse Sockeye Recovery Plan is a living document and the implementation of the recovery plan is well underway with all partners committed to ongoing research, restoration, enhancement and monitoring/evaluation.

2.0 SITE ACCEPTANCE INTO PROJECT

The sites below were chosen, discussed, reviewed, Designed and included at meetings held by DFO for stakeholders, Local Agencies, Local Societies, and other interested parties from 2006 to 2012. Areas of possible ground water sources were identified by use of air photos, local knowledge, casual observations of spring water during winter months and by finally walking the identified routes. An excavator opened test holes to specified depths to prove feasibility of left and right bank sources. Finished channels with 2 meter bottoms and 1.5 to 1 back slopes were installed.

1. Beaver dam sites were opened up and a beaver control program will be set up between Fisheries and Oceans Canada (DFO) and the trapper, Paul Rusch.
2. DFO may commit to continuing the beaver control program when possible.
3. Three embankment refuge sites were installed by DFO and Graywolf Resources Incorporated. (GRI)
4. A third steep pass fishway was added at Highway #37 south.
5. Disturbed areas were treated by planting spruce trees by Little Trees Ltd.
6. The old Sheet pile dam was removed.
7. A natural materials fish passage was installed at the outlet of the 2006 tributary into the WWC.

3.0 PREPARATION OF SITES

Site preparation is the same for all sites except #6 where a fishway was installed. As below:

Step 1. Clear access from an existing road to the site. Damage to undergrowth or trees was minimized. Materials from felled danger trees was salvaged and installed as Large Woody Debris (LWD). Fallen trees and rotted wood was salvaged and buried for access across abandoned creek channels.

Step 2. The work site was cleared and grubbed for survey and excavation.

Step 3 LWD was moved in for placement by Excavator.

A Steep Pass model D fishway was installed at site # 7. The only site preparation required was to remove the existing steel bolted on hatch plate from a previous installation and to bolt the new aluminum fishway in place.

Also the 16 beaver dams that were breached required manual labor only so that all in stream work was completed removing dam trees and branches to adjacent creek banks. No site preparation was required for these sites.

4.0 CONSTRUCTION

1) 1.0 Three meter or larger diameter pools, one meter deep, with LWD were excavated at channel/tributary confluence. Rip rap was placed to avoid disturbance to the Warm Water Channel banks.
2) Access Improvement: Beaver dam removal @ 80m upstream of Hwy 37N crossing and at 15 other sites.
3) Removal of sheet pile weir.
4) A groundwater channel, habitat complexing (pool creation and lwd placement, undercut bank creation) were installed.
5) Refuge under bank structures were installed.
6) A natural materials fish access was installed.
7) A third fishway section was added at Highway 37 S

Numbers 1 and 2

Most of the work for pools, rip rap and LWD placements was completed by a tracked excavator working from Creek banks. One beaver dam was removed partially by hand and partially by

excavator. The machine was moved over the creek by using log under the tracks. 15 smaller dams were removed by manual labor. Removed wood was staked along the banks

Number 3

The old dam was pulled out in one piece by the excavator operator and crushed into a compact bundle of sheet metal using the machine tracks. The steel was disposed of at a metals recycling company

Number 4

Several minor tributaries were developed leading into the 2006 channel. All were excavated without siltation of water during the operations. All of the most promising sources were opened to proposed ditch widths and slopes. Three areas were investigated and abandoned to avoid having the excavator stuck in the marshy conditions. See photos

Number 5

Two log and lock block refuge areas were designed and supervised by DFO staff. The structure consisted of a level flat foundation surface be pulled back from the bank at 150mm below the creek surface. Lock blocks were placed end to end at intervals and a rear log wall was set against the shore block ends. Filter cloth was used to cover the logs. Fill was placed and compacted against the rear logs. Top horizontal logs were placed and lashed back witk 3/8 inch cable. Filter cloth was placed over logs and two access control logs were dropped and suspended to a suitable opening for fish. See photos.

Number 6

The outlet from the 2006 channel into the WWC had deteriorated and a jump pool was assembled using large rip rap that was placed as a pool base to prevent erosion. See photo.

Number 7

A third fishway was installed in the bolted steel plate opening that was intended for expansion to accommodate increased flows. The installation was quite simple as pipe arch had been set up to pass double or triple 2006 flow levels. The fishway was fabricated in Terrace and brought to the site with a Hyab truck. The plate was removed by a Billabong crew and the fishway was lowered down and bolted on.

The operation was conducted in an environmentally safe way. All clean up, grading at different areas was finished before leaving.

5.0 RE-VEGETATION

Re-vegetation was completed in two days. Quality of work was excellent.

References:

Fisheries and Oceans Canada. 2011. Lakelse Lake Sockeye Rehabilitation Program: Spawning Channel / Improved Spawning Habitat Project. Unpublished report for Pacific Salmon Commission Northern Fund. Terrace, B.C.

Fisheries & Oceans Canada, 2002, Schulbuckhand (Scully) Creek Restoration Feasibility Study. Unpublished report for BC Hydro Sustainability Funding program.

Fisheries and Oceans Canada, 2005. Lakelse Sockeye Recovery Plan. Unpublished document.

Gottesfeld, A.S., K.A. Rabnett, and P.E. Hall. 2002. Conserving Skeena Fish Populations and Their Habitat. Skeena Fisheries Commission, Hazelton B.C.

Government of Canada and Government of the United States of America. 2009 (last updated). Pacific Salmon Treaty. Accessed online, 19/10/11 at: http://www.psc.org/pubs/treaty.pdf

Guimond, E. 2009. Scully Creek Sockeye Egg Incubation Assessment 2008-2009. Unpublished report produced for DFO North Coast. Terrace, B.C.

Guimond, E. and D.W. Burt. 2007. Puntledge Egg Incubation Assessment 2006-2007 Results. Puntledge River Water Use Plan. Egg incubation success in Reach C PUN-221.4D. Prepared for BC Hydro.

Koning, W.C. and Keeley, E.R. 1997. Salmonid Biostandards for Estimating Production Benefits of Fish Habitat Rehabilitation Techniques. Chapter 3 of Fish Habitat Restoration Procedures. Watershed Restoration Technical Circular No. 9. Ministry of Environment, Lands and Parks. Vancouver, BC.

MacFarlane, S. 2011. Biostandards for Restoration Projects. Draft document in production for Fisheries and Oceans, Canada. Vancouver, BC.

Pacific Salmon Commission. 2011a. Northern Fund Call for Project Concepts. Accessed online, 18/10/11 at:

http://fund.psc.org/2012/NF%202012%20Call%20for%20Project%20Concepts.pdf

Pacific Salmon Commission. 2011b. Appendix to the 2011 Northern Fund Call for Project Concepts. Accessed online 18/10/11 at:

http://fund.psc.org/2012/NF_Stage%20II%20Appendix.pdf

Skeena Fisheries Commission. January 2003. Conserving Lakelse Fish Populations and Their Habitat. Lakelse Watershed Fish Sustainability Plan. Stage II Briefing Backgrounder. Hazelton, B.C.

6.0 COSTS SHEET

1. Contract Services consists of all on site work required to improve access by removal of a beaver dam: to remove an existing sheet pile dam: to explore and/or develop two possible water sources: to improve confluences from tributaries to Scully Warm Water Channel. The Contractor will accomplish the above by use of one or more excavators, a low bead truck/trailer, two haul trucks and any necessary labor.
2. Contract services Engineer/Supervisor will administer all work and payment details: supervise construction, Survey for as built drawings: design all works: produce and maintain records for submission to DFO.
3. Travel A lump sum of $500 is included for travel expenses during the project
4. Supplies and materials supplies consist of filter cloth ditch/pond lining left over material will be transported to terrace DFO.
5. Environmental monitor responsible for Isolating/trappping/recording/transporting fish as required during the project.
6. Administration A 10 percent administration fee is included to cover the costs of Contract preparation: office record keeping: Making payments Reporting and co-ordination of project works.

See also Appendix a) attached spread sheet for cost details.

7.0 APPENDICES

a) Project cost sheet

b) Paul Rusch, Trappers wild life photos

c) GRI/ DFO terrestrial photos

d) Before air photos

e) After air photos

f)) Engineering plans