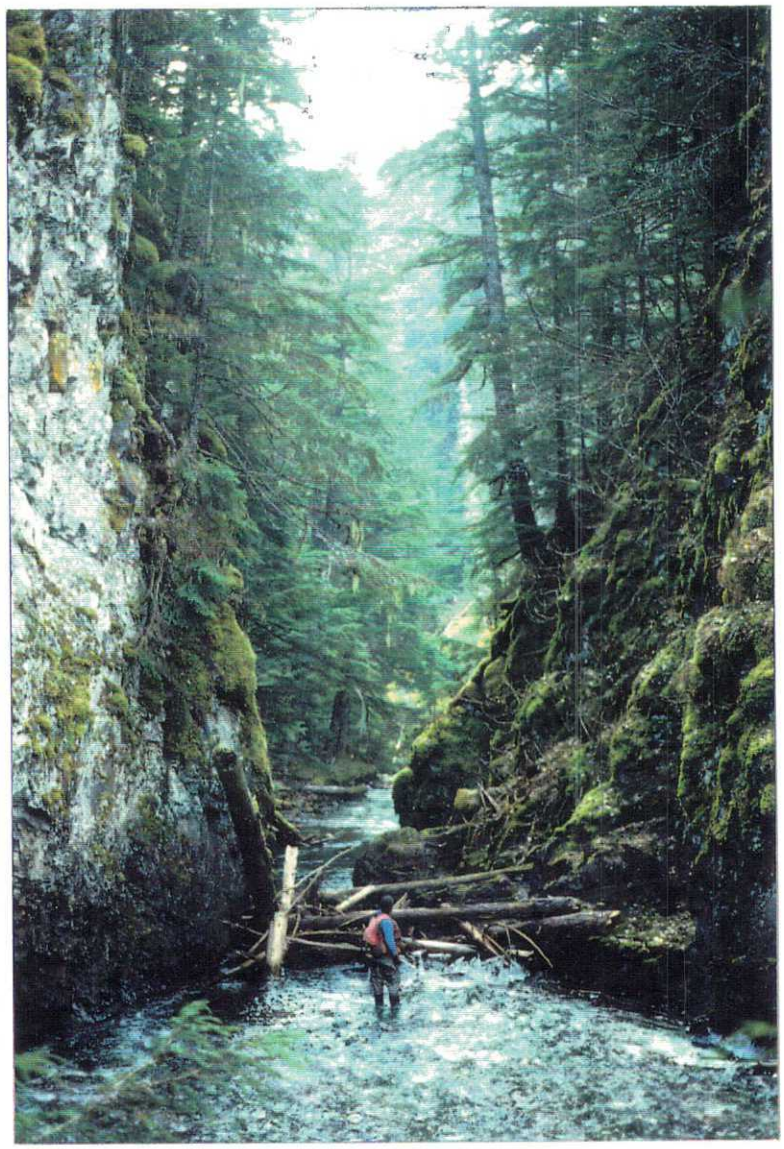
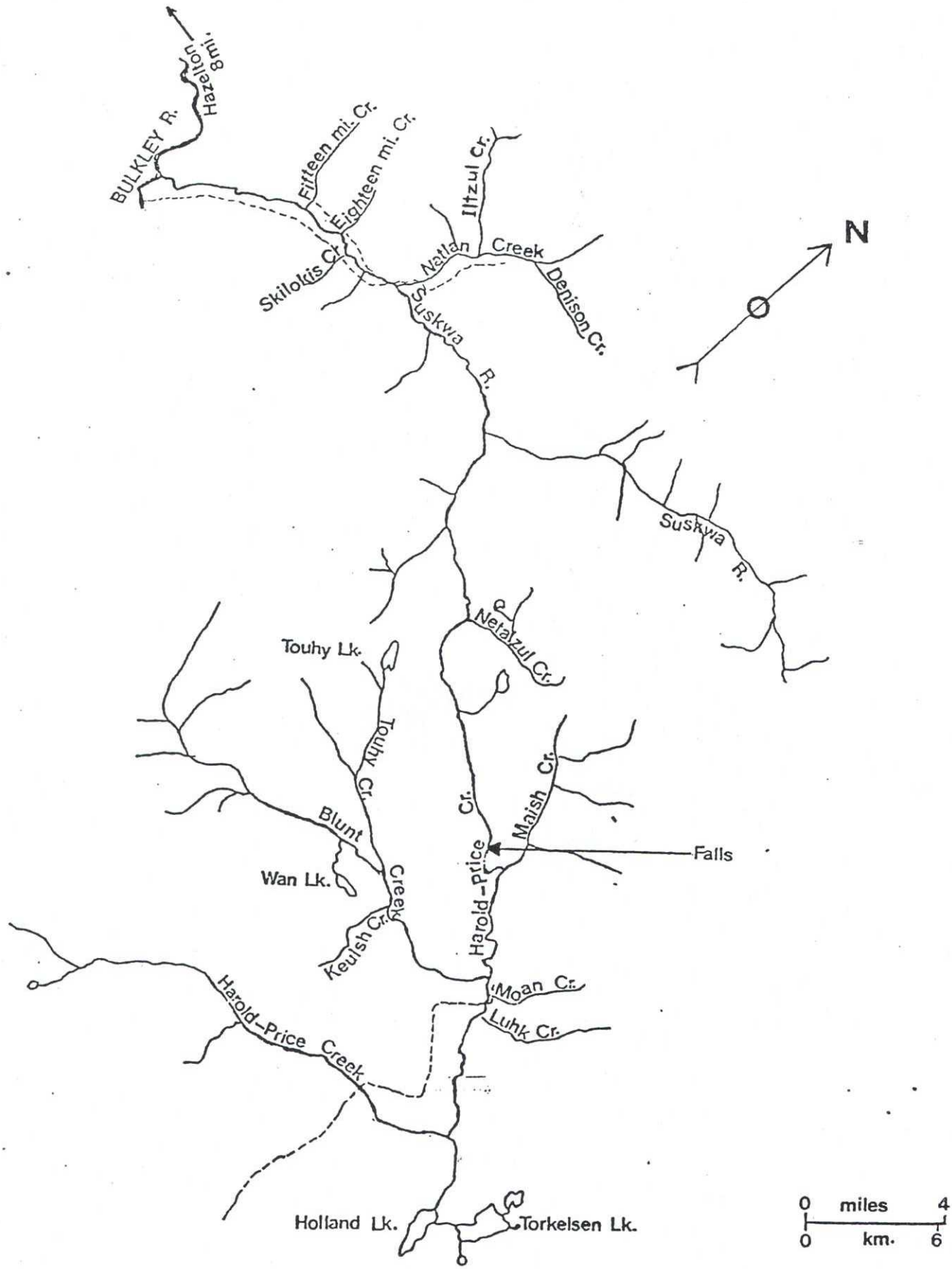
Suskwa Watershed Restoration Program 1996 Fisheries and Riparian Field Assesments and Prescriptions



Prepared by M. Jacobs
for Suskwa Restoration Society

Suskwa Watershed Restoration Program 1996
Fisheries and Riparian Impacts
Level II

Table of Contents



1.1 Suskwa River and tributaries

1.2 Introduction

From July to November 1996, field assessments were made of logging related impacts to fish, fish habitat and riparian areas throughout the Suskwa River watershed, as part of the Watershed Restoration Program. Funding of this program was provided through Forest Renewal British Columbia (FRBC).

Most sites were identified in 1995 as part of the "Level 1" Overview Assessment using historical data, aerial photographs and brief site visits by helicopter.

Additional impacts were noted during field assessments in 1996 as well as potential impacts that will need future assessment. An attempt was made to prioritize impacts according to fish presence or absence and degree of hazard to the fisheries resource. Subsequent remedial prescriptions were made, with cost estimates, for these impacts.

1.3 Methodology

Identified potential impact sites were gee-trapped using salmon roe as bait. Many sites also provided opportunities to dipnet fry, especially at sites were low flows inhibited trapping.

At sites were not fish were found, efforts were made to determine limiting factors (ie, barriers downstream) and potential rehabilitation.

Gee-trapping data from 1996 was combined with trapping data from 1995 for fish distribution throughout the watershed. Trapping success declined as stream temperatures dropped below 5°C in October.

Affirmed fish bearing and potential fish bearing streams were assessed using DFO/MOE stream survey forms and large woody debris tally cards in accordance with FHAP of the watershed restoration program. Riparian vegetation assessments were made at all identified impact sites using "A Field Guide to Site Identification and Interpretation for the Prince Rupert Forest Region" (Land Management Handbook #26).

Impact sites have been reference to 93M series map/block numbers and hierarchical watershed codes, developed from SISS maps in the "Level 1" report, in sequential order by priority of sub-basin. Reference to posted kilometre signs on Forest Service Roads were also made where appropriate (ie. culverts).

Although impacts have been rated (high, moderate or low priority), most low priority impacts do have cumulative effects that justify treatment objectives. These lower priority sites, though not immediately threatening to fish, pose threats to the long term productivity of these systems. High to moderate priority impacts have been described in detail and lower priorities (usually involving streamside planting) have been presented in the accompanying tables with projected costs.

Planting prescriptions and costs were based on an assumed 10 meter planting zone for each bank of any given stream, depending on whether the stream required vegetation on one or both banks.

1.3.1 Back-up calculations of costs and assumptions

Costs estimates (in table 1) include streamside planting figures and remedial instream works for crews with hand tools and/or heavy equipment, where applicable and electro-shocker fees where needed.

High priority sites requiring remedial works, especially at channel diversions, include helicopter time for aerial photography, prior to rehabilitation.

Planting figures were based on local nursery prices for "615" seedlings and approximate tree planting cost (per tree) from local tree-planting contractors. Planting areas (in hectares) were calculated based on an assumed 10m planting zone for each bank of stream, where applicable.

A target of 1200 stems per hectare was established for projected costs. A breakdown of individual costs is as follows:

Cost per tree: $1.00 (to plant) + .60 (to buy) - $1.60/tree
medium sized tracked hoe - $143.00/hour, lowbed - $91.00/hour,
chainsaw - $30.00/day, hand tools - $15.00/day, vehicle - $90.00/day,
wages: 3 person crew - $800.00/day, electro-shocker - $50.00/day,
helicopter - $715.00/hour

1.4 Results/Executive Summary

All impact sites, identified in the "Level 1" report, exhibited some form of impact to fish and/or fish habitat as a result of forest harvesting and/or road development.

The varied topography of the Suskwa drainage displays a variety of impacts to the fisheries resource. Streams of the Nechako Plateau (Harold Price Creek and tributaries) exhibited higher concentrations of fine sediment throughout their lower (usually less than 2%) gradient reaches. Accumulation of coarse sediment and organic debris was also more localized than in the more moderate (5 - 10%) gradients of the Suskwa and Natlan drainages. Sediment and debris were being transported over greater distances in the Suskwa and Natlan sub-basins.

The two greatest overall impacts to the fisheries resource, within the watershed, have been the loss of productive fish habitat by impassable barriers and the loss of streamside vegetation and respective riparian functions through the logging, burning, weeding and brushing of streamside communities.

Obstruction of stream channels by failed wooden box culverts, corduroy crossing and poorly placed metal culverts limit access to otherwise viable fish habitat. These site specific impacts are easily remedied by de-activation or replacement of these crossings.

Loss of streamside vegetation and the subsequent movement of organic debris and bedload downstream from erosion has had a cumulative effect upon the watershed as a whole.

Forest harvesting and stand-tending operations continue to destabilize stream channels in the Suskwa watershed. This has resulted in annual bank erosion, subsequent delivery of sediment and debris downstream, that frequently results in debris jams with sediment wedges and channel avulsions at these points.

These cumulative impacts are best remedied by establishing streamside vegetation, presently lacking on many streams within the watershed. Planting of mixed (deciduous and coniferous) species is needed to help stabilize channels and restore riparian functions in harvested settings.

Portions of the Harold Price, for example, exhibit herbs and grasses as the only established streamside vegetation since harvesting over a decade ago. Other areas have an established shrub (usually alder) component but often lack larger conifer tree species that will contribute to future LWD and bank stability.

Unconfined logged floodplains continue to be the most susceptible to site loss and erosion due to lateral channel movement.

2.0 High to Moderate Impacts by Sub-basin

2.1.0 BLUNT CREEK AND TRIBUTARIES

Passage of anadromous fish (coho salmon) through the Harold Price (H.P.) falls was confirmed Sept. 1995 by the angling of adults and gee-trapping of fry at the H.P./Blunt confluence and in Blunt Creek reach 1 respectively. Further gee-trapping and dipnetting of Blunt Creek in 1996, revealed coho fry (0+ and 1+) at the outlet of trib. (W.C. -700-50-30-55) in the upper end of reach 5. One adult coho male was angled at the Blunt/H.P. confluence pool September 19, 1996. Dolly Varden and cutthroat trout were also found at most sites in this sub-basin.

This sub-basin has sustained the most serious impacts to fish and fish habitat due to forest development, of all sub-basins within the Suskwa watershed. These impacts threaten resident and anadromous fish in Blunt Creek and associated tributaries.

2.1.1 Blunt Creek (Reach 1) Block 93M016-032 - *High Priority*

Fish/Habitat Assessment: This section of Blunt Creek braids out into the logged floodplain of block -032 below a large debris jam. This area is used extensively by coho juveniles (1+ and 2+) for rearing. Cutthroat trout and Dolly Varden were also gee-trapped in the debris jam and associated side channels and off-channel habitats. This debris jam presently provides juvenile rearing habitat in this reach and the presence of coho fry (0+) in reach 5 of Blunt Creek indicates that this obstruction is not a barrier to upstream migrants.

Impact Description: Harvesting of trees for 753m along Blunt Creek has de-stabilized banks and contributed to the erosion of Block -032. Downstream movement of organic and inorganic materials has in-filled pools and resulted in debris jams that continue to destabilize the stream channel. As a result, multiple side-channels and off-channel sloughs have been created that provide rearing habitat for coho juveniles. Lack of riparian vegetation in this area has left streambanks susceptible to erosion and continued site loss. Several pairs of kingfishers were observed feeding here when the area was assessed. Streamside vegetation is limited to grasses and herbs for most of this site.

Prescription: Streamside planting for channel stability and riparian functions is needed along banks and on islands in this area. Mixed fill-planting of cottonwood, willow, spruce, and pine is recommended over 1.5 hectares of this logged floodplain.

Note: This site provides an excellent opportunity for sampling of juvenile coho for relative abundance in the Blunt drainage.

2.1.2 Wan Lake and tributaries

Wan Lake supports a small but productive population of cutthroat trout and Dolly Varden. The outlet of the lake (Wan Creek) is obstructed by a series of beaver dams (1m.+) Tributaries flowing directly into the lake are therefore crucial spawning and rearing areas for these species. These streams include tributaries T1, T2, T3, T4 and two other streams through Block 93M016-028 that appear to have resulted from a natural diversion of trib. 46-700-30-35 on Goat Mountain (photo 1). Individual assessments are as follows:

2.1.3 Wan Lk. Tributary 1 (T1) (43.1 km Kuelsh FSR) - *High Priority*

Fish/Habitat Assessment: Cutthroat fry (0+) were dip-netted throughout the ditchlines adjoining the "T1" road crossing of the Kuelsh FSR and upstream of the road crossing through Block 93M016-029. Due to failed ditchblocks along the Kuelsh Rd., the lower portion of T1 has been de-watered. However, Dolly Varden were gee-trapped in isolated pools below the road crossing (photo 3.) This tributary retains good stream cover and sections of small "pea" gravels in the unharvested portions around Block 93M016-029. This stream appears to have been the largest inlet to Wan Lake prior to diversion. Average gradient of T1 to Block -029 is 3%.

Impact Description: This tributary has been de-watered downstream of the Kuelsh FSR due to a failed ditchblock. This stream now drains through a culvert 136 meters east its original channel (photos 2 and 3) at the spur road branch to Block 93M016-029. These flows spread out over aggraded materials, through the forest with no established channel. T1 also has sustained damage at the entrance to Block 93M016-029. Multiple blockages of the stream channel with logging debris and loss of riparian vegetation has occurred for 100m of stream (photo 4).

Prescription: Reinstatement of the stream to its original channel at the 43.1 km Kuelsh road crossing. This will involve re-construction of the ditchblock after a fry-salvage (with electroshocker) of adjoining ditch lines. Electro-shocking of ditchlines should be conducted in August only, after trout fry emergence and prior to Dolly Varden spawning. The 100 meter harvested section of T1 in Block 93M016-029 requires removal of logging debris from the stream channel and streamside mixed fill-planting for stability and riparian functions.

2.1.4 Wan Lk. Tributary 2(T2)(42.6 km Kuelsh FSR) - *High Priority*

Fish/Habitat Assessment: Gee-trapping of this tributary found no fish below the Kuelsh road crossing. However, sub-surface flows (through road grade materials downstream of the FSR) presently limit access to this altered tributary. The stream gradient up to the road crossing is 2% and short sections of good small gravels are located above the road crossing.

Photo 1 - Debris torrent through block 93m016-029 (northwest corner) from natural diversion of trib. 46-700-50-30-35 on Goat Mountain. Diversion of flows to this area has led to ditchblock failures at crossings along the Kuelsh FSR (downstream).

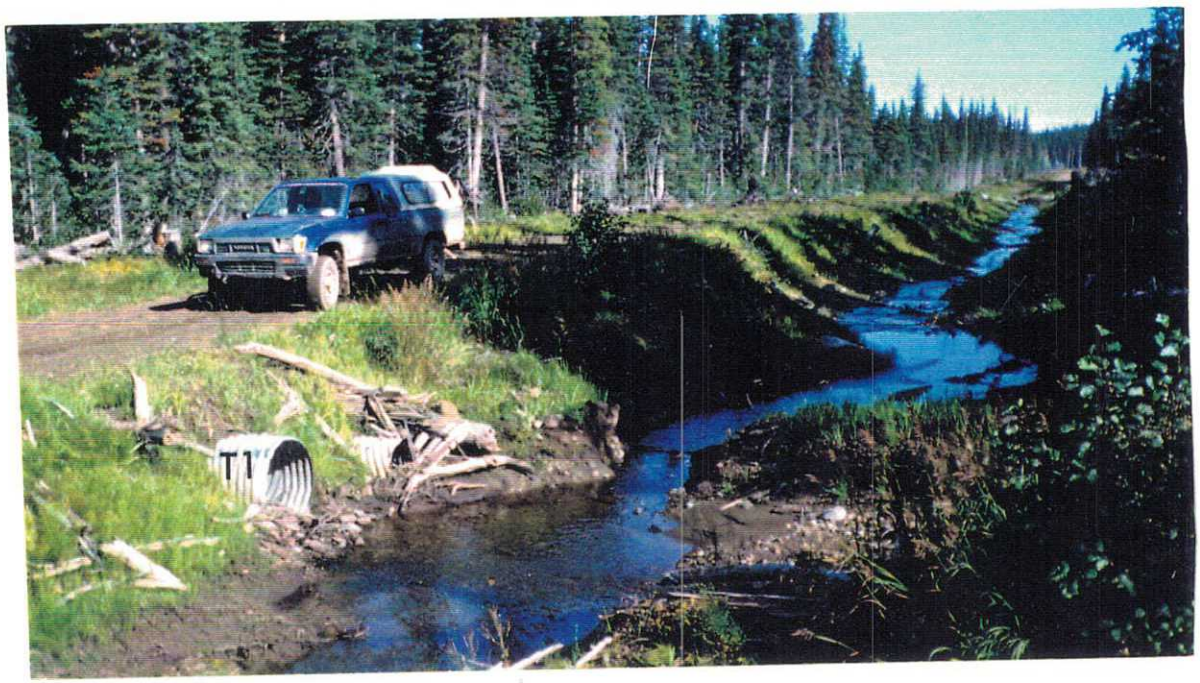


Photo 2. (top)
Failed ditch block at trib. 1 to Wan Lake. Flows continue east to next culvert. Cutthroat fry (o+) were found throughout this ditchline.

Photo 3. (left) Dewatered channel, below Kuelsh FSR (43.1 km) of Trib 1 to Wan Lake.
Dolly varden were stranded in the pools of this picture.
Sept. 10/96

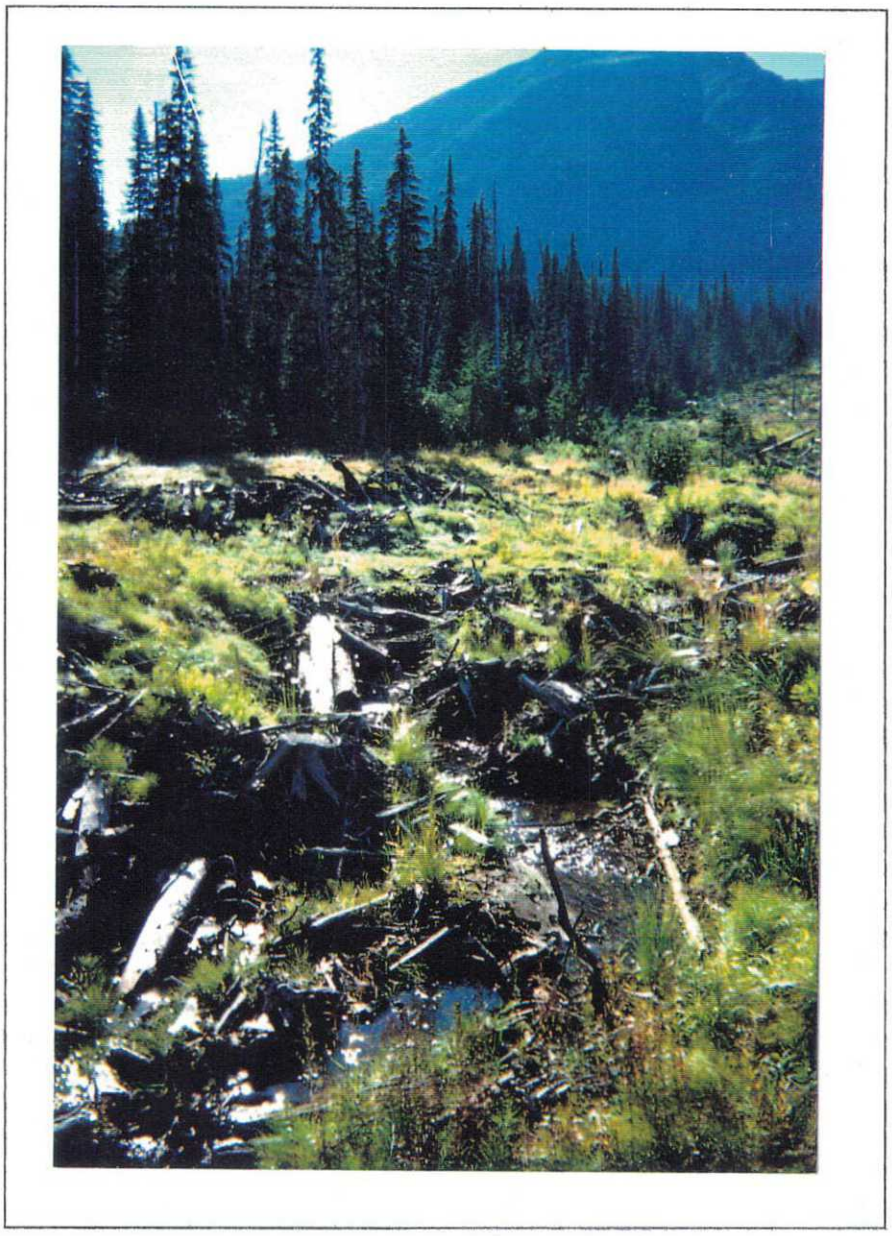


Photo 4. Trib.1 to Wan Lake at entrance to block 93m016-029. Removal of logging debris and streamside vegetation required over 100 meters.

Impact Description: This tributary, bordering the western boundary of Block 93M016-027 (photo 5) has been altered at the road crossing and a metal pipe culvert diverts flows northeast of the original channel (now de-watered.) This new channel braids-out, into the forest, over aggraded fines and gravels. Flows go sub-surface 30 meters below the FSR. The original channel has been (blue and white stripe) flagged. Four small debris jams block the stream channel at 1m, 4m, 68m and 75, upstream of the road crossing.

Prescription: This drainage should be returned to its original channel after a fry-salvage, of the newer aggraded channel, downstream of the Kuelsh road crossing. This will involve the replacement of the existing culvert at 42.6 km. This site should be electro-shocked in August after trout fry have emerged and before fall spawning occurs. All four of the small blockages upstream of this crossing can be removed with hand tools within one day.

2.1.5 Wan Lk. Tributary 3(T3)(42.4 km Kuelsh FSR) - *Moderate Priority*

Fish/Habitat Assessment: this small tributary, through the centre of Block 93M016-027 (photo 5), is inaccessible to fish above the Kuelsh road crossing (42.4 km.) No fish were found when this stream was gee-trapped below the road crossing. Fish habitat on this stream is limited to the short section between the Kuelsh FSR and Wan Lake. The stream channel above the road crossing is indiscernible for most of its course through Block 93M016-027. This stream was the smallest trib. investigated around Wan Lake.

Impact Description: The metal pipe culvert, at this crossing, has a .65 meter drop at its outlet to the stream and no jump pool. This culvert could be repositioned to allow access upstream. however, trib. 3 has been logged over and through for 777 meters in Block -027. Multiple debris blockages (100+), sub-surface flows and an indiscernible channel in the upper wetted portion of the cutblock limit habitat available on this heavily impacted tributary. This trib. lacks riparian vegetation throughout Block -027 for 777 meters.

Prescription: Streamside mixed fill-planting over 777 meters through Block 93M016-027 for water quality. Possible culvert replacement at (42.4 km) road crossing to restore access. Efforts may be more appropriately applied to other streams impacted in this area, with regards to rehabilitation.

2.1.6 Wan Lk. Tributary 4(T4) (41.9 km Kuelsh FSR) - *High Priority*

Fish/Habitat Assessment: No fish were found on this trib. when gee-trapped, below the road crossing Oct. 16, 1996. However, sections of good (small) spawning gravels exist upstream and downstream of the Kuelsh road crossing (presently impassable.)

Photo 5. Wan Lake and the tributaries. Additional water from Goat Mountain diversion also traverses block 28 and (0+) cutthroat trout were dip-netted in spur road ditchlines.

Stream gradient is 2% up to the road crossing. Harvesting of timber along this stream (in Block 93M016-027) was ongoing during "Level 2" Assessment (photo 6.)

Impact Description: The culvert at this road crossing has a .5 meter drop with no established jump pool at its outlet. The excavated ditchline on the upstream side of the culvert also presents an obstacle to fish. Ongoing forest harvesting, at the time of assessment, was contributing to the loss of riparian vegetation, the creation of multiple instream blockages, destabilization of the stream channel and the delivery of fine and course sediment to this tributary. Harvesting of timber, over this stream, begins at the Kuelsh road crossing and continues 461 meters upstream along the eastern boundary of Block 93M016-027.

Prescription: Re-assessment of this tributary will be required in 1997 to establish prescriptions for revegetation and assess fish and fish habitat impacts. Removal of trees, felled over and into the stream, is scheduled for winter 1996/97. The culvert at the Kuelsh road crossing should be replaced to restore access to this stream. The grading of the southern ditchline would improve access upstream of this road crossing as well.

2.1.7 W.C. 46-700-50-30-35 (Spur J at 43.1 km Kuelsh FSR) - *Moderate Priority*

Fish/Habitat Assessment: This newly created stream channel was formed as a result of a natural diversion of trib. 46-700--50-30-35 above Block 93M016-029 on Goat Mountain. No fish data was collected in Block -029. However, (0+) cutthroat fry were dip-netted on this trib. and in ditchlines downstream in Block 93M016-028. Stream gradient of this trib. is 8% at Block -029. This gradient decreases on approach to Wan Lake. This heavily aggraded trib. lacks streamside vegetation on its eastern banks in Block -029. Bedload deposits have in-filled pools and resulted in the braiding of the stream channel.

Impact Description: The western boundary of this cutblock has a (3 meter) deep channel that fans out into a (60-100 meter) swath of gravels, cobbles and boulders as a result of the natural diversion on Goat Mountain. This debris torrented portion (photo 1) of Block -029 continues to transport bedload materials through the forested "leave strip" to Block 93M016-028. Erosion of the stream bank is enhanced by the lack of stabilizing vegetation in Block 93M016-029.

Prescription: The debris torrented area through Block 93M016-029 requires mixed fill-planting (for channel stability) for 464 meters on the blocks western boundary. Planting of willow, cottonwood and pine is recommended. Planting of the aggraded area should be attempted. Block 93M016-028 will require further assessment in 1997.

Photo 6. Trib 4. to Wan Lake in Block 93 m016-027 (under fallen logs)
Ongoing forest harvesting, during October 1996, and subsequent removal of timber (winter 1996/97) will require reassesment of this tributary for fish/forestry impacts in 1997.

2.1.8 (W.C.) 700-50-30-110 (24.4 km Blunt 2000 Rd.) - *High Priority*

Fish/Habitat Assessment: This stream when assessed contained fry of the year, juvenile and adult cutthroat trout immediately above and below, as well as inside the 900mm metal pipe culvert. Cutthroat trout, at this crossing, were limited to approximately 60 meters of available habitat. Two cutthroat adults were dipnetted in the centre of this culvert.

Impact Description: Upstream migration, at present, is obstructed at the entrance to block 93M005-004 by "shot rock" used in spur road construction (photo 7). This spur road should be forded and the natural gradient returned to the stream. No fish were gee-trapped above this obstruction. Downstream movement has been impeded by a channel diversion, the 900mm culvert being placed 30 meters east of the original channel, now de-watered (photo 8). The new watercourse fans out over aggraded bedload material into a fen with no distinguished channel. The old (de-watered) channel meanders through a series of ponds before joining Blunt Creek in reach 7. Erosion of streambanks has been enhanced by the lack of riparian vegetation at this site.

Prescription: Continued assessment of this tributary downstream of the road crossing will be necessary prior to re-instating flows to the original channel. A fry-salvage with the use of an electro-shocker, will be necessary on the new channel should flows be redirected to the old channel. This should be conducted in August. An effort to determine presence and distribution of fish through the new channel and downstream fen area is needed prior to redirecting flows. Lack of streamside vegetation will require mixed fill-planting for stream cover, bank stability and future LWD at the entrance to block 93M005-004 for 60 meters.

2.1.9 W.C. 46-700-50-30-55 (30.4 km Blunt 2000 FSR) - *High Priority*

Fish/Habitat Assessment: The lower reach of this tributary is comprised of a series of beaver ponds that support rearing coho fry and Dolly Varden (photo 10.) This appears to be the upper limit of distribution for coho within the Blunt drainage, that is known thus far. This stream, within Block 93M015-020, retains a gradient of 8%. This decreases prior to joining Blunt Creek. No fish data was recorded within Block -020. Small "pea" gravels were available on this tributary.

Impact Description: This stream has been logged to and through despite efforts to establish a riparian buffer within Block -020 (photo 9.) Sedimentation from forest harvesting and road development on this stream, was aerially photographed Oct 18, 1995 (see "level 1" Mosaic Blunt #8.) Multiple blockages of logging debris obstruct this stream beginning 161m downstream of the Blunt 2000 Rd. Loss of streamside vegetation and mechanical disturbance has reduced channel stability and exposed this stream for 388 meters.

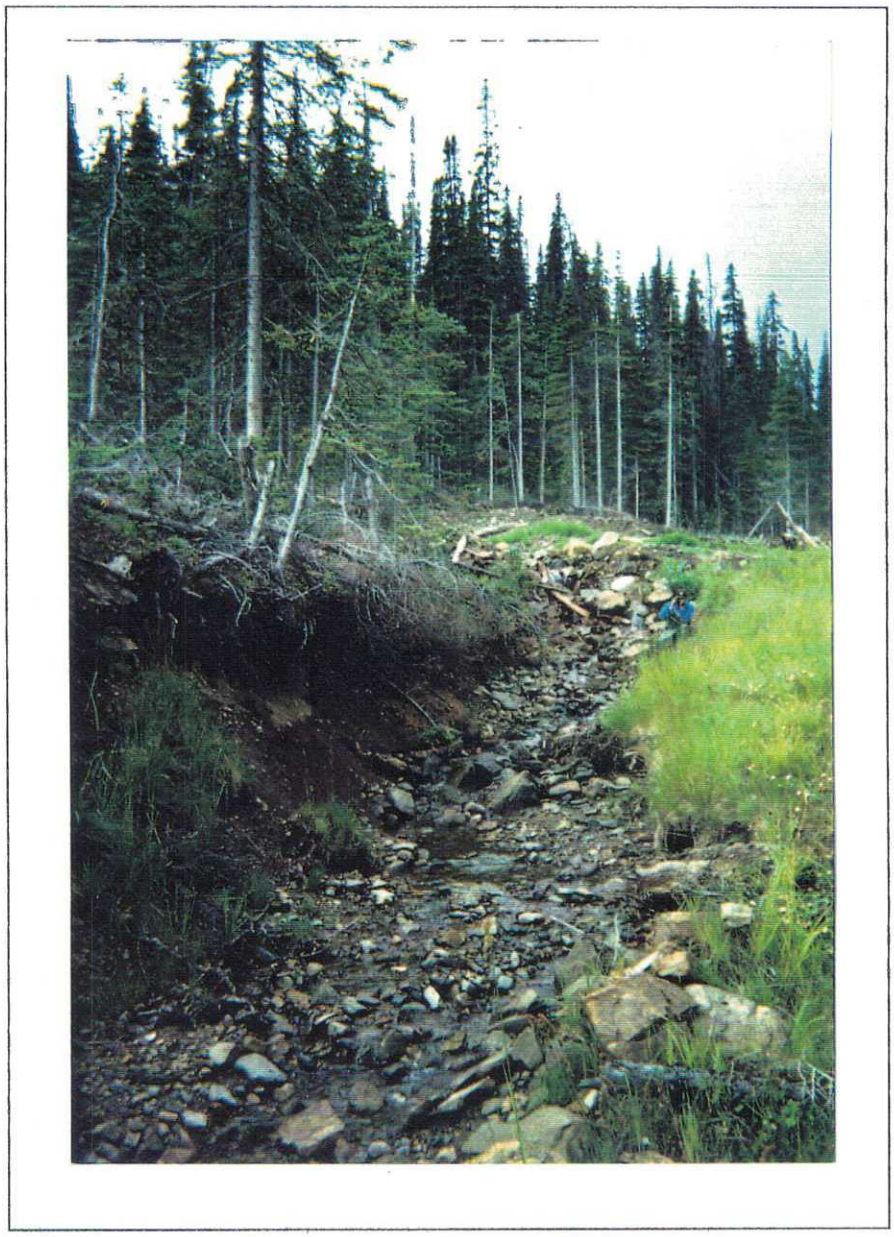


Photo 7. Trib. 46-700-50-30-110 at entrance to block 93m005-004 (24.4 km Blunt FSR)
Road grade materials block access upstream of the spur road (center).
Improper culvert placement dewatered the stream channel downstream of this point.
Cutthroat trout (0+, 1+ and adults) were dip-netted in this isolated 60 meters of stream..

Photo 8. Trib 46-700-50-30-110 from spur road obstruction(lower right) in block 93M005-004 (24.4 km Blunt FSR). This diverted streams original channel splays out over aggraded road materials (upper right). A significant amount of wetland area was dewatered as a result of this diversion. Cutthroat trout (0+,1+, and adults) were dipnetted in this isolated section of stream. Adult cutthroat were found residing inside the culvert in this photo.

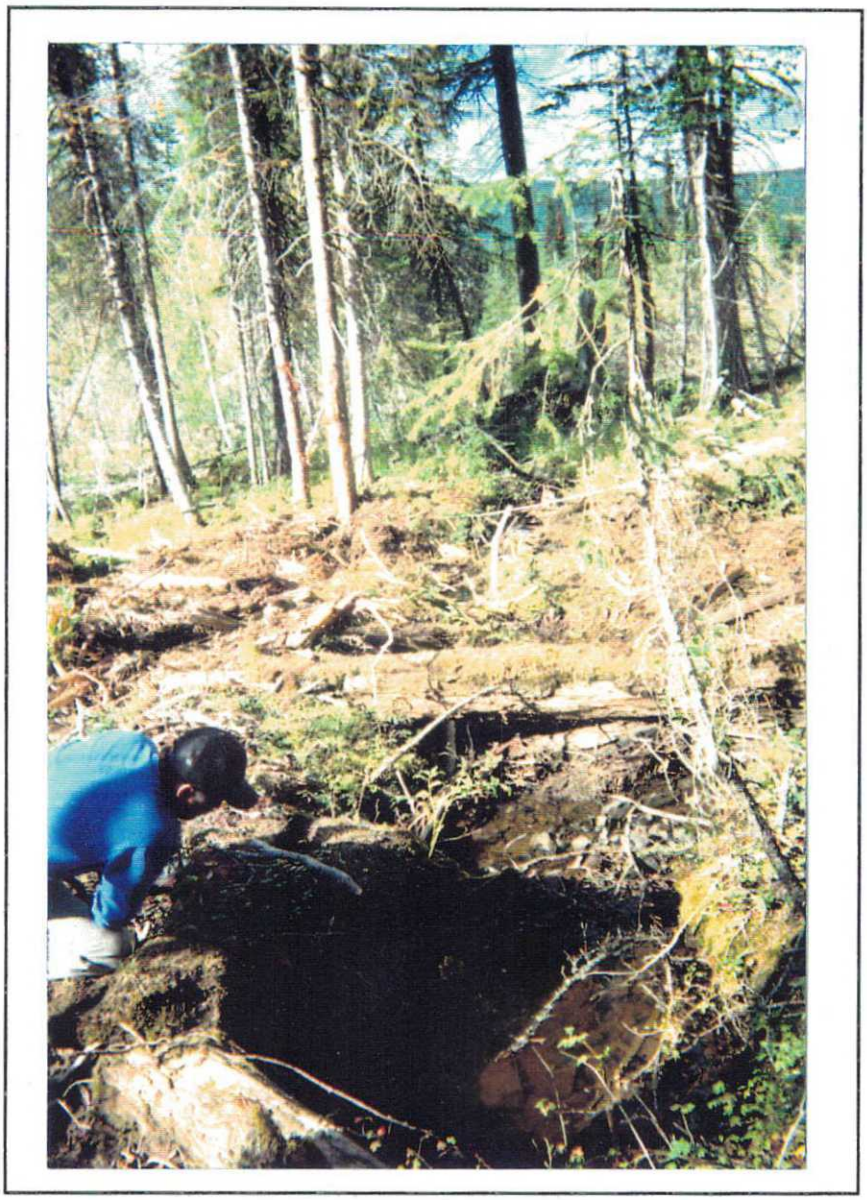


Photo 9. Trib. 46-700-50-30-55 in block 93M015-020 (30.4 km Blunt FSR). Skid trail through creek (at center) and multiple blockages of logging debris. Logging contractor fell trees inside a flagged riparian management zone. Coho juveniles (0+ and 1+) were gee-trapped downstream at beaver pond complex.

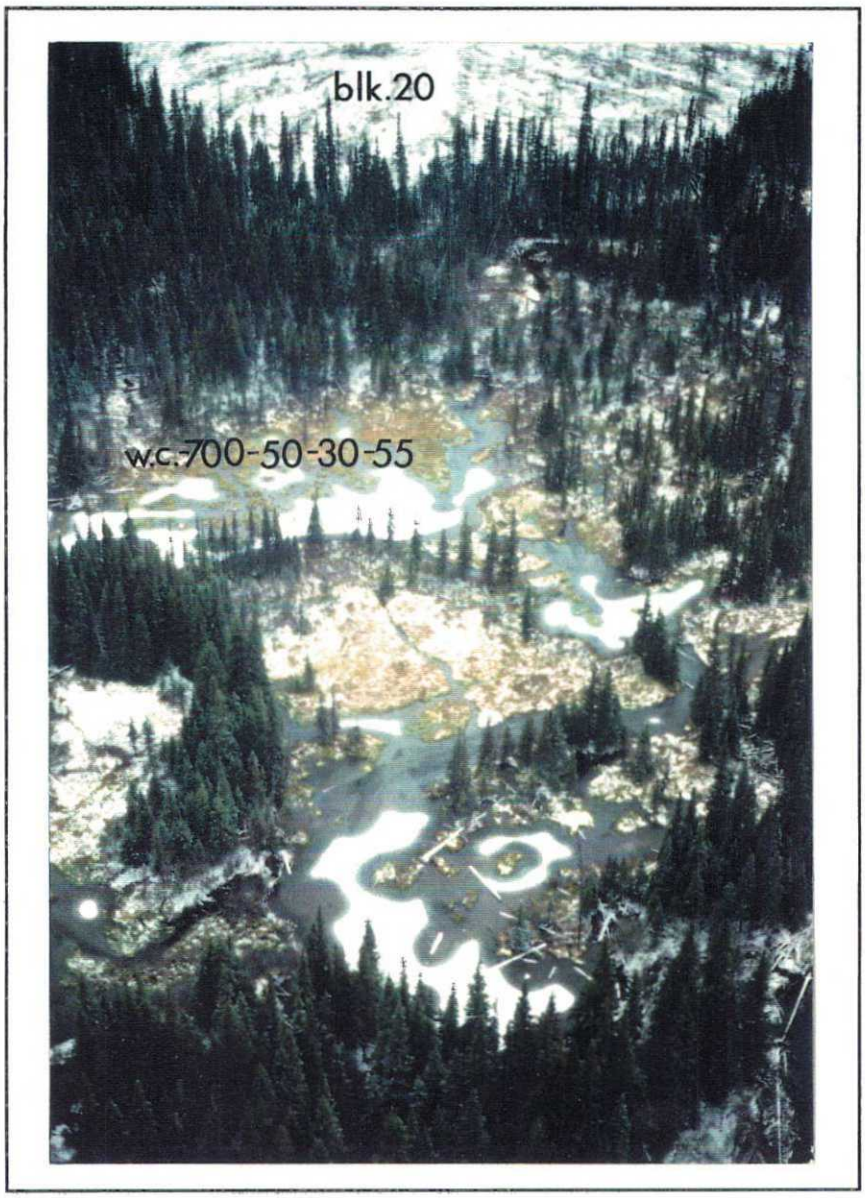


Photo 10. Trib. 46-700-50-30-55 beaver pond complex and block 93M015-020. Coho juveniles(0+ and 1+) were found rearing here. These ponds join Blunt Creek at the upper end of Reach 5. Sedimentation of these ponds, through blk.20 development was aerially photographed for the "level 1" report in mosaic - Blunt #8 Oct., 1995.

Prescription: Removal of small blockages beginning 161m below Blunt 2000 Rd. crossing. This may be accomplished with hand tools and a small crew in one day. Streamside mixed fill-planting is recommended for 388 meters through Block -020 for channel stability and to fulfil riparian functions.

Modification of the H.P. falls was accomplished by blasting, in 1978 to assist anadromous fish passage to the Upper Harold Price drainage (Chudyk, 1978).

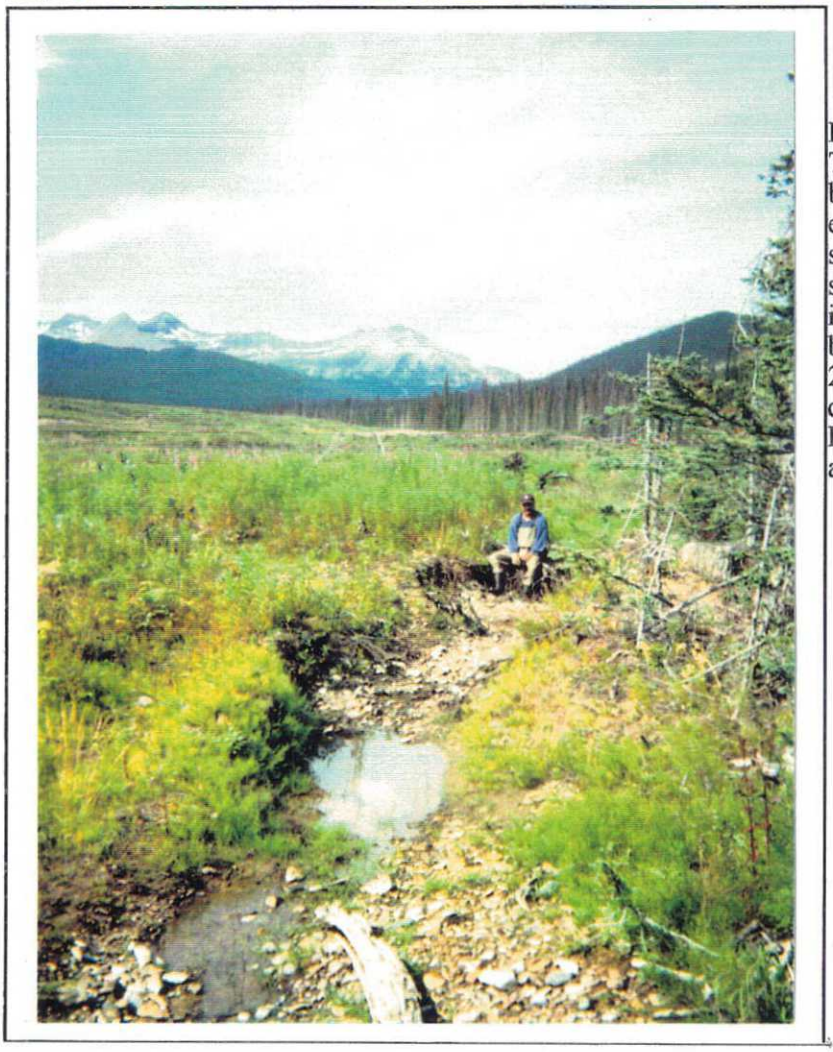
Coho salmon successfully negotiate these falls, as was confirmed during the Suskwa WRP 1995. It appears that excellent rearing habitat, available on Blunt Creek for this species, is presently under-utilized. An opportunity exists for enhancement of coho stocks in this area. The Toboggan Creek Fish Hatchery has expressed interest in such a program. Enhancement may provide future opportunities for assessment with regards to exploitation and timing of runs. This species appears to have been decimated on other tributaries within the watershed (ie. Natlan)

2.1.10 W.C. 46-700-50-30-115-010 (21.3 km Blunt 2500 FSR) - *High Priority*

Fish/Habitat Assessment: This tributary, when gee-trapped, revealed an abundant population of Dolly Varden above and below the road crossing. This stream, bordering Block 93M015-002 for 1645 meters, lacks adequate riparian vegetation (photo 11) along its western banks. Ample (small to large) gravels exist as a result of bedload delivery to the stream channel. There appears to be limited depth to existing pools except at debris jams and bedrock outcroppings. Stream gradient is 2%.

Impact Description: Two channel diversions have occurred as a result of improper bridge placement, and a debris jam of harvested material located 357 meters downstream of the road crossing. The bridge site has channelled flows into Block -002, and an estimated 350 cubic meters of till has been deposited downstream. A debris jam and subsequent sediment wedge seasonally forces flows onto the blocks fireguard (photo 12) 357 meters downstream of the 2500 road bridge. Another potential diversion exists at a similar debris jam 259 meters downstream of the FSR. Loss of streamside vegetation for 1600 meters, along Block -002, continues to enhance erosion of organic and inorganic materials along the streams western banks. The infilling of pools is apparent on this aggraded channel, especially downstream of the FSR crossing.

Prescription: The disassembly of two debris jams located 259m and 357m downstream of the Blunt 2500 road bridge will help retain flows in their original channel. This could be accomplished with hand tools and a small crew in several days. Streamside mixed fill-planting of willow, spruce, and pine is recommended for 1600 meters of stream bank along Block -002. This is important if channel stability and riparian components are to be restored at this heavily impacted site.



Photos 11 and 12
Trib. 700-50-30-115-010(top) and block 93M015-002. Actively eroding logged flood plain needs streamside vegetation. Debris jams seasonal flows onto fire guard (left) in block 93M015-002 357 meters below the road crossing (21km Blunt 2500 FSR). Channel avulsion at crossing needs stability. Numerous Dollyvarden were gee-trapped above and below the road crossing.

2.2.0 LOWER HAROLD PRICE CREEK AND TRIBUTARIES

2.2.1 Harold Price Creek (Reach 1) - *High Priority*

Fish/Habitat Assessment: A series of shallow side-channels along the southwest side of Harold Price Creek was found to support an abundant population of rearing (1+) chinook fry when gee-trapped July 25, 1996. The extent of these channels remains unknown, but it appears, from "level 1" mosaics, that an extensive network of these channels run adjacent to the Harold Price mainstem and are fed by tributaries draining the northeast slopes of Blunt Mountain.

Impact Description: Ongoing road development and forest harvesting at the time of assessment, was contributing fine sediments to this area from the new portion of the Hamblin main FSR and associated timber sales. There are six cutblocks scheduled for harvesting along this southwest side of the Harold Price on and around tributaries feeding this high value rearing area.

Prescription: Due to the high value rearing habitat identified along this section of the Harold Price (and limited knowledge as to the extent of use) a detailed fish/fish habitat assessment should be made of tributaries W.C. 46-700-50-001, -024, -3.7, -4.4, -4.7 and -4.9 in 1997.

2.2.2 Camp Creek W.C. 46-700-50-14

General Fish/Habitat Description: An impassable 2 meter falls exists 381 meters upstream of the Harold Price confluence on Camp Creek. Cutthroat trout were gee-trapped on Camp Creek and trib. 46-700-50-14-15 and angled in Camp Lake upstream of these falls. Cutthroat trout also spawn and rear in an unlabelled "feeder" stream (photo 13) that enters Camp Lake at the entrance to block 93M025 x 2 (branch 53.1A km). The lower gradient slower moving section of Camp Creek, immediately below the lake, exhibits good overall cover and sections of small gravels ideal for cutthroat trout. Visual observations of fry were made downstream to trib. 46-700-50-14-15 where increased gradient (8%) and cascade/riffle sequences occur. The use of Camp Creek by anadromous species, below the falls, remains unknown.

Impact Description: An adequate road crossing and limited harvesting related impact were observed on Camp Creek (see associated tributaries.)

Prescription: No treatment (see associated tributaries, as follows).

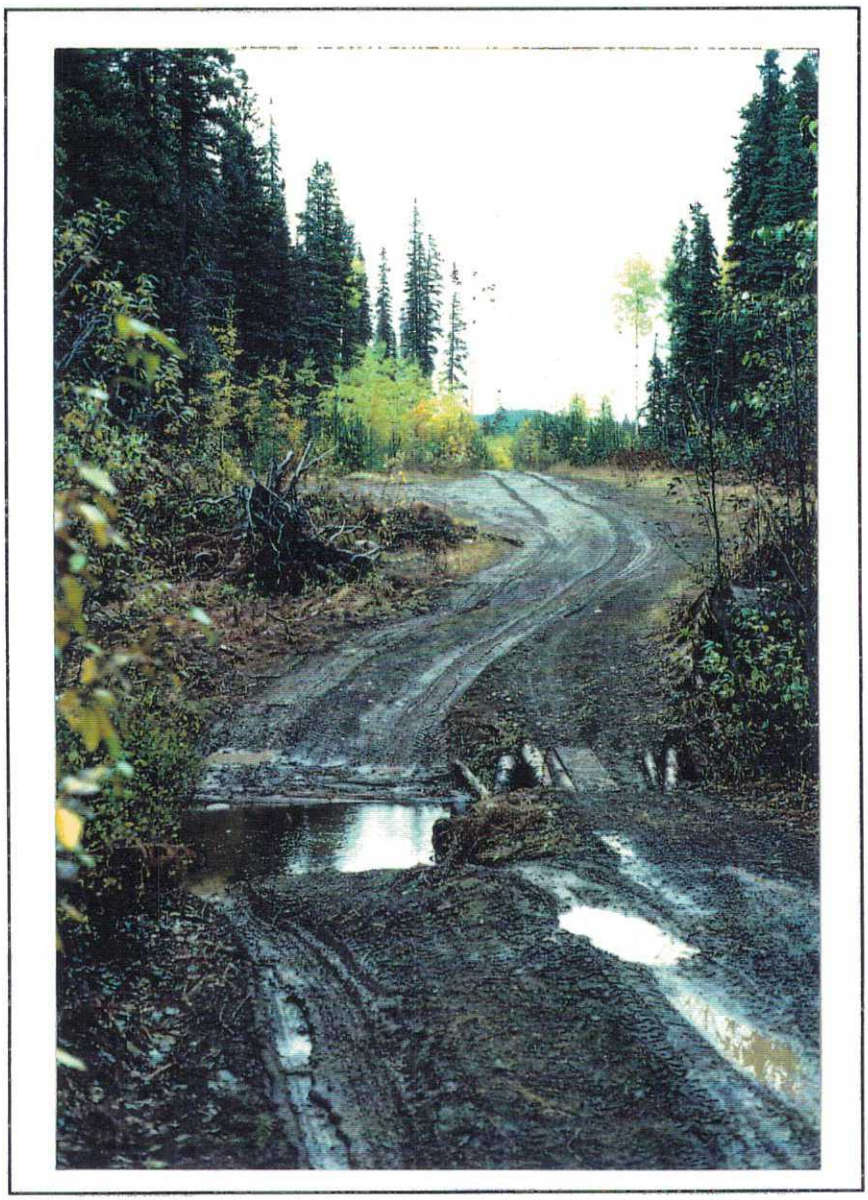


Photo 13. Unnamed tributary to Camp Lake at entrance to block 93M205 x 2. Unarmoured ford contributes sediment to Camp Lake and stream. Cutthroat trout spawned at this crossing in 1990 when access was limited to pedestrian traffic (footbridge) only.

Camp Creek Tributaries

2.2.2a W.C. 46-700-50-14-15 - *High Priority*

Fish/Habitat Assessment: This stream drains through Block 93M026-005. One adult cutthroat trout was gee-trapped, inside the metal pipe culvert, at the second crossing upstream of the Camp Creek confluence. Ample large woody debris exists on this trib. The substrate is comprised primarily of fine sediment with limited spawning gravels available. Average stream gradient is 15%. This stream exhibits good initial shrub cover (alder, willow.)

Impact Description: Two metal culverts (on spur D in Block -005 and in Block -006) present obstruction to fish migration. The lower crossing (photo 14) plunges 1 meter, at its outlet, to a marginal jump pool. The upper crossing (Block -006) is plugged with debris and has a .75 meter drop onto rocks. A failed corduroy crossing also exists 70m upstream of the upper crossing in Block 93M026-006.

Prescription: The upper and lower spur road culverts should be removed in Blocks -005 and -006. Stream blockages, including the corduroy crossing in Block -006, are easily accessed via existing roads. Subsequent mixed fill-planting of these sites and exposed portions of this stream for 3362 meters is recommended for future LWD, channel stability and associated riparian functions.

2.2.2b Camp Lake Tributary (Block 93M025 x2) - *High Priority*

Fish/Habitat Assessment: This stream, unmentioned in the "level 1" report, represents the bulk of flows into Camp Lake and is utilized by cutthroat trout for spawning and rearing. Cutthroat were observed spawning, at this road crossing (photo 13) in 1990, prior to the fording of this stream. The ford recently replaced a small foot bridge that limited vehicle access to this area. Detailed habitat information on this tributary was not acquired during the 1996 field season.

Impact Description: Vehicles accessing Block 93M025x2 and Camp Lake presently drive through this stream and are contributing fine sediments to this trib. and Camp Lake. Impacts, upstream of this crossing (if any), remain unknown.

Prescription: An effort should be made to exclude vehicle traffic from this stream as the existing ford lies on top of a known spawning site for cutthroat trout. A wooden box culvert or permanent vehicle barrier (ie: boulders) should be placed at this crossing. Further assessment of this stream should be conducted through Block 93M026-003 in 1997 to determine possible logging related impacts upstream of Camp Lake and this crossing.

Photo 14. Trib. 46-700-50-14-15 lower spur road crossing (obstruction). One adult cutthroat trout was gee-trapped upstream of this site. This spur road is scheduled for de-activation and the culvert is to be removed.

2.2.2c W.C. 46-700-50-14-60 (53.8 on branch 53.1/Upper Fulton FSR) - *Moderate priority*

Fish/Habitat Assessment: This small tributary, when gee-trapped, was not found to retain fish. It is not known if it is accessible downstream of the road crossing to fish from Camp Creek.

Impact Description: The stream channel has been diverted to the ditchline for 200m and drains SW of original channel (now flagged).

Prescription: Removal of berm at culvert outlet to restore flows to original channel. This must be conducted after a fry-salvage of new drainage (August only).

2.2.3 Lower Harold Price Creek (Reach 4) - *High priority*

Fish/Habitat Assessment: The Harold Price Falls, located within this reach, represents the upper limit of distribution for some anadromous fish species and an obstacle for others. The 1995 overview flights revealed coho salmon attempting jumps at these falls and a large brown bear was observed on one occasion. One gee-trap was also ravaged by bear(s) at the falls.

Impact Description: A cutblock scheduled for harvesting is planned immediately above this site and may impact wildlife values (ie. grizzly).

Prescription: An assessment of tributaries 046-0700-50-17.6 and -17.7, in this proposed cutblock, and game trails accessing the falls, should be conducted in the 1997 field season.

2.2.4 Maish Creek Tributary (W.C. 46-700-50-20-60) 49.3 km U. Fulton FSR - *High Priority*

Fish/Habitat Assessment: Maish Creek drains extensive marshlands along the Upper Fulton FSR. Dolly Varden, when gee-trapped, were found below this FSR crossing only (Sept. 1995.) This stream retains sections of small gravels and good cover, and, to date, limited forest harvesting. Stream substrate is algae-covered with deposits of organic sediment and frequent instream vegetation. Stream gradient is 2% at the road crossing.

Impact Description: This 900mm metal pipe culvert (photo 15), at 49.3 km Upper Fulton FSR, obstructs fish passage upstream. No fish were found above this crossing, when gee-trapped, in 1995.

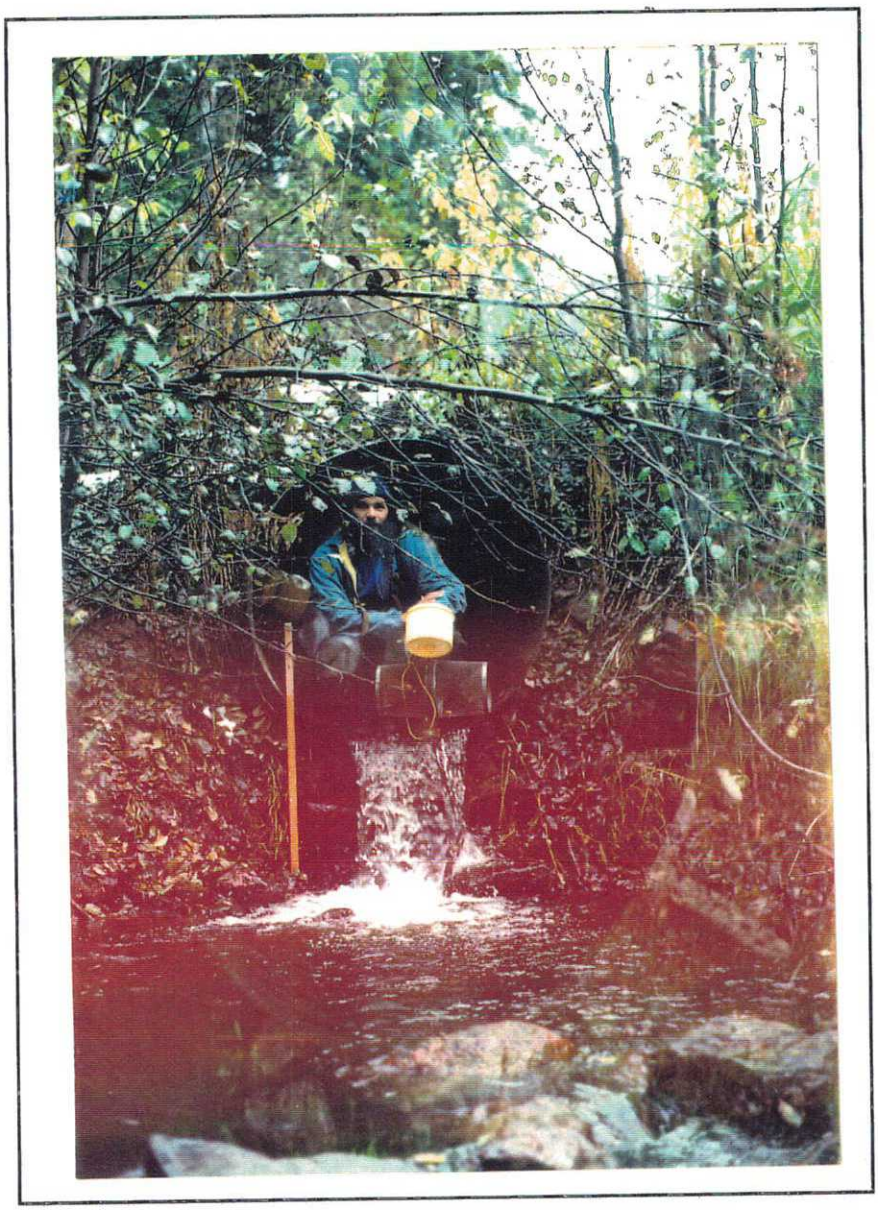


Photo 15. Trib 700-050-20-60 (49.3 km) Upper Fulton FSR. Culvert obstructs fish passage. Gravid dolly varden were gee-trapped up to this crossing, but not above. Fall/1995.

Prescription: Replacement of existing culvert to ensure access for resident fish. This should be done in August, only after trout fry have emerged and before char commence spawning.

2.2.5 Maish Creek Trib. (W.C. 46-700-50-20-55) 49 km Upper Fulton FSR - *High Priority*

Fish/Habitat Assessment: This tributary to Maish Creek drains extensive marshlands along the Upper Fulton FSR. Dolly Varden were observed spawning immediately below the road crossing (Sept. 1995.) Cutthroat trout were gee-trapped at this crossing during the 1996 field season. Sections of small gravels, good instream cover and undisturbed riparian vegetation benefit this portion of the Maish drainage. Stream gradient at road crossing is 2%.

Impact Description: The wooden box culvert (WBC) at this site (49 km Upper Fulton FSR) is presently failing into this stream.

Prescription: Replacement of existing culvert. It is recommended, for retention of existing spawning habitat, that another WBC replace the existing one. This, as well, should be done in August to minimize impacts to resident fish.

2.2.6 Paask Creek (W.C. 46-700-50-20-10) 45 km U. Fulton FSR - *Moderate Priority*

Fish/Habitat Assessment: Dolly Varden spawners (with milt) were gee-trapped at the Upper Fulton FSR crossing at the lower Block 93M026-008 boundary in 1995. No fish were found when this site was trapped in 1996. Stream gradient at the road crossing is 11%, but increases (to 23%) 280m upstream of the road crossing. Cascade/pool sequences dominate the channel upstream of the FSR. Drops of 1 meter or more exist at debris jams and bedrock outcroppings. In-filling of the stream channel, with eroded bank materials, is apparent throughout the cutblocks this stream transects.

Impact Description: The ford at the Upper Fulton FSR crossing is contributing fine sediment to the stream channel, especially during fall hunting season when vehicle traffic is heavy in this area. Portions of this stream have been brushed of initial shrub cover and lack stabilizing vegetation. Subsequent downstream movement of bedload has resulted from bank erosion and there has been a loss of riparian components through a total of 998 meters of cutblock. A valley wall failure off of Block 93M026-031 at the Maish/Paask confluence (photo 16) is enhanced by the lack of stabilizing vegetation along the terrace edge.

Prescription: Road crossing required. An abandoned metal bridge deck located 20 meters SW of the crossing may suffice if structurally sound. Streamside mixed fill-planting for channel stability and riparian functions is recommended from the FSR

Photo 16. Failure to Maish Creek at Passk Creek confluence from block 93M026-31. Planting of terrace edge is recommended for 50 meters.

crossing to the upstream block boundary (998m.) Planting of the terrace edge of the Block 93M026-031 (for 50m) has been included in the Maish Creek prescription.

2.2.7 Lower Harold Price Creek (Reach 6) - *High Priority*

Fish/Habitat Assessment: This reach of the Harold Price is characterized by extensive riffles and glides with few available pools for 6356m of stream. Coho salmon, cutthroat trout, Dolly Varden and mountain white fish were found along this reach when gee-trapped during 1995/96. Good initial shrub cover (primarily sitka alder) exists for most of this reach. However, large woody debris (LWD), present and future, is lacking especially in reach 6a (along Block 93M016-016.) Existing instream cover is limited to the occasional pool and instream boulders. Six pieces of large woody debris were tallied over 538m of stream. Average wetted widths over 20 meters classifies this stream as "S1" (according to F.P.C. classifications 1995). Average stream gradient is 2%.

Impact Description: Loss of riparian components for 6356 meters. Limited existing and future LWD especially along Block 93M016-016. Stand tending operations have removed streamside shrub cover and spruce in this area suffer an unknown affliction (photo 17). This area was aerially treated with vision (roundup) in 1990, for brush control, and lacks hardwood riparian components (photo 18) along reach 6a.

Prescription: Mixed fill-planting for 6 km along the SW bank and 1.5 km along the NW bank. Pine is recommended over spruce with willow and cottonwood. LWD placement is possible here if logs are angled downstream. However, access to each 6 is limited within Block -016.

2.2.8 Tsouts Creek (W.C. 46-700-50-24) (42.2 km Fulton FSR) - *High Priority*

Fish/Habitat Assessment: Tsouts ("tsouts" is Gitksan for "bird") supports cutthroat trout, Dolly Varden, and rearing coho. Despite a gradient of 20% at the Fulton FSR crossing, Dolly Varden were observed spawning 1,557m upstream in the upper portion of block 93M016-021. October 1, 1996. Cutthroat (0+) and coho (1+) juveniles were dipnetted downstream of the crossing in cascade/pool sequences and off-channel areas near the H.P. respectively.

Impact Description: The wooden box culvert over Tsouts Creek is presently failing, and should be replaced. Good initial shrub cover exists below the road crossing, but lacks future LWD, and bank stability. Multiple debris jams and a lack of shrub and tree species, upstream of the FSR, needs remedial work.

Prescription: Streamside mixed fill planting using willow, cottonwood, pine and spruce is recommended for a total of 5,806m of stream bank through Blocks 93M016-021 and -030. Replacement of existing WBC with new WBC. Future monitoring of debris jams and channel morphology upstream of the FSR is recommended.

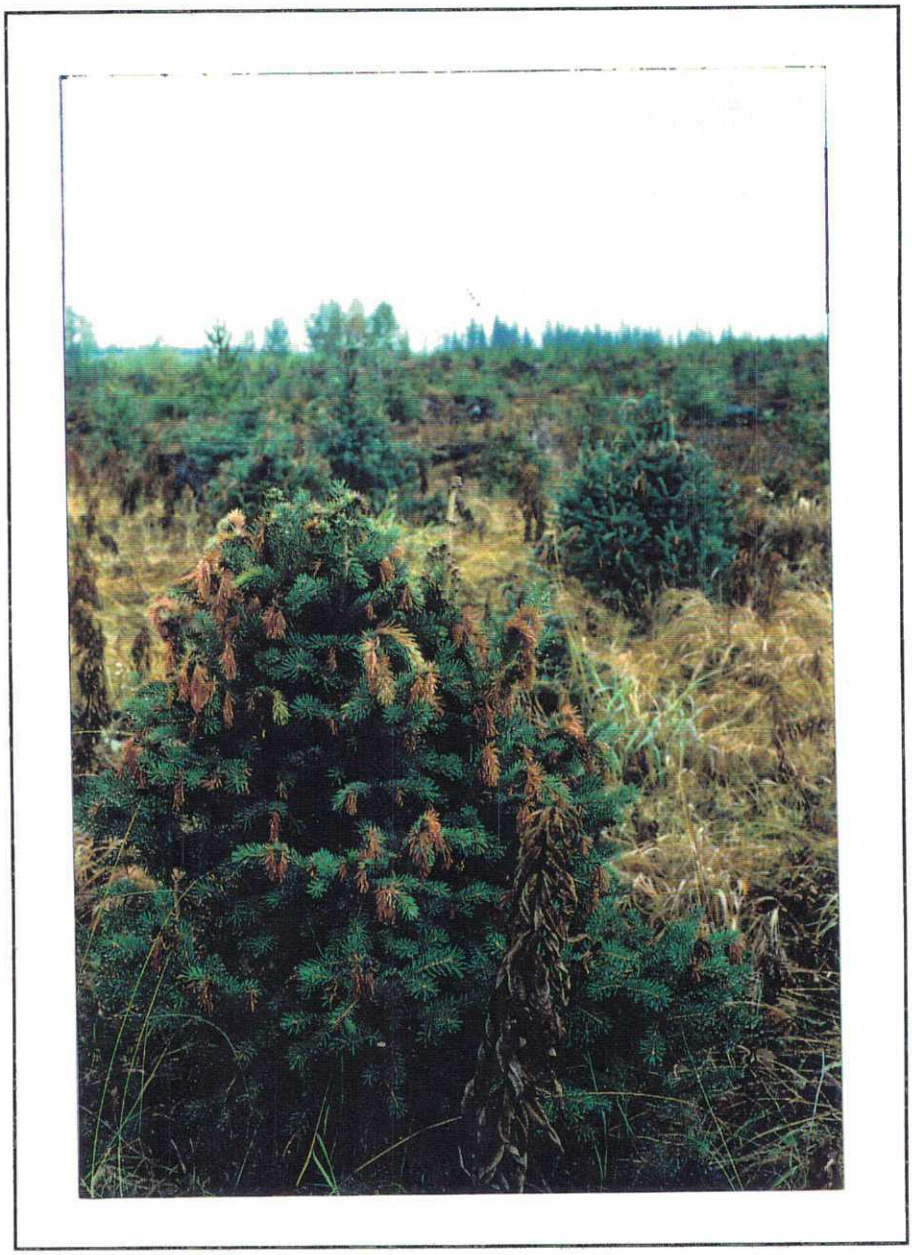


Photo 17. Stunted spruce trees common along reach 6 of Harold Price Creek in block 93M016-016. Planting of lodgepole pine for future LWD is recommended.

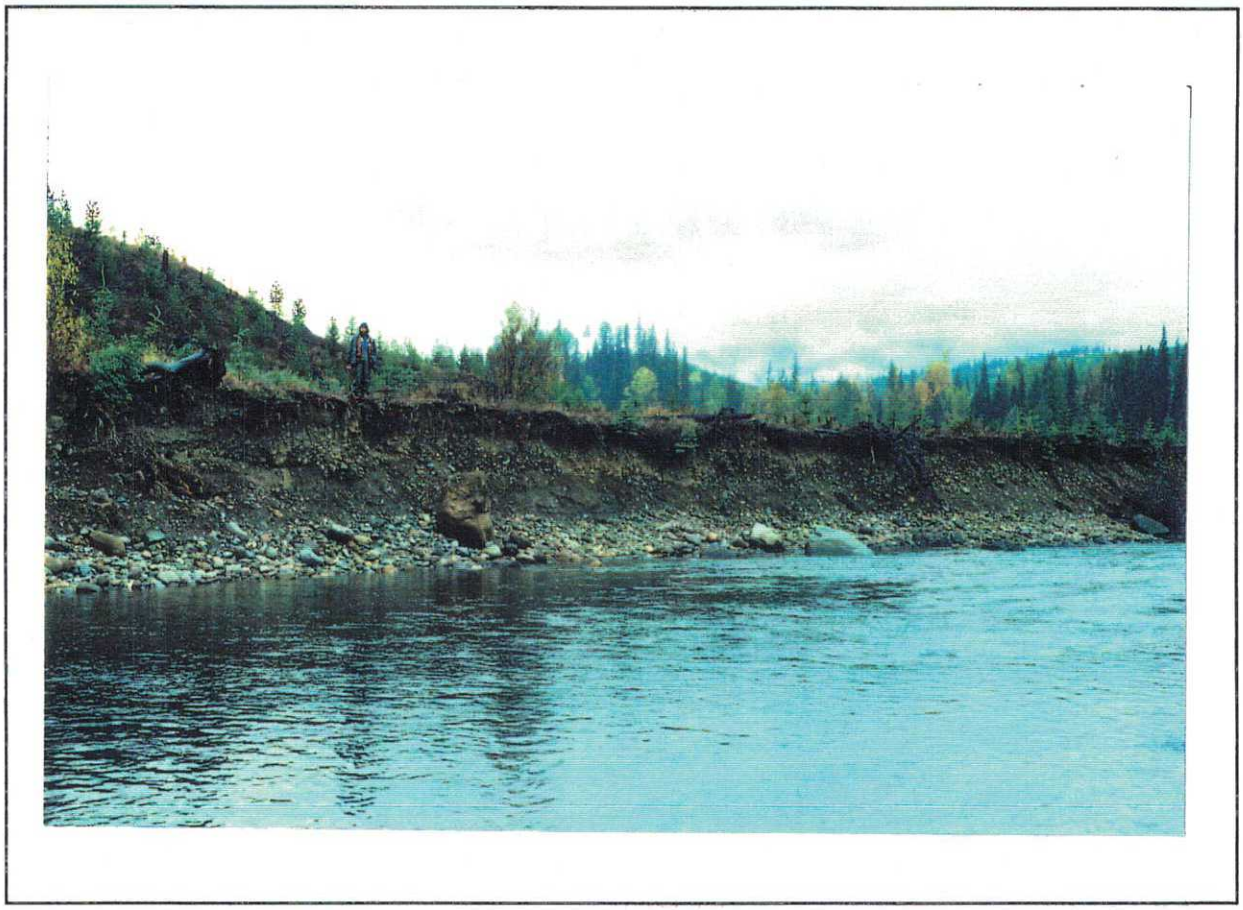


Photo 18. Reach 6a of the Harold Price Creek and block 93M016-016. This area sprayed with "Vision" in 1990, lacks streamside vegetation crucial to bank stability and riparian attributes.

2.2.9 W.C. 46-700-50-27 (39.6 km Upper Fulton FSR) - *High Priority*

Fish/Habitat Assessment: This tributary, which enters the Harold Price (H.P.) Creek in reach six, was found to support rearing coho juveniles immediately upstream of its confluence with the H.P. A series of (three) beaver dams located 130-581 meters upstream of the H.P. confluence, appear to hinder fish passage upstream. No fish were gee-trapped at the Fulton FSR (39.6 km) crossing despite moderate (5%) stream gradients, and good cover downstream of the crossing. Stream gradient increases to 33%, 1226 meters upstream of the Fulton FSR crossing, and areas of small "pea" gravels, potentially used by cutthroat trout, and Dolly Varden, are available to this point.

Impact Description: This tributary, upstream of the FSR crossing lacks adequate riparian vegetation for 2427m through Blocks(s) 93M016-036 and -007. Recent brushing has removed initial shrub (willow and alder) cover, created numerous small debris jams and reduced bank stability. The wooden box culvert at 39.6 km (U. Fulton FSR) is failing. Existing beaver dams may hinder fish passage.

Prescription: The wooden box culvert (WBC) should be replaced with another WBC. The older beaver dams, near this tribs confluence with the Harold Price Creek, may be breached for access, but these ponds should not be de-watered. It is unknown to what extent fish utilize this portion of the stream and effort should be made to gee-trap these ponds prior to such a breeching. Streamside mixed fill-planting of willow, cottonwood, pine and spruce is recommended for 2425m through Blocks 93M016-036 and -007.

2.3.0 UPPER HAROLD PRICE CREEK SUB-BASIN

2.3.1 Harold Price Creek (Reach 7) Block 93M016-035 - *High Priority*

Fish/Habitat Assessment: The mainstem Harold Price through reach 7 exhibits low gradient flows (1%), and a meandering channel pattern through forested and non-forested wetlands. Heavy accumulation of fine sediments represents approximately 50% of stream substrate. This section is dominated by glides with the occasional pools, and riffles. Dolly Varden, and cutthroat trout were gee-trapped within this reach (1995/1996.) Schools of juvenile, and adult mountain white fish were observed, especially at debris jams. The discharge through this sluggish section of the H.P. was 0.82 m3/s.

Impact Description: Forest harvesting (for 1079m) along the southwest bank of this reach, in Block 93M016-035, has resulted in the loss of riparian vegetation and associated functions. Subsequent streambank erosion contributes to sediment loading of the stream and site loss within the block. The northeast side of the stream remains unlogged to date.

Prescription: Streamside mixed fill-planting of willow, cottonwood, spruce and pine is recommended. A total of 1079m of exposed streambank requires stabilizing vegetation.

2.3.2 W.C. 46-700-50-40 (H.P. East Main FSR 0.9 km from Fulton FSR Branch) - *High Priority*

Fish/Habitat Assessment: This stream borders Block 93M016-012 for 259 meters. Cutthroat "fry of the year" (0+) were dip-netted during assessment. Good small gravels and cover exists throughout the area sampled, downstream of the road crossing. An unharvested buffer of roughly 20 meters was left along this stream. Stream gradient averaged 1%.

Impact Description: The wooden box culvert over this stream has collapsed (photo 19) and obstructs fish passage above the Harold Price East Main. Some blow down of timber to the stream has occurred from the riparian (20m) buffer along Block 93M016-012.

Prescription: Removal of this failed culvert is necessary to restore access upstream. Road access to this culvert must be made from the Upper Fulton FSR at the 38.1 km branch. The Harold Price East Main has been de-activated and an excavator will have to be "walked" to sites north of Luhk Creek. This includes excavation at tribs W.C. 46-700-50-40 and an adequate forested stream buffer along this trib requires no streamside planting. This crossing is scheduled for semi-permanent de-activation within the Roads, Hillslope and Gullies "Level 2" report. (SRS 1996)

Photo 19. Trib. 46-700-50-40 (H.P. east main FSR). This wooden box culvert and road grade materials have collapsed into the stream. Cutthroat fry (0+) were dipnetted up to this crossing. This road is scheduled for de-activation in 1997.

2.3.3 W.C. 46-700-50-45 (H.P. East Main 1.8 km from Fulton FSR Branch) - *High Priority*

Fish/Habitat Assessment: This stream through Block 93M016-010, retains little of its original channel. The low (1%) gradient and the fact that this stream was logged over and through for 2079m has left an indiscernible drainage with frequent flooded portions of cutblock. No fish were gee-trapped at the H.P. east main crossing. However, fry, presumably cutthroat and/or Dolly Varden, were observed downstream of a corduroy barrier within Block -010. Stream substrate was comprised primarily of fine sediment. This stream lacks riparian vegetation throughout Block 93M016-010.

Impact Description: A corduroy crossing, 145m downstream of the H.P. East Main crossing is an obstruction to fish on this stream. The metal pipe culvert at the H.P. East Main crossing is damaged, but would be passable to fish. Multiple debris jams and three older beaver dams (26.3 to 29.4m) upstream of the FSR crossing impede access through Block -010. This stream lacks adequate riparian vegetation throughout Block -010. Some sections of stream exhibit established patches of shrub alder.

Prescription: The corduroy crossing 145m below the FSR crossing should be removed. Access to this site with heavy equipment, will be difficult without crop tree damage. However, access may be restored using hand tools and a small crew. The metal culvert should be removed at the FSR crossing. An excavator will have to be "walked" from the U. Fulton FSR at the 38.1 km branch to this site, due to sections of this road already de-activated. Multiple small debris jams and older apparently abandoned beaver dams should be breeched to establish access, upstream of the FSR crossing. Streamside mixed fill-planting of willow, cottonwood, spruce and pine is recommended for 2079m for riparian rehabilitation.

2.3.4 Luhk Creek (W.C. 46-700-50-50)(H.P. East Main Access vie Torkelson FSR) - *High Priority*

Fish/Habitat Assessment: Luhk Creek (Luhk mean "rotten" in Gitksan) is the largest tributary to the Harold Price in reach 7. Luhk exhibits good, small spawning gravels, and frequent scour pools at debris jams. Stream discharge 0.11m3/s. Cutthroat, and Dolly Varden were gee-trapped in the upstream portion of block 93M016-019, and Dolly Varden were observed spawning (Sept. 24/96) near the upstream boundary of the block. Good initial shrub cover primarily alder, is established through most of Block -019. Average stream gradient is 2%.

Impact Description: A small side channel diversion into Block 93M016-019, 240 meters below the northeast block boundary has occurred as a result of a debris jam and in filling of the existing stream channel with aggregate material. Gee-traps set in this new channel failed to catch fish and flows go sub-surface 60m into the cutblock. Stream side vegetation is limited at this northeast portion of Block -019. Future large

woody debris is lacking throughout the drainage in Block -019. Erosion of bank material is evident at openings in shrub vegetation.

Prescription: The side-channel diversion into Block -019 may be remedied with a log deflector and planting of bank-stabilizing vegetation. An electro-shocking fry-salvage should be completed prior to flows being returned to the original channel. Though good initial shrub alder exists, streamside mixed fill-planting for future LWD and periodic bank stability concerns is recommended. This is required especially in the upstream portion of Block 93M016-019. Aerial photography of this section of Luhk Creek is recommended to monitor impacts and remedial effects on this stream.

2.3.5 Howal Creek (W.C. 46-700-50-55)(32.2 km Fulton FSR) - *High Priority*

Fish/Habitat Assessment: Despite concerns, listed in Level 1, regarding adequacy of riparian vegetation and road crossings through block 31-3 (93M016-033), assessment revealed few impacts to this ephemeral tributary of Howal Creek (no flows Sept. 11/96.) No fish were able to be gee-trapped in the isolated pools of this stream. The mainstem of Howal Creek (located at 32.2 km Upper Fulton FSR) was subsequently trapped and assessed. Cutthroat trout and Dolly Varden were abundant at this road crossing. Good instream cover, spawning gravels and a gradient of 2% was noted. Streamside vegetation was lacking along Blocks 93M016-034 and -035.

Impact Description: Impacts were discovered on Howal Creek up and downstream of its crossing at (32.2 km) Fulton FSR. The metal pipe culvert at this crossing, is unravelling on the north side of the Fulton FSR at the block 93M016-034 opening (photo 20.) A debris jam, consisting primarily of small organic debris, is located 96m downstream of the Fulton FSR crossing, and presents an obstacle to fish. In Block 93M016-035, Howal Creek has left its original channel and flows down the fireguard (photo 21) at 181m, 268m, and 235m downstream of the Fulton FSR. This segment of stream now has two channels at these diversions. These diversions are confined to the floodplain. The total length of channel, now in the fireguard, is 100m for these three diversions. Well established crop trees will provide future LWD; however, limited shrub cover enhances erosion and lateral channel movement in Block 93M016-035. Limited riparian vegetation exists in Block-034 for 566 meters.

Prescription: The unravelling culvert (32.2 km Upper Fulton FSR) should be trimmed with a welding torch to prevent further degradation of this passable culvert. The debris jam, 96 meters below this crossing, may be removed with hand tools and a small crew. Channel diversions to the fireguard, are limited within the existing floodplain. Some difficulty would be had trying to reinstate flows back to the original channel without heavy equipment, and subsequent site damage. Therefore, it is recommended that this area be stabilized by planting, and the new channels left as they are. A total of 1033m of mixed fill-planting (in Blocks 93M016-034 and -035) is recommended using willow, cottonwood, spruce and pine to help stabilize the stream channel and restore riparian components.

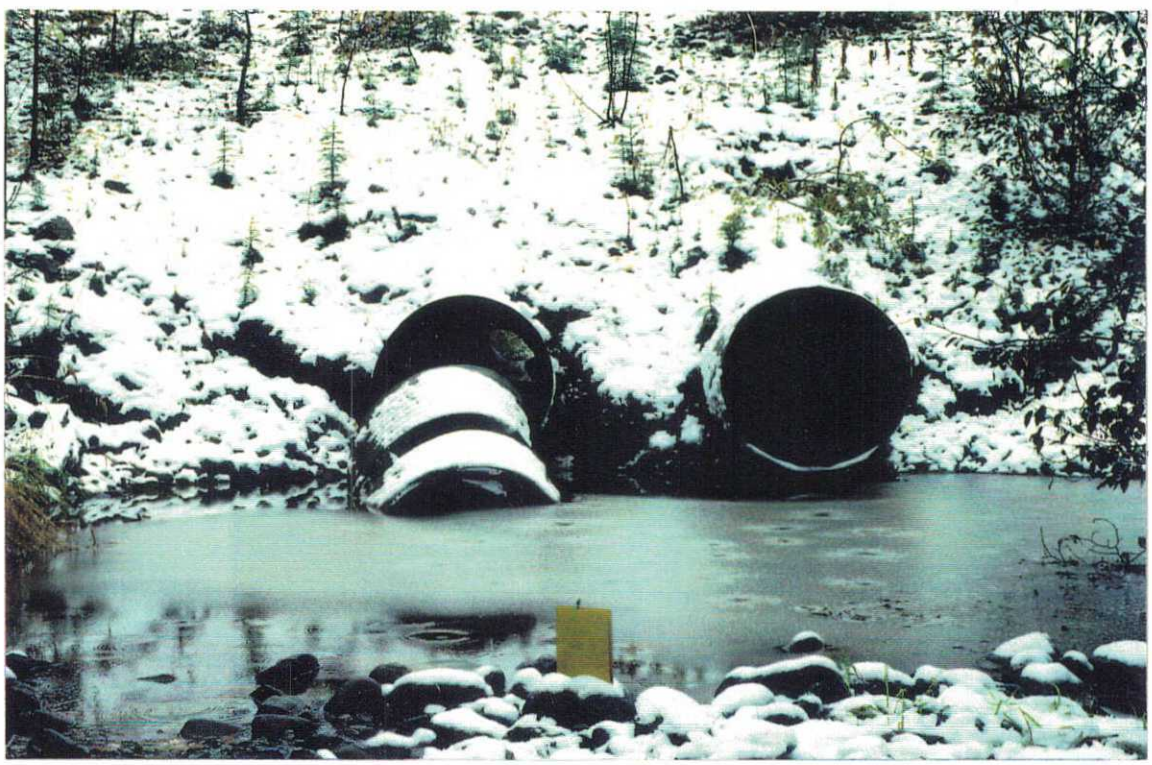


Photo 20. Howal Creek crossing at 32.2 km Upper Fulton FSR. Unravelled culvert needs trimming. Cutthroat trout were gee-trapped above and below this crossing. Riparian vegetation is needed upstream and downstream of crossing in blocks 93M016-034 and -035.

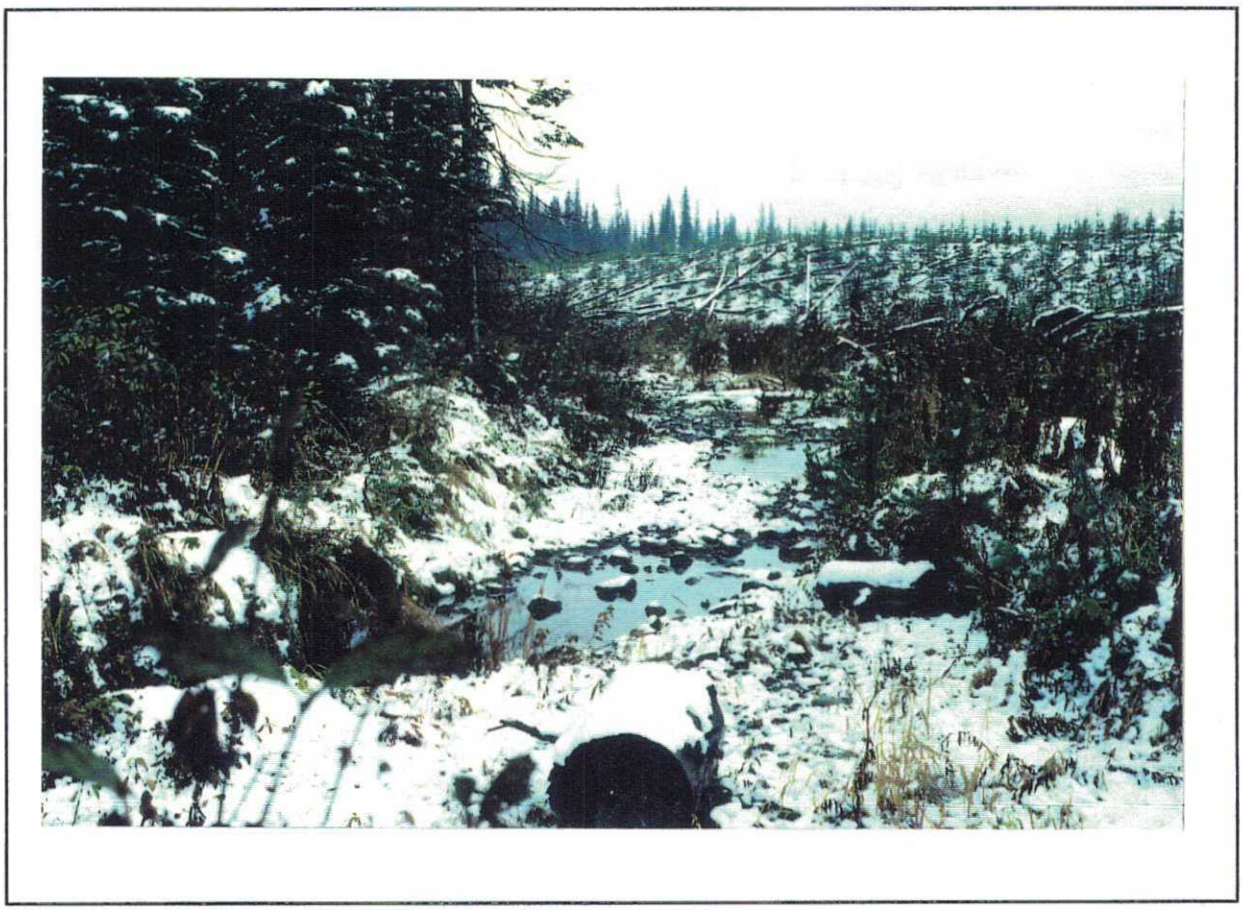


Photo 21. Howal Creek and block 93M016-035. Stream has been diverted to fire guard in this photo (original channel in forested area at left). Planting of this block boundry for channel retention is recommended for 565 meters.

2.3.6 W.C. 46-700-50-85 (3.2 km H.P. East Main FSR Block 93M017-031) - *High Priority*

Fish/Habitat Assessment: This stream, accessed via the Torkelson FSR, exhibits an abundance of small gravels, and (0+) cutthroat fry upstream of the road crossing. Good cover exists along this stream with an established alder/shrub component and a mature pine, spruce, and fir canopy. A series of beaver ponds exist downstream of the road crossing. This productive tributary has a stream gradient of 2%.

Impact Description: The wooden box culvert at this crossing has collapsed and presents an obstacle to fish. The flooding of beaver ponds, downstream of the FSR crossing, has resulted in the loss of living trees along a thin (5-10m) buffer between this stream and Block 93M017-031. This has contributed to bank instability, erosion and blowdown in this block.

Prescription: The wooden box culvert should be replaced at this road crossing. Some mixed fill-planting of willow, cottonwood, and pine is recommended from 89m to 238m upstream of the road crossing and for 285m downstream of the FSR. The breeching of one beaver dam 193m below the FSR may also reduce bank erosion along Block 93M017-031.

2.3.7 Upper Harold Price Creek (Reach 8) - *High Priority*

This sluggish, low gradient (1%) section of the Harold Price Creek exhibits similar traits to that of reach 7. Fine sediment accumulation represents at least 50% of stream substrate. This section is dominated by long stretches of deep glides and occasional riffles. Cutthroat trout and Dolly Varden were gee-trapped, and schools of mountain white fish were observed. Several mainstem beaver dams were under construction at the time of assessment. Spawning gravels were limited and instream vegetation (algae) abundant. Some portions of stream bank along Block 93M017-019 have shrub-alder cover, but frequent openings retain herbs and grasses as the only stream side vegetation.

Impact Description: Inadequate riparian vegetation along Block 93M017-019 (photo 22) and in Block 93M007-101 (See reach 9) has enhanced bank erosion and delivery of sediment to the H.P. Most of the area along the creek, in Block 93M017-019, is not sufficiently restocked (NSR) and future LWD is also a concern.

Prescription: Remedial work should concentrate on stabilizing banks within Blocks 93M017-019 and 93M007-101 by establishing riparian vegetation. Mixed fill-planting of willow, cottonwood, spruce and pine is recommended for 1223m along Block 93M017-019. Block 93M007-101 is described in reach 9 of the H.P.

Photo 22. Harold Price Creek (reach 8) and block 93M017-019. Streamside vegetation is needed for bank stability and riparian functions for 1223 meters.

2.3.8 Torkelson Creek Tributary (W.C. 46-700-115-010) - *High Priority*

Fish/Habitat Assessment: This tributary to Torkelson Creek was found to contain cutthroat trout when gee-trapped at the spur D corduroy crossing in Block 93M017-024. Limited spawning gravels were available on this low gradient (2%) trib. Available habitat appears to consist of 1011m of stream between Torkelson Creek and a series of (2m+) beaver dams at the Block -024 boundary. Gee-traps upstream of these dams failed to catch fish. Good initial shrub-alder is established over most of the harvested section of stream. Instream vegetation (rushes and horsetails) provides cover as well as shallow pools and frequent LWD.

Impact Description: Two corduroy crossings in Blocks 93M017-024 and 93M017-016, have decomposed to this stream (photos 24 and 25). The lower crossing restricts access to viable fish habitat. The upper crossing acts as a dam for local beavers and no fish were discovered here. Recruitment of future LWD is a concern through Block -024. Good initial shrub cover is established (photo 23).

Prescription: Removal of existing corduroy crossings to facilitate access. These crossings are located at spur "D" in Block -024 and at the Block -016 boundary on spur A. Streamside mixed fill-planting of cottonwood pine and spruce is recommended for 1369M through Block 93M017-024.

2.3.9 Torkelson Creek Tributary (W.C. 46-700-50-115-30)(Block 93M017-007) - *Moderate Priority*

Fish/Habitat Assessment: This low gradient (1%) tributary to Torkelson Lake supports cutthroat fry of various age classes including (0+) "fry of the year." This stream meanders through forested wetlands comprised of alder/willow shrub cover and mature spruce and fir. The substrate consists primarily of fine sediments, and sand with occasional small gravels. Block 93M017-0 borders this stream for 1130m. There were 85 pieces of LWD tallied over 284m.

Impact Description: A small debris jam (pink flagged), midway along this block boundary with the stream is sending water (seasonally) onto the fireguard. Shrub-alder is established along most of this boundary but occasional openings are vegetated with herbs and grasses only.

Prescription: The debris jam described in "impacts, should be cleared to restore access and may easily be accomplished with hand tools and a small crew. Mixed fill-planting along this streams border with Block 93M017-007 is recommended for 1043m to help maintain the original stream channel and re-establish riparian functions.

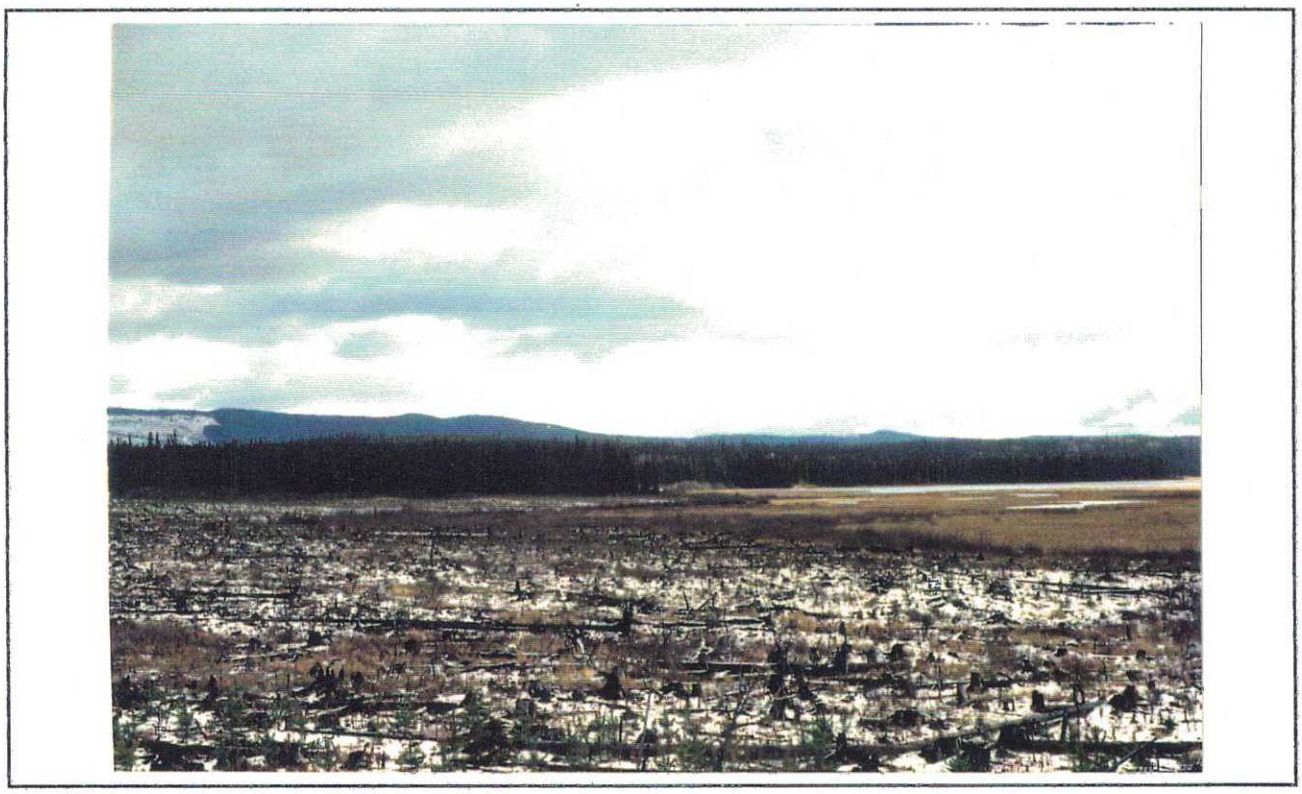


Photo 23. Blocks 93m107-018/-034 and-024 at Torkelson Creek. Riparian vegetation needed along wetlands for 1365 meters.

Photos 24 and 25. Trib. 46-700-50-115-010 obstructed by two courduroy crossings in blocks 93m017-016 (top) and -24 (bottom). These roads were prescribed for deactivation in 1997. (R. Hand G. "Level 2" prescriptions).

2.3.10 Harold Price Creek (Reach 9) - *High Priority*

Fish/Habitat Assessment: This low gradient (1%) reach of the Harold Price is prone to sediment accumulations, and significant deposits were found in the glides, pools and at mainstem beaver dams of this reach. Spawning gravels were not abundant here. Habitat is characterized by extensive glides with occasional pools and riffles. Cutthroat trout, Dolly Varden, mountain white fish and burbot are known residents (SISS 1991.) Cutthroat trout and schools of mountain white fish were observed; however, no gee-traps were set in this reach. Streamside vegetation is limited along Block 93M007-101 and large debris jams are common as you approach the reach 10, gradient break. There were 257 pieces of LWD over 1803 meters.

Impact Description: A large debris jam with heavy bed load accumulations, at reach break 10, has diverted H.P. flows to a side channel bordering Block 93M007-101. From aerial photographs, taken October 1995, it appears that this diversion took place between that time, and when this area was assessed September 19, 1996. The original channel has been de-watered for 1113m. Lack of streamside vegetation along Block 93M007-101 has increased bank erosion (photo 26), and site loss within the block. Most of this block boundary is NSR. The area near reach break 10 appears to be the recipient of massive amounts of organic and inorganic materials eroded from reaches 10 and 11. Aerial applications of herbicide (photo 27) in Block 93M007-101 may contribute to erosion problems here.

Prescription: Mixed fill-planting of willow, cottonwood, aspen, pine and spruce is recommended for 1654 meters of streambank along Block 93M007-101. Seasonal shifts of debris and sediments will continue to affect stream channel morphology in this reach until stream banks in reaches 9, 10, and 11 are stabilized.

2.3.11 W.C. 46-700-50-120 (Branch 27.6 km Upper Fulton FSR) - *Moderate Priority*

Fish/Habitat Assessment: This small tributary, which enters the H.P. at the southern Block 93M007-101 boundary (reach break 10), supports Dolly Varden and cutthroat trout. These species were gee-trapped here Sept. 28, 1996 and this tributary is a known spawning site for cutthroat trout. At the time of assessment stream discharge went sub-surface 257m prior to joining the Harold Price. Limited spawning gravels were available. Stream substrate was comprised of approximately 80% fine sediment. Stream gradient was 0.5%. This stream exhibits sections of glides with occasional riffles and pools. The channel meanders through Blocks 93M006-006 and -007. Stream cover is limited to instream rushes, occasional patches of alder and logging debris.

Impact Description: The metal pipe culvert, which was passable when assessed September 28, 1996, was replaced with a wooden box culvert October 22, 1996 (photo 28), by Repap, Smithers operations. Significant amounts of fine sediment was delivered downstream. An effort should be made, in the future, to replace crossings

Photo 26. Harold Price Creek (reach 9) and block 93m006-001. Planting for bank stability and riparian functions needed for 1654 meters.

Photo 27. Block 93m006-001 stand tending operations may contribute to loss of riparian vegetation. This block was aerially sprayed with "Vision" August 1995.

Photo 28. Trib. 46-700-50-120 (branch 27.6 km Upper Fulton FSR) This crossing was replaced Oct.22/96. Dolly varden and cutthroat trout were gee-trapped here in Sept./96. This crossing requires hydroseeding and streamside planting. Block 93M006-006-007 and -010 reqires streamside fill-planting along this tributary for 2055 meters. Future instream works should be conducted in August (after trout fry emerge and prior to fall spawning).

during August, after trout fry have emerged, and before Dolly Varden begin spawning. Sediment was definitely deposited to this stream as flows go sub-surface for 257m prior to joining the Harold Price. Dolly Varden eggs would have, if present, been incubating a the time of excavation. A significant amount of exposed clay exists at this new crossing. Riparian vegetation is limited to patches of shrub alder and grasses.

Prescription: An effort should be made to grass seed and fill-plant this crossing. Mixed fill-planting of willow, cottonwood, spruce and pine is required through Blocks -006 and -007 for 1070m along both banks.

2.3.12 Harold Price Creek (Reach 10)

Fish/Habitat Assessment: This unstable reach of the Harold Price has been harvested along both banks for 4 km. Cutthroat trout and Dolly Varden were gee-trapped here during 1995/1996 field seasons. This wandering stream channel (gradient 3%) had a wetted width of 6m at the time of assessment. Bankfull widths were often in access of 25 meters. Extensive gravel bars and superfluous amounts of logging debris litter the stream channel (photo 29.) Few deep pools exist throughout this reach and stable LWD is scarce (119 large pieces over 4 km.) Substrate is comprised primarily of cobbles. Fine sediments formed wedges at debris jams. Stream avulsions were creating and dewatering areas of off-channel habitat. Stream habitat is dominated by shallow riffles. Stream side vegetation is limited to shrubs and grasses with periodic crop trees.

Impact Description: The wandering stream channel continues to actively erode banks on the north and south side of the H.P. through Blocks 93M006-004, -005, -006, -007, -010, and -012. This continues to transport bedload, debris, and fine sediment downstream; de-water off channel habitat; eliminate existing streamside vegetation, including crop trees, and produce extensive gravel bars. Seasonal shifts of debris influence the streams channel. An in-filling of pools is apparent and, overall instream cover is limited by the loss of water depth and lack of stable LWD. Riparian vegetation is lacking for the entire reach.

Prescription: An extra effort should be made to establish riparian vegetation in reaches 10 and 11, allowing for inevitable site loss at meanders. Planting of willow, aspen, cottonwood, spruce, and pine is recommended for stream banks through blocks, as well as for revegetation of dry back channel areas. Streamside vegetation is required for 7538m of stream bank in reach 10.

2.3.13 Upper Harold Price Creek and Tributaries (Reach 11) - *High Priority*

Fish/Habitat Assessment: This reach, though not identified in the Level 1 report as impacted, exhibits logging related impacts similar to those in reach 10 (photo 30.)

Photo 29. Reach 10 of Harold Price Creek and block 93M006-012. Extensive bank erosion requires stabilizing vegetation throughout reach 10 for 3769 meters. Planting of gravel bars and dry channels also recommended.

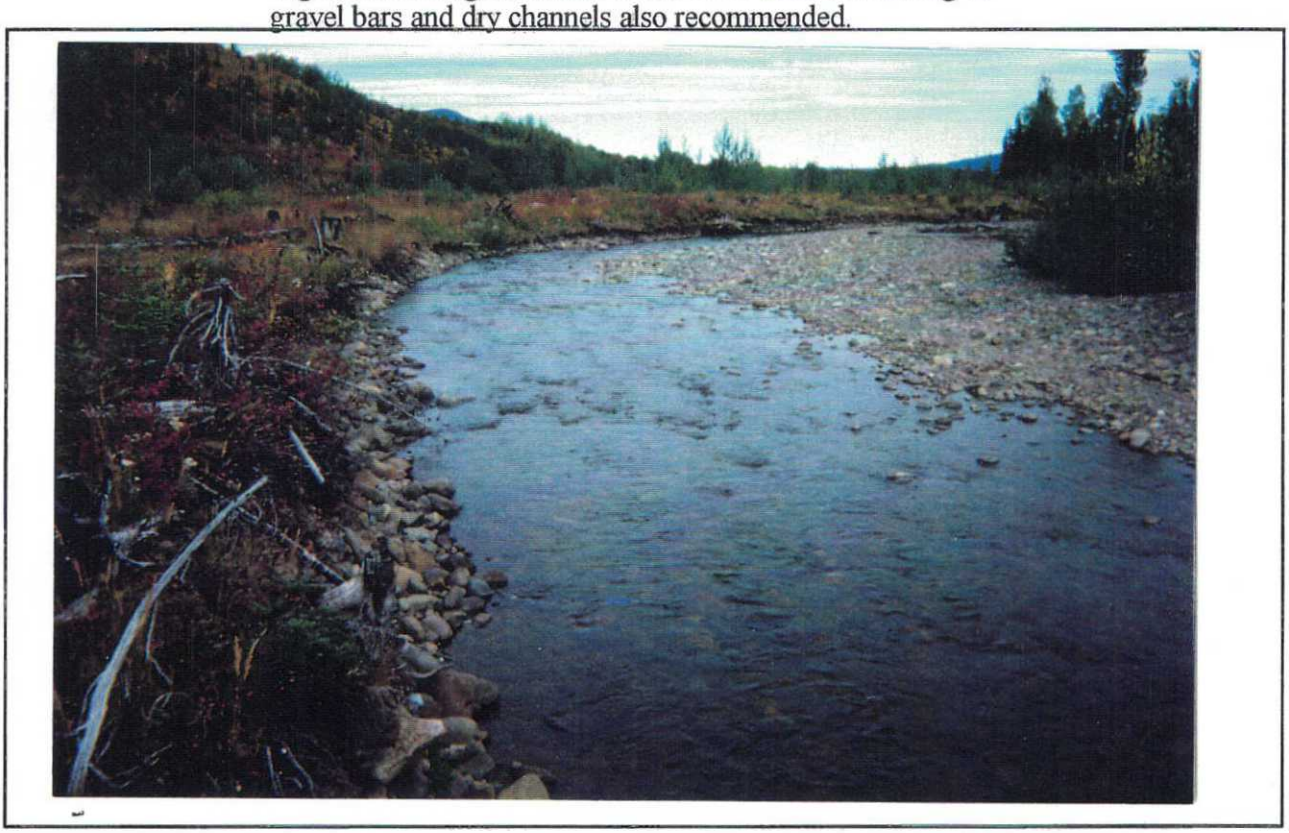


Photo 30. Reach 11 of Harold Price Creek (block 93M006-004) Streamside vegetation is needed for 925 meters of reach 11. Bank erosion contributes to site loss and downstream movement of sediments, bedload, and organic debris.

This section of stream exhibits greater fish habitat than that of reach 10. However, LWD is limited (22 stable LWD over 695m.) Habitat consists primarily of riffles and glides with occasional pools at debris jams or bedrock outcroppings. The stream gradient is 3%. Substrate is comprised of mostly cobble and boulders. Most of the stream banks lack adequate riparian vegetation although patches of undisturbed timber exist.

Impact Description: Loss of stream side vegetation as a result of logging, has increased bank erosion, site loss, downstream mobilization of bed load, and organic debris and loss of related riparian functions in Blocks 93M006-004 and 93M006-012.

Prescription: Streamside planting, for stability, LWD and associated riparian functions is required for 925m along the north and south banks of the Harold Price Creek in each 11. As in reach 10, an extra effort should be made, when planting, to allow for site loss and bank erosion when establishing this vegetation. Planting of willow, cottonwood, pine, aspen, and spruce along blocks, and at dry back channels is recommended.

2.3.14 W.C. 700-50-140 (5.4 km on Branch 27.6A Fulton FSR) - *High Priority*

Fish/Habitat Assessment: Cutthroat trout (0+) fry were dipnetted on this tributary up to a debris jam (1m drop) located 217m upstream of the branch 27.6A road crossing. This stream, with good LWD, small gravels and multiple cascade/riffle/pools sustains a healthy population of rearing cutthroat trout as were observed during assessment September 17 and 18, 1996. Stream gradient averages 10%. Good initial shrub cover (alder/willow) exists along this stream through Block 93M006-003 though future LWD and periodic openings require fill-planting.

Impact Description: A debris jam (217m) upstream of the (Branch 27.6A) road crossing hinders access upstream. Some bank erosion has occurred at periodic openings in the shrub-alder. Future LWD is a concern along this tributary.

Prescription: The debris jam upstream of the FSR crossing should be removed to ensure access upstream of this point. Streamside mixed fill planting would benefit this tributary. Suggested species are willow, cottonwood, spruce and pine for 380m of stream through Block 93M006-003. The wooden box culvert at this crossing is passable, but aging, and if not replaced/removed, it should be monitored for structural integrity.

2.4.0 LOWER SUSKWA RIVER SUB-BASIN

2.4.1 15 Mile Creek (W.C. 46-700-010) - *Moderate Priority*

Fish/Habitat Assessment: This stream is suspected to have a short section of available habitat in its lower reaches; however, was not gee-trapped in 1996. Assessment of this stream was limited to the road crossing as it was identified as a "Category 1" concern.

Impact Description: The wooden box culvert over this stream has collapsed and is contributing bridge materials and sediment to 15 mile creek. Three road failures to this stream exist at the eastern approach to this crossing.

Prescription: Removal of the existing structure over this stream and subsequent planting of the road crossing. Access to this crossing must be made via Stege's bridge, as road failures prohibit access from the Iltzul West FSR. Access via Stege's bridge is not possible prior to bridge repairs scheduled for summer 1997. A fish/habitat assessment of the lower reaches of this stream should be conducted in 1997.

2.4.2 Skilokis Creek (W.C. 46-700-031) 26.3 km Hamblin FSR - *High Priority*

Fish/Habitat Assessment: Reach 1 of this stream extends from the Suskwa River, 448m upstream to an impassable 3m falls located at the southern boundary of Block 93M024-018. This segment is used for rearing by juvenile bull trout, Dolly Varden, and rainbow trout. This reach is characterized by cascades and riffles with few available pools. Limited LWD (10 pieces over 448m) exists on this section of stream through Block -018. Streamside vegetation is limited to planted pine upstream of the road crossing; however, an established shrub/tree component exists downstream of the bridge, consisting of cottonwood, white birch, alder, and spruce with an understorey of cedar, and some hemlock. Stream gradient is 4%.

Impact Description: The bridge crossing on the Hamblin FSR is passable to fish; however, failing banks, and bedload deposition has in-filled pools in this reach. There is a lack of large woody debris (LWD) through this short section of stream (10 pieces over 448m), and lateral bank erosion continues to remove crop trees from the cutblock, especially upstream of the road crossing. Prior brushing and thinning projects to the stream have had an adverse effect on bank stability, and erosion continues to impact fish and fish habitat in this reach.

Prescription: An excellent opportunity exists downstream of the bridge crossing to place LWD for cover, and pool creation. Two old skid roads access the stream 60m downstream of the road crossing, and will help limit disturbance by heavy equipment in log placement (photo 31). At the time of assessment, two large logs (50cm+

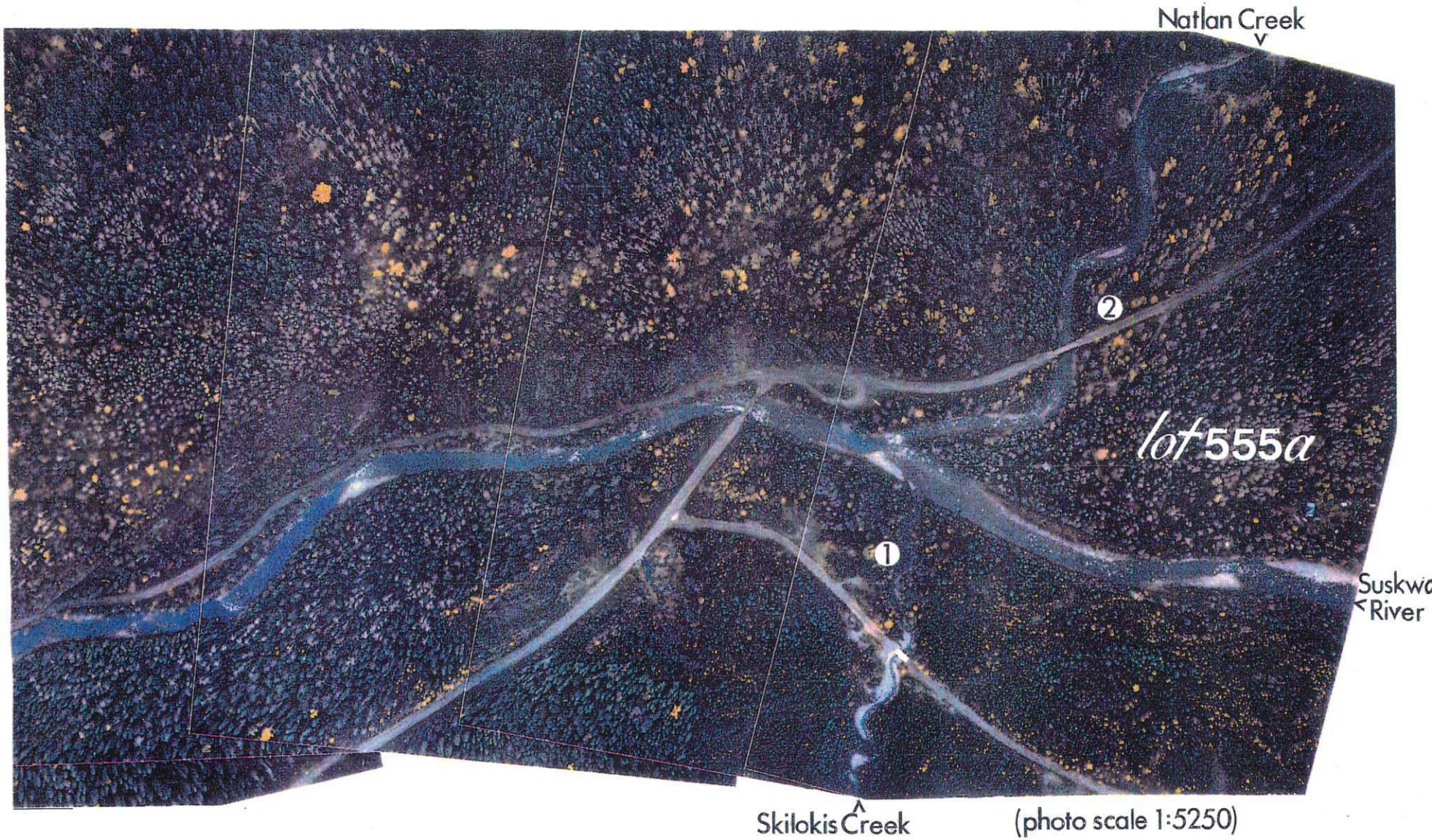


Photo.31 Skilokis Creek rehab. site(1) and lot 555a groundwater channel(2).

DBH) were located instream near these access points. Unstable banks, upstream of the road crossing, should be planted with willow and cottonwood. Some fill-planting of shade tolerant conifers is recommended, and existing conifers may be selectively released downstream of the Hamblin Bridge. Population densities of existing fry, in this reach, should be determined prior to rehabilitation. This will provide a data base for monitoring the success of remedial works.

2.4.3 Lower Suskwa River Tributaries (Reach 6)

General Description: These small tributaries have short, 50-150m, low gradient reaches joining the Suskwa mainstream (Oikos, Weiland, Wildfor '95.) Access by fish species, upstream of the Suskwa floodplain was limited to Jumbo Creek and trib (WC 700-36) due to gradients in excess of 30% at the valley walls. All of these streams are utilized as juvenile rearing areas for salmon and/or trout in their lower reaches. Dolly Varden and bull trout were also gee-trapped at some sites. Road crossings along the Hamblin Main FSR and Natlan A FSR represent the greatest threat to these rearing areas downstream. Failing bridges and box culverts as well as sediment from these crossings are prone to accumulate downstream. Site specific prescriptions are as follows:

HAMBLIN ROAD CROSSINGS

2.4.3a W.C. 46-700-033 (2.25 km Hamblin Main) - *High Priority*

Fish/Habitat Assessment: A large side channel and beaver pond complex supporting juvenile coho, chinook and rainbow trout (steelhead) exists downstream of the road crossing on this stream.

Impact Description: The wooden box culvert (#10) over this stream is failing. Fine sediment from the Hamblin FSR is being deposited to the high-value rearing area of this tributary.

Prescription: Replacement of the existing WBC to reduce potential downstream movement of road grade materials due to culvert failure. Subsequent stream side planting of the road crossing after replacement.

2.4.3b W.C. 46-700-034 (2 Crossings at 3.04 km and 3.13 km on the Hamblin Main FSR) Culverts #14 & 15 Respectively - *High Priority*

Fish/Habitat Assessment: This tributary supports rearing chinook, rainbow trout (steelhead) and Dolly Varden at its lower reach adjoining the Suskwa River.

Impact Description: Two wooden box culverts exist on this tributary. The one at 3.04 km (#14) is in the process of failing and the one at 3.13 km (#15) has collapsed into the stream. Fine sediment from the Hamblin FSR is collecting at the lower gradient section of this stream adjoining the Suskwa River.

Prescription: Replacement of culvert #14 and #15 along the Hamblin FSR. This site should be grass seeded after culvert replacement.

2.4.3c W.C.46-700-036 (Bridge Crossing at 3.53 km Hamblin Main FSR) - *Adequate Crossing (No Treatment)*

This stream supports rearing chinook and rainbow trout (steelhead) and is a known spawning site for bull trout.

2.4.3d W.C. 46-700-040 (Wooden Box Culvert at 5.04 km Hamblin FSR) - *High Priority*

Fish/Habitat Assessment: This tributary supports rearing chinook, coho, rainbow trout (steelhead), bull trout and Dolly Varden in reach 1 along the Suskwa River.

Impact Description: The road crossing here (#18) is at present, stable. However, bridge building materials have been discarded to the stream channel.

Prescription: Removal of bridge materials from stream channel with hand tools and small crew (1/2 day.)

NATLAN A ROAD CROSSINGS

2.4.3e W.C. 46-700-041 (5.8 Natlan Ard.) - *No Treatment*

Adequate wooden box culvert. The Gitksan word for this creek is Madii-Lii, which means something like "women that drown puppies." This stream joins a series of beaver ponds along the Suskwa River and supports rearing chinook and coho salmon.

2.4.3f W.C. 46-700-044 (6.4 km Natlan Ard.) - *High Priority*

Fish/Habitat Assessment: This stream supports rearing chinook and coho salmon at its outlet along the Suskwa River.

Impact Description: The wooden box culvert here is failing to this ephemeral stream. Bridge materials and sediment are being delivered downstream.

Prescription: The WBC should be replaced at this crossing.

2.4.3g W.C. 46-700-045 (8 km Natlan Ard.) - *High Priority*

Fish/Habitat Assessment: This stream flows onto the Natlan A FSR and runs east (for 30m) before it drains southward. Rearing chinook, coho, rainbow trout (steelhead) and Dolly Varden were gee-trapped at the lower beaver pond complexes of this stream.

Impact Description: Sediment deposition to high value rearing areas downstream.

Prescription: This stream should be cross-ditched at the point where it enters the Natlan A FSR.

2.4.3h W.C. 46-700-048 (8.4 km Natlan Ard.) - *High Priority*

Fish/Habitat Assessment: This stream, locally known as Jumbo Creek, supports rearing juvenile chinook, coho, rainbow trout (steelhead), and Dolly Varden. Dolly Varden were gee-trapped at the road crossing, and the other species were trapped in the beaver pond complexes downstream. Substrate is comprised primarily of fine sediment with occasional small gravels and cobble below the FSR. Stream gradient was 3-5% downstream of the road crossing. Beaver ponds begin 614m below crossing. The stream consists of shallow glides and riffles with few pools.

Impact Description: The bridge over this stream is decomposing into the existing channel. Fine sediment and bridge materials are being delivered downstream. Local concerns exist regarding a decline in stream discharge possibly related to harvesting upstream. Jumbo Creek is a domestic water supply.

Prescription: Reconstruction of this road crossing is required as this is a local access road. This site should be grass-seeded and planted with willow afterwards. Assessment of Blocks 93M035-008, -009, -010 and -018 is required to determine harvesting impacts to this drainage upstream of this road crossing.

2.5.0 UPPER SUSKWA SUB-BASIN

2.5.1 Thoen Mountain Debris Torrent (W.C. 46-700-084) - *High Priority*

Fish/Habitat Assessment: this streams new channels along the Thoen Main FSR in block 93M035-010 were gee-trapped and no fish were found at any of the road crossings. This stream is classified S6 (according to F.P.C. classifications, 1995). The extent of use by fish on this streams lower reaches and effects of the channel diversion near its confluence with the Suskwa River remains unknown.

Impact Description: This stream, after accumulating cut debris, stumps and aggregate material in the southeast corner of Block 93M035-001, has left its original channel. Flows are now dispersed through Blocks 93M035-004 and -010 (see photo 32). The debris torrent extends 1044m of which the stream is subsurface for 665m. A corduroy crossing in the eastern portion of Block 93M035-004 (branch 8-9) obstructs drainage of these flows and contributes to site loss within the block and sedimentation downstream. Impacts downstream of Block -010 remain unassessed.

Prescription: The corduroy crossing in block -004 should be removed (with excavator) to prevent flooding and site erosion. Further assessment of this new drainage (along the Suskwa) should be conducted during 1997. Low level aerial photography of this dramatic torrent from Thoen Mountain to the Suskwa River is also recommended.

2.5.2 W.C. 46-700-140 (0 km Grizzly Main FSR) - *High Priority*

This stream (noted in Level 1 report as S10) supports bull trout and Dolly Varden char. Some difficulty was had locating a secure gee-trap site on this (9% gradient) stream. This stream is dominated by cascades and plunge pools with occasional riffles. Substrate is comprised primarily of cobble with abundant (large and small) gravels and boulders. There were 141 LWD pieces tallied over 732 meters. Riparian vegetation is sparse along Block 93M035-015 though patches of shrub-alder are established. Most of the western banks of this stream are undisturbed. This stream produced the greatest number of bull trout per gee-trap of all sites sampled.

Impact Description: A debris jam, 423m upstream of the bridge site, is channelling flows towards Block 93M035-015. A potential channel diversion exists here. Lack of streamside vegetation, unstable banks and a shallow drainage adjacent to the creek has left this stream vulnerable to de-watering below this debris jam (see photo 33.) Bank erosion along Block -015 contributes bedload to the existing channel and deposits of fine sediment were noted at small backwaters. The bridge crossing, though passable, contributes road grade materials (eroding at its west bank abutment) to the stream channel.

Photo 32. Trib. 46-700-84 in block 93M035-004. A debris torrent begins in block 93M035-001 and diverts flows to block -004 and -010 downstream. No fish were found on this upland bench, however, a courduroy crossing in block -004 should be removed to limit site loss via flooding.

Photo 33. Trib 46-700-140 in block 93M035-015. This site (423 meters) above the Grizzly FSR bridge is vulnerable to channel diversion into block -015. Removal of a debris jam and log deflectors may retain this stream channel until streamside vegetation is established. Numerous bulltrout juveniles were gee-trapped at the road crossing.

Prescription: The debris jam, 423m upstream of the road crossing, should be removed. Removal of this debris jam with hand tools and use of existing cottonwood logs to help deflect flows should reinstate this tributary to its original channel. This will maintain the water course until sufficient streamside vegetation is established. Mixed planting of cottonwood, spruce, and willow along this entire stream (675m) boundary with Block 93M035-015 is recommended. Wide angle aerial photography, similar to the "Level 1" mosaics, of this block/tributary is recommended for 1997 prior to instream works. This will provide a "before and after" opportunity to assess rehabilitative works.

2.5.3 W.C. 46-700-144 (.5 km Grizzly Main FSR) - *High Priority*

Fish/Habitat Assessment: this small stream has a short (approximately 200m) section of available habitat above its confluence with the Suskwa River as this road crossing (photo 34) is presently impassable. Dolly Varden char were gee-trapped below the 1200mm metal culvert. No fish were trapped upstream of this crossing. Gradient immediately upstream of this crossing is 17% but declines to 7% through block 93M035015 and the (passable) wooden box culvert on the Parker Main FSR/Block 93M035015. Stream habitat is comprised of cascade/pool sequences with occasional riffles. Small gravels were available, on this stream, above and below the Grizzly Main. Riparian vegetation appears to be lacking, along this stream, through Block 93M035-015. The use of neighbouring streams by bull trout make access to this tributary a higher priority in the Upper Suskwa sub-basin.

Impact Description: This stream is impassable above the metal culvert at .5 km on the Grizzly FSR. Lack of riparian vegetation along block -015 is apparent, though assessment of this stream was limited to observations made at road crossings.

Prescription: The metal culvert should be replaced with a wooden box culvert that retains streambed characteristics and stream gradient should be returned to its natural slope through the Grizzly Main road grade. Mixed fill-planting through Block -015 can be expected for approximately 600m. The section of stream above the Grizzly FSR crossing (though Block -015) should be assessed in 1997.

2.5.4 W.C. 46-700-137 (.430 km Netazul Main FSR - Block 93M035-006) - *High Priority*

Fish/Habitat Assessment: No fish were able to be gee-trapped or observed on this dynamic tributary through Block -006. A stream gradient of 20% and several 1m drops (over debris) near the confluence with the Suskwa River may explain fish absence. This stream is characterized by extensive cascades and riffles and very few pools. Superfluous amounts of logging debris exist instream. However, stable LWD is scarce (55 pieces over 1564m.) Streamside vegetation is limited to alder and

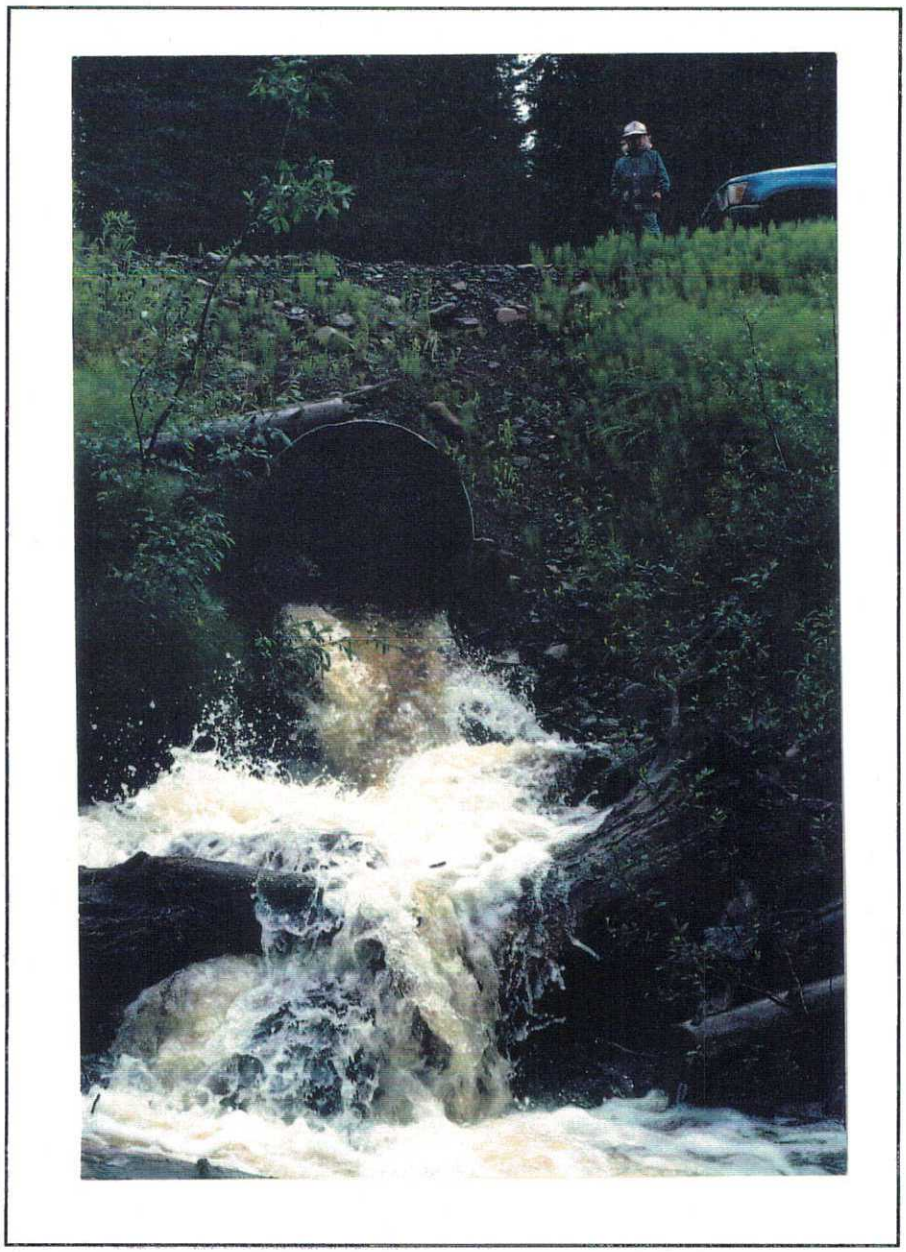


Photo 34. Trib 46-700-144 .5 km Grizzly FSR) This impassable culvert should be replaced to restore access upstream. Dolly varden were gee-trapped up to this crossing, but not above.

willow and well-spaced conifers. This stream is glacier-fed from Netazul Mountain. Stream gradient was 10% through Block -006.

Impact Description: The bridge crossing over this stream has been removed and the Netazul Main has been de-activated past this point. However, bridge stringers and the road grade materials have been left in the stream channel (photo 35). The Netazul Main, past this point, was cross-ditched during de-activation but these cross-ditches have now been in-filled with logs for road access. These cross-ditches are actively eroding (photo 36) fines to the stream and removal of this debris will limit further deposition downstream. It is unknown how far dross-ditches have been infilled along the Netazul Main as 1996 assessment was limited to block 93M035-006. Two channel avulsions in Block -006 have occurred as a result of debris accumulation in the stream channel. Lack of streamside vegetation, unstable banks and multiple debris jams continue to laterally erode the steam channel and transport logging debris and bedload downstream. Fording of this stream is necessary to access the Netazul Mine trail, which parallels this stream above Block -006. This area is commonly used for recreation.

Prescription: The road grade at this crossing should be pulled back and bridge materials should be removed. This site should then be planted with cottonwood, willow, spruce and grasses. A small armoured ford should be left for vehicle access. Further assessment of the Netazul Main FSR to block 93M035-016 should be conducted and blocked cross-ditches cleared. This may be accomplished with a small crew and chainsaws. Streamside planting of willow, cottonwood and spruce is recommended throughout block 93M0335-006 especially downstream of the pulled bridge site. A total of 2200m of streambank requires vegetation to help stabilize the stream channel and restore other riparian components lost through harvesting in Block -006.

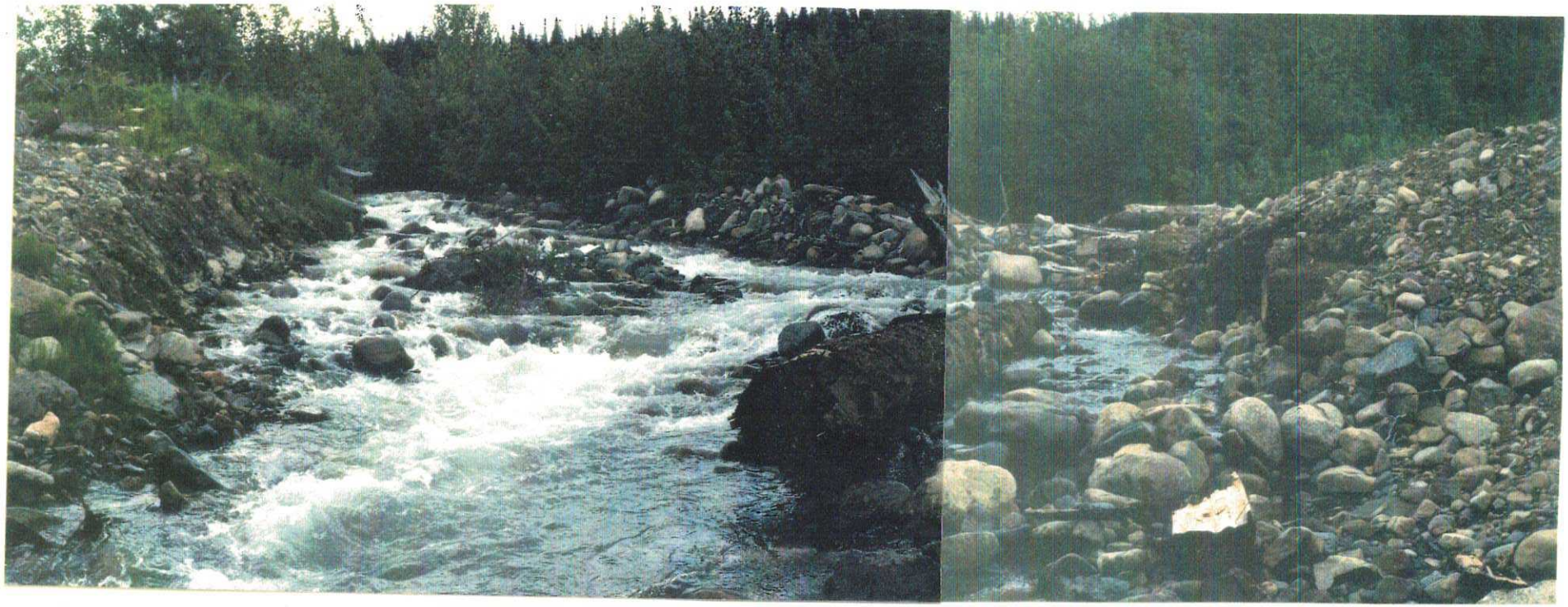


Photo 35. Trib. 46-700-137 in block 93M035-016. Deactivation of the Netazul FSR left bridge stringers and road grade materials instream. Cross-ditches have been in-filled (see photo 36). Mixed species fill-planting is recommended through block -016 especially downstream of this crossing.

Photo 36. Blocked cross-ditches eroding along the (deactivated) Netazul FSR. Assessment of cross-ditches along this road should be made in 1997. Water in this picture joins trib. 46-700-137 in block 93M035-016.

2.6.0 NATLAN CREEK SUB-BASIN

General Description: This sub-basin includes the Iltzul Creek and Denison Creek drainages and is characterized by frequently confined (often entrenched) stream channels of moderate gradients (3 - 10%).

Natural obstructions to fish migration were found on all 3 drainages. Two of these obstructions (on Natlan and Denison) appear to have been compounded by logging and road development. Barriers on the Iltzul and Denison are described later in this section. Anadromous fish distribution was limited to areas downstream of these obstructions. Populations of Dolly Varden were the only species noted above these barriers. Scarpslope failures, noted in "level 1" were examined on Natlan, Iltzul and Denison Creeks. All of these gullies appear to have been enhanced by seasonal run-off from forest service roads and/or cutblocks. Of 16 failures assessed during summer 1996, only two appear eligible for remedial action thus far. Unfortunately assessments were made after spring run-off and water sources were often difficult to trace. These have been highlighted on 93M series maps.

2.6.1 Natlan Creek (Reach 1) Near W.C. 46-700-30-004 - *High Priority*

Fish/Habitat Assessment: This section of stream, when gee-trapped, held rainbow trout and Dolly Varden in abundance. Traps were set within beaver ponds and at their outlets. No coho were found despite historical observations (SISS 1991.) Fish were not found to be using off-channel areas on Natlan Creek. Beaver dams with heavy sediment deposits presented barriers to off-channel habitat at sites visited.

Impact Description: Sedimentation of off-channel areas along Natlan Creek from the Suskwa FSR has occurred on reaches 1 through 6. Deposition to these sites exceeds 1m in depth at some beaver ponds. Ongoing sediment loading was evident during "Overview" flights of this area. These beaver ponds act as sediment traps, but water quality with in these ponds and off-channel fish habitat has suffered.

Prescription: Heavy sedimentation of off channel areas on Natlan Creek, has occurred from run-off along the Suskwa FSR. Limited accessability to these sites has resulted in a recommendation for mitigative works in reach 1 (see Lot 555A groundwater channel). This small groundwater channel (photo 31) enters Natlan Creek immediately upstream of the Suskwa FSR bridge and the channel runs adjacent to the road for 200m through lot 555A. This site was identified as a potential rearing area for Salmonoid Enhancement Programs in 1990 and some work was begun establishing ponds before funding was cut. Rainbow trout (steelhead) were "gee"-trapped during the 1996 field season in this channel. An opportunity exists to improve fish habitat at this site by increasing the depth of the channel (creating pools), adding large woody debris and removing obstructions (ie. ponding structures). This site, with minimal groundwork, will improve off channel habitat presently lacking on the Natlan drainage. The incised nature of this valley hinders potential

rehabilitation of other off-channel sites that were found to be impacted by heavy sediment loads from the Suskwa FSR. Mitigation/rehabilitation of this year-round channel has been encouraged by the owners of Lot 555A. Portions of this channel lie within the FSR "right of way."

2.6.2 Natlan Creek (Reach 3) - *High Priority*

Fish/Habitat Assessment: Rainbow trout (steelhead), Dolly Varden, mountain white fish, and bull trout were discovered downstream of the barrier located in reach 3. Dolly Varden were found upstream of this point to reach 7. This frequently confined channel is comprised of long sections of riffles and cascades with occasional pools at debris jams and bedrock outcroppings. Gradient 3%. Coho have been observed historically at this constriction (SISS 1991.) No coho were gee-trapped on Natlan drainages during 1995 or 1996.

Impact Description: A bedrock constriction 66 meters downstream of tributary W.C. 700-30-36 on Natlan (cover photo), presents a barrier to fish. A 2 meter falls has been created over a debris jam at this point. It is uncertain as to the amount of logging related material within the debris jam. A sediment wedge exists immediately upstream of this constriction. A valley wall failure off Block 93M034-005 may be enhanced by Suskwa FSR run-off.

Prescription: Removal of this barrier, with hand tools, is possible with caution. A small detonation may be required to safely eliminate this jam. Access to this site may be made via a well established trail commencing in the northwest corner of Block 93M034-005. Assessment of gully failure in Block -005 during spring run-off 1997 is recommended.

2.6.3 W.C. 46-700-30-130 (34 km Suskwa Main FSR) - *Moderate Priority*

Fish/Habitat Assessment: This stream was found to contain Dolly Varden up to the existing road crossing. The stream channel braids below the FSR over aggraded road materials. The extent of available habitat upstream of the road crossing remains unknown. Stream gradient averages 6%.

Impact Description: The pipe-arch culvert (photo 37) at 34 km Suskwa FSR has a 1m drop at its outlet and presently obstructs fish passage. The jump pool at this site is .75m deep. It is recommended that a drop of this distance be accommodated with at least a 1.25m jump pool (B.G. Dane 1978) to facilitate access upstream. Bank failures on the southwest side of this stream exist from the road crossing downstream to the forest edge, through the right-of-way. Deposition of bedload downstream has induced braiding of the stream channel 60m below the road crossing. Ongoing erosion continues to contribute fine sediment and bedload to this stream and Natlan Creek. An in-filling of pools below the road crossing is apparent.

Photo 37. Trib. 46-700-30-130 (34 km Suskwa FSR) . This culvert requires a jump pool to ensure access upstream. Dolly varden were gee-trapped up to this crossing. Pull back of road grade materials is recommended for southeast stream bank. (at right)

Prescription: A jump pool of adequate depth should be created below this culvert. Stepping up of the existing pool by placing rip-rap at the "tail-out" may accommodate this. Pull back of road grade materials along the southwest stream bank (below the FSR) and streamside planting of willow and cottonwood will help stabilize this site.

2.6.4 W.C. 46-700-30-144 (Branch 6B @ 37 km Suskwa Main FSR) - *High Priority*

Fish/Habitat Assessment: No fish were found at this site when gee-trapped July 16/17, 1996. A stream gradient of 2% exists downstream of the road crossing on this small tributary. Assessment was limited to the road crossing only. Limiting factors, if any, downstream to Natlan Creek remain unknown. This stream enters Natlan Creek in reach 7.

Impact Description: The bridge at this road crossing (Branch 6B-37 km Suskwa FSR) has collapsed to the stream channel (photo 38.) Bridge materials, fine sediment and bedload is being deposited to this stream.

Prescription: this crossing should be removed and the area planted with grasses and mixed shrub/tree species at this crossing. This crossing is scheduled for permanent de-activation. Assessment of possible barriers downstream to Natlan Creek should be assessed in 1997.

2.6.5 Natlan Creek (Reach 6)

Fish/Habitat Assessment: Gee-trapping in reach 6 and most of this reaches retained Dolly Varden only. The average stream gradient on this upland bench is 2%. Natlan Creek down cuts below this reach into an entrenched valley with bedrock canyons. Reach 6 exhibits ample small and large gravels and cobble. Stream habitat is comprised of extensive glides and riffles with occasional pools at under cut banks and debris jams. Forest harvesting in this reach is limited to Blocks 93M044-008 and -009. Over 1600m, 132 stable LWD pieces were tallied. Dominant instream cover consisted of boulders and undercut banks. Dolly Varden were also gee-trapped within beaver ponds located in Block 93M044-008.

Impact Description: A series of (5) debris jams and bedload accumulation at these points are contributing to lateral channel erosion and channel avulsion beginning 122m below Block 93M044-009. Braiding of the stream channel has occurred, at these debris jams. Cut stumps were evident in these accumulations. An in filling of pools is apparent. Assessment of off-channel fish habitat in Block -008 found large amounts of fine sediment accumulating in these beaver ponds. Ongoing forest road development, during heavy rains at the time of assessment, was delivering a plume of sediment to this area. Limited riparian vegetation in Blocks 93M044-008 and -009 enhance bank erosion and channelization.

Photo 38. Trib 46-700-30-144 at branch 6b-37km Suskwa FSR. Failure of bridge delivering fine and coarse sediment to Natlan Creek. Bridge site was prescribed for deactivation during 1997. (R.H. and G. "Level 2" prescriptions)

Prescription: Streamside mixed fill-planting of Block 93M044-008 and especially -009 is recommended to help stabilize the stream channel and restore riparian functions lost during harvesting. Streamside vegetation is required for 826m of stream. Assessment of current impacts to this area in block 93M044-008 is required in 1997. Road development, through this block, was incomplete at the time of assessment.

2.6.6 Iltzul Creek (W.C. 46-700-30-013)

General Description: Despite observations of an unknown species of salmon spawning in its headwaters (anonymous, 1995), Iltzul Creek remains inaccessible upstream of two 3m falls located in reach 3 (below Iltzul West FSR @ 11 km). The proximity of the Shegunia River to the Iltzuls headwaters and access to that system via the Iltzul West FSR may explain these observations. An isolated population of Dolly Varden exists upstream of these falls on Iltzul Creek. Downstream of these falls the Iltzul supports rainbow trout (steelhead), bull trout and Dolly Varden. Good spawning gravels, bedrock pools and instream cover exists throughout reach 1 and is utilized for rearing by these species. Evidence of spawning steelhead (large cleaned gravel rears) was noted 20m upstream of the Iltzuls confluence with Natlan Creek (reach 1). No adult steelhead were observed during August when the area was assessed. All road crossings are contributing sediments to this drainages.

2.6.6a W.C. 46-700-30-013-60 (14 km Iltzul West Main) - *High Priority*

Fish/Habitat Assessment: This stream supports Dolly Varden in abundance up to, but not above, the road crossing. A gradient of 4% up and downstream of the FSR was noted. No harvesting has yet been done along this tributary. Assessment was limited to the road crossing only.

Impact Description: An apparent barrier 20 meters downstream of this crossing limits access by Dolly Varden to habitat above the FSR. A build-up of road grade materials behind bridge timbers has formed a 1m falls.

Prescription: The removal of one cedar log at this obstruction should restore access to this tributary. The extent of available habitat upstream of the FSR remains unknown.

2.6.6b Iltzul Creek Failure Reach 3 (11 km Iltzul West FSR) - *High Priority*

Fish/Habitat Assessment: This site is located upstream of two falls (3m each) on Iltzul Creek. Dolly Varden were gee-trapped above these falls. Rainbow trout (steelhead) bull trout and Dolly Varden were trapped downstream in reach 1. Traps were not set immediately below these falls, but it is expected that this barrier is the upper limit for rainbow and bull trout on this drainage.

Impact Description: A series of (4) failures exist here. All are contributing course and fine sediment to Iltzul Creek. An in-filling of pools is evident. One of these failures appears to be enhanced by added drainage from spur #1 in Block 93M034-001. The other failures appear to be influenced by seasonal run-off from the Iltzul West FSR. However, assessments were made after snow melt and additional sources of water may contribute to these failures.

Prescription: Cross-ditching of spur #1 in Block 93M034-001 should help reduce additional discharge to one failure and restore the natural drainage to other gullies in this unstable area of reach 3. Assessment of these failures during spring run-off may help determine other problems not evident during assessment in the summer of 1996. These failures have been highlighted on map 93M034.

2.6.6c Iltzul Creek Tributary (110m past branch 6000 bridge) - *Moderate Priority*

Fish/Habitat Assessment: This stream (gradient 7%) was not identified during "Level 1;" however, enters Iltzul Creek 97m upstream of the branch 6000 road crossing. Assessment was limited to the road crossing only.

Impact Description: The culvert at the branch 6000 road is at present impassable due to the lack of a jump pool and logging debris at its outlet (photo 39).

Prescription: The cleaning of this site and placement of boulders below (to form a jump pool) will allow resident Dolly Varden to access to this small tributary. Gradient upstream of this culvert is 7%.

2.6.7 Denison Creek W.C. 46-700-30-20 (Reach 1) - *High Priority*

Fish/Habitat Assessment: This segment of Denison Creek exhibits and average gradient of 3.5%. It is comprised primarily of riffles and cascades with occasional scour pools and few glides. Stream substrate is dominated by cobbles and gravel. Braiding has occurred at debris jams below the FSR crossing. Single bull trout was gee-trapped below a barrier located 337m upstream of the Natlan Creek confluence. No fish were able to be trapped above this point.

Impact Description: Denison Creek joins Natlan Creek in reach 3. No fish were gee-trapped above an obstruction located 337m upstream of this confluence. Two 1m drops have been created by a slope failure (below the Suskwa FSR) and an accumulation of logging debris behind this failure. The old bridge crossing abutments (10m below existing bridge) are contributing debris to the stream channel (photo 40.) Debris jams, below this crossing, have enhanced lateral channel movement and the braiding of the existing channel. A 1m high beaver dam exists 61m upstream of the Suskwa FSR bridge (km 22.2) and presents an additional seasonal barrier.

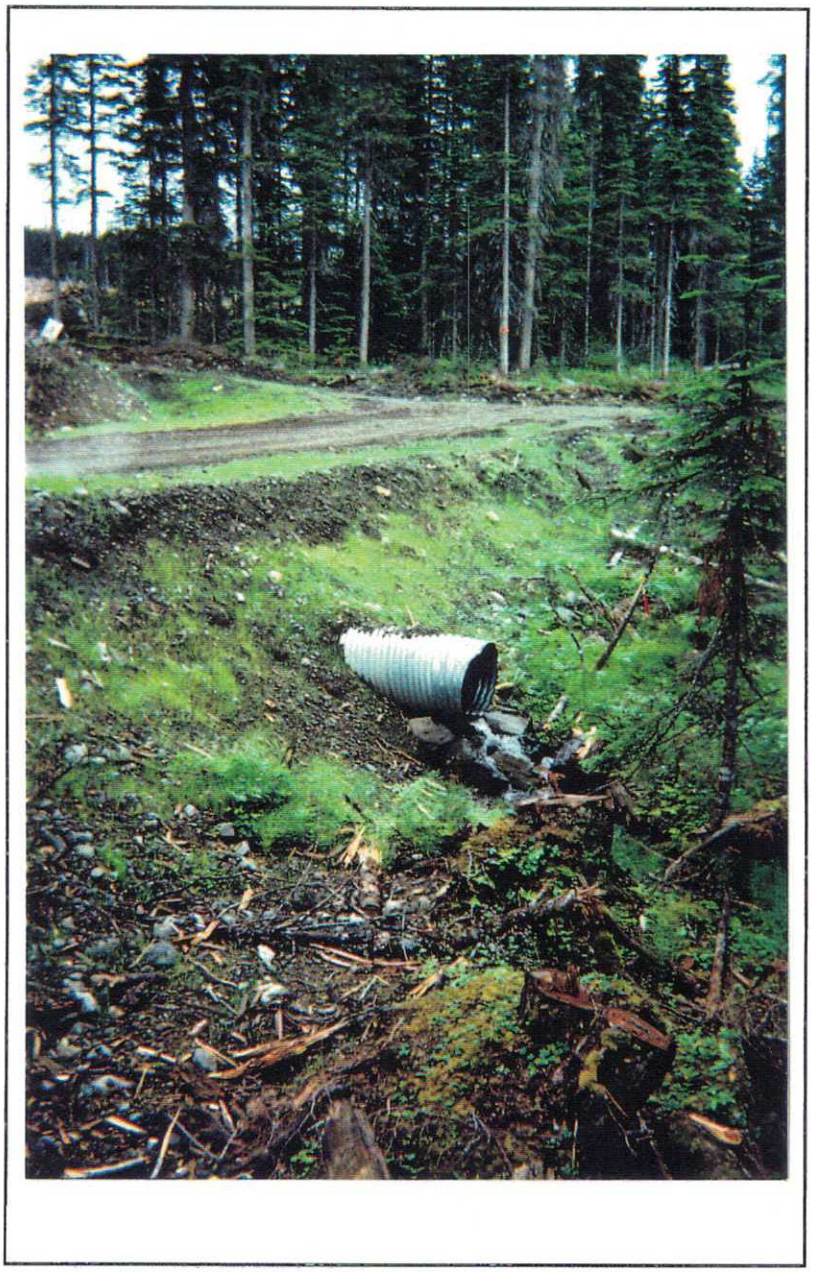


Photo 39. Unnamed trib. to Iltzul Creek (presently impassable).

Photo 40. Old Bridge abuttment failing into Denison Creek (reach 1) at 22.2 km Suskwa FSR. Bridge materials are contributing to debris jams downstream.

Prescription: Partial removal of debris jams 839 meters below the FSR crossing will help facilitate access on Denison Creek. However, care must abe taken not to dislodge this debris jam as it appears to be stabilizing the toe of this failure. Removal of older bridge abutments should be done using an excavator. The beaver dam upstream of this crossing should breeched prior to fall spawning of bull trout in 1997.

2.6.8 Denison Creek Failure Reach 2 (4.374 km Parker FSR) - *High Priority*

Fish/Habitat Assessment: A series of gully failures along this reach were assessed after spring run-off. Stream channel data was not collected on reach 2 as these were treated as "category 1" type impacts. Of 5 failures located here only one is eligible for remedial work. However, future assessment during spring run-off/snow melt conditions may determine remedial possibilities. No fish were able to be gee-trapped on Denison Creek, despite one observation, above reach 1 barriers

Impact Description: Existing failures contribute course and fine sediment to Denison Creek. All are enhanced by FSR run-off along the Parker FSR.

Prescription: Only one failure appears eligible for remedial works. This failure (one of five in this area) appears to be draining excess water from culvert #22 on the Parker Main FSR. A failed berm immediately below this culvert distributes water north to this failure at the terrace edge. Original flows from this culvert drained west towards the tributary crossed at 4.1 km on the FSR. Filling of this berm and redirection of these flows to their original channel may be accomplished with a small crew with hand tools in 1 or 2 days. Assessment of all failures, is recommended, during periods of spring run-off when water sources are more easily traced. All failures noted during 1996 assessments are highlighted on 93M series maps.

2.6.9 Denison Creek (Reach 3) Block 93M035-011 - *Moderate Priority*

Fish/Habitat Assessment: Gee-trapping of reach 3 during 1995 and 1996 failed to catch fish. However, one observation of, what appeared to be, a char (bulltrout or Dolly Varden) was noted in reach 3. This dynamic (8% gradient) portion of Denison Creek is comprised of extensive riffles and cascades with plunge pools at debris jams. Substrate is dominated by cobbles and gravel. Superfluous amounts of LWD (230 large pieces tallied over 900m) exist in reach 3, especially through Block -011.

Impact Description: This cutblock was logged to Denison Creek for 533m. The block itself spans 2 avalanche chutes and multiple debris jams throughout this reach have led to lateral bank erosion into the block. Similar events have occurred upstream of forest harvesting on Denison Creek in this unstable and torrented reach. A small tributary entering Denison Creek (227m upstream of where the stream exits the cutblock) remains blocked with logging debris and should be cleaned of obstructions. Riparian vegetation is sparse along Block -011.

Prescription: Streamside planting of willow, cottonwood and spruce is recommended over the 533m of exposed stream. Planting here should focus on stabilizing the eastern banks of Denison Creek. The small (blocked) tributary in Block -011 should be cleared for access.

3.0 Recommendations/Conclusions

3.0 RECOMMENDATIONS

Remedial prescriptions for fish and wildlife habitats on any watershed is a costly and inefficient means of resource management when preventative opportunities exist. Ongoing forest development continues to degrade habitat throughout the Suskwa watershed despite new guidelines introduced in the Forest Practices Code. Assessment and conservation of high value areas in advance of harvesting is a more effective approach to fish and wildlife management.

Assessment of areas targeted for harvesting, within the 5 year licence plans, is needed prior to development and pre-harvest silvicultural prescriptions. Despite appointed biologists, on staff at industry offices, activities detrimental to fish and fish habitat were witnessed during the 1996 field season at Wan Lake, Natlan Creek, Blunt Creek and Harold Price Creek tributaries. These involved instream works during periods of spawning, road construction during heavy rains, and the falling of timber over and into fish bearing streams.

It is essential that future instream works be conducted in August after trout fry have emerged and before fall spawning occurs.

The list of impacts presented in this report was prioritized for efficiency in the field only. Failure to address lower priority prescriptions (usually involving mixed-planting of riparian areas) will continue to have an adverse cumulative effect on the watershed.

Higher priority sites, especially where rehabilitative or mitigative works are prescribed, should be aerially photographed and sampled for fry densities prior to remedial action. This will provide a data base for comparison after rehabilitation.

It is essential that areas of forest harvesting continue to be assessed for fish and wildlife values, prior to harvesting if possible, as forest development moves from valley bottoms to upper operable limits. Concerns still exist on harvested as well as unharvested areas of the watershed that may prove to be valuable fish habitat but were not visited due to time constraints. A list of possible impacted areas still unassessed is as follows:

3.1 Fisheries Impact Concerns for Assessment 1997

Rating	Suskwa Sub-basin
L	Suskwa mainline drainage at 14km from block 93M024-22
H	Hamblin FSR crossing of trib.46-700-32 (diverted?)
M	Block 93M024-013 (trib.46-700-42) enhancing valley wall failure?
H	Trib. 46-700-084 (debris torrent) blocks 93M035-001,-004 &-010 (pg.57)
H	Jumbo Creek tribs. @ blocks 93M035-008,-009 & -010 (pg.56)

L	Tributary to Denison Cr. @ entrance to block 93M035-004
H	Block 93M035x17 (trib. 36-700-147) block boundary
M	Netazul FSR road crossings to block 93M035-016

Natlan Sub-basin

H	Iltzul Creek gully failures (assess during run-off) (pg.70)
H	Denison Creek gully failures (assess during run-off) (pg.74)
H	Natlan Creek (reach 3) failure @ block 93M034-005 (pg.66)
M	Natlan Creek (reach 6) Branch A road developments @ 35km Suskwa FSR (pg.68)

Harold Price Sub-basin

H	H.P. (reach 1) Hamblin FSR development impacts to tribs. (pg.23)
H	Camp Lake trib. @ block 93M025x2 and 93M026-003 (pg.25)
M	Toughy FSR crossings from H.P. bridge crossing onwards
M	Upper Moan Creek @ block 93M016-007
H	Torkelson Lake tribs. (Nilkitkwa FSR) blocks 93M017-014 & -017
M	H.P. (reach 9) trib. through spray block 93M007-101
M	H.P. reach 10) trib. 46-700-50-135 in block 93M006-012

Blunt

M	Trib. 46-700-50-30-70 @ block 93M015-19 boundary
M	Trib. 46-700-50-30-85 @ block 93M015-12 boundary
H	Wan Lake trib. 4 (pg.12)
H	Wan Lake (new) tribs. @ block -028 (pg.14)

3.2 Dynamic Impacts

The following sites have been listed for possible assessment during high water events. These areas, described in detail within this report, exhibit harvesting related and/or natural phenomena that may be disastrous during heavy spring run-off conditions. These have been included because heavy snow accumulations have occurred within the watershed and an opportunity may exist to records these events. Estimated costs for these visits were not budgeted within this report.

Lower Suskwa Sub-basin:

15 Mile creek bridge
Skilokis Creek bridge (block 93M024-18)

Upper Suskwa Sub-basin:

Thoen Mt. debris torrent (blocks 93M035-004 and -001)
Trib. 46-700-137 (block 93M035-006)
Trib. 46-700-140 (block 93M035-015)

Natlan Creek Sub-basin:

H.P. reach 9 (block 93M007-101)
H.P. reach 10 (block 93M006-006 and -012)
Luhk Creek (block 93M016-010)

Blunt Sub-basin:

Wan Lake tribs. below Goat Mt. diversion (blocks 93M016-29 and 029)
Trib. 46-700-50-30-115-010 (block 93M015-002)

3.3 Suskwa WRP Proposed Work Schedule (1997)

February/March

- Identify eligible sites
  - required materials (ie. stems) % mix
  - MOF/MOELP funding?
  - wildlife concerns/adjusted planting figures.
- Identify missing mosaics/update 1:20;000 with (5 year plans)
  - flight plan/booking
- Instream permit applications (ie. form 7) for instream works
- Contact contractors (silviculture)

April/May

- Assess lower elevation/south facing run-off with geo. (ie. Natlan failures etc.)
- Aerial photography
- Commence spring planting

June/July

- Assess higher elevation/north facing sites (ie. trib.-30-115-110)
- Assess gee-trap new impact concerns (ie. Nilkitkwa FSF)
- Continue planting

August/September

- Instream works (identified 1996)

- fry densities (Aug. only)
- fry salvage - channel reinstatements

October/November ?

- Monitoring - prescription achieved?
- Mosaic presentations/rehab. descriptions
- report/stocking opportunities (Sept./Oct.)?

4.0 References

4.0 REFERENCES

Banner, A.; Mackenzie; S. Haeussler; S. Thomson; J. Pojar; R. Trowbridge:
A Field Guide To Site Identification And Interpretation For The Prince Rupert Forest Region. Crown Publications. 1993.

Chudyk, W.E.: Suskwa River Steelhead Trout:
The 1977 Inventory, Creel Survey and Life History Characteristics Study Leading to the Removal of a Barrier on Harold-Price Creek. Fisheries Report No. 77-5 (S.E.P. 1978)

Equipment Rental Rate Guide 1996\97. Province of British Columbia:
Crown Publication. 1996.

Coupe, R., C.A. Ray, A. Comeau, M.V. Ketcheson and R.M. Annas:
A Guide To Some Common Plants Of The Skeena Area. Province of British Columbia. 1982.

Dane, G.G.:
A Review and Resolution of Fish Passage Problems at Culvert Sites in British Columbia. Fisheries and Marine Service Technical Report No. 810. 1978

Ginger, J.G. and D.M. Silver:
Roads, Hillslope and Gullies "Level 2" WRP report (unpublished) for Suskwa Restoration Society. 1996

Houp, K.W., and T.E. Pearsall:
Reporting Technical Information. Library of Congress Cataloguing in Publication Data. 1982.

Hosie, R.C: Native Trees of Canada. Ministry of Environment. Crown Publications. 1973.

Johnston, N.T., and P.A. Slaney:
Fish Habitat Assessment Procedures. Watershed Restoration Program. Crown Publications. 1996.

Ministry of Environment and Dept. of Fisheries and Oceans:
Fish Habitat Inventory and Information Program (SISS), 1991.

Oikos and T. Johnson:
Riparian Assessment and Prescription Procedures. Watershed Restoration Program. 1996.

Province of British Columbia:
Forest Practices Code Fish-Stream Identification Guidebook. 1995.

Scott, W.B., and E.J. Crossman:
Freshwater Fishes of Canada. Bryant Press. 1973.

5.0 Appendices

5.1

Fisheries Impacts/Prescription/Costs Summary

Suskwa WRP 1996

Blunt Creek Sub-basin

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Blunt Sub-basin)

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Blunt Sub-basin Reach 1 Blunt Creek (46-700-50-30)	93M016-032	36 km Upper Fulton FSR	CO, CT DV, MW	**H** Limited riparian vegetation over logged flood plain. Subsequent channel instability (see pg. 7)	Mixed fill-planting of logged floodplain incl. islands of this high value rearing area (see pg. 7)	1.5 ha	P= $ 2,891.
Blunt Creek Reach 2 46-700-50-30	93M016-032	36 km Upper Fulton FSR	CO, CT DV, MW	**L** Valley wall failure enhanced by seasonal run-off at block -032	Planting of block fire-guard with willow/alder and cottonwood at failure for 50m.	.05 ha	P= $ 96.
Kuelsh Creek	93M016-N/A (road xing)	40 km Kuelsh FSR	CT, DV	**L** Adequate road crossing (passable) some sediment from ditchlines	No treatment, crossing has been hydro-seeded	NT	NT
Wan Creek 700-50-30-30	93M016-028	43.8 km Kuelsh FSR	CT, DV	**M** Adequate riparian buffer (0+) cutthroat fry in block -028. (See Appendix 2)	Some fill-planting of spruce along block -028 at Wan Cr. assess blk.-028 in 1997. (see appendix 2)	.05 ha	P= $ 96.
Wan Lake trib. 1 (T1)	93M016-029	43.1 km Kuelsh FSR	CT	**H** Natural diversion on Goat Mt. has led to failed ditchblocks and channel diversion. Stream blockages at entrance to blk.93M016-029. (see details pg. 8)	Fry-salvage from Kuelsh rd. ditchlines and reinstatement of stream channel. Removal of debris and streamside planting at blk. 93M016-029 entrance. Aerial photography (see pg. 8)	.464 ha	P= $ 888. F= $ 4,750. E= $ 1,144. H= $ 2,860.
Wan Lake tribs. 2-4 (T2, T3, T4)	93M016-027	41.9 km to 42.6 km Kuelsh FSR	unknown	**H** T2 has been diverted at the Kuelsh FSR. T3 & T4 are impassable at the Kuelsh Rd. due to poor culvert placement. (see details pg. 9-12)	T2 requires reinstatement after a fry-salvage with electro-shocker. T3 needs rip. veg. and culvert replacement. T4 needs culvert replacement & re-assessment in 1997 due to logging disturbance Oct.'96 (see pg. 9-12))	1.6 ha	P= $ 2,984. F= $10,000. E= $ 2,288. H= $ 2,860.

P = planting F = fisheries crew E = excavation H = helicopter NT= no treatment N/A = not applicable
(see methodology for backup calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs for the Suskwa Watershed Restoration Program 1996 (Blunt Sub-basin)

Page 2 - Blunt

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
46-700-50-30-55	93M015-020	30.4 km Blunt 2000 FSR	CO, CT DV	**L** Multiple small blockages & loss of stream cover for 480m through blk.93M015-020. (see details pg. 16)	Removal of logging debris & streamside planting for bank stability, shading & future LWD in blk. -200. (see pg. 16)	.96ha	P= $ 1,845. F= $ 950.
Blunt Sub-basin 46-700-50-30-70	93M015-019	28.9 km Blunt 2000 FSR	Unknown	**L** Bank erosion at road crossing (2000 Rd) lower spur rd. in blk.-019 contributing fine sediments	Grass seeding of crossings & re-trapping of stream for fish presence. Ongoing road work & sedimentation at time of assessment.	.01 ha	P= $ 20. F= $ 1,900.
46-700-50-30-75	93M015-N/A (road crossing)	27.8 km Blunt 2000 FSR	CT, DV	**L** Adequate bridge crossing. Some sediment from ditchlines	No treatment	N/A	NT
Blunt Creek Reach 7	93M015-N/A (road crossing)	2700 branch Blunt 2000 Rd.	CT, DV	**L** Adequate bridge crossing. Some sediment from ditchlines	No treatment	N/A	NT
46-700-50-30-90	93M015-011	28 km Blunt 2700 FST	Ø	**L** High gradient trib. drains to forested wetlands.	No treatment. Assess fishbearing trib.46-700-50-30-85 of blk.93M015-012 in 1997.	N/A	F= $ 920.
46-700-50-30-105	93M015-N/A (road crossing)	28-1 km Blunt 2600 FSR	N/A	**L** No flows Aug./96 ephemeral stream	No treatment	N/A	NT
46-700-50-30-100	93M015-N/A	26.4 km Blunt 2000 Rd	Ø	**L** Bank failures & sediment from roadcrossing	Grass seed & fill plant with willow at crossing right-of-way	.08 ha	P= $ 154.
46-700-50-30-110	93M005-004	24.4 km Blunt 2000 FSR	CT	**H** Channel diversion at road crossing & upstream barrier at spur rd. Blk.-004. (see details pg. 16)	Fry-salvage of new flooded area prior to channel re-instatement & removal of spur road grade. Area will need planting after treatment. (see pg. 16)	.1 ha	P= $ 192. F= $ 5,000. E= $ 1,144. H= $ 2,860.

P = planting F = fisheries crew E = excavation H = helicopter NT= no treatment N/A = not applicable
(see methodology for backup calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Blunt Sub-basin)

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
46-700-50-30-115-005	93M005-N/A (road crossing)	22.2 km Blunt 2000Rd	CT, DV	**L** Aggraded debris jam 30m below road crossing & unstable banks	Removal of blockage & stream side planting of willow & grasses. (see appendix 2)	.1 ha	P= $ 192. F= $ 950.
Blunt sub-basin 46-700-50-30-115-010	93M015-002	21.3 km Blunt 2500rd	DV	**H** 2 channel diversions into blk.-002. Unstable banks, erosion & bedload delivery downstream. (see details pg. 21)	Removal of debris jam 357 meters downstream of crossing. Streamside planting of willow, pine & spruce for 1600 meters. (see pg. 21).	1.6 ha	P= $ 3,072. F= $ 2,850
46-700-50-30-115-015	93M005-002	21 & 21.5 km. Blunt 2000 FSR (2 crossings)	DV	**L** Two road crossings. One at 21 km needs bank stability & the other at 21.5 km is impassable at the road crossing	Streamside planting & culvert replacement. Grass seeding required. .	.08 ha	P= $ 154.
46-700-50-30-115-20	93M005-N/A (2 rd.crossings)	19.2 & 19.6 km. Blunt 2000 FSR	DV	**L** Passable road crossings. Some sedimentation at road crossings.	Grass seeding of culvert sites & streamside planting of willow	.16 ha	P= $ 307.
46-700-50-30-115-25	93M005-001	18.3 km Blunt 2500 rd	DV	**L** Obstruction at road crossing. Some sediment	Establish small jump pool at culvert outlet.	N/A	F= $ 950.
Blunt Creek reach 9 & 10	93M015-N/A	Blunt 2500 Rd.	DV	**L** Small amounts of find sediment to trib. 46-700-50-30-135 & side channel	No treatment	N/A	NT

Blunt Total $ 54,317.00

P= Planting F=Fisheries Crew E=Excavation H=Helicopter NT=No Treatment
(See methodology for back up calculations)

Lower Harold Price Creek Sub-basin

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Lower Harold Price sub-basin))

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Harold Price Creek 46-700-50 Reach 1	93M025-002	11.5km Natlan A FSR	CO, CH, CM, PK, ST, RP, CT, DV, MW	**L** Loss of riparian vegetation along terrace edge in block -002 and subsequent erosion.	Mixed fill-planting of block -002 boundary for 200m of H.P. reach 1.	.2	P=$ 384.
Harold Price Creek Reach 1	93M025	8.6km	CH	**H** Sedimentation from forest development along Hamblin FSR of high value chinook rearing area (side channels) SW side of H.P.	Further assessment of recent (1996/97) developments along Hamblin FSR and tribs. to H.P. side channels. (see pg. 23)	N/A	F=$ 4,450. (5 days)
Harold Price Creek Reach 4 & 5	93M016	3km Toughy FSR	CH, ST, RB, CO, MW, CT, DV	**H** Potential degradation of grizzly bear habitat/access to H.P. falls.	Assessment of trib. 46-70-50-17.6 and proposed opening. (see pg. 27)	N/A	F=$ 1,780. (2 days)
Harold Price Creek Reach 6(a & b)	93M016-014,-015,-016,-017, and -020	.8km Toughy FSR	CO, CT, DV, MW	**H** Removal of riparian vegetation for 6km along H.P. Subsequent bank erosion and loss of riparian functions.	Streamside planting for a total of 7.5km of streambank. LWD placement opportunities. (see pg. 31)	7.5	F= ? P=$14,400.
Camp Lake (unnamed trib.)	93M025	53.6km Upper Fulton FSR	CT	**H** Fish-bearing trib. at entrance to block -X2 delivering sediment to lake from road crossing. (See photo 13)	Construction of wooden box culvert over stream and assessment of block 93M026-003. (see pg. 25)	N/A	F=$ 900.
Camp Creek 46-700-50-14	93M025	52.km Upper Fulton FSR	CT	**L** Adequate riparian vegetation at lake outlet	No treatment	NT	∅

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary
for the Suskwa Watershed Restoration Program 1996 (Lower Harold Price sub-basin))

Page 2 - Lower Harold Price

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Camp Creek Reach 4	93M025	53.4km Upper Fulton FSR	CT	**L** Adequate road crossing	No treatment (scheduled for MOF de-activation 1997).	NT	∅
46-700-50-14-10	93M026-007	46.5km Branch 53.1	∅	**L** This trib. was dry when visited Oct. 16/96.	No treatment	NT	∅
46-700-50-14-15	93M026-005 and -006	55.5km Branch 53.1	CT	**H** Two road crossings present barriers to fish. Loss of future LWD.	Removal of these crossings is scheduled for 1997. Mixed fill-plant for 3362m. (see pg. 25)	3.4	P=$12,910. E=$ 2,000.
46-700-50-14-40	93M026-005	54.8km Branch 53.1	CT	**L** Fish access limited by gradient below road crossing.	Streamside mixed fill plant for 1200m for water quality.	2.4	P=$ 4,608.
46-700-50-14-60	93M026	53.8km Branch 53.1	Unk	**M** Stream has been diverted at culvert	Reinstatement of original channel to Camp Creek at culvert outlet. (Remove berm.) (see pg. 27)	N/A	E=$ 1,144.
46-700-50-19	93M016-031	45km to Maish Creek Crossing	∅	**L** Loss of riparian vegetation. This trib. is inaccessible to fish due to high gradient.	Streamside planting for water quality for 1060m.	2.2	P=$ 4,070.
Maish Creek 46-700-50-20	93M016-031 and -020	45km to Maish Creek bridge	CT, DV	**L** Adequate road crossing. Loss of riparian vegetation above and below road crossing.	Streamside planting for 268m in block -031 at points just below road crossing to Paask Cr. confluence and H.P. terrace edge	.27	P=$ 515.
Maish Creek 46-700-50-20 Reach 4 & 5	93M026	45km Upper Fulton FSR	DV	**L** Adequate wooden box culvert (WBC)	No treatment. WBC should be monitored for structural integrity.	NT	∅

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary
for the Suskwa Watershed Restoration Program 1996 (Lower Harold Price sub-basin))

Page 3 - Lower Harold Price

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates $
Paask Creek 46-700-50-20-10	93M026-008, -039 & -018	45km Upper Fulton FSR	DV	M Lack of riparian vegetation and resulting bank erosion. Sedimentation at ford.	Streamside planting for 1130m upstream of road crossing. (see pg. 29)	2.26	P = 4,340
46-700-50-20-40	93M026	47.3km Upper Fulton FSR	DV	**L** Adequate ford	No treatment	NT	∅
46-700-50-20-55	93M026	49km Upper Fulton FSR	DV	**H** This wooden box culvert is failing into this stream.	Replacement of wooden box culvert with new WBC. (see pg. 29)	N/A	E = 1,144
46-700-50-20-60	93M026	49.3km Upper Fulton FSR	DV	**H** Eastern tribs. metal pipe culvert is impassable & should be replaced (photo 15).	Replacement with WBC. (see pg. 27)	N/A	E = 1,144 + MC ?
46-700-50-22	93M016-020 & -X23	43km Upper Fulton FSR	∅	**L** Loss of riparian vegetation. Stream has 40% gradient at H.P.	Streamside mixed fill-plant for 1200m through blocks 20 & x23.	2.4	P = 4,608
Tsouts Creek 46-700-50-24	93M016-030 & -021	42.2km Upper Fulton FSR	DV, CO, CT	**H** Failing wooden box culvert at U.Fulton FSR crossing & lack of streamside vegetation for 5806m of stream bank.	Replacement of WBC & mixed fill-planting for riparian functions. (see pg. 31)	5.8	P =11,147 E = 1,144 + MC
Shummi Creek 46-700-50-25	93M016-017, -021 & -016	40-9km Upper Fulton FSR	DV, CT	**L** Small portions of stream lacking riparian vegetation above road crossing.	Fill-planting at opening along stream in block -021.	.71	P= 1,363

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary
for the Suskwa Watershed Restoration Program 1996 (Lower Harold Price sub-basin))

Page 4 - Lower Harold Price

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates $
46-700-50-27	93M016-016	39.6km Upper Fulton FSR	CO	**H** Failure of WBC at FSR. Loss of riparian vegetation & numerous small blockages through blocks -015, -016, -007 & -036.	Replacement of WBC at FSR. Streamside mixed fill-planting for 1900m. Removal of small blockages instream. (see pg. 34) Assess beaver dams for coho.	3.8	E = 1,144 F = 940 (1 day) P = 7,296
46-700-50-28	93M016-016	2km Toughy FSR	CO,cDV, CT	**M** Bank erosion and loss of riparian vegetation. Impassable culvert at Toughy FSR.	Streamside mixed fill-plant for 1800m. No fish were gee-trapped above H.P. oxbow. Retrap. in 1997.	1.8	P = 3,456
Moan Creek 46-700-50-35	93M016-031	37.5 Upper Fulton FSR	CT, DV	**L** Adequate road crossing & riparian vegetation.	Assess upper reaches in block 93M-10-007 in 1997.	N/A	F = 940

Lower Harold Price $ 85,827.00

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Upper Harold Price Creek Sub-basin

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Upper Harold Price sub-basin))

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates $
Harold Price Creek Reach 7	93M016-035	32km Upper Fulton FSR	CT, DV MW, BB	**H** Loss of riparian vegetation & subsequent bank erosion & site loss.	Streamside mixed fill-planting for 1079m in block 93M016-035. (see pg. 35)	1.08	P=$ 2,072.
Harold Price Creek Reach 8	93M016-019 & -101	2.1 km Torkelson FSR	CT, DV, BB, MW	**H** Loss of riparian vegetation & subsequent bank erosion & site loss. (see pg. 41)	Streamside mixed fill-planting for 1223m in blocks 93M016-019 & -101. Bridge crossing adequate.	1.2	P=$ 2,304.
Harold Price Creek Reach 9	93M006-101	28.4km br. Upper Fulton FSR	CT, DV, BB, MW	**H** Loss of riparian vegetation & associated functions. Subsequent erosion & site loss.	Streamside mixed fill-planting for 1654m in block 93M016-101. (see pg. 46)	1.7	P=$ 3,176.
Harold Price Creek Reach 10	93M006-005,-006,-007,-010 & -012	27.3km Upper Fulton FSR (1st bridge)	CT, DV, MW	**H** Loss of riparian vegetation & lateral channel erosion - site loss.	Streamside mixed fill-planting for channel stability & riparian functions for 3769m. (see pg. 49)	7.5	P=$ 7,237.
Harold Price Creek Reach 11	93M006-004 & -012	3.5km branch 27.6	CT, DV	**H** Loss of riparian functions, site loss and lateral channel movement.	Streamside mixed fill-planting for 925 m. in blocks -004 & -012. (see pg. 49)	.93	P=$ 1.785.
46-700-50-40-	93M016	38.5km Upper Fulton FSR HP East FSR	CT	**H** Wooden box culvert has collapsed into stream. Numerous (0+) cutthroat below crossing.	Removal of failed crossing. Scheduled for de-activation 1997. (see pg. 35	N/A	E=$ 2,288. P=$ 35.
46-700-50-45	93M-016-010	39.5km Upper Fulton FSR to HP east FSR	Unk. fry observed below crossing	**H** Multiple blockages & loss of riparian vegetation through block -010.	Removal of multiple blockages & corduroy crossing. (see pg.37) Streamside planting for 2079m.	4.2	P=$ 7,987. F=$ 1,880. (2 days) E=$ 1,144.

P = planting F = fisheries crews E = excavation NT = no treatment N/A = not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary
for the Suskwa Watershed Restoration Program 1996 (Upper Harold Price sub-basin))

Page 2 - Upper Harold Price

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Luhk Creek 46-700-50-50	93M016-010	approx.37km HP east FSR	CT, DV	**H** Channel diversion to block -010. Bank erosion & lack of future LWD and riparian vegetation	Log deflection 240m below NE block boundary & streamside mixed fill-planting for a total of 2680m. (see pg. 37)	2.68	P=$ 5,145. F=$ 4,800. (5 days) H=$ 1,430.
Howal Creek 46-700-50-55	93M-16-034 & -035	32.2km Upper Fulton FSR	CT, DV	**H** Lack of riparian vegetation in blocks -034 & -035. Small blockage of stream below U.Fulton & damaged culvert.	Removal of debris jam 93m downstream of U.Fulton FSR. Streamside planting for a total of 1034m in blocks -034 & -035. Culvert repair. (see pg. 38)	1.03	P=$ 1,982. F=$ 470. (.5 day) H=$ 715. * Welding ?
46-700-50-85	93M017-031	35.4km HP east FSR	CT	**H** Collapsed wooden box culvert. Limited riparian vegetation in block -031.	Replace wooden box culvert & streamside plant for 523m. Possible breaking of beaver dam. (see pg. 41)	.523	P=$ 1,004. E=$ 1,144. (+$12,000. ? for WBC) F=$ 470. (.5 day)
46-700-50-110	93M017-018	32.8km HP east FSR	Ø	**L** Ephemeral stream lacks adequate riparian vegetation. Multiple blockages.	No treatment	NT	Ø
46-700-50-120	93M006-007 & -010	27.6km Upper Fulton FSR	CT, DV	**M** Sedimentation of trib. at road crossing. Lack of adequate riparian vegetation.	Grass seeding of road crossing (replaced Oct.22/96) & streamside mixed fill-plant for 1070m (both banks). (see pg. 46))	2.1	P=$ 7,891.
46-700-50-125	93M006-005	26.2km Upper Fulton FSR	Ø	**L** Ephemoral stream with adequate riparian vegetation. Dry when visited Sept.'96	No treatmentt	NT	Ø

P = planting F = fisheries crews E = excavation NT = no treatment N/A = not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary
for the Suskwa Watershed Restoration Program 1996 (Upper Harold Price sub-basin))

Page 3 - Upper Harold Price

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
46-700-50-140	93M006-003	Branch 27.6 Upper Fulton FSR	CT	**H** Debris jam obstructs fish passage 217m upstream of road crossing & stream lacks adequate riparian vegetation.	Removal of obstruction & streamside planting for 380m of block -003. Bridge is scheduled for perm. de-activation 1997. (see pg. 51)	.76	P=$ 1,459.
Torkelson Creek 46-700-50-115	93M017-018 & -034	2km Torkelson FSR	CT, BB	**L** Sparse riparian vegetation in block -018 & -0234 bordering wetlands.	Mixed fill-plant for 1069m along wetlands marsh.	1.1	P=$ 2,115.
46-700-50-115-10	93M017-024 & -016	branches A & D on Torkelson FSR	CT	**H** 2 corduroy crossing s obstruct access. Trib. lacks adequate riparian vegetation.	Removal of corduroy crossings & streamside mixed fill plant for 1369m. (see pg. 43)	2.7	P=$ 5,257. E=$ 2,288.
46-700-50-115-30	93M017-007	5.8km Torkelson FSR (Br.A)	CT	**M** Small diversion of flows to block -007 & inadequate riparian vegetation.	Removal of debris at "pink flagged' diversion site to retain flows in original channel. Stream side planting for 685m. (see pg. 43)	.69	P=$ 1,325. F=$ 940. (1 day)

Lower Harold Price Total $ 80,343.00

P = planting F = fisheries crews E = excavation NT = no treatment N/A = not applicable
(see methodology for back-up calculations)

Lower Suskwa River Sub-basin

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Lower Suskwa Sub-basin)

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Suskwa River Reach 6	93M024-013	5.7km Hamblin FSR	CO,CH,PK ST,RB,CT MW,BT.D V	**L** Seasonal drainage of block -013 eroding terrace edge	No treatment	NT	∅
Fifteen Mile Creek 46-700-10	93M024	10 km from Steges bridge	Unk.	**M** Old bridge crossing has collapsed to stream	Removal of existing WBC and subsequent planting of road crossing. Assessment of lower reaches in 1997 (see pg.52)	.04	F=$ 1,144. P=$ 77.
Eighteen Mile Creek 46-700-16	93M024	3 km Iltzul W. FSR	Unk.	**L** Lower road crossing has been removed. Upper crossing is adequate. Gradient prevents fish access to this point.	No treatment	NT	∅
Skilokis Creek 46-700-031	93M024-018	.28km Hamblin FSR	RB, DV, BT	**H** Forest harvesting and stand tending has contributed to loss of riparian vegetation, bank stability and LWD	Streamside planting for 448m through block -018 LWD placement downstream of the road crossing (see pg. 52)	.9	P=$ 1,730. F=$10,150.
46-700 - 033	93M024-017	2.25 km Hamblin FSR	CO, CH, RB	**H** This wooden box culvert (#10) is failing and should be replaced	Replacement of culvert and subsequent planting of road crossing (see pg. 54)	.04	Ex=$ 1,144. + $12,000.
46-700-034	93M024	3.05km and 3.1km Hamblin FSR	CH, RB, DV	**H** 2 wooden box culverts (#14 &15) are collapsing into this stream	Replacement of these culverts and grass seeding of these sites afterwards (see pg. 54)	.04	E=$ 2,288. + MC (10,000.)
46-700-036	93M024	3.5 km Hamblin FSR	CH, RB, BT	**L** Adequate bridge crossing. Some sediment from ditchlines	No treatment	NT	∅

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary
for the Suskwa Watershed Restoration Program 1996 (Lower Suskwa Sub-basin)

Page 2 - Lower Suskwa

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
46-700-40	93M024	5km Hamblin FSR	CH, RB, CO, BT DV	**M** Adequate crossing. Box culvert material discarded to stream	Removal of box culvert materials from stream immediately below crossing. (see pg. 55)	N/A	F=$ 470. (.5 day)
46-700-41	93M024	5.8km Natlan A FSR	CH, CO	**L** Adequate wooden box culvert	No treatment. Culvert should be monitored for structural integrity	NT	∅
46-700-44	93M025	6.4km Natlan A FSR	CH, CO	**H** This wooden box culvert is presently falling into the stream	Replacement of this culvert and grass seeding of the crossing afterwards (see pg. 55)	N/A	E=$ 1.144. + $12,000.
46-700-45	93M025	8km	CH, CO, RB, DV	**H** This year-round trib. runs down the Natlan A FSR for 30m	This trib. needs a cross-ditch at the point where it enters the FSR (see pg. 56)	N/A	E=$ 1,144.
46-700-048	93M025	8.4km Natlan A FSR	CH, CO, RB, DV	**H** The bridge over this stream has collapsed	Replacement of bridge and subsequent grass seeding of this site. Assessment of blocks 93M035 -8, -9, -10 and -18. (see pg. 56)	N/A	E=$ 1,144. + $12,000. WBC F=$ 1,800. w/truck

Lower Suskwa Total $ 68,235.00

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Upper Suskwa River Sub-basin

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Upper Suskwa Sub-basin)

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Suskwa River Reach 7	93M025-002 & -004	9.7lm Natlan A FSR	CH, ST, DV, BT, CO	**M** Removal of streamside vegetation is contributing to erosion in blocks -002 & -004	Streamside planting for bank stability in blocks 93M025-002 & -004	1.19	P=$ 2,285.
46-700-084 (SK 8)	93M035-004	7km Parker FSR (branch 8-9)	Unk.	**H** Debris torrent from Thoen Mt. diverts flows from this trib. to blocks -004 & -010	Removal of corduroy road in block -004 (see pg. 57) Note: Debris blocks a small trib. at entrance to block -004 and should be cleaned	N/A	E=$ 1,144.
Suskwa River Reach 11	93M035	.75km Grizzly Main	RB, BT, DV	**L** Adequate bridge crossing	No treatment	NT	Ø
46-700-137	93M035-006	.05km Netazul FSR	Unk.	**H** Erosion of bridge site and road grade materials. Lack of streamside vegetation through block -006	Streamside planting for 110m through block -006. Pull-back of materials at deactivated bridge site. Further assessment of Netazul Main cross ditches to block -016. (see pg. 60)	2.2	P=$ 4,224. E=$ 1,144. F=$ 890. (1 day)
46-700-140	93M035-015	0 km Grizzly FSR	DV, BT	**H** Imminent diversion to block -015 and loss of riparian vegetation	Placement of log deflectors 423m upstream of crossing and streamside planting for 675m. Pull-back at FSR (see pg. 57)	.68	P=$ 1,305. F=$ 2,820. (3 days) H=$ 715. E=$ 1,144.
46-700-144	93M035	.46km Grizzly FSR	DV	**H** Impassable culvert DVA were trapped up to this crossing	Culvert replacement of Grizzly FSR. Assess block 93M035 - 1997 (see pg. 60)	N/A	E=$ 1,144. + 10,000.
46-700-147	93M035	11.6km Thoen FSR		**L** Adequate bridge crossing	Assess block X 17 boundary in 1997	N/A	F=$ 890. (1 day)

Upper Suskwa Total $ 27,705.00

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Natlan Creek Sub-basin

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Natlan Sub-basin)

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Natlan Creek 46-700-30 Reach 1	93M024x9	17.3km Suskwa FSR	DV, CO, RB,MW, BT, CT	**H** Sedimentation of off-channel habitat from Suskwa mainline.	Mitigative work on Lot 555A groundwater channel. (see pg. 65)	N/A	F-10 days =$ 8,000. + truck 900 +Tools 150 =$ 9,050.
Natlan Creek Reach 2	93M034	1km Iltzul E. FSR	DV, RB, MW, BT, CT	**L** Sedimentation to Natlan Creek at Bridge site	No treatment	NT	Ø
Natlan Creek Reach 3	93M034-005	25km Suskwa FSR	DV, RB, BT, MW	**H** Natural bedrock constriction and accumulated debris obstructs access. Gully failure off of Block 93M034-005	Removal of reach 3 barrier. Assess failure in block -005 during spring run-off. (see pg. 65/66)	N/A	F=$ 1,840. (2 days)
46-700-30-130	93M044-001	34km Suskwa FSR	DV	**H** Impassable pipe arch culvert and bank erosion at crossing.	Pull back of road grade materials and creation of a jump pool at culvert outlet. (see pg. 66)	.06	E=$ 144. P=$ 115.
Natlan Creek Reach 6	93M044-008 and -009	35km Suskwa FSR 2500 Rd.	DV	**H** Inadequate riparian vegetation, eroding banks and lateral channel movement.	Streamside planting for bank stability and riparian functions. Assessment of recent road development in block 004-008. (see pg. 68)	.826	F=$ 1,800. (2 days) P=$ 1,586.
46-700-30-142	93M044	36.1km Suskwa FSR	DV	**L** Sedimentation from ditchlines at road crossing.	No treatment. Area has been hydro-seeded	NT	Ø

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary for the Suskwa Watershed Restoration Program 1996 (Natlan Sub-basin)

Page 2 - Natlan

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
46-700-30-144	93M044	38km Suskwa FSR	UNK	**H** Bridge has collapsed to stream. (see pg. 68)	Pull bridge and plant streamside vegetation at crossing. Assess for barriers downstream (see pg. 68)	.08	E=$ 2,288. P=$ 154. F=$ 890. (1 day)
Iltzul Creek 46-700-30-13 Reach 1 & 2	93M034-004	2km Iltzul E. FSR	DV, RB, BT	**L** Valley wall failures (4) along terrace edge and off of block -004	Assess during spring run-off, 1997. See map 93M034	N/A	F=$ 890. (1 day)
Iltzul Creek Reach 3	93M034-001	11km Iltzul W. FSR	DV, RB, BT	**H** Failures (4) along block - 001 to Iltzul Creek.	Cross ditching of spur 1 in block - 001 will reduce seasonal drainage to one failure. Assess 1997. (see pg. 70/71))	N/A	E=$ 1,144. F=# 940. (1 day)
Iltzul Creek Reach 4	93M034	12.9km Iltzul W. FSR (branch 6000)	DV	**L** Sedimentation from ditchlines at road crossing	No treatment. Area has been hydro-seeded.	NT	∅
46-200-30-13-60	93M034	14.3km Iltzul W. FSR	DV	**M** Road building materials obstruct passage 20m downstream of bridge site	Removal of debris below crossing to facilitate access. Crew with tools (1 day). (see pg. 70)	N/A	F =$ 940. (1 day)
46-700-30-13-54	93M034	13.7km Iltzul West FSR (Br. 6000)	DV	**L** Adequate pipe arch culvert. Some sedimentation from ditchlines	No treatment	NT	∅
Iltzul Creek unnamed trib. near - 054 confluence	93M034	13km Iltzul W. FSR (branch 6000)	DV	**M** Impassable culvert at branch 6000 rd.	Clear debris from culvert outlet and establish jump pool. (see pg. 71)	N/A	F =$ 940. (1 day)

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

Appendix 1: Fisheries Impacts/Prescriptions/Costs Summary
for the Suskwa Watershed Restoration Program 1996 (Natlan Sub-basin)

Stream (Watershed code)	Map/Block Numbers	Road Access	Fish Present	Impacts/Rating (H.M.L.)	Prescriptions	Plantable Area (Ha)	Cost Estimates
Denison Creek 46-700-30-20 Reach 1	93M034	22.2 km Suskwa FSR	DV, BT	**H** Old bridge abutments collapsing to stream contributing to debris jams and barriers downstream. (see pg.71)	Removal of old bridge materials and partial removal of bridge material of debris jams downstream (see pg. 71) Breeching of beaver dam prior to fall spawning. Selective removal of debris jams.	N/A	E=$ 575. (4 hours) F=$ 2,820.
Denison Creek Reach 1	93M034-005	23km	DV ?	**L** 2 older failures along terrace edge in block -005 appear to have stabilized with natural regeneration	Assess during spring run-off (See map 93M034)	N/A	F=$ 890. (1 day)
Denison Creek Reach 2	93M035-002	4.4km Parker FSR	DV ?	**H** This failure (1 or 5) drains excess water from culvert #22 on the Parker FSR dues to a failed berm below the road crossing	Redirection of flows to original drainage by small crew with hand tools (see pg. 74). Assess during spring run-off)	N/A	F=$ 1,880. (2 days)
Denison Creek Reach 3	93M)35-011	8km Parker Main	DV ? observed	**M** Complete removal of vegetation along Denison Creek for 533m has resulted in bank erosion and lateral channel movement	Streamside planting for channel stability and removal of debris at small trib. in block -011. (see pg. 74)	N/A	P=$ 1,025. F=$ 1,880. (2 days)

Natlan Total $ 31,791.00

P = planting F = fisheries crew E = excavation H = helicopter NT = no treatment N/A not applicable
(see methodology for back-up calculations)

5.2

Riparian impact/Prescription/Costs Summary

Suskwa WRP 1996

Blunt Creek Sub-basin

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Blunt Creek Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
Blunt Creek reach 1 46-700-50-30	93M-016-032	Lower Blk.35 boundary with Blunt proceed u/s	CO, DV, CT	**H** Limited riparian veg. enhances floodplain erosion. Limited stream cover & future LWD. (see pg. 7)	Blunt #1	1506	1.5	1807	Willow, Act Sx	$ 2,891.
Blunt Creek reach 2	93M016-002	4.5 km on Kuelsh FSR	CO, DV, CT	**L** Seasonal run-off enhances failure to Blunt Cr. in blk.-002 along terrace edge.	Blunt #3	50	.05	60	Willow, Act Pl	$ 96.
Wan Creek	93M016-028	Eastern block boundary with lake outlet	CO, DV, CT	**L** Sparse riparian veg. at lake outlet, Future LWD concerns.	N/A	50	.05	60	Sx	$ 96.
Wan Lake trib. 1 (T1)	93M016-029	Entrance to blk.-029. 43.1 km Kuelsh FSR	CT, DV	**H** Loss of riparian veg. enhances erosion & channel instability. Limited future LWD & stream cover. (see pg. 8)	N/A	464	.464	557	Willow, At Sx, Pl	$ 891.
Wan Lake Tribs. T2, T3, & T4	93M016-027	41.9 km to 42.6 km Kuelsh FSR → u/s	Unk.	**H** Re-assessed T4 for riparian concerns. Lower priority planting of T3. (see pg. 8-12)	N/A	1554	1.554	1865	Willow, Act Sx, Pl	$ 2,984.
46-700-50-30-55	93M015-020	30.4 km Blunt FSR crossing d/s	CO, DV	**H** Water quality concerns to high value rearing habitat downstream. (see pg.16)	N/A	960	.96	1152	Willow, Sx Pl	$ 1,843.

* Riparian prescription figures are already included in Appendix 1 - budget projections

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Blunt Creek Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
46-700-50-30-70	93M015-019	28.9 km Blunt FSR	Unk.	**L** Bank erosion enhanced by limited streamside veg. at road crossing. Assess 1997	N/A	10	.01	12	Willow, Sx Pl	$ 20.
46-700-50-30-100	93M015-N/A	26.4 km Blunt FSR crossing	Ø	**L** Bank failures & sed-iment deposition enhanced by limited rip. veg at road crossing. (u/s & d/s)	N/A	80	.08	96	Willow, Sx	$ 154.
46-700-50-30-110	93M005-004	24.4 km Blunt FSR crossing	CT	**H** Bank erosion & limited stream cover above & below road crossing. Channel to be re-established 1997. (see pg. 16)	N/A	100	.1	120	Willow, Sx	$ 192.
46-700-50-30-115-005	93M005-N/A road crossing	22.2 km. Blunt FSR crossing d/s	CT, DV	L Limited streamside veg. enhances erosion of road grade below FSR crossing	N/A	100	.1	120	Willow, Sx	$ 192.
46-700-50-30-115-010	93M015-002	21.3 km Blunt 2500 Rd (downstream)	DV	**H** Limited riparian veg. enhances erosion, debris jams & channel diversions Blk.-002 (see pg. 21)	N/A	1600	1.6	1920	Willow, Sx Pl	$ 3,072.
46-700-50-30-115-015	93M005-002	21.0 km Blunt FSR crossing	DV	**L** Bank instability & erosion at road crossing	N/A	80	.08	96	Willow, Sx	$ 154.

* Riparian prescription figures are already included in Appendix 1 - budget projections

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Blunt Creek Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
46-700-50-30-115-20	93M005-N/A (road crossings)	19.2 km & 19.6 km Blunt FSR	DV	L Bank erosion due to limited riparian veg. at both crossing.	N/A	160	.16	192	Willow	$ 307.

* Total $12,892.00

* Riparian prescription figures are already included in Appendix 1 - budget projections

Lower Harold Price Creek Sub-basin

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Lower Harold Price Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
H.P. Creek reach 1 46-700-50	93M025	Suskwa & H.P. confl. u/s to large failure-1147m	CO, CH, CM,PK, ST, RB, CT,DV, BT,MW	**L** Lack of riparian vegetation in block -002 enhancing failure in reach 1	H.P. #1	200	.2	240	Willow, Act, Sx, Pl, Hw, Cw	$ 384.
H.P. Cr. reach 6a/b 46-700-50)	93M016-014,015,016, 017, & 020	4696m below Toughy bridge → u/s	CO, DV, CT, Mw	**H** Removal of riparian veg. for 6 km along H.P. Subsequent bank erosion & loss of riparian functions. (see pg. 31)	H.P. #12 & #13 & #14	7500	7.5	9000	Willow, Act Pl	$14,400.
46-700-50-14-15	93M026-005 & 006	55.5 km branch 53.1 → u/s	CT	**M** Inadequate riparian vegetation in blocks - 005/006 (see pg.25)	N/A	3362	3.4	4080	Willow, Act Sx, Hw, Cw	$ 6,528.
46-700-50-14-40	93M026-005	54.8 km branch 53.1 → u/s	∅	**L** Inadequate riparian vegetation in block -005. Water quality concerns.	N/A	24200	2.4	2880	Willow, Act Sx, Hw, Cw	$ 4,608.
46-700-50-19	93M016-031	45 km to Maish FSR crossing	∅	**L** Loss of riparian veg. Water quality concerns. Inaccessible to fish	N/A	21220	2.12	2544	Willow, Act Sx	$ 4,070.
Maish Creek reach 1 46-700-50-20	93M016-031 & 020	45 km to Maish Cr. bridge	CT, DV	**L** Inadequate riparian veg. along blks.-031 (below & above crossing to Paask confl. & H.P. terrace edge. Enhanced erosion.	N/A	268	.27	324	Willow, Act Sx, Pl	$ 518.

* Riparian prescription figures ($) are already included in Appendix 1 - budget projections

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Lower Harold Price Sub-basin)

page 2

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
Paask Creek 46-700-50-20-10	93M016-008,-030 & 018	45 km U.Fulton FSR crossing → u/s	DV	**M** Loss of riparian attributes upstream of road crossing. (see pg. 29)	N/A	2260	2.26	2712	Willow, Act Sx, Pl	$ 4,339.
46-700-50-22	93M016-020 & X23	H.P. Confl. → upstream	∅	**L** Limited riparian veg. through blocks 020 & X23. Not accessible to fish.	H.P. #12	2400	2.4	2880	Willow, Act Sx, Pl	$ 4,608.
Tsouts Creek 46-700-50-24	93M016-030 &-021	42.2 km Upper Fulton FSR (u/s & d/s)	DV, CO, CT	**H** Limited riparian veg. enhancing erosion & sediment deposition in blks.-21/-30. Limited future LWD (see pg. 31)	H.P. #12	5806	5.8	6960	Willow, Act, Sx, Pl	$11,126.
Shummi Ck. 46-700-50-25	93M016-0212	40.9 km Upper Fulton FSR	DV, CT	**L** Small portions of this stream lack riparian veg. below the FSR (blk.-021)	H.P #13.	710	.71	852	Willow, Act, Sx	$ 1,363.
46-700-50-27	93M016-016, -015,-007, & -036	39.6 km Upper Fulton FSR → u/s	CO	**H** Removal of riparian veg. enhances erosion & sediment transport above FSR. (see pg.34)	H.P. #13	3800	3.8	4560	Willow, Act, Sx, Pl	$ 7,296.
46-700-50-28	93M016-016	2 km Toughy FSR d/s	CO, DV, CT	**L** Bank erosion & limited streamside veg. Especially at H.P. oxbow	N/A	1800	1.8	2160	Willow, Act Pl	$ 3,456.

* Total $62,696.00

* Riparian prescription figures ($) are already included in Appendix 1 - budget projections

Upper Harold Price Creek Sub-basin

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Upper Harold Price Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
H.P. Creek reach 7 46-700-50	93M016-035	32 km U.Fulton FSR (NE block boundary)	CT, DV, MW, BB	**H** Loss of riparian veg. in blk. -035. Subsequent bank erosion & site loss. (see pg. 35)	H.P. #17	1079	1.08	1296	Willow, Act, Sx, Pl	$ 2,074.
H.P. Creek reach 8 46-700-50	93M016-019 & -101	start at reach break 9 proceed d/s	CT, DV, MW, BB	**H** Loss of riparian veg. blk.19/101. Subsequent bank erosion & site loss.. (see pg. 41)	H.P. #18/19	1223	1.2	11440	Willow, Act, Sx, Pl	$ 2,304.
H.P. Creek reach 9 46-700-50	93M006-101	start at reach break 10 proceed d/s	CT, DV, MW, BB	**H** Loss of riparian veg. & lateral channel erosion along blk.-101 (see pg. 46)	H.P. #19/20	1654	1.654	1985	Willow, Act Sx, Pl	$ 3,176.
H.P. Creek reach 10 46-700-50	93M-006 -005.-007, -010, &-012	start at reach break 11 d/s	CT, DV MW, BB	**H** Loss of riparian veg. enhances lateral channel erosion & site loss at all blks. Unstable channel. (pg. 49)	H.P 20/ 21/22	7538	7.538	900	Willow, Act Pl, Sx, At	$14,400.
H.P. Creek reach 11 46-700-50	93M-006-004 & -012	Confl. of H.P. & trib. 46-700-50-140 proceed d/s	CT, DV	**H** Loss of streamside veg. enhances erosion & sediment loading. (pg. 49)	H.P. #22	925	.93	1116	Willow, Act Pl, Sx	$ 1,785.
46-700-50-40	93M016-012	H.P. east FSR crossing	CT	**M** Planting required after culvert de-activation (see pg. 35)	H.P. #15	40	.08	96	Willow, Act Pl	$ 154.

* Riparian prescription figures ($) have already been included in Appendix 1 - budget projections

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Upper Harold Price Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
46-700-50-45	93M016-012	39.5 km U. Fulton FSR to H.P. east FSR crossing u/s & d/s	Unk. fry observed	**H** Limited riparian veg. & undefined channel. Ponding of water. (see pg. 37)	N/A	4158	4.18	4992	Willow, Act Pl, Sx, At	$ 7,987.
Luhk Creek 46-700-50-50	93M-016-010	SW block boundary proceed u/s	CT, DV	**H** Limited riparian veg. enhances channel erosion/ diversion. Limited future LWD (see pg. 37)	N/A	2680	2.68	3216	Willow, Act Pl, Sx	$ 5,145.
Howal Creek 46-700-50-55	93M016-034 & -035	32.2 km U. Fulton FSR crossing u/s & d/s	CT	**H** Lack of riparian veg. enhances channel erosion & avulsion (blk-35). (see. pg. 38)	N/A	1034	1.03	1236	Willow, Act Sx, Pl	$ 1,985.
46-700-50-85	93M017-031	H.P.east main FSR crossing u/s & d/s	CT	**L** Limited riparian veg. enhances erosion of blk.-031 (see pg. 41)	H.P #	523	.523	600	Willow, Act Pl, Sx	$ 1,004.
46-700-50-120	93M006-007 & -010	branch 27.6 U.Fulton FSR crossing. u/s & d/s	CT, Dv	**M** Limited stream cover & future LWD through blks.007/010. Plant new road crossing. (see pg. 46)	H.P. #	2140	2.14	2568	Willow, Pl Sx	$ 4,109.
46-700-50-140	93M006-003	branch 27.6A FSR crossing u/s & d/s	CT	**L** Future LWD concerns. Good alder cover. Some small openings in shrub cover. (see pg.51)	N/A	760	.76	912	Willow, Sx, Pl	$ 1,459.

* Riparian prescription figures ($) have already been included in Appendix 1 - budget projections

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Upper Harold Price Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
Torkelson Creek 46-700-50-115	93M017-018 & -034	32.4 km Tork. FSR. From blk.-18 landing	CT	**L** Sparse riparian veg. bordering wetlands (blk.-18 & -34)	H.P. #19 (POC only)	1069	1.1	1320	Willow, Act At, Sx	$ 2,112.
46-700-50-115-10	93M017-024 & -016	Reach break 1 proceed u/s from wetlands	CT	**L** Limited future LWD and portions of exposed stream. Some shrub alder. (see pg. 43)	N/A	2738	2.7	3240	Willow, Act Sx, Pl	$ 5,184.
46-700-50-115-30	93M017-007	SE corner of blk.-007 proceed u/s	CT	**M** Sparse riparian veg. along eastern blk. boundary. Destabilized stream channel. (see pg. 43)	N/A	685	.69	828	Willow, Act Sx, Pl	$ 1,325.

* Total $54,203.00

* Riparian prescription figures ($) have already been included in Appendix 1 - budget projections

Upper and Lower Suskwa Sub-basin

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Upper and Lower Suskwa Sub-basin)

Note: During the (1995) overview, 11 riparian areas were identified for assessment in 1996. Field assessments, made in 1996, determined that inadequate riparian vegetation was a common source of impacts to the fisheries resource. A Total of 46 sites have been described/prescribed here. The total length of streambank requiring mixed fill-planting exceeds 75 km throughout the watershed.

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
Fifteen Mi. Creek (46-700-10)	93M024 (Rd. crossing)	bridge site (10 km from Steges bridge)	Unk.	**L** Rd. crossing will require streamside veg. after de-activation (see pg. 52)	N/A	40	.04	48o	Willow, Act Sx,Hw,Cw	$ 77.
Skilokis Cr. 46-700-031	93M024-018	Suskwa confl. to blk.-018 boundary u/s	Rb, DV, BT	**H** Limited riparian veg. contributes to bank erosion & sediment transport. (see pg. 52) Bedload has in-filled pools.	Skilokis #1	896	.9	1080	Willow, Act Sx, Hw, Cw	$ 1,728.
Suskwa R. (reach 7)	93M025-002 & -004	Suskwa & H.P. confl. to Natlan A road crossing	CH, ST, CO, BT, DV	**M** Loss of streamside vegetation enhances erosion in blocks -002 & -004.	Suskwa #12	990	.99	1176	Willow, Act Sx, Hw, Dw	$ 1,882.
46-700-084 (SK 8)	93M035-001, -004 & -010	Blk.-001 to Suskwa River	Unk.	**H** Further assessment of fish/riparian impacts from Thoen Mt. debris torrent. (see pg. 57)	n/a	?	?	?	?	?
46-700-137	93M035-006	Netazul FSR crossing u/s & d/s	Unk.	**H** Lack of streamside vegetation enhances lateral erosion & channel shifts. (see pg. 60)	Suskwa #19	220	2.2	2640	Willow, Act Sx, Pl	$ 4,224.

* Riparian prescription figures ($) are already included in Appendix 1 - budget projections

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Upper and Lower Suskwa Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
46-700-140	93M035-015	0 km Grizzly FSR u/s	BT, DV	**H** Loss of riparian vegetation enhances bank erosion & channel diversion in block -015. (see pg.57)	N/A	675	.68	816	Willow, Act Sx, Pl	$ 1,306.

* Total $9,217.00

* Riparian prescription figures ($) are already included in Appendix 1 - budget projections

Natlan Creek Sub-basin

Appendix 2. Riparian Impacts/Prescription Costs Summary
Suskwa Watershed Restoration Program 1996
(Natlan Sub-basin)

Stream (W/shed code)	Map/Blk Nos.	POC	Fish Present	Impact description Rating(H.M.L.)	Level 1 Photo Mosaic Ref.	Plantable streambk (m)	Plantable area in ha. (streambk X10 10,000	Stems @ 1200/ ha	Recom-mended species	*Cost @$1.60/ stem
Denison Cr. reach 3 46-700-30-20	93M035-011	Block -011 boundary with Denison Cr.	Unk.	**M** Limited riparian vegetation through block -011 enhances erosion & sediment deposition (see pg. 74)	Denison #4 & 5	533	.533	640	Willow, Act Sx, At	$ 1,024.
Natlan Cr. reach 6	93M044-008 & 009	Branch A bridge site 35 km Suskwa FSR u/s & d/s	DV	**H** Lack of riparian vegetation in blocks -008 & -009. Subsequent erosion, debris jams & channel avulsion downstream (see pg. 68)	Natlan #14	826	.826	991	Willow, Act Sx, At	$ 1,586.
46-700-30-144	93M044	Branch 6B 38 km Suskwa FSR crossing	Unk.	**M** Road crossing will require streamside vegetation after de-activation. (see pg. 68)	N/A	80	.09	96	Willow, Act Sx, At	$ 154.

* Total $2,764.00

* Riparian prescription figures ($) have already been included in Appendix 1 - budget projects