Fish Habitat and Inventory Project 2000
Prescriptions for Stabilizing Degrading Fish Habitat

Peel Inlet and Rennell Sound Streams
Haida Gwaii

Submitted to:

Habitat Restoration and Salmon Enhancement Program
Department of Fisheries and Oceans
Ministry of Environment, Lands and Parks

HECATE STRAIT STREAMKEEPERS SOCIETY
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TABLE OF CONTENTS

1.0 Introduction

The Hecate Strait Streamkeepers (HSS) are a community group consisting of commercial fishermen, fisheries patrolmen, students, fisheries technicians, biologists and concerned citizens. HSS has conducted stream rehabilitation on Haida Gwaii streams since 1997. The core members of this group have each spent over 25 years hiking streams, counting salmon, working in creeks and developing innovative and practical ways to rehabilitate streams. They have observed creeks prior to logging, and understand the dynamics of both disturbed and undisturbed watersheds.

HSS is dedicated to:

- Restoring function of stream ecosystems, and ensuring access for salmon, on all disturbed watersheds in Skidegate Inlet.
- Exploring and assessing streams for rehabilitation elsewhere on island, including Selwyn Inlet, Rennell Sound, Tasu Sound, Englefield Bay, Peel Inlet and the East Coast of Graham Island.
- Encouraging community involvement in watershed stewardship on Haida Gwaii
- Providing training and local employment.
- Promoting informed land use decisions on the islands.

1.1 Project Background

HSS is grateful for the funding provided by both the Pacific Salmon Foundation (PSF) and Fisheries and Oceans Canada (DFO) Habitat Restoration and Salmon Enhancement Program (HRSEP). Both PSF and HRSEP have provided generous financial support to the Haida Gwaii habitat restoration and enhancement community since 1996/1997. This is now producing many measurable benefits to fish habitat in the streams of Haida Gwaii. All of the streams in this years study areas have been disturbed by roads and/or logging in the last 40-50 years and minimal or no remedial work has been conducted on most of these streams. HSS prescriptions will be the initial effort towards restoring natural processes to these streams. A blockage to upstream migration for adult spawners has had a negative impact in most of these streams. Ensuring free movement of juvenile and adult salmonids to these streams is an important first step.

To date, the prescription and rehabilitation activities of HSS have been guided by the following principles:

- Develop plans to manipulate debris blockages that, from observation during salmon spawning season, have proven to block access to traditional spawning areas for adult salmon. From our experience we have found that the structure and function of debris jams can be maintained while ensuring fish passage.

- Work with materials existing on-site to efficiently input as much large woody debris (LWD) to the streams as possible. Using efficient hand labor techniques the natural recovery process is accelerated by placing LWD or manipulating existing boulders in ways that emulate what is observed naturally in streams.

- Avoid negatively impacting natural restorative events occurring in stream and riparian areas. This is achieved by thorough consideration of restoration prescriptions that use hand labor techniques.

- Monitoring of previous rehabilitation work is essential to the success of our program.

HSS has provided assessments and developed prescriptions on 40+ streams in Skidegate Inlet, Long Inlet, East Coast Graham Island, Sewell Inlet, Tasu Sound, Rennel Sound and Peel Inlet. The information and knowledge gained from this broad overview of island streams has given us the ability to prioritize and evaluate rehabilitation potential, for the short and longer term.

We are still in the initial rehabilitation stage for most of these creeks, and several, including those in this report, have had no treatment yet. It is clear that this is a long-term project, and the assessment projects we have completed are but the first stage.

Our assessment protocol has evolved since 1997. Our field technicians have suggested changes to assessment strategies since the beginning, and the priority of certain aspects of assessment have shifted. We have received and incorporated input from local resource professionals with the Ministry of Environment, Lands, and Parks and Department of Fisheries and Oceans, and this has helped clarify their needs and requests for information. As well, reviewing an array of literature on watershed rehabilitation techniques has helped in guiding us towards gathering the most critical information in our assessments.

1.2 Project Objectives

This project was intended to provide baseline habitat condition and fish inventory and distribution data necessary to formulate specific habitat restoration prescriptions. Assessment procedures focused on the lower, anadramous reaches and tributaries with a broad objective of providing immediate stabilization and improvement of instream and riparian habitat to spawning and rearing salmonids.

The objectives of this project include:

1. Assess the current status of degrading salmonids spawning and rearing habitat and prioritize reaches requiring the development of immediate stabilization and rehabilitation prescriptions.

2. Based on the results of objective #1,
   a.) prepare prescriptions for stabilizing actively degrading fish
   b.) develop detailed plans to initiate an ongoing restoration program to recover the highest priority areas of spawning and rearing habitat to historic levels of productivity.

3. Assemble a profile of all species utilizing the aquatic environment

4. Establish detailed instream and riparian cross-sections at representative sites on stream

2.0 Study Areas

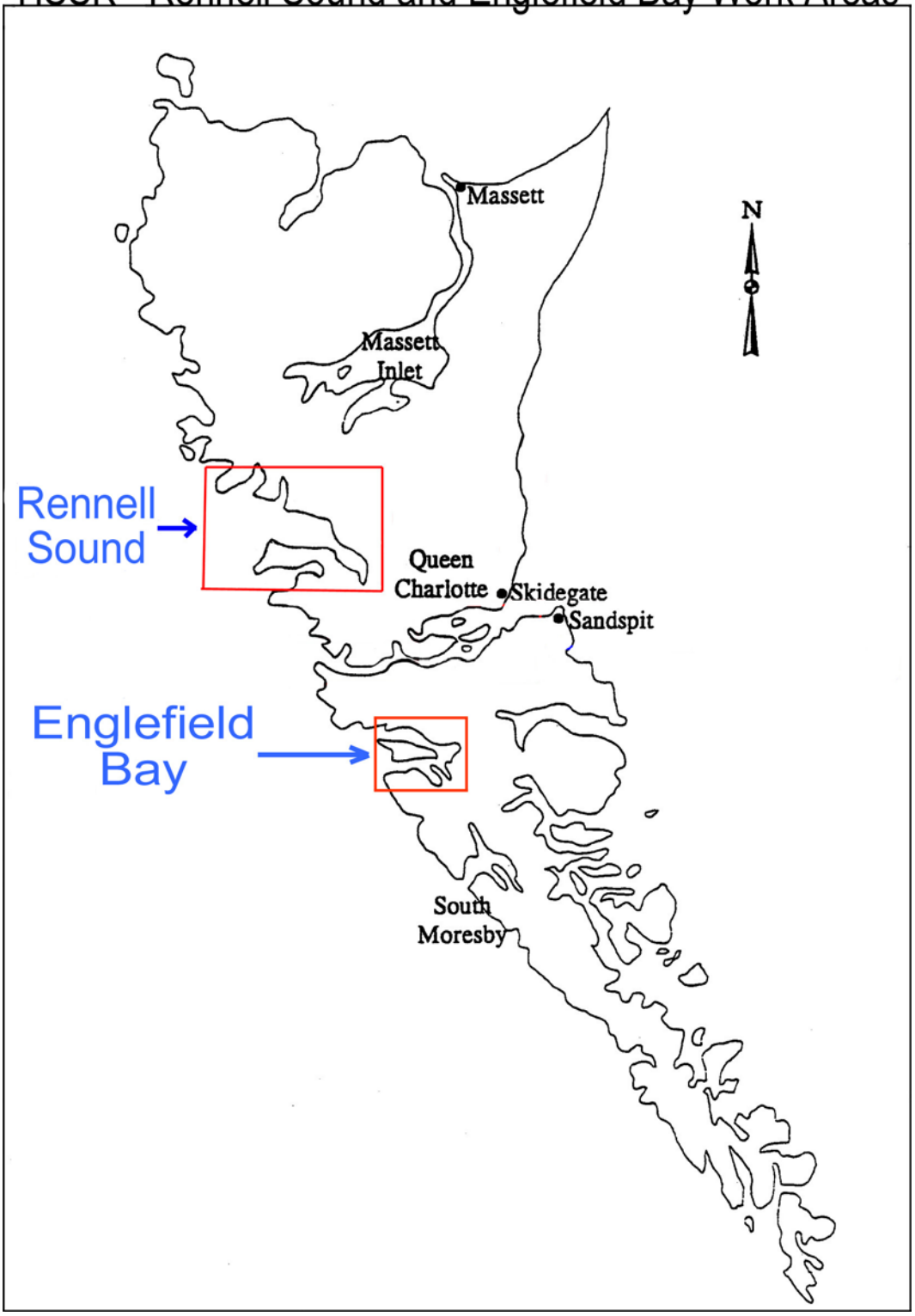
2.1 Selection of Streams

Englefield Bay –Peel Inlet – HSS had not conducted any formal assessments on Peel Inlet streams before this season. Several members of HSS are patrolmen for the DFO and have a 15 to 20 year history of monitoring these streams and are intimately familiar with them. Thus from personal observation salmon presence and abundance and logging history was known. Since 1970 these streams have only been monitored by boat as logging roads and bridges were not passable. Road access to Peel Inlet is now available but difficult requiring 4-wheel drive and knowledge of conditions. Funding from the PSF made it possible for the assessment crew to spend 1 week in the area living aboard a HSS members boat.

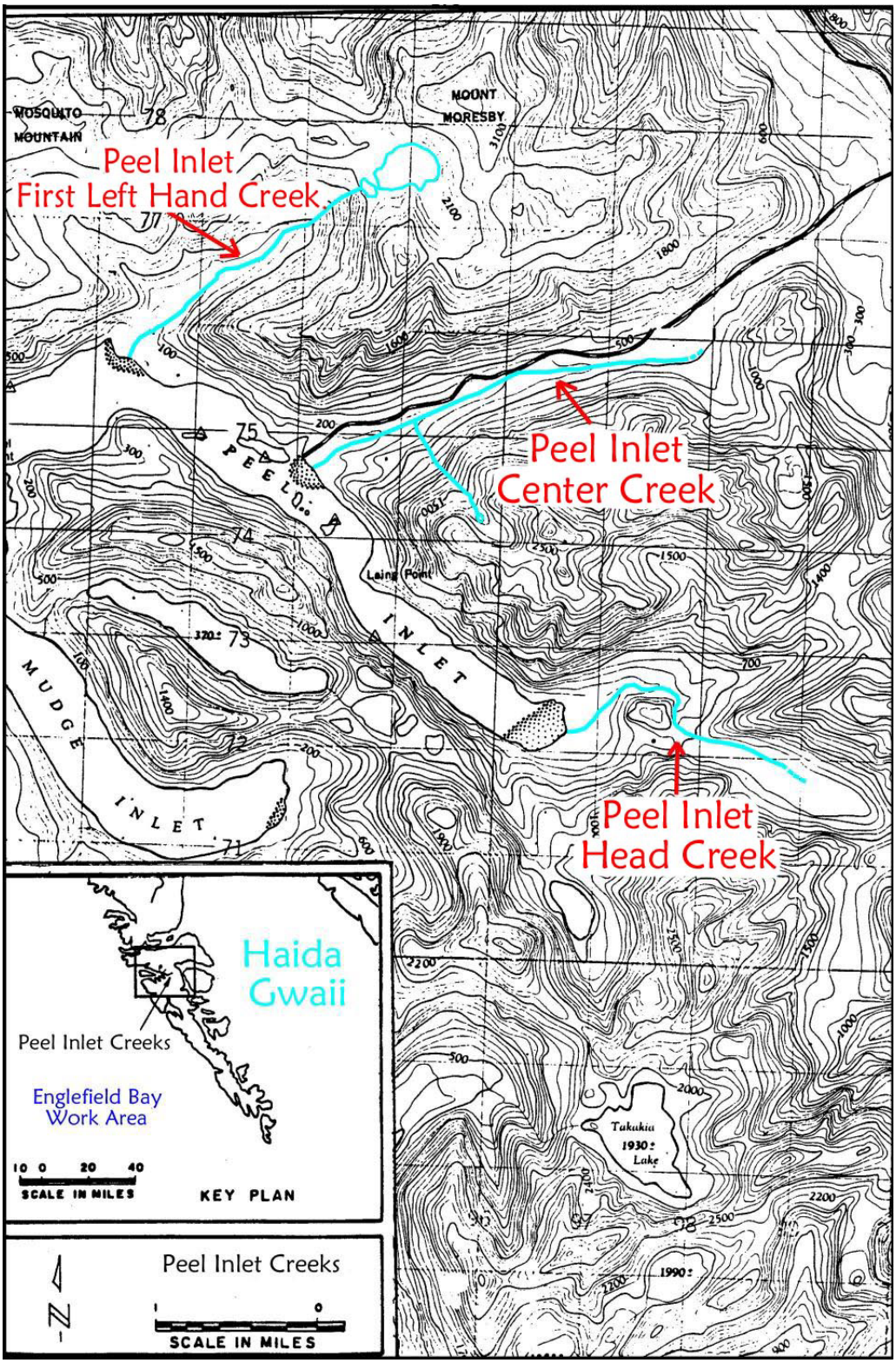
Rennell Sound – A large portion of streams flowing into Rennell Sound have also been heavily impacted by roads and logging. Mass wasting events in the 1970's devastated many of the watersheds. Many of the larger streams have had Level 1 assessments and some Level II prescriptions completed for the Watershed Restoration Program of FRBC.

As with Peel Inlet HSS members as patrolmen for the DFO have a 15 to 20 year history of monitoring these streams and are familiar with them. However, the large size and low returns since the devastation in the 1970's have made these streams less of a priority for the DFO's monitoring program. A key criterion for selection of the streams for inclusion in this assessment project was their smaller size, which is appropriate for HSS style, hand labor rehabilitation techniques.

HSSK - Rennell Sound and Englefield Bay Work Areas



ENGLEFIELD BAY WORK AREA -PEEL INLET CREEKS



PEEL HEAD CREEK OCTOBER 2000

Fry Trapping Data-Peel Head Creek

Trap #	Distance from mouth m).	Time Set	Time Pulled	Total Time Set	Coho	Rainbow	Dolly Varden	Habitat where trap set.
1	0+085 – R side of channel.	15:45	18:26	2 H 41 Min	0	0	0	Slow side pool under LWD.
2	0+170 – R side of channel.	16:00	18:25	2 H 25 Min	1	0	0	Under LWD.
3	0+210 – near RB.	16:15	18:20	2 H 5 Min	4	0	0	Slow side pool under LWD.
4	0+230 – near RB.	16:20	18:20	2 H	0	0	0	Side of deep pool, root wad.
5	0+310 – near LB	16:30	18:15	1 H 45 Min	0	0	0	Under LWD.
6	0+310 – mid-channel	16:35	18:15	1 H 40 Min	0	0	0	Under LWD.
7	0+495 – R side channel.	16:55	18:07	1 H 12 Min	50	0	0	Side of glide.
8	0+515 – mid-channel.	17:15	18:00	45 Min	3	0	0	LWD pool complex.
TOTAL					**58**	**0**	**0**	

PEEL HEAD CREEK OCTOBER 2000

Peel Head Creek – General Habitat Summary

Peel Head Creek was surveyed on the afternoon of October 4th/2000. Although there are some restoration needs and potential this stream was ranked the lowest on the priority list of the 3 Peel Creeks. There are several reasons for this ranking including:

1) The spawning and rearing habitat below ~0+450 m appears to be good to excellent. At this time 1-2000 Chum were spawning, 50-100 Pink and 60+ Coho were in the creek.
2) The rearing and spawning habitat is poor above 0+450 m as the gradient increases, pools and gravel are lacking, and large wood instream is lacking. There is large wood on the banks which, if added to the creek, would likely improve the habitat to a certain extent. However, due to the higher gradient in the stretch from 0+450m – 0+760m the longevity of placed structures might be low. Any LWD pieces added would have to be securely anchored in place with sufficient sized boulders.
3) At 0+760m there is a cascade which we believe is impassable to all species of salmon. Therefore, only 300m of habitat exist where HSSK restoration works would be applied.

To summarize, although Peel Head Creek was rated as lowest on the priority ranking of the 3 Peel Creeks, the stretch from 0+450m – 0+760m would likely benefit from the addition of large woody debris. There is high quality wood available on the banks and some work recommendations were made for LWD placements. At some point upon completing work in the other 2 Peel Creeks, we may then follow through with completing these work recommendations.

The dominant riparian vegetation in this creek is alder, with young spruce and hemlock being the subdominant species.

PEEL HEAD CREEK OCTOBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Neil Davies, Kevin Koch **Date:** Oct 4/00

Meters From→to	**Structure**	**Function**	**Photographs**	**Recommendations**	**P-Days**	**Priority**
0+430	LWD placement RB.	Provide cover in glide.	Photo 1	Pull piece from RB UP to stump at 0+445m. Cable to stump and anchor with boulders.	.8	Low
0+430	LWD placement LB.	Provide additional cover in glide.	-	Pull piece from LB UP to 0+450m, cable to root wad.	1.2	Low
0+475	LWD placement LB.	Add to existing LWD to increase cover and scouring effect.	-	Pull LWD from high on LB and cable to existing piece above pool. Bring boulders in for an anchor. Rope up to LWD high on bank.	1.2	Low
0+530	LWD placement RB.	Cause scour and diffuse velocity.	Photo 2 Photo 3	Cable instream end to 2 boulders. Rope bank end to alders. Swing out more than 3 meters.	1.6	Low
0+540	LWD placement LB.	Cause scour and diffuse velocity.	Photo 2 Photo 3	Pull in so that UP end is positioned where DN end is now, at 45 degree angle into creek; i.e. pull it DN then over into creek. Anchor and cable to instream boulders.	1.6	Low
0+680	LWD placement LB.	Provide cover, cause scour and diffuse velocity.	-	Pull in and cable to boulders.	1.2	Low
TOTAL					**7.6**	

Photo Documentation

Photo 1: 0+430m – Looking UP from mid-channel at 0+410m; glide.

Photo 2: 0+560m looking DN from R side on large boulder. Several large boulders available here for anchoring.

Photo 3: 0+525m – Looking UP at section where we propose 2 LWD placements. Large LWD piece visible on L side photo.

PEEL FIRST LEFT HAND CREEK OCTOBER 2000

Fry Trapping Data-Peel First Left Hand Creek

October 3/00

Trap #	Distance from mouth (m).	Time Set	Time Pulled	Total Time Set	Coho	Rainbow	Dolly Varden	Habitat where trap set.
1	0+110	9:30	19:05	9 H 35 Min	0	0	0	LWD formed pool
2	0+200	10:00	19:00	9 H	6	0	4	L side of fast glide.
3	0+240	10:30	18:55	8 H 25 Min	12	0	1	LWD formed pool.
4	0+275	11:40	18:30	6 H 50 Min	20	0	0	Behind LWD in pool, R side.
5	0+550	12:15	17:50	5 H 35 Min	3	0	0	Pool behind LWD.
6	0+640	12:30	17:30	5 H	7	0	0	Pool behind LWD.
7	0+680	12:30	17:25	4 H 55 Min	23	0	2	Pool behind LWD.
8	0+765	12:41	16:55	4 H 14 Min	40	0	4	Slow side pool behind LWD.
TOTAL					**111**	**0**	**11**	

PEEL FIRST LEFT HAND CREEK OCTOBER 2000

Peel First Left Hand Creek – General Habitat Summary

- Saw 25 live Chum, 8 dead Chum, maybe 1 adult Coho.

Reach 1: 0-1+1700m+ - We observed only one distinct reach in the length of this creek in which we surveyed. The morphology was cascade pool with boulders and wood creating pools. However, there were very few pools as there is very little wood existing instream. Cobble was the dominant substrate with boulder subdominant. Gravel existed in isolated pockets. The gradient averaged 2-4% throughout this section.

The riparian area was similar to that of Peel 2nd Left Hand and Peel Head Creeks. Mature alder is the dominant vegetation with young spruce and hemlock the subdominant. The channel in this creek is unconfined with grass also an important riparian vegetation type.

We recommend working from the top down in this creek because the upper structures will be relatively quick and easy to build with major benefits. There are several very large pieces of LWD in close proximity to the stream to work with in the upper section.

In addition, at 0+600m a substantial tributary hits the RB. This tributary contributes significant flow to the mainstem and therefore structures built upstream of this point will have a higher chance of success than those built downstream of 0+600m.

We did not hike up to a barrier on this creek. DFO/MOEP Fish Habitat Inventory and Information Program records indicate a falls at 1.6 km from the mouth that is impassable to all salmon. We did not observe this falls.

PEEL FIRST LEFT HAND CREEK OCTOBER 2000

Assessment of Restoration Work Required Prescriptions

Persons Surveying: Neil Davies, Kevin Koch **Date:** Oct 3, 4/00

Meters From→to	Structure	Function	Photographs	Recommendations	P-Days	Priority
0+050	Anchor existing instream LWD piece on LB.	Hold in place to maintain cover.	Photo 1	DO NOT remove boulders from natural riffle where log is now. Cable to boulders where log presently rests.	.4	Med
0+100	Manipulate LWD jam on LB.	Deflect water towards existing LWD structure. Stop bank erosion on RB just DN of LWD jam.	Photo 2	Pull large log directly across stream, cable to RB alders.	.8	Med
0+130	Full span rock line.	Gravel recruitment in riffle.	-	Build low to streambed-low gradient.	.8	Med
0+155	Full span riffle structure.	Scour DN by LB root wad.	Photo 3	Pull boulders from DN. Build UP from where ribbon hangs.	1.6	Med
0+175	LWD placement LB.	Increase scour under existing overhang.	Photo 3	Pull large LB log UP and place under deep overhang. Cable to overhang and bank alder.	1.6	Med
0+230	Full span rock line.	Pool water and recruit gravel.	Photo 4	Build rock-line from where ribbon is hanging across channel. Build low to streambed-low gradient.	1.2	Med
0+250	LWD placement LB.	Provide more cover in existing pool and cause scour.	-	Swing instream end UP so it hangs into pool. Cable bank end to alders. Find ballast.	1.2	Med
0+330	Half span rock line LB.	Deflect water towards off-channel habitat on LB.	Photo 5	Build from LB on angle towards pink ribbon. Use boulders from mouth of off-channel to lower the level at mouth. Bring out to large mossy white instream boulder half way across channel.	2	Med

Assessment of Restoration Work Required Prescriptions - continued

Meters From→to	Structure	Function	Photograph	Recommendations	P-Days	Priority
0+390	LWD placement RB.	Provide cover and cause scour.	Photo 6	Swing butt end over to LWD piece on opposite bank and cable them together. If both logs end up instream that's OK.	2	Med
0+410	LWD placement RB.	Provide cover and cause scour.	-	Swing root end instream 1/3 of way. Find 2 big boulders for ballast on root end	1.6	Med
0+500	LWD placement.	Provide cover and cause scour.	-	Swing log into creek; pull boulders in and cable for ballast.	1.6	Med
0+540	Full span riffle structure.	Pool water, recruit gravel and scour DN.	-	Ribbon hanging at DN end of where riffle structure should be placed.	1.6	Med
0+580	Riffle structure.	Recruit gravel and cause scour.	Photo 7	Pull boulders from banks UP and DN. Use the largest boulders on the DN end of structure and cable these to banks. Ribbon is hanging at upper end of where riffle structure should be placed.	1.2	Med
0+585	Root wad placement R side channel.	Create back eddy and scour UP of R line at 0+580m.	Photo 7	Buck off by big alder and pull into creek with root wad facing UP. Cable to bedrock bank.	1.2	Med
0+710	LWD placement LB.	Provide cover and cause scour.	-	Buck 5 small alders from in front. Pull end closest to stream and swing in.	2.4	High
0+715	LWD placement LB.	Provide cover and cause scour.	-	After pulling in 0+710m log, pull directly in towards end of 1st log and cable together, forming a V-shaped structure.	2.4	High
0+760	Root wad placement from RB to L side channel.	Provide cover and cause scour.	Photo 8	Pull root wad (root end first) from RB towards large log L side channel snug up to end of log, rope together and cable to instream boulders.	1.2	High

Assessment of Restoration Work Required Prescriptions - continued

Meters From→to	Structure	Function	Photographs	Recommendations	P-Days	Priority
0+780	Rock line 2/3 way across channel from LB.	Recruit gravel; scour pool DN under existing LWD.	Photo 9	Build only as high as mossy boulder present now. Build back UP 2-3 m from DN end of natural rock line.	1.6	High
0+860	Fill hole in logjam with boulders.	Divert more flow towards R side and create back eddy.	Photo 10	Start with large boulders then pack spaces between with smaller cobble. This will ensure minimal water flow through this structure.	.8	High
0+925	2/3 span riffle structure from RB.	Divert flow towards L side LWD and recruit gravel. Pool water behind.	-	Build riffle structure from RB ~ 2/3 way across channel. Only build as high as mossy instream boulder which is present now. Build DN to small RB alder.	2.4	High
0+930	LWD repositioning from LB DN to 0+920m.	Cause scour, recruit gravel and divert flow.	-	Pull directly DN ~10-12 m and cable in instream boulders.	1.6	High
0+930	LWD placement RB – complex	Provide cover and cause scour.	Photo 11	Pull directly in and cable to UP logs.	1.6	High
0+935	LWD placement RB – complex	Provide cover, cause scour and diffuse velocity.	Photo 11	Buck 2 smaller logs resting on 2 larger logs and clear away. Pull bottom log directly in until it falls. Pull top log in on an UP angle until it falls on top other log. Cable together. Pull boulders from UP LB for ballast.	3.2	High
0+950	Pull parallel LWD into channel.	Cause scour and diffuse velocity.	Photo 11	Cable to instream boulder on DN end; on UP end rope to bank alder.	.8	High
0+953	LWD placement LB.	Divert flow towards RB, provide cover and scour pool.	Photo 12	Pull log snug up against root wad on LB and cable to instream boulder. Rope bank end.	1.6	High

Assessment of Restoration Work Required Prescriptions - continued

Meters From→to	Structure	Function	Photographs	Recommendations	P-Days	Priority
0+990	LWD placement across channel from LB.	Provide cover in existing pool and cause scour.	Photo 13 Photo 14	Buck bottom log ~ 3m from creek end and pull away. Pull larger top log into creek directly across channel. Cable end to large mossy instream boulder, which is under root wad. Cable other smaller chunk to large log or to instream boulders.	2.4	High
1+080	Pull LWD farther into channel on RB, just UP from small LWD jam/cascade.	Split channel, diffuse velocity and recruit gravel UP.	Photo 15	Rope root end to UP alder. Pull ~1.5m out into channel.	.8	Low
1+480	LWD placement on L side channel.	Provide more cover in existing pool and cause scour.	Photo 16	Cable LWD to instream boulders with butt end on DN side of both boulders.	1.6	Low
1+660	LWD placement on RB.	Create pool, retain gravel and slow flow.	-	Pull directly into creek ~1/3 way into channel. Cable to RB root wad. Find ballast. Buck ~ 2m of stream end to get to sound wood.	1.6	Low
TOTAL					**51.6**	

Photo Documentation

Photo 1: 0+050m – Looking UP from the RB. LWD piece not visible in this photo.

Photo 2: 0+125m – Looking DN from the RB at LWD structure at 0+100m.

Photo 3: 0+150m – Looking UP from the RB at location for full span riffle structure.

Photo 4: 0+214m – Looking UP from the LB. Plan to place full span rock-line between where Neil stands and LWD extending into creek in background.

Photo 5: 0+330m – Looking across stream from RB to LB. Neil is standing in dry off-channel. A half span rock-line would redirect some water into the off-channel.

Photo6: 0+380m – Looking UP from MC at location for LWD placement. Neil is standing between the 2 LWD pieces.

Photo 7: 0+600m – Looking DN from the RB at location for riffle structure.

Photo 8: 0+750m – Looking UP from the LB. We propose placing the root wad (visible L of Neil in photo) across channel and rope to log visible on R side photo.

Photo 9: 0+800m – Looking DN from LB at location for rock line. The rock -line would span from the L side channel 2/3 of the way across channel.

Photo 10: 0+870m – Looking downstream from mid-channel at the logjam.

Photo 11: 0+950m – Looking DN from mid-channel. 2 logs for 0+930m and 0+935m structure are visible above Neil. Large log parallel to stream visible on R side photo.

Photo 12: 0+950m – Looking across stream R to L. Log visible in foreground could be placed where Neil is standing.

Photo 13: 0+980m – Looking UP from mid-channel. LWD piece visible on R upper side of photo.

Photo 14: 0+990m – Looking DN from the L side channel at location for LWD placement. Notice large instream boulder available for an anchor.

Photo 15: 1+080m – Looking UP from mid-channel LWD jam at location for LWD placement. Neil is pointing to the piece which we propose to move farther into the channel.

Photo 16: 1+480m – Looking UP at pool. Instream anchor boulders are visible to the right of Neil in photo.

PEEL 2ND LEFT HAND CREEK OCTOBER 2000

Fry Trapping Data-Peel Second Left Hand Creek

Date: October 5/2000

Trap #	Distance from mouth (m).	Time Set	Time Pulled	Total Time Set	Coho	Rainbow	Dolly Varden	Habitat where trap set.
1	0+150 – mid-channel.	9:20	19:18	9 H 58 Min	3	0	0	Flowing water under LWD.
2	0+340 – R side channel.	9:40	19:10	9 H 30 Min	11	0	0	Pool DN off cross log.
3	0+405	9:45	19:07	9 H 22 Min	12	1	0	Excellent LWD pool.
4	0+700	10:20	18:54	8 H 34 Min	30	0	0	Pool & cover formed by alder root wad.
5	0+850	11:00	18:46	7 H 46 Min	6	0	0	Under LWD L-side channel in pool.
6	0+985	11:52	18:40	6 H 48 Min	0	0	0	Boulder formed cascade pool.
7	1+135	12:20	18:30	6 H 10 Min	17	5	0	Pool by LWD.
8	1+285	13:14	13:45	31 Min	2	4	1	Pool DN of cascade / wood jam.
9	1+340	13:45	18:10	4 H 25 Min	9	21	0	Deep pool DN from cascade.
TOTAL					**90**	**31**	**1**	

PEEL 2ND LEFT HAND CREEK OCTOBER 2000

Fry Trapping Data-Peel Second Left Hand Creek

Date: October 6/2000

Trap #	Distance from mouth (m).	Time Set	Time Pulled	Total time set	Coho	Rainbow	Dolly Varden	Habitat where trap set.
1	2+510	11:05	17:24	6 H 19 Min	0	0	6	Pool formed by alder root wad.
2	2+470	11:05	17:10	6 H 5 Min	0	0	8	LWD formed pool.
3	2+300	11:21	16:40	5 H 19 Min	0	0	12	SWD /LWD jam formed pool.
4	2+240	11:25	16:30	5 H 5 Min	0	0	10	Pool under root wad.
5	2+170	11:30	16:20	4 H 50 Min	0	0	2	LWD formed pool.
6	2+100	11:35	16:03	4 H 28 Min	0	0	22	LWD formed pool (~2.5 m deep).
7	1+800	12:00	14:40	2 H 40 Min	0	0	0	Upper end of long glide by root wad.
8	1+740	12:00	14:20	2 H 20 Min	0	0	3	1 m deep pool under LWD and spruce bough cover.
TOTAL					**0**	**0**	**63**	

This fry trapping data strongly suggests that the cascade/debris jam at 1+510 m is acting as a barrier to upstream migration of Coho salmon, as none were caught above this section. 90 Coho fry were caught below 1+510 m, as high up as 1+340 m.

PEEL 2ND LEFT HAND CREEK OCTOBER 2000

Peel 2nd Left Hand Creek – General Habitat Summary

During our 3 day assessment of Peel 2nd Left Hand Creek we broke the lower 3 km of stream into 3 distinct reaches:

Reach 1: 0-1+200 m – The morphology of this reach would be classified as riffle-pool with large woody debris forming pools. There is good spawning habitat here for pink and chum salmon and several hundred of each were observed at this time. Large and small woody debris are moderately abundant in this reach and rearing cover for salmonids is good. This is a low gradient reach averaging 1-2%.

0+340 m – Instream cross-log here creates excellent plunge pool, which appears to be a partial barrier to chum salmon, as we saw much fewer chum UP of this point.
0+450 m – Alder jam may also be a partial chum barrier, as it was packed with leaves and debris from last year's freshet.
0+500-550 m – Over-widened, eroding area, which we believe was caused by an upstream logjam blowing out.
1+019 m – Steep tributary on the RB which is not accessible to salmon due to it's high gradient.
1+100 m – Uppermost observation of pink salmon spawning.

Reach 2: 1+200m – 1+600m – At 1+200m a major cascade is most likely a barrier to upstream migration of pink and chum salmon. This reach has cascade-pool morphology with boulders creating pools. Spawning habitat is poor as there is minimal gravel. Gradient is steeper than reach 1 averaging 3-4%.

- ***Flagged road access at 1+200m with orange ribbon.***

1+285 m – Debris jam creates major impediment to coho salmon. Fry trapping reveals coho do access the stream above this point. It appears adults may get through a side-channel on the R side of the creek (if looking DN).
1+350 m – Last years salmon bones found on shore, and fresh eggs from this year found.
1+510 m – Steep cascade acts as barrier to coho salmon. Access is probable around cascade UP the R side if debris jam manipulated. Gradient UP the R side is ~ 20% with step pools available.

- ***Flagged an access point to the road here, which is < 100m from the creek. Used orange and blue & white ribbon on both sides of road.***

Reach 3: 1+600m – 2+835m – At 1+600m the gradient decreases again back to 1-2% average. The morphology returns to riffle-pool with gravel, and large wood forming pools (same as reach 1). Moderate to good spawning and rearing habitat here with abundant gravel and low gradient. Pools and cover are lacking for spawning adults and rearing juveniles. There is abundant large wood available on the banks, which is much needed in the stream. This reach has excellent potential for spawning and rearing habitat for coho salmon with the abundance of large wood that could be added to the stream.

2+000-2+010 m – Debris jam from old slide needs maintenance.
2+082 m – Tributary LB with no salmon access due to high gradient.
2+090 m – Old slide hit RB here. Now revegetated with alders. Likely one of the causes of DN debris jams.
2+100 m – LWD jam with water flowing over a main jam then through a hole to the R side. UP passage for fish now is probable but this could easily jam with small woody debris and will need routine maintenance.

Peel 2nd Left Hand Creek – General Habitat Summary, continued

2+200 m – 2+240 m – DN end of old off-channel on the RB. This OC is ~ 60m long and enters the RB 35 m UP. It was dry at the time of survey.
2+275 m – 2 small tributaries enter both banks here, neither allow salmon access (too small and steep).
2+500 m – Major tributary enters LB that has a barrier to salmon access near the mouth. The confluence is an excellent spawning area for coho with side-channel and off-channel habitat, low gradient and abundant gravel.

- ***Flagged a road access point at 2+530m as road is < 100m from creek.***

2+835 m – Debris jam/cascade here that is a probable coho barrier.
3+000 m – End of survey. Morphology changes back to cascade-pool with boulder. Channel becomes narrow, steep and constricted and salmon habitat is marginal.

The riparian area throughout the length surveyed was dominated by mature and young alder, with young spruce and hemlock the subdominant species. This creek had previously been logged to the banks ~30-40 years ago. The banks are very steep and it is obvious there were many landslides that hit this creek, judging by the high number of debris jams that were observed (7 jams from 0-2+835m, 1 old slide path).

There is ~1200m of good to excellent spawning habitat above the barrier at 1+510m. Our priority for restoration should be to clear passage for upstream migration through these 7 debris jams. Through previous experience we are confident these jams can be manipulated without negative impacts to the creek or other habitat being lost. These jams all have old cut logs in them, which exist as proof that these jams are related to past logging activities.

Downstream of 0+400m there is an off-channel that is blocked with debris and presently is only accessible in the lower 50 meters. This area was brought to our attention by Dan Bate, Habitat Restoration Technician with the Ministry of Environment Lands and Parks, Queen Charlotte, BC (October 31, 2000). A habitat restoration prescription for this off-channel is not included in this report. We will conduct a preliminary assessment and develop plans for this when time permits.

PEEL 2ND LEFT HAND CREEK OCTOBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Neil Davies, Kevin Koch **Date:** Oct 5, 6, 7

Meters From→to	**Structure**	**Function**	**Photographs**	**Recommendations**	**P-Days**	**Priority**
0+340	Debris jam clearing.	Maintain Chum and Pink access.	-	On R side channel, UP of cross log, clear alder SWD.	.8	High
0+450	Debris jam clearing.	Maintain Chum and Pink access.	-	Clear SWD.	.8	High
0+680	LWD placement LB.	Provide cover and cause scour.	-	Find adequate anchor.	.8	Med
0+775	Full span rock line.	Recruit gravel.	Photo 1	Use rock from UP and DN. Build low to streambed.	1.6	Med
0+830	2/3 span rock line from RB.	Recruit gravel and pool water.	Photo 2 Photo 3	Pull rock from UP, R side channel, to create deeper pool above rock line	1.6	Med
0+850	LWD placement.	Provide cover and cause scour.	Photo 4	Pull x-log UP just enough to drop into pool. Cable to boulders.	.8	Med
0+910	Riffle structure.	Pool water, recruit gravel and cause scour.	Photo 5	Build 2/3 way across from RB. Pull rock from UP.	1.6	Med
0+920	LWD placement LB.	Provide cover and cause scour.	-	Pull LB LWD over top boulder and cable to boulder.	1.2	Med
0+940	2/3 span rock line from LB.	Raise level of UP pool and recruit gravel.	Photo 6	Build 2/3 way across from LB, and low to streambed.	1.2	Med
1+090	Full span rock line.	Raise level of UP pool and recruit gravel.	Photo 7	Use available boulder. Build low to streambed.	1.6	Med
1+105	LWD placement RB.	Provide cover and cause scour.	Photo 8	Pull UP ~2m and cable end with 2 boulders.	.8	Med
1+330	Debris jam maintenance.	Allow water flow through a side-channel to provide Coho access.	Photo 9	Cut a 2m section from ribboned LWD (cut from boulder UP 2m towards ribbon. Cut 1.5 m off of LWD piece laying on DN side of boulder.	1.2	High
1+340	Partial rock line L side channel.	Deflect water towards R side channel.	Photo 10	Build from ribbon over ~4m between boulders. Drill large boulder and pull UP by root wad in pool.	.8	High

Assessment of Restoration Work Required – Prescriptions - continued

Meters From→to	Structure	Function	Photo	Recommendations	P-Days	Priority
1+510	Debris jam maintenance.	Provide Coho access to excellent UP habitat.	Photos 11-15	Cut 2m off log in bottom of jam (ph.1756), then cut ends off DN logs just below.	.8	High
1+585	Full span rock line.	Recruit gravel, pool water and improve existing pool.	Photo 16	Pull boulders from UP. Build low to streambed.	2	Med
1+600	LWD placement LB.	Provide cover and cause scour in existing pool.	-	Buck 2m off end and pull out, then UP to 1+600m marker. Cable instream end to boulder, bank end to spruce tree.	2	Med
1+670	LWD placement LB.	Provide cover and cause scour.	Photo 17	Pull out until it drops then UP and cable to instream bedrock and to bank alders.	1.2	Med
1+770	LWD placement RB (large log).	Cause scour.	Photo 18 Photo 19	Pull root wad end UP ~2m and tie both ends to bank alders.	1.2	Med
1+785	LWD placement RB (root wad).	Recruit gravel, pool water and cause scour.	-	Pull in ~2m and cable to RB spruce tree.	.8	Med
1+800	LWD placement RB (small log).	Provide cover and cause scour.	-	Buck off small chunk and check for sound wood. Swing out and cable to instream boulder.	.8	Med
1+815	LWD placement in channel.	Cause scour and provide cover.	Photo 20	Cable top end to bedrock where alder is ribboned. Root wad end DN, place parallel to channel.	2.4	Med
1+860	LWD placement RB.	Scour pool and provide cover.	-	Pull small log into creek ~1m. Cable to bank alders.	.4	Med
1+865	LWD placement RB.	Scour pool and provide cover.	Photo 21	Pull UP in direction it is pointing in between 2 big alders and bring ~2m into creek.	1.2	Med
1+920	LWD placement over stream.	Provide overhead cover.	Photo 22	Fall 3 flagged alders over stream, bundle together and cable to bedrock. Place overtop stream, not in channel. The closest of these is 7m from the RB.	1.2	Med

Assessment of Restoration Work Required – Prescriptions - continued

Meters From→to	Structure	Function	Photo	Recommendations	P-Days	Priority
1+935	LWD placement from the RB.	Provide cover and cause scour.	Photo 23	Cut cross log towards L side and let it stay where it falls. Cable bank end to alder.	.4	Med
1+950	LWD placement LB.	Provide cover and cause scour.	-	Pull out no more than 1 m and rope to big alder.	.4	Med
1+985	LWD placement LB.	Cause scour.	Photo 24	Pull out 1.5m from banks and cable bank end to alder.	**.8**	Med
2+010	Debris jam maintenance.	Ensure UP access for Coho.	-	Remove SWD and cut out small section.	**.4**	High
2+020	Debris jam maintenance.	Ensure UP access for Coho.	Photo 25	Cut small logs above root wad.	**.8**	High
2+150	LWD placement R side channel.	Stabilize existing LWD.	-	Pull UP ~2 m and cable in place.	**.6**	Med
2+165	LWD placement R side channel.	Cause scour.	Photo 26	Swing over top embedded LWD and staple (5-6 staples) using cable to embedded LWD.	**.8**	Med
2+190	LWD placement LB.	Provide cover and cause scour.	Photo 27	Roll over until root wad end is in channel.	**1.2**	Med
2+285	Woody debris removal.	Allow water flow into off-channel habitat.	Photo 28 Photo 29	Cut and clear out debris from mouth. Pull 1 large log UP ~1m (LB end), then pull DN log UP beside it and cable them together. The objective is to divert water towards the RB and scour the off-channel mouth.	**1.6**	High

Assessment of Restoration Work Required – Prescriptions - continued

Meters From→to	Structure	Function	Photo	Recommendations	P-Days	Priority
2+330	LWD placement LB.	Provide cover and cause scour.	Photo 30	Buck ~3 m from UP end. Pull UP ~1m past embedded boulder and cable. Tie DN end to keep tight to bank.	**2.4**	Med
2+340	LWD placement LB.	Provide cover and cause scour.	-	Pull straight into creek and cable end to boulder or log just UP from previous LWD piece.	**.8**	Med
2+530	Half span rock line.	Deflect flow towards off-channel mouth.	-	Place on angle towards off-channel mouth. Build low to streambed.	**1.2**	High
2+540	Clear debris jam from off-channel mouth.	Open up access to off-channel.	-	Pull LWD away from off-channel mouth and place in bottom of riffle. Cable to existing LWD. Trim alder roots to keep from jamming with wood.	**1.2**	High
2+800	LWD placement LB.	Provide cover and cause scour.	-	Pull directly into pool.	**1.2**	Med
2+800	Debris jam maintenance.	Allow access UP for Coho.	-	Clear out SWD.	**.8**	Med.
TOTAL					**43.4**	

PEEL 2ND LEFT HAND CREEK OCTOBER 2000

Photo Documentation

Photo 1: 0+800m – Looking DN from mossy instream boulder. Propose rock line where Neil is standing (0+775m.

Photo 2: 0+800M – Looking UP from same spot as previous photo. Location for proposed rock line. Notice boulder dominated substrate.

Photo 3: 0+825m – Looking UP at site for rock line. The overhanging cross log is visible in the background.

Photo 4: 0+900m – Looking downstream at suspended cross log.

Photo 5: 0+900m – Looking UP at potential location for riffle structure. Large boulders are abundant here.

Photo 6: 0+950m – Looking DN at potential site for rock line at 0+940m. The line will go from the LB where Neil is standing 2/3 way across channel.

Photo 7: 1+100m – Looking DN from the LB at potential site for full span rock line at 1+090m.

Photo 8: 1+095m – Looking UP from the LB. Propose pulling LWD piece Neil is pointing to UP roughly 2m and anchoring in place just DN of the riffle.

Photo 9: 1+350m – Looking UP. Neil is standing at mouth of dry side channel, just upstream from debris jam at 1+330m.

Photo 10: 1+350m – Looking UP from previous LWD jam at site for construction of rock line. This will divert water towards the side channel.

Photo 11: 1+520m – Looking DN at debris jam from LB. This location is just UP from a steep cascade where water flow splits to the R past where Neil stands, and to the L down an impassable bedrock falls.

Photo 12: 1+500m – Looking UP at same section as previous photo.

Photo 13: 1+510m – Looking DN at same section as photo 11 close-up. We recommend bucking 2 m of this log. Close inspection showed this is a cut log resulting from past logging in this creek.

Photo 14: 1+510m – Looking UP from the top end of the logjam. UP from Neil to~1+600m the substrate is boulder and bedrock dominant, with cobble as subdominant.

Photo 15: 1+550m – Looking DN at bedrock section above debris jam. From this point up ~50 the substrate is dominated by bedrock, boulder and cobble.

Photo 16: 1+575m – Looking UP from the L side channel. Proposed location of rock line at 1+585m.

Photo 17: 1+680 m – Looking DN from the RB at site for LWD placement at 1+670m. This piece would be anchored instream to the large bedrock which rises above the surface in bottom left of photo.

Photo 18: 1+750 m - Looking UP from the RB at site for LWD placement at 1+770m. We propose pulling the large mossy log in upper left of photo upstream 2 m.

Photo 19: 1+780 m – Looking DN from the RB at same site as previous photo for LWD placement. Mossy log in the upper right of the photo be pulled upstream ~2m.

Photo 20: 1+825 m – Looking DN from the RB at site for LWD placement in channel at 1+815m.

Photo 21: 1+845m – Looking UP from instream debris jam. Log in upper left of photo is to be moved ~2m into the creek (1+865 m). The log is in a glide section with gravel and cobble the dominant substrate.

Photo 22: 1+920m – Looking UP from the RB. This is a deep glide section that would benefit from overhead cover.

Photo 23: 1+945m – Looking DN from the RB at suspended cross log at 1+935 m.

Photo 24: 1+995m – Looking DN from the LB at site for LWD placement. Log is visible in upper left of photo.

Photo 25: 2+020m – Looking DN at debris jam.

Photo 26: 2+160m – Looking UP from mid-channel at site for LWD placement at 2+165 m.

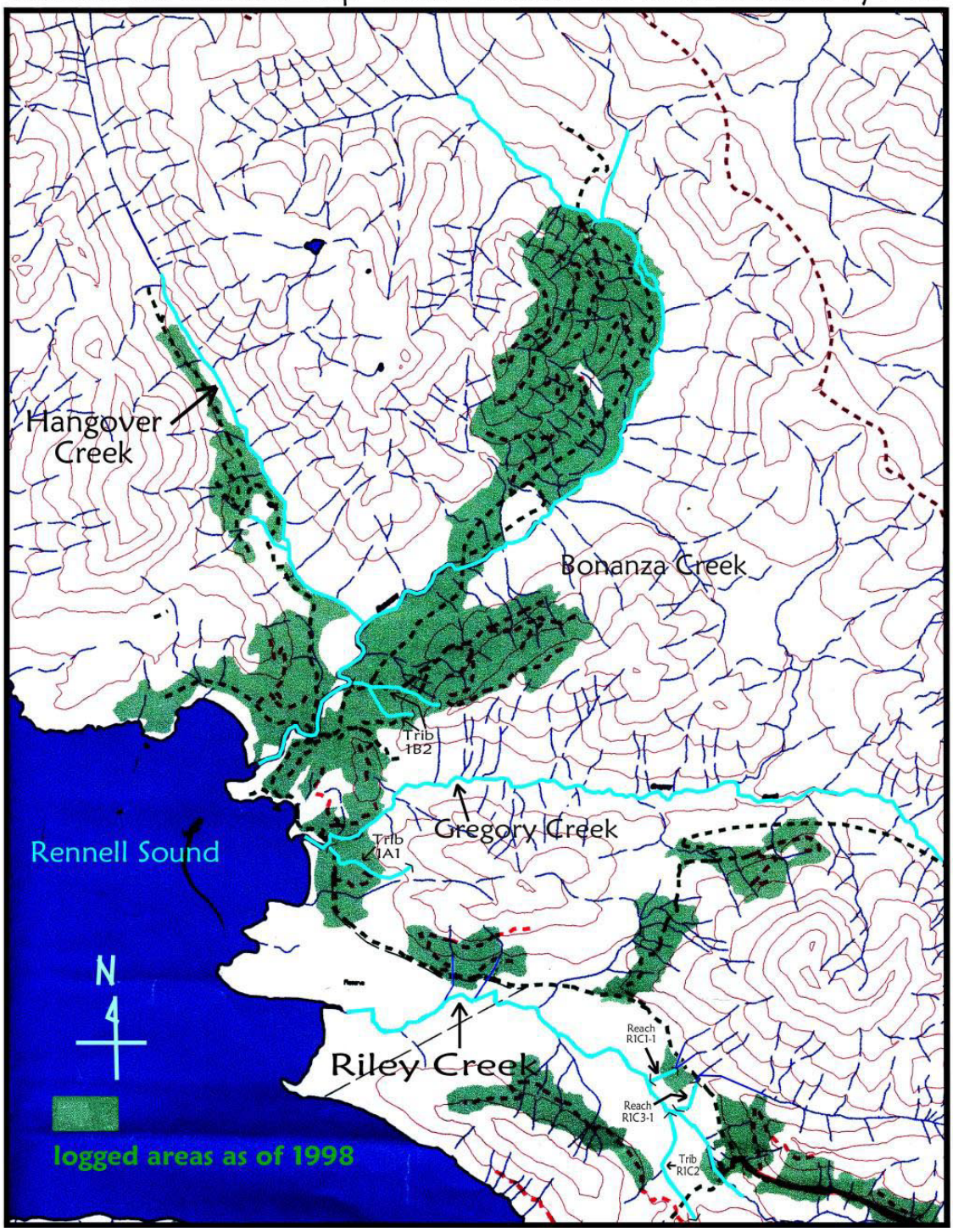
Photo 27: 2+180 m - Looking UP from the LB at site for LWD placement at 2+190 m. Log is visible to left of Neil in photo and will be rolled into the creek.

Photo 28: 2+295m – Looking DN from the LB. We propose to pull the wood in mid-photo UP ~ 1m to divert flow towards an off-channel area which is blocked at the mouth.

Photo 29: 2+290m – Looking across from L-R at wood to be pulled UP at 2+285 m.

Photo 30: 2+325m – Looking UP from mid-channel at site for LWD placement at 2+320 m. Log on right could be pulled UP and cabled to an embedded boulder where Neil is standing.

Rennel Sound Overview Map - Shows Tributaries and Reaches Assessed by HSSK



BONANZA CREEK 1B2 TRIBUTARY OCTOBER 2000

Fry Trapping Data-Bonanza 1B-2 Tributary

Date: October 12/2000

Trap #	Distance from mouth (m).	Time Set	Time Pulled	Total Time Set	Coho	Rainbow	Dolly Varden	Habitat where trap set.
1	0+010 m UP from bridge.	11:00	14:30	3 H 30 Min	2	0	2	-
2	0+150 m UP from bridge.	11:10	14:40	3 H 30 Min	7	0	1	-
3	0+170 m DN from bridge.	11:20	14:50	3 H 30 Min	12	1	1	- 1 sculpin caught
TOTAL					**21**	**1**	**4**	

BONANZA CREEK 1B2 TRIBUTARY SEPTEMBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Jack Robinson; Lorelee Parker **Date:** Sept. 14/00

Meters From→to	**Structure**	**Function**	**Photographs**	**Recommendations**	**P-Days**	**Priority**
0+000		Benchmark. This creek comparable in size to Branch 10.				
0+000	LWD jam	Partial barrier to pinks.	Photo 1 & 2	Clear out passage		
0+000 to 0+150	SWD & small overhanging alder	Possible barriers.	Photo 3 (0+050)	Spend 1 crew hour hand clearing passage	0.8	1
0+217	Road	Upstream 100 to 150 m. No coho fry observed. May be dry in summer.				
0+217 to 0+325	SWD	Obstructions; potential SWD jams.		Hand clean.	0.8	1
Total					**1.6**	

Photo Documentation

Photo 1: 0+000 m Looking DN towards Bonanza mainstem. This jam requires minor manipulation to allow unrestricted passage for adult pink salmon.

Figure 2: 0+000 m. Looking UP at the jam from the LB of the Bonanza Creek mainstem.

Figure 3: 0+050 m. Looking DN from mid-channel. Braiding has occurred UP from the jam at 0+000 m. Minor manipulation of jam could improve access for salmon through the lower 325 m of this creek. Matters are much worse ~250 m. upstream, where a road awaiting deactivation and beavers cause further habitat degradation. Two adult pinks were observed in the lower section, and no coho fry. We suspect this lower reach dewaters in the summer. We recommend an environmental monitor be on site during the road deactivation and that a further assessment for restoration potential be done after the deactivation is complete.

HANGOVER CREEK 1D4 TRIBUTARY SEPTEMBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Jack Robinson, Lorelee Parker Date: Sept. 18/00

Meters From→to	Structure	Function	Photographs	Recommendations	P-Days	Priority
0+000	Confluence of Hangover and Bonanza mainstem	Ribboned only; no tin tags	Photo 1	Install tin tags @ 100m marks	0.2	Med
0+000 to 0+321	Trail	Foot access for enumeration of adult salmon		Build trail	0.6	Med
0+058	X-log & SWD jam	Partial barrier to pinks	Photo 2	Manipulate SWD leaving X-log intact	0.3	Low
0+100	Several X-logs & SWD jam	Partial barrier to pinks	Photo 3	Manipulate SWD & possibly one X-log	0.5	Low
0+220	X-log & SWD jam	Partial barrier to pinks	Photo 4	Cut chute in X-log	0.3	Low
0+232	X-log & SWD jam	Partial barrier to pinks	Photo 5	Manipulate SWD	0.2	Low
0+262	SWD obstructions	Partial barrier to pinks	Photo 6	Manipulate SWD	0.3	Low
0+311	X-log & SWD jam	Partial barrier to pinks	Photo 7	Manipulate SWD	0.3	Low
0+321	Bridge	None	-	No recommendations	0	-
0+328	LWD jam 7 m. upstream	None	-	No recommendations	0	-
TOTAL					**2.7**	

Photo Documentation

Photo 4: 0+000 m. Looking UP from mid-channel at the confluence of Hangover and Bonanza Creeks.

Photo 5: 0+058 m. Looking UP at cross log and SWD.

Photo 6: 0+100 m. Looking DN at several instream cross logs and SWD.

Photo 7: 0+220 m. Looking across the stream from the RB. Cross log and SWD creating a partial barrier to pink salmon.

Photo 8: 0+232 m. Looking DN from the RB.

Photo 9: 0+262 m. Looking UP from the RB.

Photo 10: 0+311 m. Looking UP from just below bridge.

GREGORY CREEK 1A1 TRIBUTARY SEPTEMBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Jack Robinson, Lorelee Parker Date: Sept. 18/00

Meters From→to	Structure	Function	Photo	Recommendations	P-Days	Priority
0+000	LWD jam	Partial barrier to pinks; causes tributary to braid at mouth	Photo 1 Photo 2	Hand cleaning best performed at R. hand side to keep flow where it currently is.		1
0+000 to 0+029	SWD jam	Obstructions	Photo 3	Hand clean.	2.5	1
0+037	SWD jam @ X-log	Partial barrier to pinks	Photo 4	Hand clean, leaving cross-log intact.	0.3	1
0+048	SWD jam	Partial barrier to pinks	Photo 5	Hand clean.	0.3	1
0+054	X- log; SWD jam	Partial barrier to pinks	Photo 6	Hand clean, leaving cross-log intact.	0.5	1
0+067	3 suspended X logs; SWD jam	Partial barrier to pinks	Photo 7	Hand clean, leaving suspended structures and cross-log in creek intact.	0.6	1
0+074 to 0+084	SWD jams	Obstructions	Photo 8	Hand clean.	0.3	1
0+084	Root wad @ LB	None	Photo 9	Roll into creek to augment natural pool and provide cover.	0.7	2
0+100	Lower end of Beaver Stop culvert	Partial barrier to pinks	Photo 10	Hand clean.	0.3	1
0+100 to 0+136	SWD jams	Partial barriers to pinks	Photo 11	Hand clean.	0.3	1
0+150	Not yet deactivated spur	Barrier	Photo 12	Reassess after deactivation; contact DFO and MoELP about expediting process.		
Total					**5.8**	

Photo Documentation

Photo 1: 0+000m. Looking UP the tributary from mainstem. LWD jam, creating partial barrier to pinks and causing tributary to braid at the mouth.

Photo 2: 0+010m. Looking DN at 0+000m logjam. Mainstem visible in background.

Photo 3: 0+000m to 0+029m. Looking up from the LB.

Photo 4: 0+37m. Looking down from mid-channel.

Photo 5: 0+048m. Looking down at SWD creating partial barrier to pink salmon.

Photo 6: 0+054m. Looking upstream from the right bank.

Photo 7: 0+067m. Looking upstream from the right bank at numerous suspended cross logs and SWD.

Photo 8: 0+074m to 0+084m. Looking upstream at SWD jam which impedes fish passage.

Photo 9: 0+084m. Looking upstream from the left bank. Root wad visible in right corner of photo could be pulled into the creek to provide cover and augment pool.

Photo 10:0+100m. Looking upstream from the left bank at SWD creating partial barrier to pinks.

Photo 11: 0+100m to 0+136m. Looking DN from the LB. SWD interspersed throughout this section.

Photo 12: 0+150m. Looking UP from mid channel at old logging road not yet deactivated. Reassess after deactivation.

RILEY CREEK R1C1-1 TRIBUTARY SEPTEMBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Jack Robinson, Lorelee Parker **Date:** Sept. 15/00

Meters From→to	**Structure**	**Function**	**Photo**	**Recommendations**	**P-Days**	**Priority**
0+000	Benchmark @ confluence of mainstem					
0+015	2 suspended x-logs	Cover; future LWD	Photo 1	Drop one suspended log into creek. Cut in half and allow end to fall into creek.	0.2	2
0+016	Instream cross-log & SWD	Partial barrier to pinks	Photo 2	Cut ramp in x-log; leave SWD @ right bank so as not to adversely divert flow.	0.3	1
0+026	Instream cross-log	Cover, diversity		Leave intact.		
0+037	SWD jam	Low water barrier to pinks	Photo 3	Manipulate clear SWD to allow adult fish passage while minimizing head cutting.	0.6	1
0+050	Large cross-log	Cover; future LWD	Photo 4	Cut suspended log in half and place strategically into creek.	0.9	2
0+059	SWD jam	Low water barrier to pinks	Photo 5	Manipulate with care to preserve structure.	0.3	1
0+100	Stream flows under large stump @ right bank	High water by-pass channel past stump	Photo 6	Remove SWD @ right bank upstream of passage past stump.	0.2	1
0+161	SWD jam	Barrier; upper limit of observed pinks	Photo 7	Hand clean, install 3 pinned log baffles UP	0.6	1
0+173	LWD jam & SWD jam behind it	Coho may be blocked here	Photo 8	Remove SWD; add LWD for cover.	1.3	1
0+180	SWD jam	Barrier to pinks	Photo 9	Manipulate SWD to clear passage, install 3 small log pinned baffles UP	0.3	1
0+192	10 m. road over old wooden culvert	Constricted passage	Photo 10	Allow head-cutting of this deposit by manipulation of jam @ 0+180.	0.3	1
0+200-0+242	SWD	Potential jams	Photo 11 & 12	Manipulate to insure passage.	0.6	1
0+253	SWD jam	Barrier to pinks	Photo 13	Manipulate to insure passage.	0.3	1

RILEY CREEK R1C1-1 TRIBUTARY SEPTEMBER 2000

Meter From→to	**Structure**	**Function**	**Photo**	**Recommendations**	**P-Days**	**Priority**
0+266	SWD jam	Barrier to pinks		Manipulate to insure passage; install baffles UP.	0.3	1
0+282	LWD jam; cross-log & SWD	Barrier to coho	Photo 14	Manipulate SWD in right channel to allow passage.	0.3	1
0+329	Cross-log & SWD	Barrier to coho	Photo 15	Manipulate barrier, cut root system off large x-log immediately DN, leave in stream for cover; use 4 m. chunk of same log to scour pool by dragging to left bank corner where root wad has been allowed to drop in.	1.1	1
0+345	Trib enters @ left; cross-logs	Present and future LWD opportunities	Photo 16	Hand clean tributary working UP until gradient steepens; leave cross-logs intact.	0.6	1
0+367	Cross-log; gradient steepens	Barrier to coho		Manipulate to improve passage.	0.5	1
0+367-0+525	SWD	Potential jams	Photo 17	Manipulate to improve passage.	0.6	1
0+525	Bridge on Riley Main road.					
Total					**9.3**	

Photo Documentation

Photo 1: 0+000 m. Looking UP from mid-channel at suspended cross-logs at 0+015m (see arrows).

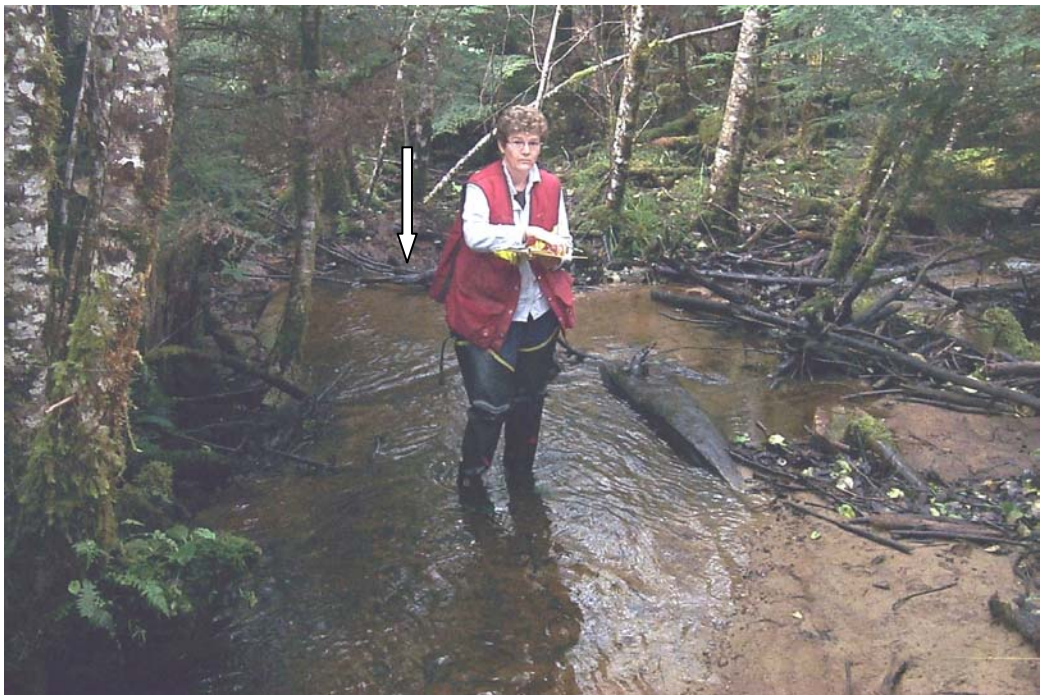


Photo 2: 0+016 m. Looking DN from mid-channel. There is danger of braiding here if the SWD is removed at the right bank. Better to cut a chute in the submerged instream cross-log (not visible in photo, see arrow).

Photo 3: 0+037 m. Looking UP from the LB at barrier to pink salmon.

Photo 4: 0+050 m. Looking UP from mid-channel at suspended log (see arrow).

Photo 5: 0+059 m. Looking UP from the RB. SWD jam acting as barrier to the passage of pink salmon.

Photo 6: 0+100 m. Looking DN from mid-channel at SWD to be manipulated (arrow). Creek flowing under large stump seen to the left of the arrow. This results in blocked passage on the UP side.

Photo 7: 0+161 m. Looking UP from the RB. Upper limit of observed pink salmon at SWD jam, which appears to be creating a barrier (0.75m high jump at present flow conditions).

Photo 8: 0+173 m. Looking UP from the RB at LWD jam (arrow). SWD collecting on upstream side of LWD structure. Available LWD could be manipulated for improved cover.

Photo 9: 0+180 m. Looking UP from the LB. SWD seen in foreground creating barrier for pinks.

Photo 10: 0+192 m. Looking UP at collapsed wooden culvert (arrow runs along culvert).

Photo 11: 0+200 m Looking DN from the LB at upper end of wood culvert from previous photo (arrow pointing to culvert). Manipulation of jam @ upper end of the culvert could prevent future barriers.

Photo 12: 0+200 m. Partial barrier to fish passage.

Photo 13: 0+253 m. Looking UP from mid-channel at partial barrier to pink salmon.

Photo 14: 0+282 m. Looking upstream from the LB at potential barrier to coho salmon. (see arrow).

Photo 15: 0+329 m. Looking upstream from the RB. Cutting root wad off cross log and leaving in stream for cover would create excellent rearing habitat.

Photo 16: 0+345 m. Looking downstream from mid-channel.

Photo 17: 0+367 looking upstream.

RILEY CREEK R1C-2 TRIBUTARY SEPTEMBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Jack Robinson; Lorelee Parker **Date:** Sept. 18/00

Meters From→to	**Structure**	**Function**	**Photo**	**Recommendations**	**P-Days**	**Priority**
000		Benchmark – bridge.		-000 downstream from bridge +000 upstream from bridge		
0-040	SWD & root jam.	Barrier to pinks.	Photo 1 & 2	Clear SWD and cut roots as necessary to allow passage for adult pink salmon.	0.6	1
000 to 0-260	No coho fry observed in this pristine creek; adult pinks observed to 0-260.	Excellent example of untouched habitat.		Build discreet trail for educational tours ~ 1 km. from bridge to mainstem.	1.9	2
TOTAL					**2.5**	

Photo Documentation

Figure 1: 0-040 m (DN from bridge). Looking UP from the RB. This tributary is a prime example of unlogged habitat.

Figure 2: 0-040 m (DN from bridge). Looking DN from the RB.

RILEY CREEK R1C3-1 TRIBUTARY OCTOBER 2000

Fry Trapping Data

Date: October 4/2000

Trap #	Distance from mouth (m).	Time Set	Time Pulled	Total Time Set	Coho	Rainbow	Dolly Varden	Habitat where trap set.
1	0+100m UP from bridge.	10:15	15:30	5 H 15 Min	1	0	0	-
2	0+125m UP from bridge.	10:20	15:35	5 H 15 Min	3	0	1	-
3	0+470m UP from mouth.	10:30	15:20	4 H 50 Min	6	0	10	-
TOTAL					**10**	**0**	**11**	

RILEY CREEK R1C3-1 TRIBUTARY SEPTEMBER 2000

Assessment of Restoration Work Required - Prescriptions

Persons Surveying: Jack Robinson, Lorelee Parker **Date:** Sept. 15/00

Meters From→to	**Structure**	**Function**	**Photo**	**Recommendations**	**P-Days**	**Priority**
0+016	2 suspended cross-logs; downstream log on LB broken; cedar log on the RB at 0+010m.	Scour pool and provide cover.	Photo 1	Cut up broken log and cable to the RB to scour pool and provide cover; incorporate cedar (0+010m RB) into structure.	1.3	2
0+030	Root wad and suspended LWD on the LB.	Causing erosion on the RB in conjunction with embedded cross-log.	Photo 2	Cut off root wad and position in hole on the RB and use suspended 1.5 m. log and trunk of root wad to further protect bank and scour a pool. Secure UP root wad first, so DN root wad doesn't fall flat.	1.9	1
0+050	4 cross-logs	Limited cover and future instream function.	Photo 3	Recommend dropping and adding 1 cross-log to the creek for pool scour and cover.	0.3	1
0+118	LWD parallel to left bank (moss-covered).	Very little present function.	Photo 4	Drag UP to LB at 0+124 m; position behind stump in order to scour a pool in mid channel; cable in place.	1.1	2
0+200-0+239	Undercutting LB; 3 stumps may fall in after 2-3 years.	None.	-	No recommendations.	0	-
0+312	Cross-log broken on the RB where there is presently a fast chute; suspended log ¾ way across creek resting on stump.	Upper limit to observed pinks.	No photos taken after this point	Cut channel on L side by digging hole on UP side of cross-log. Clear SWD from DN side; try to roll stump DN to allow log end to fall into creek.	1.3	1
0+329	Full spanning rock line.	Dissipate energy & form pool.	-	Build full-spanning rock line. Cable large rocks on UP side, pile smaller rocks DN for riffle structure - 1:12 length for height.	0.6	2
0+358	Full spanning rock line.	Dissipate energy & form pool.	-	Build full spanning rock line; pull boulder UP and cable.	1.3	2
0+388	Cross-log.	Energy dissipation; complexity	-	Leave intact.	0	-
0+390	LWD on RB	None	-	No recommendations; too steep.	0	-
0+400	Full spanning rock line.	Augment existing pool.	-	Build full-spanning rock line and cable.	1.3	2

Assessment of Restoration Work Required – Prescriptions - continued

Meters From→to	**Structure**	**Function**	**Photo**	**Recommendations**	**P-Days**	**Priority**
0+412	Large LWD on the RB	Provide cover and cause scour.	-	Roll ½ turn into creek.	0.6	2
0+427	Natural rock line	Energy dissipation, gravel recruitment; pool maintenance.	-	Reinforce and cable in place.	1.1	2
0+495	Cross-log	Clear passage.	-	Remove SWD from left bank	0.2	1
0+542	Natural rock line	Energy dissipation, gravel recruitment; pool maintenance.	-	Reinforce and cable in place to backwater a pool.	1.3	2
Total					**12.3**	

Photo Documentation

Photo 1: 0+016m. Looking UP from mid-channel. 3 large suspended logs available at this site. Suspended log seen in this photo could b manipulated to provide for structure and cover.

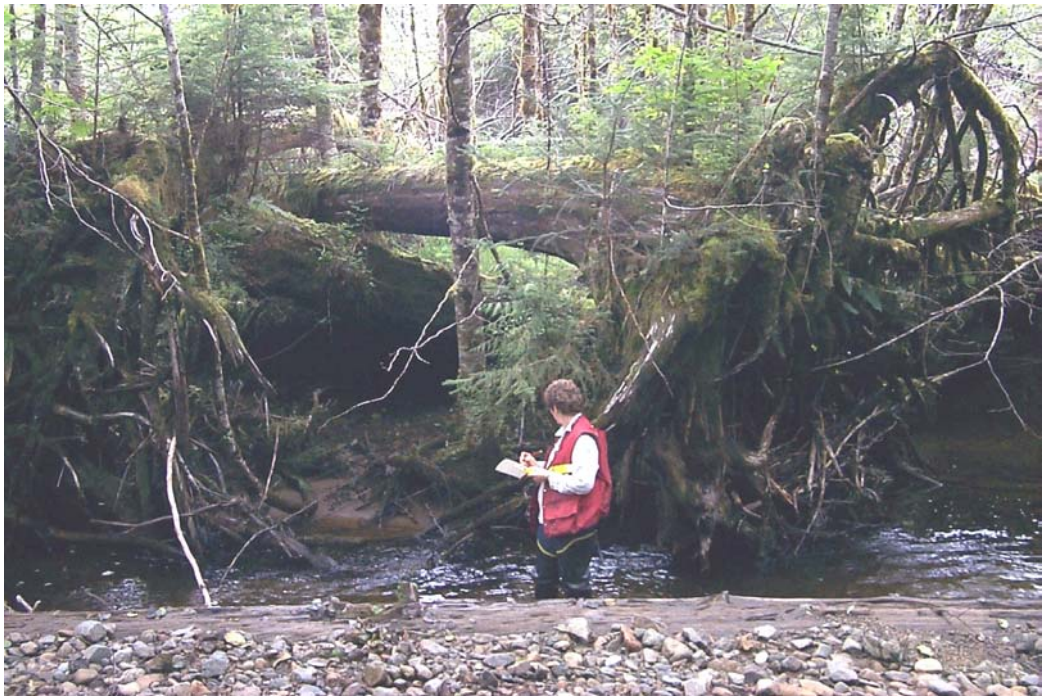


Photo 2: 0+030m. Looking from LB to RB. Cutting off root wad and anchoring against the RB could reduce erosion of the RB.

RILEY CREEK TRIBUTARY R1C1 OCTOBER 2000

Fry Trapping Data-Riley R1C1-1 Tributary

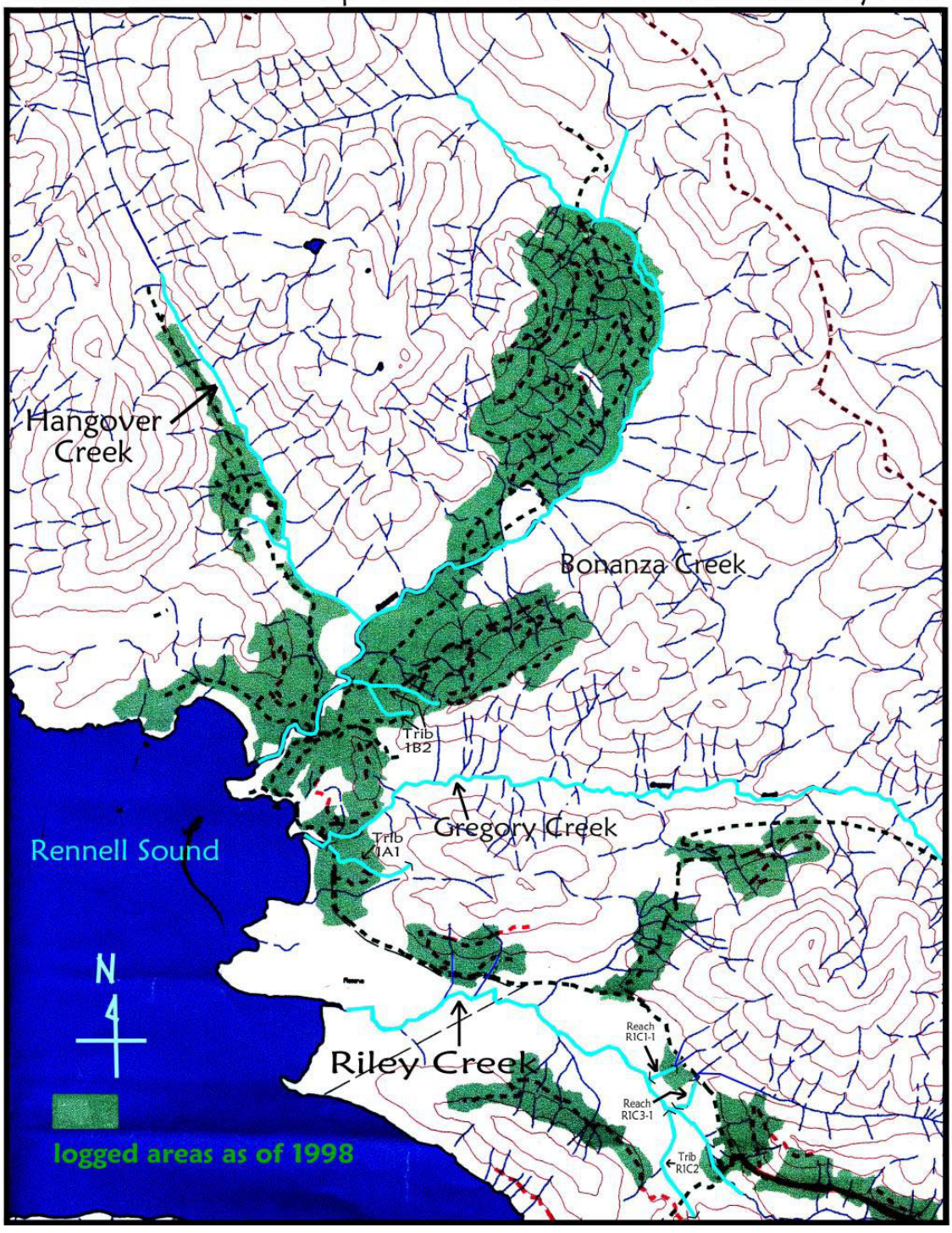
Date: October 11/2001

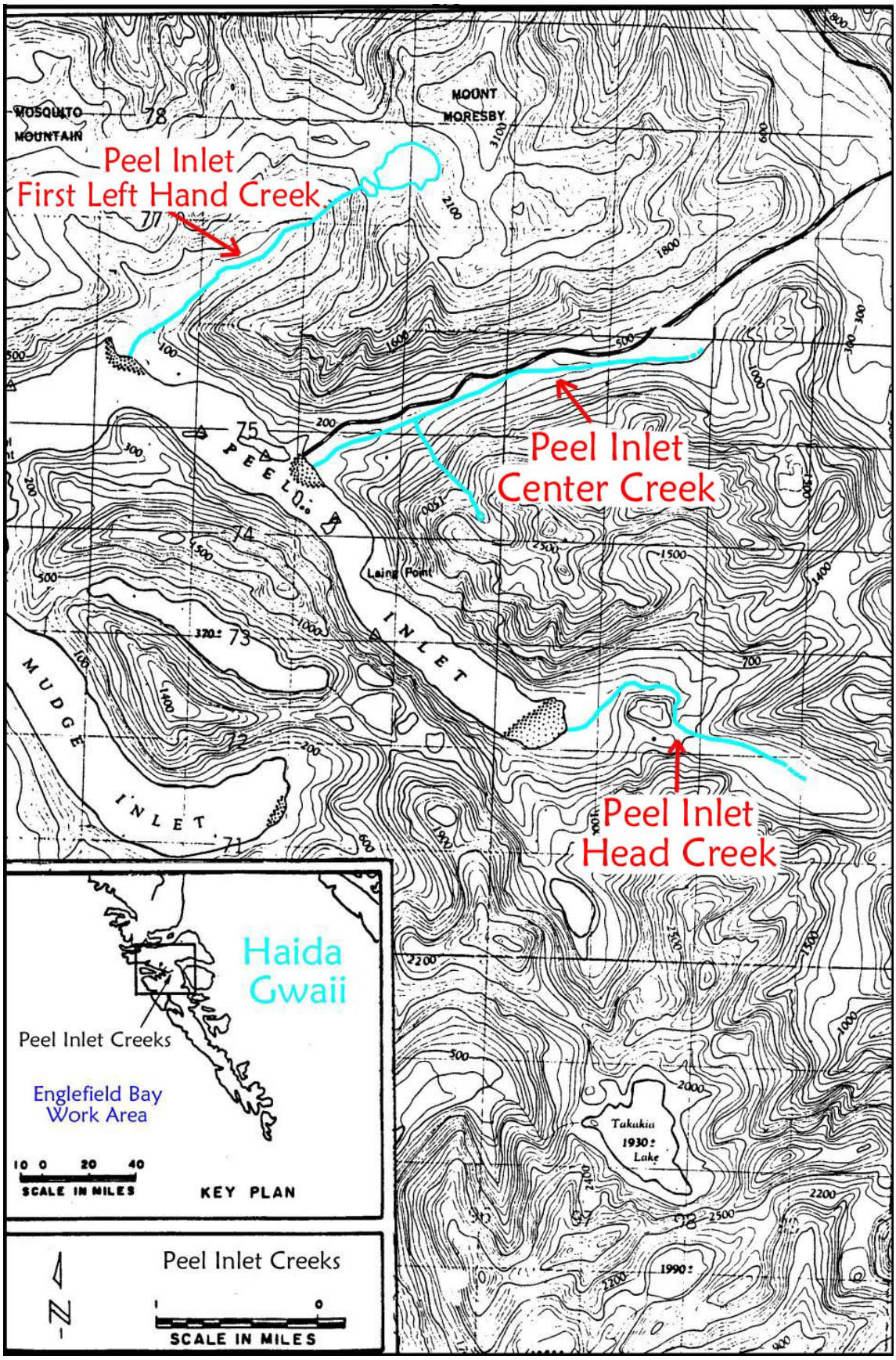
Trap #	Distance from mouth (m).	Time Set	Time Pulled	Total Time Set	Coho	Rainbow	Dolly Varden	Habitat where trap set.
1	0+150 m UP from bridge.	10:00	15:00	5 H	0	0	0	-
2	0+100 m UP from bridge.	9:55	14:55	5 H	0	0	3	-
3	0+430 m UP from mouth.	10:10	15:10	5 H	6	0	2	-
TOTAL					**6**	**0**	**5**	

Photo 3: 0+050m. Looking Up from mid-channel. 4 large suspended cross logs. One should be utilized for immediate instream LWD.

Photo 4: 0+118m. Looking upstream from mid channel.

Rennel Sound Overview Map - Shows Tributaries and Reaches Assessed by HSSK




Peel Inlet
First Left Hand Creek
Peel Inlet
Center Creek
Peel Inlet
Head Creek
MOSQUITO MOUNTAIN
MOUNT MORESBY
PEEL INLET
Laing Point
MUDGE INLET
Tukukia
1930±
Lake
1990±
Haida Gwaii
Peel Inlet Creeks
Englefield Bay
Work Area
10 0 20 40
SCALE IN MILES
KEY PLAN
Peel Inlet Creeks
N
SCALE IN MILES

HSSK - Rennell Sound and Englefield Bay Work Areas