Maxan Creek Stream Channel, Bank Stabilization and Aquatic Habitat Rehabilitation Project

Objectives
The primary objective of the 1998 works was to rehabilitate forest harvesting and agricultural impacted salmonid spawning and rearing habitat. This is expected to be achieved by reducing the delivery of sediments to the stream channel from excessively eroding streambanks, increasing stream diversity by installing and trapping LWD to encourage pool scour and provide cover.

The secondary objective of this project is to reduce maximum stream temperatures by narrowing the stream channel, and re-establishing riparian vegetation.

FRBC Region/MELP Region/MOF Region
Skeena-Bulkley / Skeena / Prince Rupert

Authors
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Proponent
Ministry of Environment, Lands and Parks, Lakes District.

Watershed
Maxan Creek

Location
The Maxan watershed is approximately 83,000 ha in area. It includes the upper most portion of the Bulkley River and it's tributaries flow out of the Lakes Forest District. The works described in this report are located on Reach 1 of Maxan Creek which flows into Bulkley Lake approximately 40 km east of Houston.

Introduction
Reach 1 of Maxan Creek meanders through flat bottom land into Bulkley Lake. The reach is 7.3 km in length. About half of the reach is located on private lands. On these lands, large clearings have removed most of the riparian vegetation to the streambank and actively eroding, vertical streambanks are common. Other disturbance indicators in the reach included, LWD parallel to banks, low LWD frequency, extensive sediment wedges and fines, low pool frequency and high water temperatures. These limiting or poor habitat conditions are believed to be primarily caused by the loss of the riparian vegetation and instream LWD causing extensive erosion, and sedimentation.

After two years of field assessments and prescriptions, rehabilitative work was initiated on Reach 1 of Maxan Creek. Rainbow trout, "early run timing" chinook and bull trout were the target species.

Assessments and Prescriptions
In April 1995 an Overview Assessment on the Maxan watershed was completed. The purpose of the assessment was to identify areas in the watershed with potential impacts from forest harvesting which required further assessment or remedial action. The results of this Overview identified Maxan Creek, the Bulkley River and Foxy Creek as the top three priority sub-basins in the watershed for further detailed assessment.

In 1996 a Level 1 detailed Fish and Fish Habitat Assessment Procedure (FHAP) was initiated to determine the quality of the aquatic habitats and prescribe remedial actions for reaches of Maxan Creek. This assessment identified the following habitat features:

- Average bankfull width for Reach 1 is 20 m with a mean wetted width of 8 m.
- Pools, riffles and glides comprised 13%, 18% and 20% of the reach, respectively. Average gradient for the reach is <2%.
- Stream temperatures measured mid-summer reached 22 ^{o}C.
- Approximately 30% of the forest east of the reach had been harvested.
- Stream channel habitat consisted of large riffle/pool/glide sequences but the substrate was frequently embedded with fines. These fines also dominated channel margins, back eddies, pools and downstream ends of channel bars.
- Distribution of LWD was clumped and low in frequency (less than 1 piece per Wb) for the entire reach.

In 1997 detailed rehabilitative designs were completed for Reach 1 on lower Maxan Creek and in 1998 the remedial works for those prescriptions were completed.

Rehabilitation Work

The "works" were initiated and completed between August 1 to August 15 and largely consisted of bank and bar stabilization techniques. All works were completed by local contractors under the supervision of MELP.

The basic method used to stabilize banks was to use large woody debris revetments for moderate energy sites (Slaney and Zaldokas 1997). The revetments began and ended at locations where there was opportunity to key the structures into a naturally protected section of streambank. Willow cuttings were staked inside the header and footer logs, and grass seed was planted over all disturbed areas of the bank. It is anticipated that the structures will limit streambank erosion by reducing water velocities adjacent to the eroding banks. It is also anticipated that the structures will catch and accumulate floating debris thereby further armoring the banks and creating diverse habitats.

The bar stabilization structures were designed to encourage fines to settle out behind the structures in the low water velocity areas. Vegetation will colonize these areas and stabilize the bars, increase cover and decrease stream temperatures. An attempt was made to mimic the natural patterns of LWD deposition and bar stabilization observed in the project area. Structures were anchored in place using driveable duck bill anchors and rock. The net effect of the prescriptions will be to promote the formation of a narrower and deeper stream channel and improve substrate quality for salmonid spawning and rearing. The increased stream cover will contribute to reducing summer low flow stream temperatures.

Equipment

Equipment used for the project included a Hitachi EX 200LC-3 excavator, a D-6 Caterpillar, skidders, self-loading logging trucks, and gravel dump trucks. Trees were knocked over (for LWD) using the D6 cat or excavator and were hauled to the sites using either self-loading logging trucks and/or skidders. Rock was loaded into dump trucks using an excavator and was imported to the rehabilitation sites. Fortunately, access was relatively good and materials could be hauled and stockpiled adjacent to most sites relatively easy.

Trees, rocks and willow cuttings were obtained free of charge except for hauling costs. Rock was obtained from local MOF rock pits. About half of the trees (LWD) used for the project were obtained from Crown Land and half were from the local land owner. The willow cuttings were surplus to another project's needs that were slated for disposal.

Labour was provided by Waterside Ventures (Burns Lake) and consisted of a crew ranging from two to four people, as required.

Cost Summary

Manpower	$ 17,825
Equipment	$ 20,901
Materials	$ 4,173
Total	$ 42,899

Production Estimates

Rehabilitative works at eight sites on Reach 1 of Maxan Creek will contribute substantially to rehabilitation of fish habitat and improve water quality for approximately 7 km of stream. The early run timing chinook, the target species in this watershed are extremely depressed. Rainbow trout are an important species for recreational uses in the watershed, and bull trout are a provincially blue listed species. It is believed that the rehabilitative measure taken will contribute to improved survival of these stocks.

Proposed Work

A comprehensive report was completed in the winter of 1998 (Olsen 1999) which will provide the basis for future project effectiveness monitoring. Monitoring of structure stability, riparian vegetation condition, habitat condition (via FHAP) and fish use is proposed to be conducted on an annual basis. Simple structural monitoring will occur following each spring freshet and repairs may be conducted as required. Additional willow planting will be conducted in the spring of 1999 as required.

Future work at these sites will also include measures to reduce livestock impacts to the stream and riparian areas, and additional planting of spruce and cottonwood in riparian areas. In

addition, a tentative agreement has been reached with the landowner and the Department of Fisheries and Oceans (DFO); to fence and manage the area as a riparian pasture/ hay field. Fencing materials will be provided by DFO, manpower and equipment to construct the fences will be provided by the landowner. Additional technical supervision and materials would be provided by MELP as required through funding from FRBC. In return for the fencing materials and manpower funding, the landowner will agree to utilize the pasture areas for hay production, leaving a riparian buffer area, and only allow livestock into the area for a short period in the fall.

For Further Information, Contact:

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