Gitsegukla Band Council 1998 Submission to

Annual Compendium of WRP Aquatic Rehabilitation Projects

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Project Title
Site 3, Tributary 1, Kitseguecla River

Objectives of WRP Project
The goals of this project included the reduction of erosion at a former bridge site, the creation of more habitat variety and the further stabilization of re-vegetating mid-channel and lateral bars. The project was aimed mainly at improving the habitat for the rearing phases of the life cycles of chinook, rainbow and Dolly Varden.

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

Authors
Bill Fell
Ed. Glenn Grieve, R.P. Bio.

Proponent
Gitsegukla Band Council

Watershed
Kitseguecla River

Location
Kitwanga River Tributary 1 is at 17 km on the Br. 200 FSR. Roche DeBoule Rd. leaves Hwy 37 ~0.5 km east of the Gitsegukla Village Bridge on Hwy 16. Stay on this main road to the FRBC sign. Don't turn right across the Br. 400 bridge at 10 km. Keep travelling south.

Introduction
Trib 1 is a small, relatively low elevation stream that probably was a major nursery stream in the southern Kitseguecla system before being logged over most of its watershed beginning about 1974 in the lower reach and continuing into the 1990's in the upper reaches. Logging occurred to both banks over much of the area and the result has been significant bank erosion and loss habitat complexity. Records of fish populations are limited to irregular escapement estimates for the mainstem river. Site 3 exhibited the most prominent damage. It was associated with a collapsed bridge crossing (see Photo 1).

Assessment and Prescription
A Level I field assessment dealt with the whole of the ~2 km long reach of which Site 3 was a part. The reach had an average gradient of ~ 4%, a bankfull width of ~10 m and a D90 of ~650 mm. The lack of functional LWD, eroding banks and wide and denuded bars suggested that the reach was very energetic at times. The conceptual prescriptions included re-establishment of riparian function, removal of the old bridge deck, reduction of bank erosion and increasing the habitat complexity.

Rehabilitation Work
The bridge deck was removed separately and its approaches were pulled back during 1997. In 1998 an excavator was used to pull the banks back further and to install approximately 18 pieces of LWD, mostly complete trees with root wads. Only one channel spanning piece was installed as a weir and the others were either placed with their root wads protruding into the edge of the stream to produce scour, in clusters with their root wads upstream to concentrate water in order to increase low water depth and to redirect water away from eroding banks, or parallel to the stream with root wads upstream in order to accelerate vegetative colonization of exposed bars. Debris catchers were installed in eroding banks to attempt to catch wood as it moved downstream in order to build up a protective mat of woody debris. The as-built survey was done with a total station to accurately record LWD location and orientation. Although the riparian area was assessed no prescribed treatment work was implemented.

Equipment
A 1997 EX200 Hitachi excavator with a thumb and biodegradable hydraulic fluid was towed to the site with a tandem axle

dump truck (4WD). The placement work took approximately 8 hours.

Cost Summary

Prescription and drawings	$ 4,200
Equipment and materials (20 ocs with roots)	$ 8,300
Project Management/reports	$ 1,650
Total	$14,150

Production Estimates

Approximately 300 m^2 of habitat was improved with some habitat complexing LWD. A conservative estimation of bio-standards (Slaney and Zaldokas, Ed., 1997) suggests that there is a potential for a 2 fold increase in salmonid production for streams compelled with LWD.

Proposed Work

It has been recommended that the LWD be anchored to boulders (B axis > 65 cm) with steel cable/epoxy.

Contact

Bill Fell, Watershed Restoration Coordinator, Gitsegukla Band Council,
36 Cascade Ave, South Hazelton, B.C.
V0J2R0
Phone 250-849-5490,
Email Gitsegukla.water@Kermode.net

References

Slaney, P.A. and D. Zaldokas. 1997. Fish Habitat Rehabilitation Procedures. Watershed Restoration Technical Circular No. 9. Ministry of Environment and Ministry of Forests.

Giesbrecht and Grieve, 1998. Kitseguecla River South Level 1 Detailed Assessment, BioLith Scientific Consultants Inc. Prepared for the Gitsegukla Band Council.

Photographs

Photo 2. Looking d/s from Photo Point 1 before construction.

Photo 1. Looking d/s from Photo Point 1 after construction.

Photo 4. Looking toward the west and across the old road site. Note the debris catchers.

Photo 3. An aerial view of Site 3 after construction. North and downstream are toward the top of the picture.

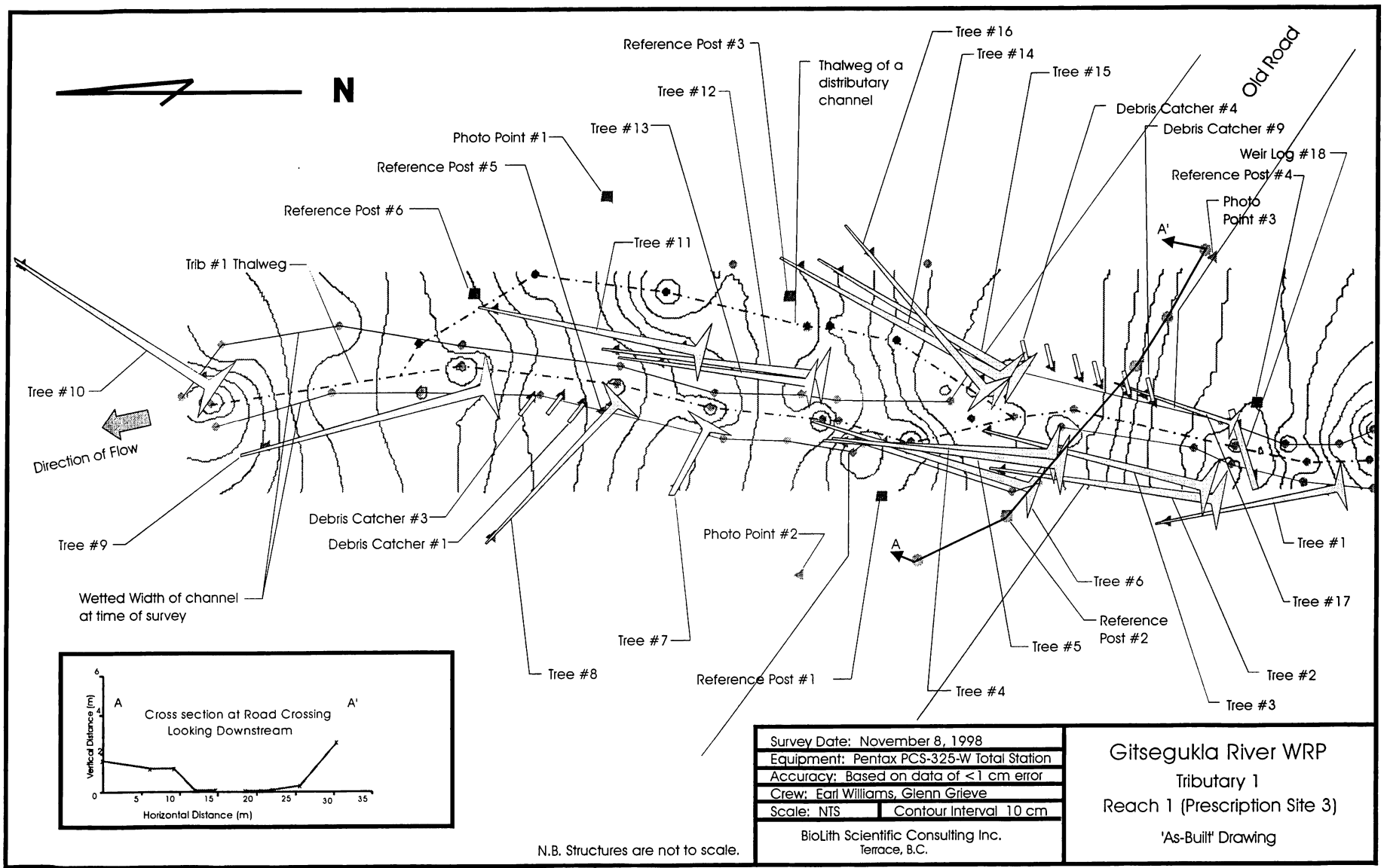

Figure 1. As-Built drawing of the construction at Site 3 on Tributary 1 in the Kitseguecla River South Sub-Basin.

Project Title
Site 14, Tributary 15, Kitwanga River

Objectives of WRP Project
The goals of this project included, primarily, provision of access through a highway culvert, but also included reduction of bank erosion and trapping of gravels. The treatments were aimed at the migration, spawning, incubation and rearing phases of the life cycles of coho, steelhead, cutthroat and Dolly Varden.

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

Authors
Bill Fell
Ed. Glenn Grieve, R.P. Bio.

Proponent
Gitsegukla Band Council

Watershed
Kitwanga River

Location
Site 14 is the channel from the Highway 37 culvert downstream to the Kitwanga River. The culvert is under the highway, 2 km south of the southernmost access road into Gitanyow (Kitwancool) Village and approximately 22 km north of Kitwanga, B.C.

Introduction
The Kitwanga River is one of the most productive rivers in northwest central B.C. Being lake fed and of low gradient over ~ 26 km, this stream hosts most of the common salmonid species. Site 14 consists of 19 m of a small stream channel between a perched highway culvert and the mainstem of the Kitwanga River. The tributary is ~ 2km long and was dry during the summer of 1998. Between the existing highway and the mainstem river, there is an old road crossing, an overhead B.C. Hydro line and an underground telephone cable.

Assessment and Prescription
The Level I Detailed Assessment reported an average gradient of 3% with little gravel in the channel. Impacts cited included a loss of riparian function, bank erosion of fines from the old road bed, and the perched culvert that was considered a barrier. Cutthroat, coho and Dolly Varden were captured below the culvert while only cutthroat were captured above. Prescriptions included bank pullback, planting with deciduous cuttings and grass seed, deepening the plunge pool through minor excavation, building of a rock weir, armouring of the plunge pool's banks, deepening of another small plunge pool and the embedding of a log weir across the channel. Provision of access to the pristine stream above the highway was the most important objective.

Rehabilitation Work
Permission to carry out works was acquired from MoF, DFO, MoELP, Ministry of Highways, BC Hydro and BC Tel. The banks were pulled back and the spoil was spread near the site. All disturbed areas were seeded, and a silt fence was installed. The single log placed in the stream was anchored with rock and dug into the bank at an angle. Most of the other prescribed treatments were implemented. Photo points and monitoring peg locations were established and the site was surveyed using a total station (see Figure 1).

Equipment
A 1997 EX200 Hitachi excavator with biodegradable hydraulic fluid was towed to the site with a tandem axle dump truck (4WD). Polaskis and shovels were used to dig in the LWD. Rock was placed by hand using a dolly. Clean-up tools and seeding equipment were used.

Cost Summary

Prescription and drawings	$1200
Equipment and materials	$2400
Project Management/reports	$ 700
Total	$4300

Production Estimates

If successful, the intended provision of access to the potentially good habitat upstream will increase anadromous fish production above the before treatment. Approximately 10 m^2 of habitat t was improved below the culvert. A conservative interpretation of bio-standards (Slaney and Zaldokas, Ed., 1997) suggests a 2 fold increase in salmonid production in channels complexed with LWD is possible.

Proposed Work

The rock weir may have to be re-built of larger material and raised so that the jump height is decreased. The riparian area still requires planting with tree species. The plunge pool banks may require more armouring and the stream channel still needs gravel added.

Contact

Bill Fell, Watershed Restoration Coordinator, Gitsegukla Band Council,
36 Cascade Ave, South Hazelton, B.C.
V0J2R0
Phone 250-849-5490,
Email Gitsegukla.water@Kermode.net

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Giesbrecht et al, 1998. Kitwanga River South Level 1 Detailed Assessment, BioLith Scientific Consultants Inc. Prepared for the Gitsegukla Band Council.

Photographs

Photo 5. A mosaic view of Site 14 during construction. The perched culvert is on the right.

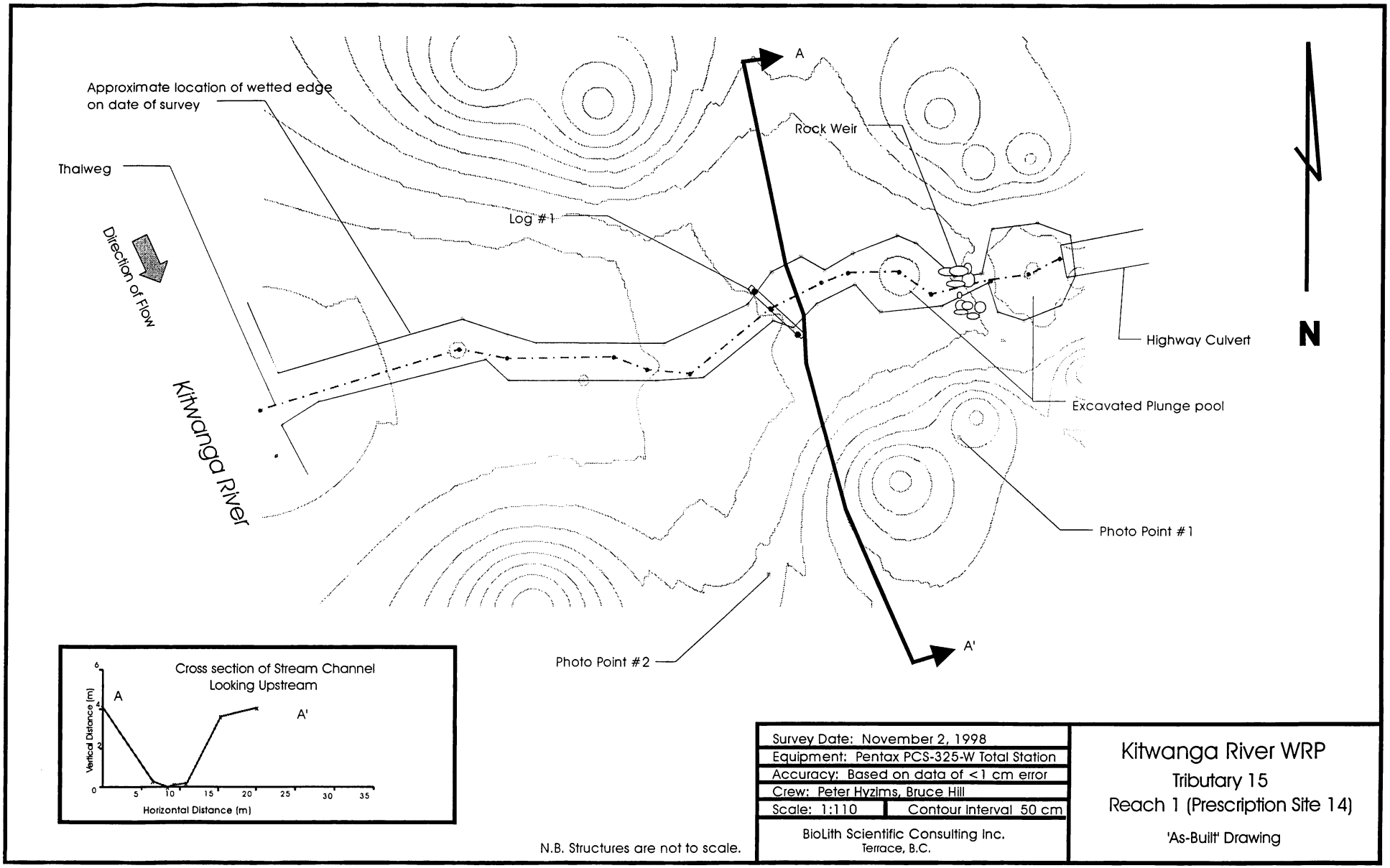

Figure 3. As-Built drawing of the construction at Site 14 on Tributary 15 in the Kitwanga River South Sub-Basin.

Project Title
Site 15, Tributary 18, Kitwanga River

Objectives of WRP Project
The goals of this project included reduction of bank erosion and increasing of habitat variety. The treatments were aimed at the migration, spawning, incubation and rearing phases of the life cycles of coho, steelhead, cutthroat and Dolly Varden.

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

Authors
Bill Fell
Ed. Glenn Grieve, R.P. Bio.

Proponent
Gitsegukla Band Council

Watershed
Kitwanga River

Location
Site 15 is on Tributary 18, which passes under Highway 37 and the southernmost access road leading north into Gitanyow (Kitwancool) Village. The crossing is ~ 200 m north of the intersection of these two roads and ~ 24 km north of Kitwanga, B.C.

Introduction
The Kitwanga River is one of the most productive rivers in northwest central B.C. Being lake fed and of low gradient over ~ 26 km, this stream hosts most of the common salmonid species. Site 15 is the 50 m section of Trib 18 between the southern Gitanyow Village access road culvert and the stream's confluence with the Kitwanga River. A mill was located 4 kilometers upstream of Site 15 on Tributary 18 during the 1970s, but the majority of the stream passes through an intact, relatively open, mixed deciduous and coniferous old growth forest. Lower and mid benches were burned early in the century, and upper benches were logged just prior to a 100-year flood event, which significantly altered natural recovery opportunities for fish stocks by removing LWD.

Assessment and Prescription
A Level I Detailed Assessment recorded the most prominent problem as the access road culvert, which was perched ~ 2 m above its plunge pool surface in low water and which was considered a barrier at all flows levels. The stream channel at Site 15 has a narrow wetted width for the channel width, an average gradient less than 3% and a gravel-dominated substrate. There were two pools in the 50 m length but little other habitat variety aside from riffle. There was a general lack of functional LWD and bank erosion near the culvert on the north side and on both sides near the mouth. This stream likely backwaters upstream at least 25 m when the Kitwanga River is high. Since a committee was struck, including Ministry of Highways, Ministry of Environment, Lands and Parks, and Department of Fisheries and Oceans, to deal with highway culverts that were impediments to fish, only the stream complexing below the culvert was allowed to proceed.
Rainbow trout were captured below and above the perched culvert in late 1997. Placement of LWD with root wads intact was prescribed at two places to stabilize the bank and to confine water into one channel to increase low water depth. The prescription also specified that the trees be oriented with the root wads upstream to direct water away from the eroding bank on the north side near the mouth and to direct water away from a flood channel near the culvert to preserve sinuosity and dissipate energy. Bank pullback and debris catchers were also prescribed to help reduce erosion and sediment input. Two channel spanning logs were suggested to produce pool habitat and trap sediment suitable for spawning. A redirection of water through a channel dug through the mid-channel bar near the mouth was prescribed to move the thalweg away from the northern eroding bank.

Rehabilitation Work

A self-loading logging truck carried logs to the site along the Kitwancool access road below the Highway. The excavator hired to place the LWD did not require access below the lower bench. An overland access route to the pullback prescribed for the southern eroding bank would have damaged the riparian vegetation on the opposite side of the creek, and, since the alternative was to cross the stream near the end of the window for works, and we were restricted from disturbing sediment during the spawning season in the Kitwanga mainstem, the pullback was determined to be detrimental for the site.

The two clusters of LWD were grouped together in two and three stem "rafts". An additional log was positioned on top of and diagonal to the parallel raft stems in the case of the cluster closest to the culvert. Tree tops that were necessarily removed for transport or positioning were placed into the interstitial spaces in the LWD clusters. All logs were then bound together using hemp rope.

The channel spanning log furthest downstream was installed as prescribed, but because there was an extra complete tree with root wad, which are hard to get and more desirable as functional LWD than logs, it was installed at the prescribed site further upstream instead of a log.

No treatment was planned or implemented for the area immediately downstream from the perched culvert, as this was considered likely to be altered extensively when the culvert problem is rectified.

All disturbed areas were seeded. Photo points, monitoring peg locations were established and all of these as well as the installed LWD were surveyed using a total station and recorded in an as-built drawing.

Equipment

A 1997 EX200 Hitachi excavator with biodegradable hydraulic fluid was towed to the site with a tandem axle dump truck (4WD). Cable and winches were used to pull the tree clusters together. Clean-up tools, seeding equipment, and positioning winches were also used.

Cost Summary

Prescription and drawings	$2850
Equipment and materials) (20pcs w/ roots)	$7400
Project Management/reports	$1700
Total	$11,950

Production Estimates

Approximately 49 lineal metres and ~ 122.5 m2 of habitat were complexed with LWD. A conservative interpretation of bio-standards (Slaney and Zaldokas, Ed. 1997) suggests that this treatment could result in a 2 fold increase in production of salmonids.

Proposed Work

Correcting the culvert problem would make the biggest difference to fish in this tributary. The LWD clusters should be anchored to rock (b axis >65 cm).

Contact

Bill Fell, Watershed Restoration Coordinator, Gitsegukla Band Council,
36 Cascade Ave, South Hazelton, B.C.
V0J2R0
Phone 250-849-5490,
Email Gitsegukla.water@Kermode.net

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Photographs

Photo 6. Looking d/s from atop the barrier culvert before construction. The red ribbon marked the upstream limit of restoration.

Photo 7. Looking d/s after construction. The technician is standing on the uppermost LWD cluster.

Photo 9. Looking u/s from Photo Point 2. An extra tree complete with root wad was substituted for the originally prescribed channel spanning log weir.

Photo 8. Aerial view of Site 15 before construction.

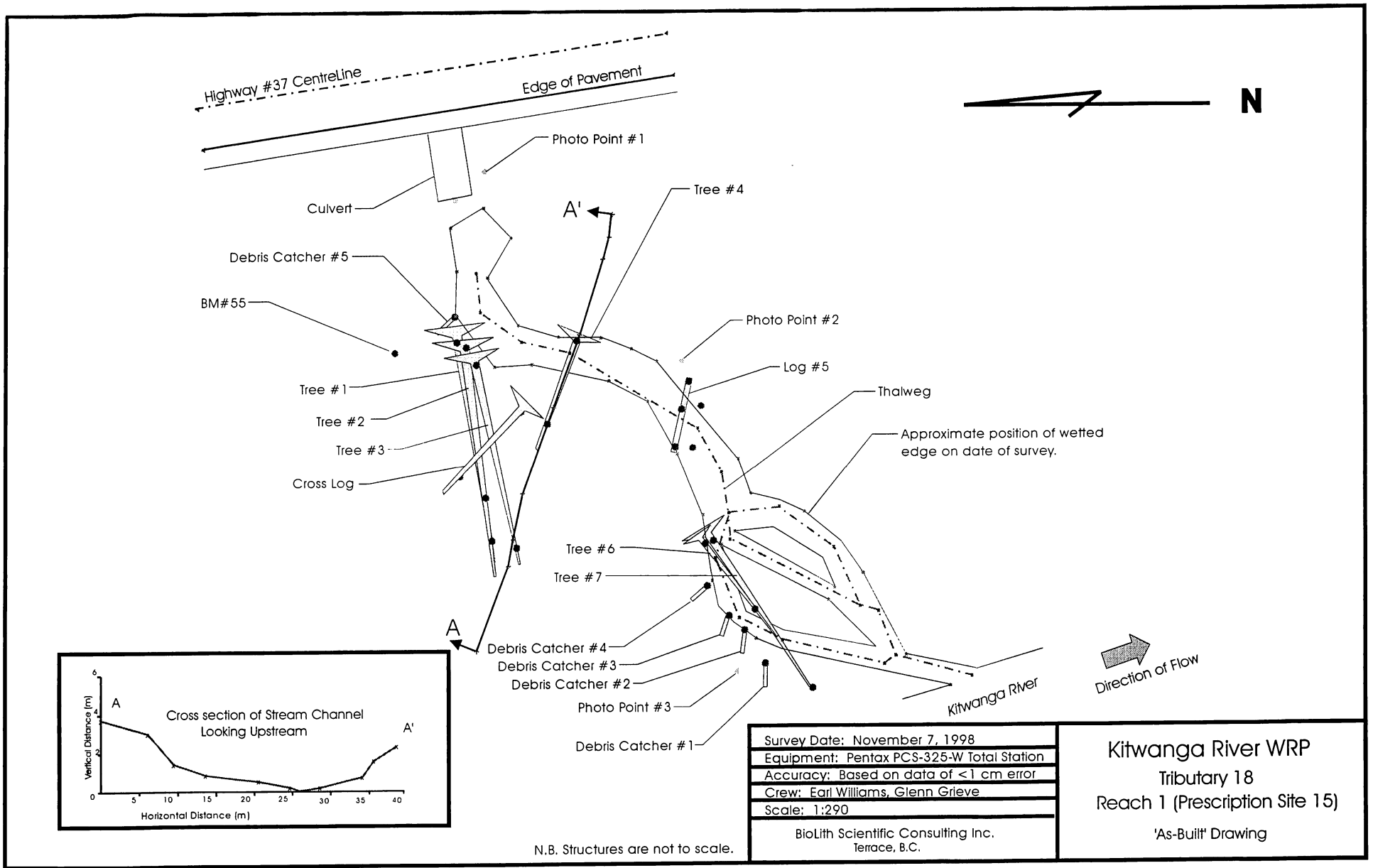

Figure 3. As-Built drawing of construction at Site 15 on Tributary 18 of the Kitwanga River South Sub-Basin.