NIMPKISH WATERSHED RESTORATION PROJECT

2003 Maintenance Works

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NIMPKISH WATERSHED RESTORATION
2003 Maintenance Works
1 INTRODUCTION

This report describes the stream and fish habitat project maintenance conducted during the summer of 2003. The maintenance was conducted to protect previous year’s investments.

Routine Effectiveness Evaluation (REE) of 483 structures at 12 sites within the Nimpkish Watershed was conducted in the early spring of 2003 (ALBY & nhc, March 2003). Six sites where minor maintenance was required were identified; two sites (Pink C. and Woss Channels) required more extensive maintenance work to protect previous work.

In all but two cases (Woss site W1SC1 and Pink Creek site PK2SD1), Routine Maintenance activities did not require new Section 9 (Water Act) approvals, as the works were previously approved (A1-1169, 2002) and recommended maintenance did not result in any substantive changes to the stream or original site objectives. Maintenance works at the Woss side channels and Pink Creek required extension of previous Section 9 approvals, as the prescribed works involved additional instream excavation and/or addition of LWD and ballast.

2003 Maintenance works are described below in their order from downstream to upstream in the Nimpkish watershed, rather than in order of priority. Location maps and site plan sketches are included in Appendix A - Figures of this report.

2 2003 MAINTENANCE SITES

2.1 PINK CREEK (WS # 537) – SITE PK2SD1

Remedial Works Completed:

The problem of coarse sediment transport through, and deposition in Reach PK2 was addressed by:

1) Constructing a rock riffle at the upper end of the site (above the second bridge) to control head-cutting and further sediment transport. (see Figure in Appendix A)
2) Removing excess coarse sediment from dry storage bars using a ‘Spyder’ excavator at sites 12, 17, 29, 31, 33 & 36 (see site plan attached).

2.1.1 Construction of Rock Riffle

A rock riffle was constructed immediately upstream of the ‘Cabin Main’ bridge at the head of reach PK2. Work at this site was conducted during a very low water period on August 18 - 19, 2003. A ‘Spyder’ excavator was used to construct the riffle using large rocks (approx. 110m$^3$) that were trucked to the site by LeMare lake Logging Ltd.
Sediment Control and Fish Protection:

The work area was isolated using silt fencing and fry exclusion nets at both the upstream and downstream ends. All fish in the work section were removed (using traps and small dip nets) and relocated upstream of the exclusion net. A small sump was excavated at the downstream end of the work area to trap any silt.

Construction Technique

Temporary small gravel berms were used to divert flows and de-water the work area as the riffle was constructed in two halves. Large rock (>0.5m) was keyed into the bed and well up the banks. Once the riffle was completed the temporary gravel berms, silt fences and fry exclusion nets were removed. Downstream siltation was minimal and both coho and cutthroat juveniles were observed in the work area the day following.

The following photos show the riffle during and after construction.

Pink C. Site PK2SD1 – Rock riffle under construction (note flow diverted along right bank – photo left)
Pink C. Site PK2SD1 – View upstream from ‘Cabin Main’ bridge - rock riffle completed

2.1.2 Coarse Sediment Bar Pullback

Removal of coarse sediment that had accumulated on bars in mid-reach PK2 was conducted during the summer 2003 low flow period (August 20th). As in the past, excess sediment from dry bars was moved out of the active channel (using the ‘Spyder’ excavator) to minimize downstream transport and in-filling of previously constructed works – there was no excavation within the wetted channel.

Excess sediment was side-cast out of the active channel at sites 12, 17, 29, 31, 33 & 36 (see Figure in Appendix A). The spoil piles were contoured and grass seeded immediately following the work.

Sediment Control and Fish Protection:

Coarse sediment was removed from dry point bar storage areas during a low flow stage in August 2003. Although the ‘Spyder’ excavator did, on occasion, move through the wetted channel, there was no impact on fish (other than temporary displacement), so sediment generation and fish removal was not an issue.

All work was conducted in accordance with WLAP ‘Best Management Practices’ and any other instructions issued by Fisheries and Oceans Canada.

The following photos show representative coarse sediment accumulations in reach PK2 and bar-pullback activities.
Site PK2SD1 – Typical bar pull-back at site #31

Site PK2SD1 – Coarse sediment deposition at site # 33 prior to pull-back.
2.2 WOSS R. (WS# 341) – SITE W1SC1

The two channels that were excavated in 2002 were evaluated using the REE Off-channel forms. Woss R. flood flows in November 2002 entered the head of the upper channel and a considerable amount of silt and coarse sediment was deposited into the upper pools and spawning glides of the upper channel. This impact resulted in fairly low evaluation scores although, for the most part, both excavated channels are working well (over 100 sockeye were observed spawning in the newly excavated channels in November 2002).

The lower channel was not affected by the November 2002 flood flows, though it is not performing well due to the fact that the main channel of the Woss R. has migrated southward and has deposited a large coarse sediment ‘wedge’ that is backwatering both channels and reducing velocity/attraction flows.

The overall physical performance evaluation score was low (<3) due to the instability of the headwall at the top end of the upper (‘spring’) channel, and the deposition of fines and coarse sediments into pools and onto the spawning glides constructed in 2002. Deposit of fine sediments has compromised the effectiveness of previously sorted and washed spawning gravels – this fine material is not being flushed out due to the reduced velocity caused by the realignment of the main Woss R. channel and the resulting backwatering effect.

Remedial Works Completed:

Maintenance work conducted at the head of the ‘upper’ channel at Site W1SC1 was modified from the original prescription due to 2003 budget limitations. A ‘200 series’ excavator was used to sort through the spoil piles from original excavation of the channels – the head slope of the ‘spring channel’ and the base of the root wad/gravel berm were lined with large boulders obtained on site (see Plan Figure – structures 9 & 10-C). Addition of large, stable rock at these sites will hopefully minimize erosion should the Woss R. again overtop its banks.

A number of rootwads (10) with stems attached were buried into the headwall of the spring channel. Other logs (from on-site windfalls) were cabled together on the higher ground just above the head of the ‘spring channel’ – hopefully this structure will dissipate the energy of flood flows should the Woss again overtop its banks. All materials used were found on-site.

Sediment Control and Fish Protection

Work at this site was conducted on September 2 – 3, 2003 when flows in the channel were very low. Silt fences were installed just downstream of the work area(s) but were really not required given the low flows. No fish were observed in the few wetted areas (<5cm deep). Most of the work was conducted with the excavator sitting on top of the banks out of the wetted area.

The following photos show the large boulder armoring of the head slopes of the channel and the rootwad/log structure constructed at the head of the ‘spring channel’
Site W1SC1 – Rootwad/log structure and boulder apron at the head of the ‘Spring Channel’.

Site W1SC1 – Boulder apron below the berm at Structure # 8 & 9
Site W1SC1 – Log ‘matrix’ cabled together above the head of the ‘Spring Channel’ to dissipate Woss R. flood energy.

2.3 KLAKLAKAMA CREEK (WS# 342) – SITE KL1DJ1

Debris jams and beaver dams have been present in the Lower Klaklakama for many years; various Nimpkish enhancement projects have cleared small woody debris to allow fish passage over the years (ref. Nimpkish Band Salmon Enhancement Project reports, 1978 – 1982).

In 2000, LWD (as marked by the project biologist) was moved to the banks to create two lateral LWD spurs at each of the two sites. Larger wood pieces, wood attached to the banks, or wood buried in the streambed was left in place. All structural wood in the lateral spurs was cabled together and also cabled to embedded logs, eliminating the need for ballasting in this small system. Maintenance work in 2003 focused on removal of additional SWD that had rafted into the structure, impeding fish access.

Remedial Works Completed:

LWD and SWD coming from the outlet of Lower Klaklakama Lake was pulled out of the narrow window between structures 1 & 2 (See Figure in Appendix A). Work was completed in one day using a chain saw winch and hand tools. All functional wood was added to the previously built structures to provide additional cover for rearing habitat.
Sediment Control and Fish Protection:

Work at this site was completed in mid-August 2003 when water levels were low. No sediment control or fish removal activities were required as the small amount of woody debris was removed by hand.

2.4 Davie River (WS# 342) – Site D5DJ1

Bank protection structures have performed well at this site (2003 overall physical and biological ratings >3), and a long and deep lateral pool has formed along the tips of the multiple LWD (LWD-M,A) structures. However, bank erosion has continued (especially immediately downstream from structure #3), and the bank anchor tree at structure #4 was pulled off the bank during November 2002 floods. Recommendations for Maintenance work at this site were to: cable the bank anchor tree that had been pulled over at structure #4 into the structure, and re-anchor the structure (with cable and tree guards) back to stable riparian trees. Addition of on-site LWD (and appropriate rock ballast) to structures 3 & 4 would improve the bank protection objectives at this site.

Remedial Works Completed:

A large cedar rootwad with a long (30m) stem attached was found on a gravel bar opposite the site following winter 2002-2003 floods. This material was used to re-enforce Structure #3 where the bank was continuing to erode. Other on-site LWD was added to Structure #4 to raise its profile and reduce bank scouring behind the previously built structure. (See Figure – Appendix A). LWD was moved and aligned using chainsaw winches and hand tools. Additional rock ballast (23 rocks at average 250 kg. each) was flown to the site and cabled to the added LWD.

Sediment Control and Fish Protection:

No sediment control measures or fish removal was required at this site. The large LWD added to Structure #3 (rootwad and logs) was pulled across the Davie R. using chain saw winches, with little to no sediment generated. LWD from above the right bank that was added to structure #4 was pulled into the structure ‘in the dry’. Impacts to the numerous juvenile salmon and resident trout observed in the area were minimal, limited to very temporary displacement only during the active work period.

The following photos show the additions to the two structures at near completion.
Site D5DJ1 – Large cedar rootwad and 3 large logs added to Structure #3. 10 large (approx. 250 Kg.) rocks added as ballast.

Site D5DJ1 – LWD added to Structure #4 and 4-A (both to the left and right of Bob Miller, crew leader) to reduce bank erosion. 13 large rocks (approx. 225 Kg.) rocks later added for ballast.
2.5 **DAVIE RIVER (WS# 342) – SITE D5DJ2**

The only Maintenance prescribed for this site was to re-cable structure #2 back to firmer bank anchoring locations well away from the unstable bank. Upon further inspection this structure was deemed stable, even though it experienced some rotation downstream following the November 2002 floods. Cabling and anchors were inspected at all 10 structures at this site – no further works were required.

2.6 **LUTZ (KO51) CREEK (VERNON WS# 3) – SITE LZ1BD1**

2003 Maintenance prescriptions for this site were to adjust the height of the rock steps (Nos. 3 & 4) in the beaver dam by-pass channel to improve juvenile fish access around the dam.

Minimal hand-work (<1/2 a crew day) was required to make the necessary adjustments at this site.
2.7 **MAQUILLA CREEK (WS# 344) – site MQ1DJ1**

Small debris jams in the natural (by-pass) channel below the 2001 work site were cleaned by hand to ensure unrestricted fish access at all flows. Juvenile trapping in the spring of 2003 determined that one of these small debris jams was evidently restricting both adult and juvenile fish passage – (17 coho, 1 rainbow, 8 cutthroat, and 14 dolly varden were caught in 2 traps below the SWD jam; only 1 coho, 2 cutthroat, and 2 dolly varden were caught in the pool immediately above the obstruction.

The crew used a chain saw winch and hand tools to remove small woody debris and improve fish access at one site in the by-pass channel. Further monitoring and juvenile trapping in the spring of 2004 should indicate whether this treatment was successful.

Minimal sediment was generated during this (minor) maintenance work and silt control/fish removal was not required. Juvenile coho were observed well upstream from the impasse 2 weeks after the SWD jam was cleared.

2.8 **QUILLA CREEK (WS# 344) – site QU5SD1**

A ‘bedload trap’ (structure # 0-1) was excavated at this site in 2001, with the expectation that it would have to be cleaned out periodically. A ‘300 series’ excavator worked from the roadside to complete this work. Flows were extremely low at the time of removal of excess coarse sediment (August 27, 2003), and the work was conducted ‘in the dry’ except for groundwater that was encountered during excavation.

The roadside stream bank was re-enforced with large rock (rip-rap) to minimize further bank erosion and sediment input from road sources.
Site QU5SD1 – Bedload trap excavated and rip-rap added to protect roadside/stream bank. Note that all active (low) flow is through the small channel at the top of the photo – groundwater only in the bedload trap. (The bank is being grass-seeded in this photo).
APPENDIX A – 2003 MAINTENANCE SITE LOCATION MAPS AND FIGURES

Nimpkish Watershed Sub-basin Boundaries

Pink Creek (WS # 537) – Site PK2SD1  Location in Nimpkish Watershed Site Plan

Woss R. (WS# 341) – Site W1SC1  Location in Nimpkish Watershed Site Plan

Klaklakama Creek (WS# 342) – Site KL1DJ1  Location in Nimpkish Watershed Site Plan

Davie River (WS# 342) – Site D5DJ1  Location in Nimpkish Watershed Site Plan

Maquilla Creek (WS# 344) – Site MQ1DJ1  Location in Nimpkish Watershed Site Plan

Quilla creek (WS# 344) – site QU5SD1  Location in Nimpkish Watershed Site Plan
APPENDIX B – APPROVALS AND CORRESPONDENCE

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