West Babine Fish Passage Restoration Project – Williams Creek 34.5km Nilkitkwa FSR

Project Completion Abstract - *Fish Salvage Component*

Biological Goals of the Project

The objective of the project was to improve upstream fish passage through the existing structure for all life stages of fish spp. known to inhabit the stream. To achieve this, the method chosen was to backwater the existing crossing structure, thereby eliminating the outfall drop, reducing the gradient of the water inside the culvert and reducing the water velocities within the culvert at the majority of flows. This would allow adequate fish passage to approximately 12km of good quality fish habitat upstream of the crossing.

FIA Information

FIA Invest. Schedule. No.: NOTSA032230
Project No.: 2230006
Fiscal Year: 2003/2004

Recipient

Pacific Inland Resources – a Division of West Fraser Mills Ltd.
MoF Region: Northern Interior Forest Region
MoF District: Skeena Stikine Forest District

Registered Professionals involved in the Project

Mr. Ralph Kossman, RPBio., Silvicon Services Inc. (Smithers) supervised the initial Fish Passage Culvert Inspections in the West Babine Watershed and conducted the fish salvage operations prior to the in-stream work. Mr. Jay Baker, Silvicon Services Inc. represented the recipient and handled the administrative aspects of the project.

Project Completion Abstract Completed by:

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Project Location

Williams Creek is located within the West Babine watershed. It passes under the Nilkitkwa FSR at ~34.5km (UTM 09 E649932 N6124018), approximately 4.0km upstream of it's confluence with Babine Lake. Williams Creek is a third order watershed that flows eastward into Babine Lake approximately 7.4 kilometres south of the outlet of Babine Lake.

Introduction and History

Silvicon Services Inc. was contracted to provide fish salvage services for this FIA funded fish passage restoration activity. Williams Creek (watershed code 480 – 452300) is a third order, S2 stream. 1:20,000 scale inventory information indicates Dolly Varden(DV) and rainbow trout(RB) are present at the Nilkitkwa FSR crossing and Prickly Sculpin(CAS), Coho salmon(CO) and Kokanee(KO) are present downstream nearer to the confluence of Williams Creek with Babine Lake. Williams Creek crosses the Nilkitkwa FSR through a 2050x4000mm pipe-arch steel multi-plate culvert. The culvert is 18.5m in length and has a slope of 2.5%. The culvert is fitted with concrete head walls, aprons and wing walls on both the inlet and outlet of the culvert. This site with a priority score of 46 was ranked as a high priority site for fish passage restoration following a Fish Passage Culvert Inspection project (procedures as per WRTC#11) conducted in the West Babine watershed in 2001. Fish Passage Culvert Inspections at the site concluded that the crossing structure represents a partial barrier to juvenile fish due to the outlet jump height and water velocity within the culvert. The West Babine watershed was identified in the Torkelson Watershed Restoration Plan (Sept. 2001) and the documents which preceded it; Interim Interior Watershed Restoration Plans (October 2000) and Integrated Watershed Restoration Plan-West Babine Watershed (December 2000), as a targeted, high-priority, watershed sub-basin.

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Description of Completed Work

Isolation of the site and fish salvage began in the afternoon of September 8, 2003. Isolation nets were installed approximately 5m upstream of the culvert inlet and approximately 25m downstream of the in-stream work area and remained in place until all in-stream work was completed. Sediment control was also erected downstream of the work site. Twelve baited minnow traps were set within the isolated area and left overnight. The following morning the traps were removed and the captured fish were transferred to holding buckets for identification and recording. A second salvage pass was then conducted utilizing a Smith-Root 12B POW electroshocker. A dip net and pole seine were used to recover the shocked fish and transfer them to holding buckets for recovery and identification. Following the recording of the captured fish, they were released downstream of the lower isolation net. After the fish salvage work was completed, a 32m section of the stream with habitat similar to that within the isolated in-stream work area was sampled above (and upstream of the culvert) the work site. The length of stream sampled was roughly equal to the length that fish salvage occurred in. This sample was intended to be used for comparative purposes between populations above and below the culvert and to serve as a baseline for possible future monitoring (or Routine Effectiveness Evaluations).

Fish Salvage

The first salvage pass, twelve baited minnow traps set overnight, saw the capture of 37 fish. The overnight minnow trapping resulted in the capture of 3 RB and 34 DV/BT. The second pass the following morning utilizing an electroshocker resulted in the capture of 23 more fish, 5 RB, 5 CO and 13 DV/BT. The upstream baseline sample resulted in the capture of 10 fish; 2 RB, 4 CO and 4 DV/BT. All fish salvaged/captured were juveniles (parr) or possibly dwarf adult residents in the case of the DV/BT. The minimum length recorded was 33mm for a CO parr, the maximum length 160mm for a DV/BT.

Discussion

Backwatering of the culvert has completely eliminated the outlet drop, reduced the water gradient to 0% for approximately 1/2 to 2/3 of the lower culvert length and has reduced the water velocities considerably within the same 1/2 to 2/3 of the culvert. The restoration work has undoubtedly facilitated both adult and juvenile fish passage through the culvert, making it easier to access the good quality fish habitat upstream of the crossing site. All three species were captured both upstream and downstream of the pre-restoration work culvert. Given the pre-restoration conditions of the site, it is unlikely that many juvenile rainbows and coho could successfully migrate upstream through the culvert. A more reasonable explanation is that adult RB and CO likely spawn upstream, being more able to successfully navigate the culvert. The downstream face of the completed rock weir/riffle structure now has a relatively steep slope with shallow, fast flowing water and no holding sites. It may be worth considering the placement of some large boulders into the weir face to provide resting and holding areas for fish, if not for this project, at least for future projects.

Monitoring

Routine Effectiveness Evaluations should be conducted at this site to assess the effectiveness of the removal of the partial barrier to fish passage. The sampling conducted upstream of the site could be used as baseline information.

Post Construction Inspection:

It is recommended that the site be visited after the spring and fall freshets in 2004 to ensure that the structure is functioning as designed.

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Photographs:

Fig.1 Second fish salvage pass - at the outlet pool utilizing an electroshocker and pole seine.

Fig.2 Weir/riffle structure approx. 1.5mo after construction.

Fig.3 110cm DV/BT captured u/s of culvert during upstream baseline sampling.

Fig.4 78cm RB captured u/s of culvert during upstream baseline sampling.

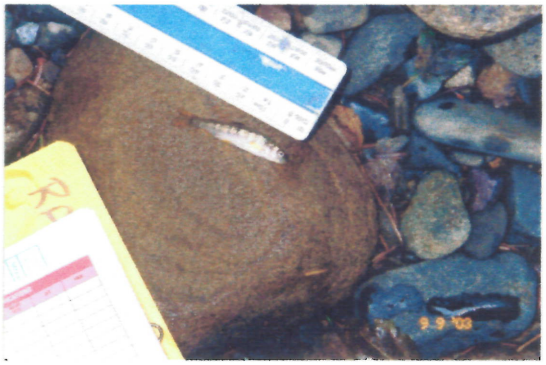

Fig.5 47cm CO captured u/s of culvert during upstream baseline sampling.

Fig.6 Closer view of face of weir/riffle structure approx. 1.5mo after construction. (Some large boulders in this riffle would provide resting and holding areas for fish).