

*Site Documentation and Access Manual for a
Water Quality Inventory on the West Coast of Vancouver Island*

*In fulfillment of the University of Victoria, Biology Co-operative Education Program
requirements.*

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Completed at MoELP - Nanaimo, BC

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MAP 1

MAP 2

Acknowledgments

My position as 'Water Quality Technician' at the Ministry of Environment, Lands and Parks - Nanaimo, BC during the past four months was beyond any of my wildest expectations! The main reason I applied for the position, beyond the fact that I wanted to be involved with water quality research, was that every avenue of the job provided a new challenge. However, I quickly found out that I really didn't know just how many challenges I was to be faced with! For all of them I am thankful, as they have enabled me to grow. I could not have done it alone, and to many people I am grateful. Hopefully I will include everyone in this section! Thanks to:

Rick Nordin for being our 'long distance' supervisor, planning and organizing many of the logistics of this project, immediately answering my questions and responding to my screams for help on budget and administrative problems, providing literature regarding water quality (which I'm sure is probably really useful to anyone who has time to read it!), editing this report, providing MULE labour in the field for two days, and most of all for entrusting this project - from start to finish - to the WILD WIMIN!!

John Deniseger for being our 'home base' supervisor, answering the many questions I fired at you over my shoulder as I raced down the hall, dropping what you were doing to help me out (e.g. answering my "HELP" emails - especially when it came to EMS training), providing field equipment and your truck (notice we didn't wreck yours!), joining Barbara and I during our first trial run with the g/c apparatus at the Nitinat Hatchery, checking up on us by asking Christine Hanson - my roommate- how we were doing, not discussing work during the baseball games, and for introducing me to the great bunch of people at MoELP.

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Introduction

The primary objective of this document is to provide reference materials, including site access information, photographs and maps, to relocate sites sampled during 1997 for a project titled Water Quality Inventory on the West Coast of Vancouver Island. Other objectives of this report are to provide: a brief background of why this study was done, an overview of the study area, a brief description of the methods used, and a 'brief inside' look at what it is really like to do a water quality inventory on the West Coast of Vancouver Island.

Background

Inventories which provide baseline data of the water quality in BC are badly needed. At present many watersheds in BC have little to no background information on water quality. Often people assume water bodies are pristine - or close to it - if the surrounding watershed is relatively unpopulated. It is important to recognize that not only human activity (e.g. sewage disposal, leechate from garbage dumps, road building, logging, etc. or smaller scale activities such as leaving garbage in a campsite) but also natural events (e.g. geology or natural mineralization, high water flows during rainy periods, decomposition of vegetative material, wildlife excrement, etc.) affect water quality. Presence of fecal coliforms and protozoans including *Giardia lamblia* (cause of 'beaver fever') and *Cryptosporidium parvum* is not necessarily caused by human activity, but may be increased due to human activity. For example, with higher turbidity levels - often caused by increased runoff due to logging, there is an increase in suspended particulate matter. This may be associated with a greater concentration of protozoan cysts in water since the cysts are usually attached to particulate matter. Therefore, whether an area is considered 'pristine' - of which there are very few left in BC, or whether it is developed, baseline water

quality data and estimation of existing impacts from human activity are needed to monitor the health of the water resource in BC. Without baseline data the goal of maintaining ecosystems close to their natural states is unattainable. In addition, water quality provides information which assists British Columbians at the private, provincial, and federal levels to make decisions regarding land use (e.g. development).

The purpose of this study, carried out by BC Ministry of Environment, Lands and Parks (MoELP), was to collect water quality data in treaty negotiation areas. The funding for this project was provided by the Common Land Inventory Base funding initiative (Aquatic Envelope Committee) which is administered through the Land Use Co-ordination Office. Knowledge of the water resource values - for drinking and other human consumptive use, as well as the associated resources such as fish, wildlife and recreation are integral components of the treaty negotiation process. It is important that government and First Nations work together to ensure that the First Nations' water supply areas meet and continue to meet the criteria for safe drinking water. In addition, limitations or problems with water quality must be identified so they can be taken into account as part of the treaty negotiation process.

The information gathered during this project will provide background data to the BC provincial government, the Ditidaht and Pacheenaht First Nations, and the general public. The objectives included determining water quality data on the West Coast to:

- 1) aid in resource allocation decisions in treaty negotiations
- 2) identify limitations to water quality supply (e.g. drinking water)
- 3) complete a base-line inventory for watersheds with little existing water quality data
- 4) determine and document the existing impacts of human activity (e.g. compare sites impacted by heavy logging to relatively undisturbed sites)

- 5) identify areas sensitive to disturbance
- 6) recognize development potential
- 7) determine the variability of water quality throughout the summer and during the fall rains

In addition to completing this water quality inventory, Bob Cook (MoELP Nanaimo, BC) and his staff are completing field studies to provide data on water quantity. The results of his research will provide data for water supply and allocation issues.

Study Area

The study area is located in watersheds south of Lake Cowichan, between Bamfield and Port Renfrew in the Coastal Western Hemlock biogeoclimatic zone on Vancouver Island. Very few water quality data exist for this region. It encompasses seven watershed areas - six of which include major river systems and their tributaries: the Klanawa River, Little Nitinat River, Nitinat River, Caycuse River, Gordon River, and San Juan River, while the seventh area includes creeks, rivers and lakes in the Rosander area (Map 1). The study area is relatively unpopulated - with the largest centers being Nitinat and Port Renfrew. The territorial home ranges of the Ditidaht First Nations and or the Pacheenaht First Nations lie in this region.

The landscape is dominated by second growth forests and clear-cuts with patches of old growth throughout. At present, three logging companies - MacMillan Bloedel (M&B), TimberWest (TW) and Pacific Forest Products (PFP) are active in the study area. Radio frequencies for 'receive' only can be acquired from the companies. Map 2 outlines M&B territory. As of the end of August, 1997, TW is buying out PFP, therefore further information

regarding radio frequencies and travel access for the remaining study area can be accessed through TW.

Water sampling in this area should only be undertaken after appropriate safety training. This is an area with active logging, severe weather, poor roads and potentially dangerous wildlife (bears and cougars). Although the chance of encountering wildlife, especially a cougar, is minimal - it is essential to be prepared. For more information contact a conservation officer at MoELP. Detailed preparation and adequate equipment are absolutely necessary if any work is to be considered in this area.

Methods

Topographic and recreational maps were used to choose approximately 85 sample sites based on coverage of watersheds and potential access (Energy, Mines and Resources Canada 1992, Mussio Ventures Ltd. 1994). All sites were sampled three times during the summer and will be sampled once during the fall rains. During the first round, the study was narrowed to 61 sites based on logging road access and ability to safely access the sites. The majority of sites were flagged with pink flagging tape. Yellow flagging tape was used at a few sites (see site photos). Latitude and longitude (lat/long) locations for the initial 85 sites were determined using a 1:50,000 topographic map series (Energy, Mines and Resources Canada 1980 & 1992). Actual location of the 61 accessible sites was geo-referenced using a Trimble GeoExplorer (Trimble Navigation Ltd. 1994). For those sites which the GPS did not provide a reading, the map lat/long (distinguished by a two digit seconds reading) versus the GPS reading (distinguished by a four digit seconds reading) is indicated in the following site documentation. Site access notes and photographs which are compiled in this document should be used to relocate these sites as

flagging tape will deteriorate or be removed, and GPS locations are not 100% accurate. In addition, Map 2 is the primary reference map to use when relocating sites within M&B timber licence 44. It provides greater detail of the logging roads than Map 1.

All sites were entered into the BC MoELP Environmental Monitoring System (EMS) database. EMS site identifiers are indicated in this report so that site information and results are readily accessible for people with access to EMS.

All sampling was completed according to the Resource Inventory Committee approved methods (Cavanagh *et. al* 1994). Water quality sampling parameters for general chemistry included true colour, nitrate and nitrite, ammonia, total Kjeldahl nitrogen, pH, total dissolved phosphorus, total phosphorus, filterable residue, specific conductance, and turbidity. Samples were also collected to analyze for nonfilterable residue, dissolved organic carbon (DOC), total organic carbon, and metals. Specific indicators of drinking water suitability included sampling for fecal coliforms, *G. lamblia* and *C. parvum* (g/c). Sampling for g/c involved use of a filtration apparatus to pump a minimum of 100L of water through a one micron polypropylene string-wound filter. During the first two weeks of sampling a g/c apparatus from the BC Center for Disease Control (BCCDC) was used, followed by a much lighter, technically improved apparatus supplied by Hyperion Research Limited. A description of the standard method to sample for g/c is in preparation (Barbara Lucas 1997) and can be accessed through the Ministry of Environment Water Management Branch in Victoria. Temperature and dissolved oxygen (DO) were measured at each site using a YSI model 57 DO meter.

Samples were sent to three laboratories for analysis as follows:

- 1) general chemistry and metals: Pacific Environmental Science Center (PESC); Vancouver, BC
- 2) fecal coliforms: JR Laboratory; Burnaby, BC

3) g/c filters: Hyperion Research Ltd.; Medicine Hat, Alberta.

For quality assurance/quality control (QA/QC) metals trip blanks were sent to PESC for each trip and duplicate fecal coliform samples were collected at several sites. QA/QC for g/c included collecting duplicate g/c filters at a site - one of which was 'blind', analyzed by Hyperion Research Ltd. Duplicate filters were collected at a second site with one filter analyzed by Hyperion and one by Health Canada - Occupational and Environmental Health Services; Prince George, BC using the same method. In addition, four filters were taken at a third site. Three were analyzed by Hyperion Research Ltd. while the fourth was analyzed by Health Canada.

Results were compared to the ambient criteria for drinking water in British Columbia (Nagpal 1995). After fall sampling is complete, the results will be compiled, analyzed and summarized in a report. For more information regarding this study you may contact Rick Nordin at the Ministry of Environment - Water Management Branch in Victoria, BC.

References

Cavanagh, N., R.N. Nordin, L.G. Swain, and L.W. Pommen. 1994. Ambient Fresh Water and Effluent Sampling Manual. BC Ministry of Environment, Lands and Parks: Water Quality Branch. Victoria, BC. 75p.

Energy, Mines and Resources Canada. 1992. Barkley Sound: 92C/14 Edition 5. Canada Centre for Mapping: Department of Energy, Mines and Resources. Ottawa, ON. Scale 1:50, 000.

-----, 1980. Carmanah Creek: 92C/10 Edition 4. Surveys and Mapping Branch: Department of Energy, Mines and Resources. Ottawa, ON. Scale 1:50, 000.

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-----, 1992. Little Nitinat River: 92C/15 Edition 5. Canada Centre for Mapping: Department of Energy, Mines and Resources: Ottawa, ON. Scale 1:50, 000.

-----, 1992. Port Renfrew: 92C/9 Edition 5. Canada Centre for Mapping: Department of Energy, Mines and Resources. Ottawa, ON. Scale 1:50, 000.

Map 1:

Lake Cowichan Combined Fire Organization. nd. Guide to Forest Land of Southern Vancouver Island. Ronalds Printing. 1cm=1.75km.

Map 2:

MacMillan Bloedel Limited. 1996. Tree Farm Licence 44 East and West Map: Recreation and Logging Road Guide to the Forest Lands of West Central Vancouver Island. 1:150, 000.

Mussio Ventures Ltd. 1994. Backroad and Outdoor Recreation Mapbook Volume II: Vancouver Island. Mussio Ventures Ltd. Surrey, BC. 59p.

Nagpal, N. K. 1995. Water Quality Criteria: Approved and Working Criteria for Water Quality - 1995. Ministry of Environment, Lands and Parks: Water Quality Branch - Environmental Protection Department. Victoria, BC. 45p.

Trimble Navigation Ltd. 1994. GeoExplorer Operation Manual. Trimble Navigation Ltd. - Surveying & Mapping Division. Sunnyvale, CA.

*Klanawa River
Monitoring Group*

E226191
Gorge ML Creek at Gorge ML Bridge

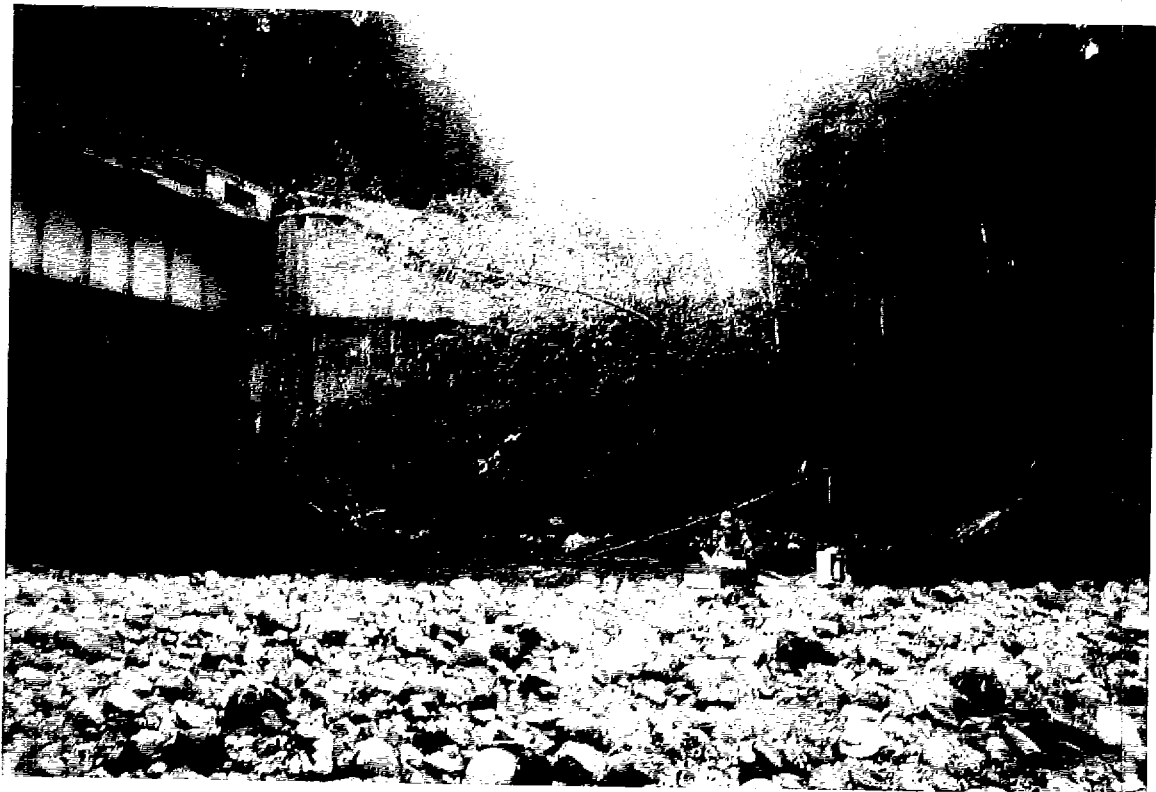
Access: 2.6km NW from junction at Newstead ML and Darling ML
Side road down to Klanawa River W of bridge
N48°46'10.80'' W124°56'48.23''
(Same access as E226192: West Fork Klanawa River at Newstead ML Bridge)

Sample Site: ~12m u/s of bridge above confluence of Gorge ML Creek and West Fork Klanawa River

Site Photos: May 28, 1997

- 1) Across sampling site; S end of Gorge ML bridge; Cheryl preparing to preserve the metals sample with 2.0mL Nitric Acid; g/c apparatus from the BC Center for Disease Control to right of Cheryl
- 2) D/s: Gorge ML bridge; Cheryl at g/c apparatus

The West Coast just wouldn't be the West Coast without rain...



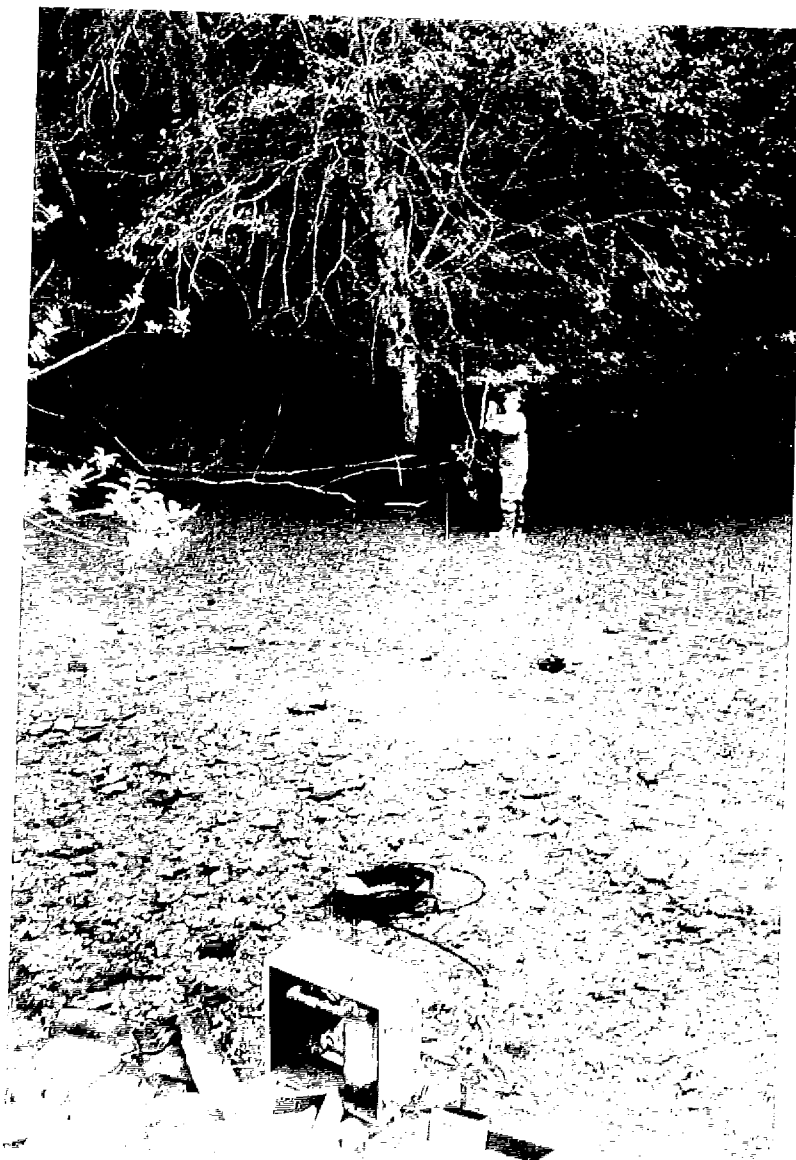
E226192
West Fork Klanawa River at Newstead ML

Access: 2.6km NW from junction at Newstead ML and Darling ML
Side road down to Klanawa River W of bridge
N48°46'04.29'' W124°56'43.44''
(Same access as E226191: Gorge ML Creek at Gorge ML Bridge)

Sample Site: ~18m u/s of bridge above confluence of West Fork Klanawa River and Gorge ML
Creek

Site Photographs : May 27, 1997

- 1) Across W Fork Klanawa River at Cheryl flagging the sample location
G/c apparatus on shore
- 2) From bridge looking u/s
- 3) D/s: Barbara at the g/c sample location



*I'd like to introduce you to our 35lb "Beast" or often called "Beasty"
(no that's not me...it's the g/c apparatus).
Be patient to meet the "Beauty"... we had to be!*



E226193
Klanawa River at N400 on Newstead ML

Access: 0.3km SE of junction at Newstead ML and Darling ML
13.1km SW of UK1000 (to bridge at site)
11.9km SW of E226197
Side road off Newstead ML across from N400
N48°45'23.78'' W124°54'49.84''

Sample Site: ~40m u/s of bridge

Site Photographs: May 28, 1997

- 1) Across Klanawa River: Cheryl collecting water samples
- 2) From bridge pier looking u/s
- 3) D/s: Barbara sampling g/c





E226194
Dorothy Creek at Northfork Main

Access: 0.3km S from Upper Klanawa Main on deactivated road
7.0km SW of E226196
Park: deactivated road just S of Dorothy Creek on E side Northfork Main
Walk down rock outcrop on SE corner of bridge
N48°49'34" W124°49'48"

Sample site: ~6m u/s of bridge

Site Photographs: June 4, 1997

- 1) Across Dorothy Creek: Cheryl attaching filter to syringe to take a DOC sample
- 2) U/s: Barbara preparing to set up the g/c apparatus
- 3) D/s: bridge on Northfork Main



The “modified beast”!

Barbara is really good at taking things apart. To get rid of unnecessary equipment weight she removed all parts we didn't need. (Good thing she is also good at putting things back together!!)



E226196

Klanawa River at Central South Main

Access: Junction of Central ML North, Central South Main and Flora Lake Main
7.0km NE of E226194
Park in approach
Walk down rocks on the SW side of the bridge
N48°52'18.60'' W124°48'52.34''

Sample Site: ~5m u/s of bridge

Site Photographs: June 4, 1997

- 1) U/s: gravel path across from sample site; Barbara collecting water samples
- 2) D/s: bridge; Cheryl by g/c apparatus





Maybe we should go into fashion design?!

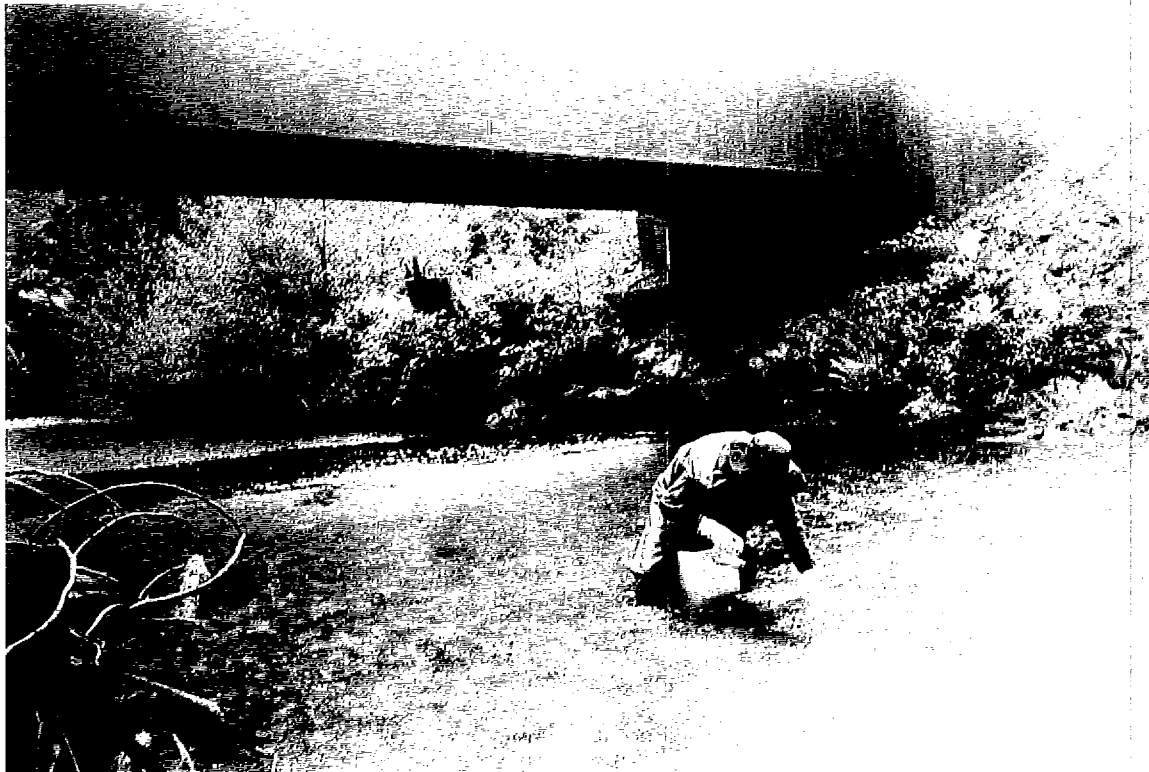
E226197
Bagley Creek at Upper Klanawa Main

Access: 11.9km NE of E226193
1.2km SW of UK1000
2.2km SW of E226198
Path on NW side of bridge; walk u/s under bridge
N124°48'29" W124°47'09"

Sample Site: ~5m u/s of bridge

Site Photographs: June 3, 1997

- 1) From under center of bridge looking u/s; Cheryl collecting water samples
- 2) D/s: bridge; Cheryl collecting water samples



Little lessons in life...

- 1) Never forget your raingear at home! It's usually WET on the west coast of Vancouver Island!*
- 2) Be resourceful.*

E226198
East Klanawa River at Bridge Between
Upper Klanawa and Upper Klanawa Main

Access: 1.0km NE of UK 1000
2.2km NE of E226197
0.2km SW of junction at Upper Klanawa and Upper Klanawa Main
Side road off NE side of Upper Klanawa Main
N48°49'02" W124°45'53"

Sample site: ~70m u/s of bridge

Site Photographs: June 3, 1997

- 1) Across East Klanawa River: Barbara taking site notes beside the g/c apparatus
- 2) U/s: gravel/rock bar in the middle of the river
- 3) D/s: bridge; Barbara at site on left



*Waterproof paper is one of the essentials in a field biologist's life...
so are webbed fingers and toes.*

Little Nitinat River Monitoring Group

Note: Franklin South Main = Franklin Main and South Main (the continuation of Franklin Main on some maps)

Nitinat Junction is at the large bridge over Little Nitinat River at the junction of Franklin South Main and Flora Lake ML

E226199

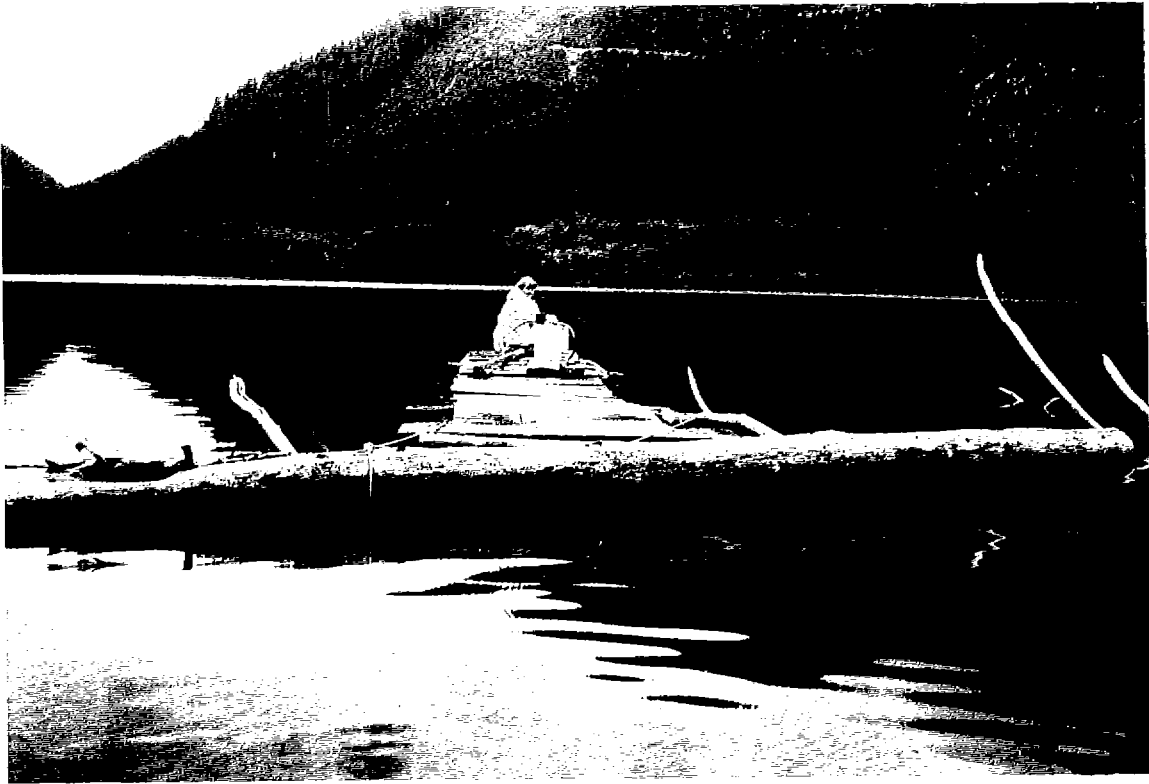
Flora Lake at Nitinat

Access: 5.1km SW of Nitinat Junction on Flora Lake ML
0.5 km down road to campsite at S end of Flora Lake (near end of the road)
Path through campsite down to shore
N48°51'42.42" W124°43'17.37"

Sample Site: Round 1: sampled off end of dock
Rounds 2 & 3: dock was removed; wade out to ~1m depth to collect water samples
Set g/c apparatus up on large log in water

Site Photos: June 4, 1997

- 1) From flagging on shore looking NW at Barbara on dock
- 2) Access ~5m right of pink flagging; g/c apparatus forefront on dock
Sampling rounds 2 & 3 : sampled g/c off light brown log closest to dock



This makes sampling look easy!



E226201
Darlington Lake at Franklin South Main

Access: Franklin South Main

1.6km NW of E226202

1.3km SE of Franklin Camp "B" Dryland Sort

Park & access: NW side of lake via boat ramp that looks like a foot path
N48°57'53.38" W124°43'12.59"

Sample Site: Wade in to ~1m depth

Caution!!! steep drop off

Site Photos: June 5, 1997

- 1) From parking area looking SE down boat ramp toward site and down Franklin Main
- 2) From bottom of boat ramp looking E: Cheryl with fecal coliform sample



*Balance is certainly one of the requirements on this job
(especially when there isn't a dock to sit on while sampling)!*

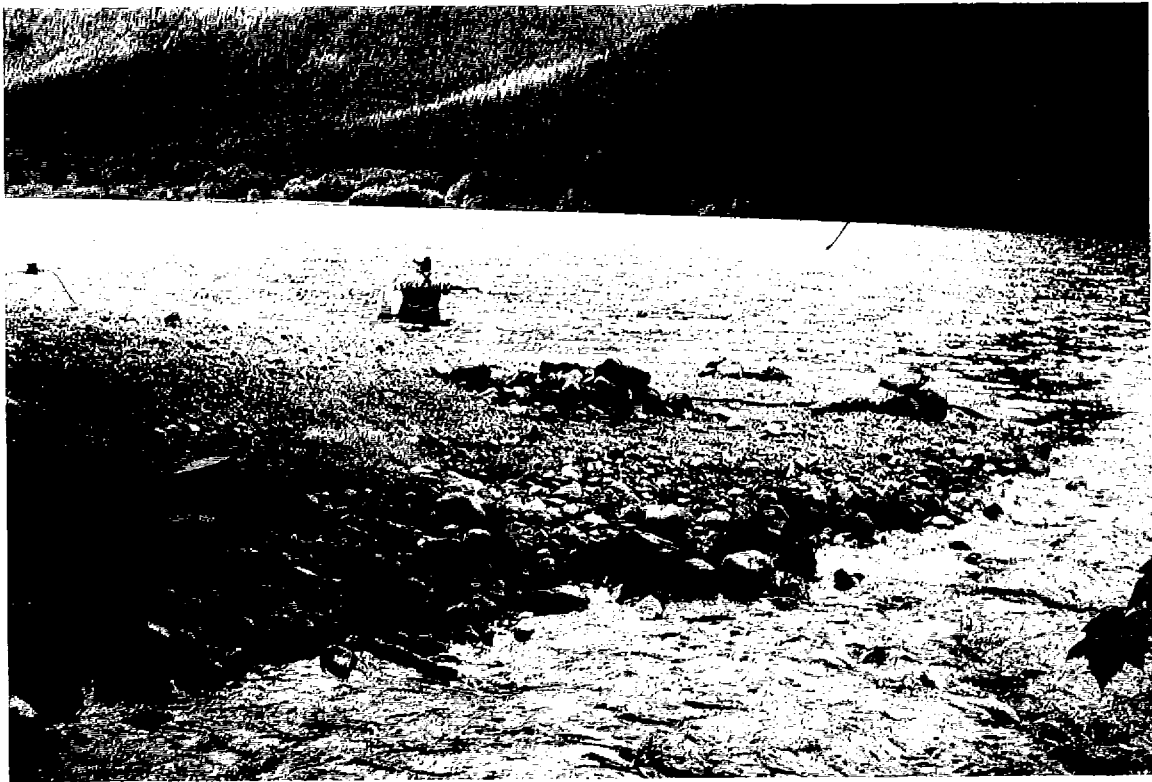
E226202
Francis Lake at Franklin South Main Boat Ramp

Access: Franklin South Main
4.6km NW of E226204
1.6km SE of E226201
Turn N down boat ramp (~ center point of lake)
N48°57'17.70" W124°42'12.25"

Sample Site: ~2m off shore at ~1m depth
~7m NW (left if facing lake) of in-flowing creek

Site Photos: June 4, 1997

- 1) From in-flowing creek looking NW at Barbara collecting water samples
- 2) SE: Barbara collecting water samples, g/c apparatus on shore and in-flowing creek on right in front of red alder



E226203
Little Nitinat River at Nadira Main

Access: First bridge on Nadira Main
Turn right onto spur just W of bridge; drive down to river
N48°57'36" W124°38'49"

Sample Site: Straight out from parking area; ~50m u/s of bridge

Site photos: June 5, 1997

- 1) Across Little Nitinat River to access spur (truck); Cheryl collecting water samples
- 2) D/s: bridge in background
- 3) From small waterfalls near bridge looking u/s at Cheryl collecting water samples



'Oooh, physics, forces... it's all coming together now...'



E226204

Little Nitinat River on East Side Franklin South Main

Access: Franklin South Main

4.6km S of E226202

2.0km S of Junction at Franklin South Main and Nadira Main

100m u/s of bridge where Little Nitinat River crosses from E to W on Franklin South Main

Park: pullout u/s from site access; across from power pole with orange painted lightning bolt (looks like a '3')

Hike down riverbank ~50m N of bridge by single maple tree (between power pole with '3' and power pole to the S with 2 yellow guy wires)

N48°55'48.98" W124°39'55.55"

Sample Site: ~8m u/s of waterfall

Site Photos: June 5, 1997

- 1) From pullout looking SW at South Main: Cheryl at access point ~5m N of the power pole with 2 guy wires; power pole with orange lightning bolt '3' in forefront
- 2) From access point on shore looking u/s: Barbara collecting water samples by flagged willow tree
- 3) D/s: Barbara rinsing syringe before filtering 250mL water for a DOC sample
Waterfall ~8m d/s
- 4) Waterfall; maple tree on left





We're living in a time of 'reuse and recycle'... we're just experimenting new ways to reuse the syringes! (He he... you should have seen the water fights!)



E226206

Little Nitinat River at Rock Cut

Access: 2.5 km S of Nitinat Junction on Franklin South Main
Park: pullout which looks like 2 pullouts on E side South Main
Hike down steep riverbank on W side of road across from S edge of rock between
the '2' pullouts
N48°52'32" W124°41'06"

Sample Site: When looking across river at the bend, ~20m from N end and ~30m from S end

Site Photos: June 5, 1997

- 1) Pullout on E side South Main; truck parked in S section
- 2) U/s: Barbara in sampling site
- 3) U/s: Sometimes you just need three hands!
- 4) D/s





*Are we having fun yet?
And it's just the beginning of the day...*



E226207

Little Nitinat River at Nitinat ML Upstream of Hatchery

Access: Go straight on Nitinat ML instead of turning left to Nitinat River Hatchery
1st large bridge (just past the Nitinat River Facility Sign)
NW side of bridge; bushwhack through alder and brush; climb down 'rock steps'; hike
to far side of little inlet
N48°51'49" W124°39'23"

Sample Site: ~60m u/s of bridge
~10m u/s of rock outcrop closest to bridge on N side of river

Site Photos: June 16, 1997

- 1) From rock inlet looking u/s: bend in the river and rock outcrops; Cheryl taking site notes
- 2) D/s: bridge



*Nitinat River
Monitoring Group*

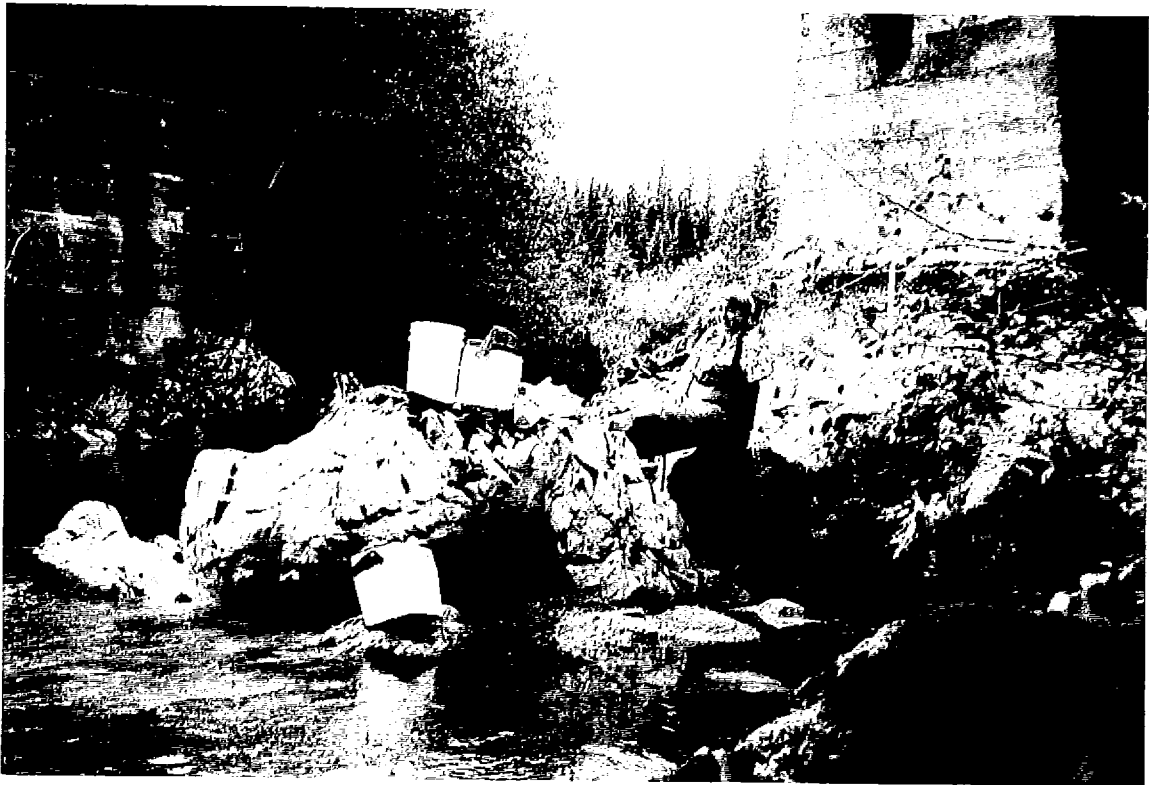
E226208
Nitinat River near Rift Creek

Access: 13.4km NW on Kissinger ML (stay left at intersection to Kissinger Lake)
Warning!!! * Pass through 2 gates which are locked at 3:30pm *
Large pullout to old bridge site on E side Kissinger ML near mile 9
N48°59'34.22'' W124°33'27.93''

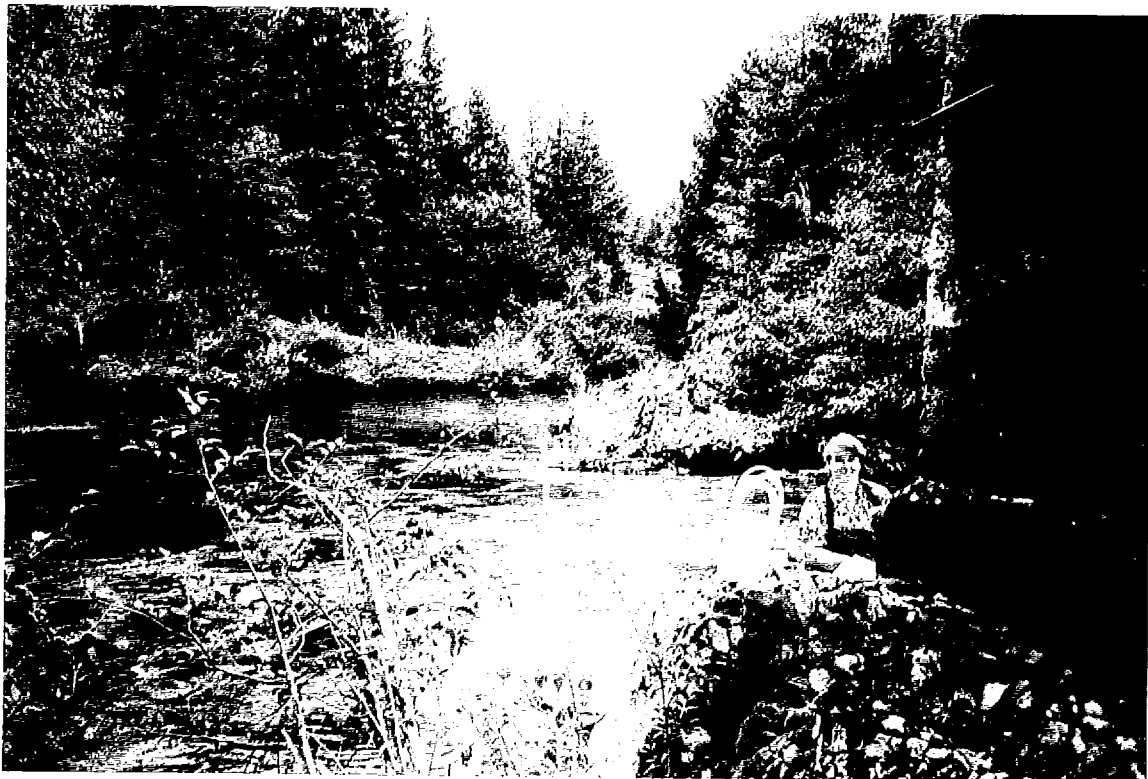
Sample Site: 2m d/s old bridge footing on E side Nitinat River

Site Photos: June 23, 1997

- 1) Across site: deactivated bridge; pool of water behind rock on left
- 2) D/s: Barbara behind old bridge at g/c sampling location



"They're actually going to give me a paycheck for this?"



E226211
Granite Creek at Carmanah Main

Access: 2.1km NE of the E end of the One-Way divide
Pullout on N side of bridge
Walk down rocks and through red alder on S side of bridge
N48°53'22.08'' W124°33'30.68''

Sample Site: ~10m u/s of bridge

Site Photographs: June 18, 1997

- 1) From bridge looking u/s: Cheryl in yellow raincoat at sample location (barely visible on right side of photo)
- 2) D/s: bridge ~10m d/s barely visible due to red alder on banks; Barbara taking site notes



E226214
Worthless Creek at Summit Br100

Access: 0.2km W on Nadira Main (off Franklin South Main)
6.6km SE (right) on Summit Main
0.7km E (right) on Br100
Park: N side of road just past bridge at Br110
*Access site with sites in Little Nitinat River Monitoring Group
N48°56'02.75'' W124°37'13.34''

Sample Site: ~12m u/s of Br100 bridge
~3m d/s of confluence of two forks of the creek

Site Photographs: June 16, 1997

- 1) From road looking across site: logs leaning against bridge on left; Barbara setting up g/c apparatus
- 2) From bridge looking u/s
- 3) From confluence of two forks (~3m u/s of site) looking d/s





I'd like to introduce you to "the Beauty" which is ~25lbs lighter than "the Beast"!

E226215

Worthless Creek at Br 60

Access: First bridge on Br60 (off Carmanah Main)
Warning!!! bridge is in a blind site
Park: pullout W side of bridge
E side bridge: bushwhack through trees, over dead logs and debris down to creek
N48°52'38.91" W124°37'24.06"

Sample Site: ~15m u/s bridge

Site Photos: June 16, 1997

- 1) From W end of bridge looking u/s and across at Cheryl at sampling site
- 2) D/s: Cheryl taking notes while g/c apparatus filters water





E226216

Nitinat River at One-Way West

Access: 3.8km W from the divide of the One-Ways (W of the 44km sign)
~2.9km W of shortcut accessed from One-Way E
Park: bend in road between 2 logs on right side of One-Way W
Hike down path, walk ~10m to gravel bar
N48°52'32" W124°37'00"

Sample Site: Off gravel bar
Landmark: red alder tree with '22' in red triangle ~40m d/s across the river

Site Photos: June 17, 1997

- 1) U/s: Cheryl collecting water samples
- 2) D/s: red alder with '22' printed in red triangle across the river; Barbara setting up g/c apparatus



E226217
Jasper Creek at One-Way West

Access: Last bridge on One-Way W before road becomes two-way
Park ~200m W in triangle where One-Ways divide
Walk down rocks on W side bridge
N48°52'03.13" W124°37'32.58"

Sample Site: ~15m u/s of bridge

Site Photos: June 17, 1997

- 1) From bridge looking u/s: Barbara on left setting up g/c apparatus
- 2) From gravel bar looking d/s: Cheryl in green raincoat (beneath yellow raincoat) at pink flagging closest to bridge



*When you hear Barbara calling “yoo-hoo, hello, who's there?, yoo” in a baritone voice,
you can guess that a bear is in site even though she didn't say “BEAR”!*

*When you see her grab the g/c apparatus without removing the filter,
you know a bear is in sight!*



E226218

Upper Jasper Creek at Washout

Access: Turn sharp right onto J1 near E end of One-Way E
Go through gate, pass blue sign "Fletcher Challenge, Caycuse Tree Farm License 46"
on right
Turn right at first fork
Park in front of the third water-bar and walk ~100m to Jasper Creek if your truck is the
size of a Dodge Dakota...if it's larger you can probably drive to the site
Walk down right side of road to creek
N48°51'25.84" W124°34'54.76"

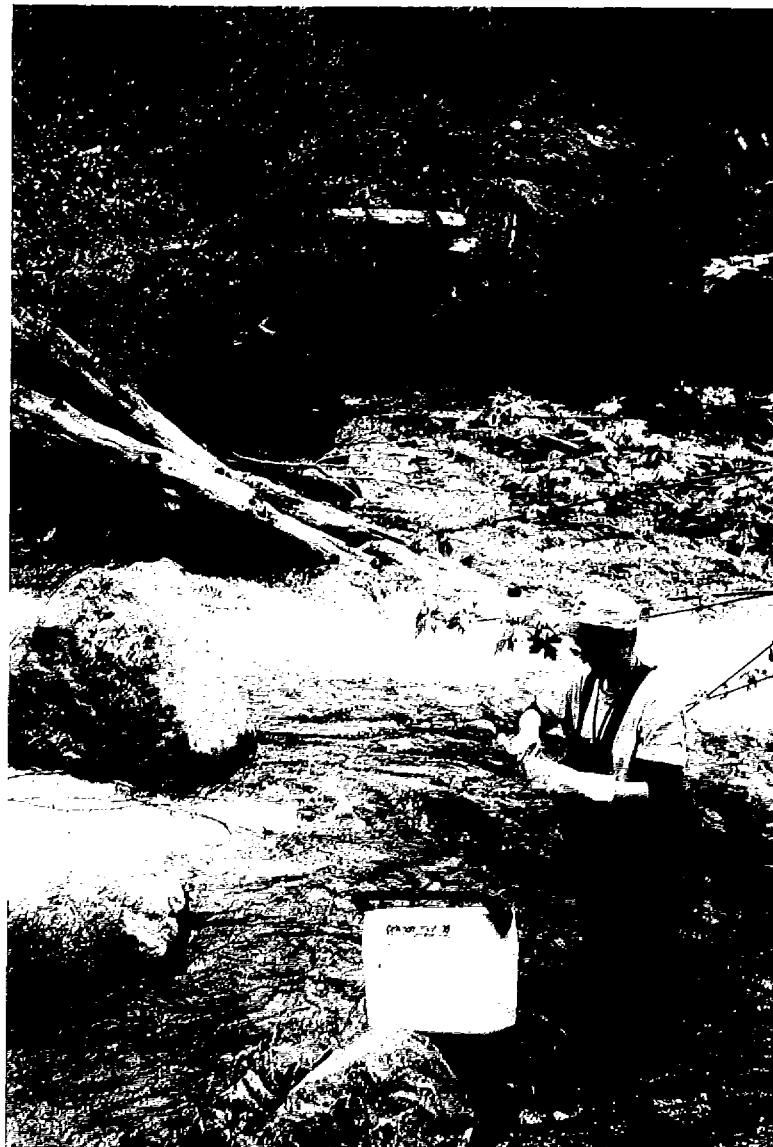
Sample site: Sample above location where two forks (from around the bend and under the old
bridge) meet (too turbulent to sample d/s of where they meet)

Site photos: June 17, 1997

- 1) Washout: view of two forks & Barbara standing at access point
- 2) From N edge of washout looking at old bridge and confluence of two forks
Cheryl collecting DOC sample
- 3) U/s: Barbara taking DO and temperature using a YSI model 57 DO meter
- 4) D/s: site access down brush behind Cheryl to location g/c apparatus is set up



Nature's way is more powerful than people's, but people sure do alter things...





E226219
Nitinat River at Carmanah ML

Access: Side road off Carmanah ML on NE side of bridge
Left at first fork (pink flagging on cedar)
Right at first spur (pink flagging on maple)
Park in camp site
N48°51'56.02" W124°38'22.43"

Sample Site: ~100m u/s of bridge
~3m u/s of hemlock growing out of large stump

Site Photos: June 17, 1997

- 1) U/s: Barbara taking site notes u/s of hemlock growing from stump
- 2) D/s: bridge; Barbara preparing to collect water samples u/s of hemlock growing from stump



E226221

Nitinat River Downstream of Hatchery

Access: Carmanah Main

2.0km S of junction to Ditidaht First Nations Reserve, Bamfield/Hatchery & One-Ways
(Duncan and Lake Cowichan)

100m N of boat ramp on Carmanah ML

Park: bend in road across from brown power pole (all other power poles are green)

Hike down rocks to river

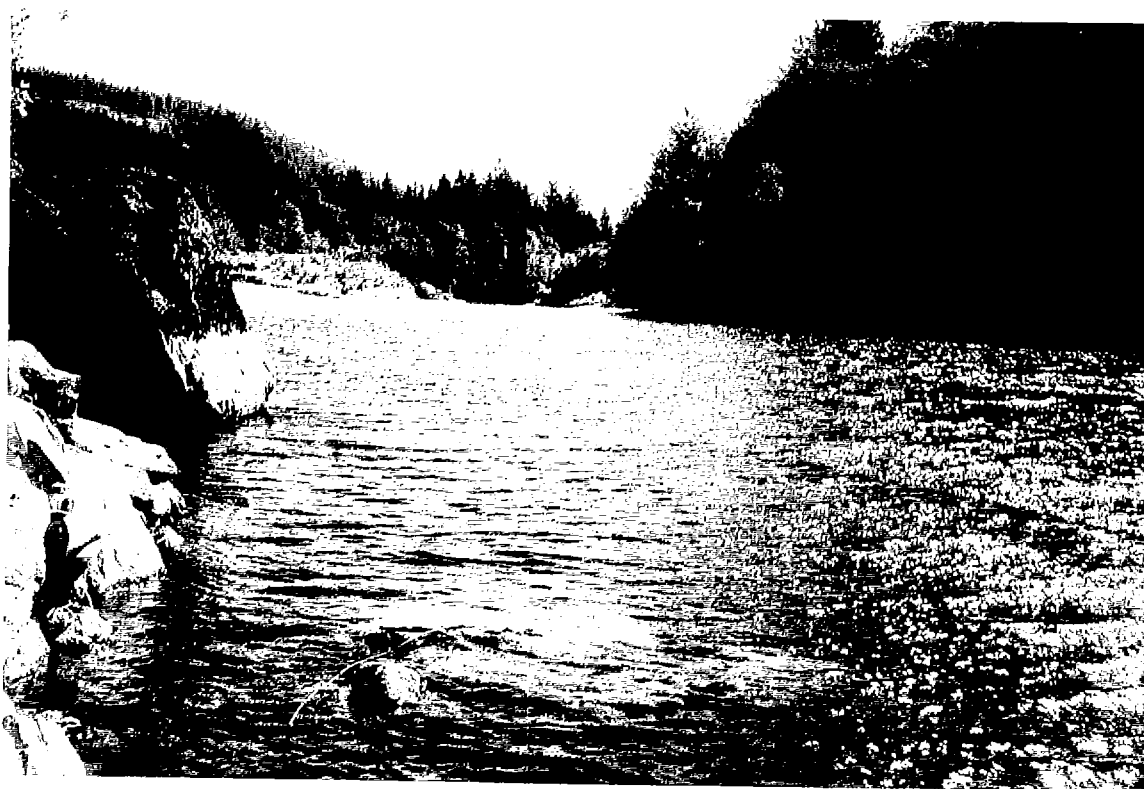
N48°50'44.58" W124°39'00.30"

Sample Site: Sample off large boulders

Site Photos: June 18, 1997 (photos 1 & 2) August 12, 1997 (photos 3 and 4)

- 1) Truck parked up from access to site. Access through opening in red alder near maple tree
Landmarks: bend in road, brown power pole, large Douglas-fir on left and two Douglas-fir crowns on right (across the river)
- 2) U/s: river winds to left u/s of site; mountain in background; large Douglas-fir hanging over river on left; Cheryl taking DO and temperature
- 3) U/s
- 4) D/s: large boulder on left - moss line indicates difference in water level at high and low flows





*Unfortunately, this is the site where we found out that our pump was not indestructible...
but it was fixable!*

E226223
Small Creek near Nitinat Gravel Quarry

Access: 0.5km S of Hatchery turnoff on Nitinat ML
Bridge immediately E of gravel quarry
Walk down S side bridge on rocks in front of 'fern wall'
N48°51'50.96" W124°39'43.53"

Sample Site: ~4m u/s old bridge (logs covered in black plastic)
~15m u/s of main bridge
Sampled d/s of red alder & debris laying across/through creek

Site Photos: June 17, 1997

- 1) From S end of bridge looking at access and u/s at creek (barely visible due to red alder growth on creek banks)
- 2) From S side of creek looking across creek; Cheryl taking site notes while g/c filters (notice the brown filter)



*Rosander
Monitoring Group*

E226247
Rosander Creek at Rosander Main

Access: 6.0km N of call point 16 on Rosander Main
First bridge S of 'no name' lake on E side of Rosander Main
Hike down ditch on NE side of bridge
N48°45'27.48" W124°42'25.60"

Sample Site: ~45m u/s bridge

Site photos: June 24, 1997

- 1) U/s: dead log ~20m u/s laying ~1.5m above creek; Barbara setting up g/c apparatus
- 2) D/s: Barbara holding g/c pump



E226249
South Fork Marchand Creek at Rosander Main

Access: 1.2km N of call point 16

0.8km S of km 14

Hike straight down embankment on NE edge of bridge through brush and red alder
N48°44'06" W124°42'12"

Sample Site: ~20m u/s bridge

Site Photos: June 25, 1997

1) From under S side of bridge looking u/s: Cheryl collecting water samples

2) D/s: bridge; Cheryl collecting water samples





Just a bit of intermittent rain...

E226251

Doobah Creek Downstream Doobah Lake at Rosander Main

Access: 0.8km W of call point 16 (sample site not actually located on Rosander Main)
Park: pullout across from small road ~65m N of bridge (<0.5km NW of T23B sign)
Hike down W side bridge; walk u/s to site
N48°43'34.10" W124°44'28.72"

Sample Site: ~4m u/s bridge

Site Photos: June 25, 1997

- 1) Looking NW across creek
- 2) From under center of bridge looking u/s: Barbara taking site notes
- 3) D/s: Barbara in front of bridge





E226253

Sprise “Surprise” Lake near Nitinat

Access: 2.3km N of turnoff to E226254
1.3km S of call point 16
0.6km down road (roadside overgrown with vegetation - easy to miss turnoff)
Warning!!! *Park at the TOP of the boat ramp*
N48 °42'34.55" W124 °44'10.58"

Sample Site: Wade out to ~1m depth
Find an area where you can collect samples without hitting submerged vegetation

Site Photos: June 24, 1997

* *The following 5 pages are only to be viewed by people who we will never ask to borrow their vehicle for field work (i.e. this excludes Ministry employees with vehicles!).*

- 1) This is what will happen if you don't park at the top of the boat ramp. The ramp has been built up over logs, which have deteriorated over time, therefore giving way under the weight of a vehicle loaded with coolers, gear and ice!

Initial reaction...Barbara. "Oh boy - I've gone over the edge into the ditch."

Response: Cheryl opens the passenger door...."Ugh...Barbara - there isn't a ditch!!!"

- 2) "Oh my...oh boy...."... hysterical laughter...

- 3) "Okay, what to do...this is not good"

Plan 1: DON'T call for help. We're resourceful. We'll get out. Besides - wasn't it just last week that we heard a logger call the dispatcher saying "can you get a tow truck out here? Two ladies are stuck in a hole?" *No kidding...that really happened!*

Plan 2: Drive out....nope that's not going to work.

Plan 3: One of us sit on hood while the other drives out....nope that's not going to work.

Plan 4: Fill the hole and drive out.... nope that's not going to work. The hole is just tooo big and the truck is resting on the frame.

Plan 5: *now this is ingenious!!!* Put blocks behind all tires, fill the hole, make a ramp, jack up the back end of the truck, Barbara sit on the hood, pray, Cheryl drive out.

- 4) WOOPEE!!! It worked and only took 1.5 hours of hauling rock, logs etc. down the boat ramp to fill the hole. This is the hole ~1m deep...

- 5) Sampling...ahh yes, back to it! But there's no time to cool off and swim since we're going to be late for our check in at the Hatchery (*by the way... radio access is not a reliable thing on the west coast*).

From water sampling location looking back at g/c apparatus and Barbara walking towards all of our gear on shore.

- 6) From water sampling location looking W across Sprise Lake. There are two loons in the water behind the reeds.



Barbara has made the best 'hole in one' I've ever seen!



When you have the choice of laughing, crying or getting angry, choose laughter. It lightens the situation and makes working together entertaining.



Patience, resourcefulness, respect for your partner's ideas (even when you know they won't work), and taking your turn cranking up the jack are all part of a great partnership!



*Many of our responsibilities were not in the job description...
but then again, neither was bird watching!*

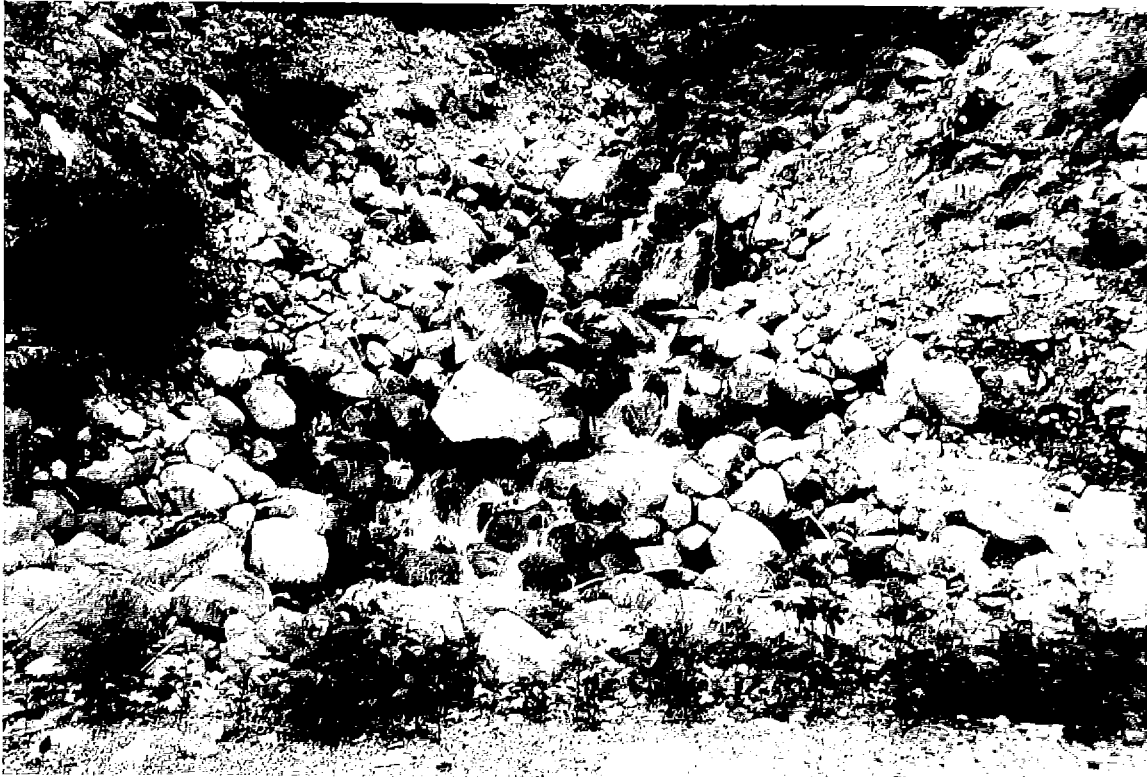
E226254
Unidentified Creek #2 Flowing into Cheewhat Lake
at Rosander Main

Access: 1.6km N of E226255
3.6km S of call point 16 (~2km S of turnoff to E226253 - Sprise Lake)
Park: small pullout at bridge (doesn't look like a bridge from the road)
N48°41'38.34" W124°44'08.54"

Sample Site: ~3m u/s of bridge

Site Photos: June 24, 1997

- 1) U/s: g/c apparatus on right
- 2) D/s: g/c apparatus on left; Barbara at truck in pullout



E226255
Unidentified Creek #3 near Cheewhat Lake
at Rosander Main

Access: 1.6km S of E226254
5.2km S of call point 16
Park: deactivated road on W side of Rosander Main ~30m N of bridge
Walk down NE side of bridge onto large log, boulder and jump down to creek bed
N48°40'49.54" W124°44'54.95"

Sample Site: ~3m u/s of bridge
D/s confluence of 2 forks but u/s mouth of the third fork (closest to bridge)

Site Photos: June 25, 1997

- 1) From bridge looking down on site: confluence of two forks in front of dead, brown sword fern
Cooler is sitting on boulder used to access site; Barbara collecting water samples
- 2) From below bridge looking u/s: Barbara sampling u/s of third fork (closest to bridge on right)
- 3) D/s: bridge barely visible due to red alder on creek banks; Barbara preserving a metals sample





E226256
Carmanah Creek near Heavens Grove

Access: Park: Carmanah parking lot

Hike down trail past Valley Mist trail to Heavens Grove sign; stay right and hike d/s on boardwalk

Left at next fork along log and over steps; medium size (for the Carmanah) Sitka Spruce tree

Turn left at log and pink flagging tape; hike u/s down path to creek

N48°39'33.36" W124°41'26.97"

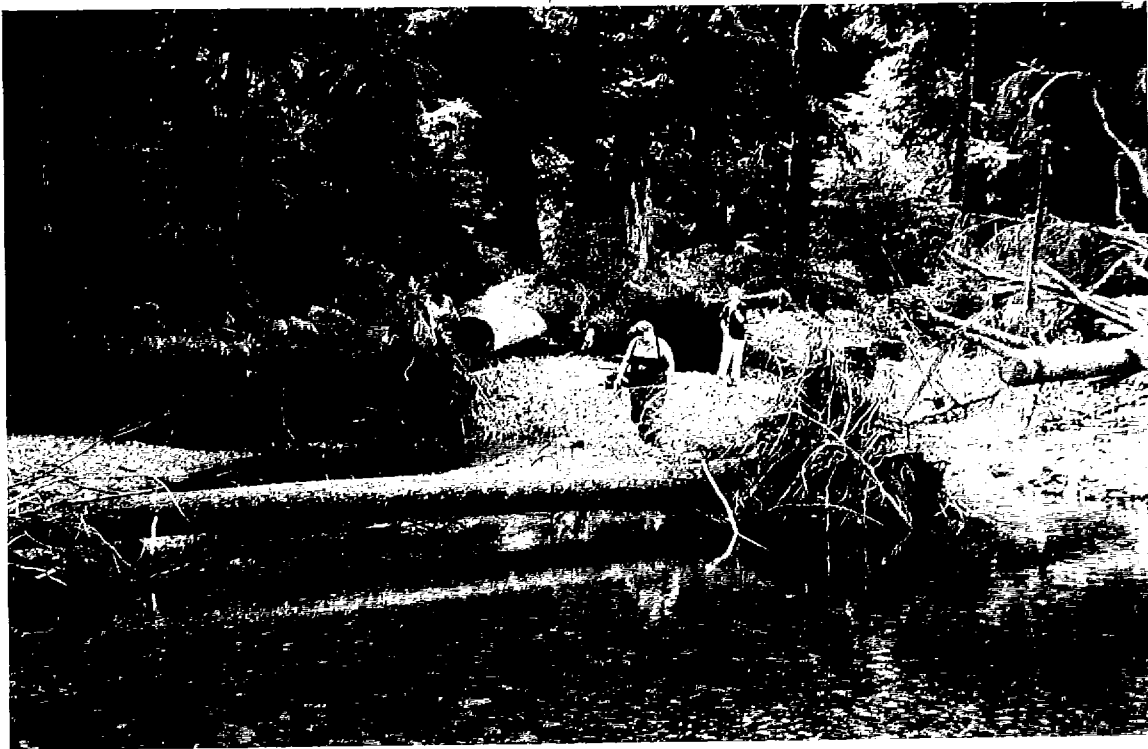
Sample Site: see photos

Site Photos: July 2, 1997

1) Across site: Spruce flagged on left; Barbara sampling g/c; Rick standing on gravel bar

2) U/s: Barbara and Rick by the g/c apparatus

3) D/s: as above



*Rick thoughtfully considering how to describe this site better...
or he's wondering how two of his employees managed to drag him, kicking and screaming, from
the office for two days to hike in the Carmanah and sample in the Rosander Watershed area!
(maybe he's devising a plan to stay forever... or looking for a way out??)*



Barbara and Rick assessing the effects of all the debris in the area...



*Barbara explaining how the g/c apparatus works and training Rick
(Management's Useful Laboring Executive).
We had to make sure he didn't think we were just on a big holiday...*

*Caycuse River
Monitoring Group*

E226130
Malachan Creek at Carmanah ML

Access: Carmanah ML

Park: junction of Carmanah ML and turnoff to Nitinat Campsite (also to E226225)

Walk up road ~50m to creek

N48°48'06" W124°39'17"

Sample Site: ~45m u/s of Carmanah ML

Site Photos: July 7, 1997

- 1) From road looking at access point and u/s; Barbara in raingear at sampling site
- 2) U/s: water quality sampling location right of coolers; Barbara taking site notes
- 3) D/s: bridge covered in vegetation near top of photo (not really visible); Barbara at site





Dumping rain again...this just proves not all sites are as 'cushy' as the Carmanah!

E226225
Malachan Creek near Nitinat Campsite

Access: Take road to Nitinat Campsite off Carmanah ML
Turn left at first small road
Park near metal shed formerly used for explosive storage
Hike across second growth: follow pink flagging to site
N48°47'57.84" W124°39'34.95"

Sample Site: see photos

Site Photos: July 2, 1997

- 1) U/s: Barbara setting up g/c apparatus
- 2) U/s: Barbara dismantling g/c apparatus and Cheryl preparing to preserve metals sample

*One of a co-op student's many goal's is to learn new skills...
lets just say Barbara had a few sites worth of training using a machete!
I kept my distance not knowing whether this new skill involved breaking trail or
trying to intimidate the mosquito's!
(no photo available)*



*Caution!!! This site is Mosquito Heaven except they're all still alive and biting...
Maybe it's mosquito hell?*

E226227
Upper Seven Mile Creek at F1A

Access: F1A (deactivated road) branches off junction at F1 and J1 (road changes name - actually not a junction)

Take sharp right off J1 onto F1A if access via One-Way E

Take left on F1A off F1 if access via Caycuse Main

F1A entrance is flagged extensively with many colors

Park: approach on left just past bridge

S side bridge - step onto large log, hike through red alder, walk u/s under bridge
N48°49'55.91" W124°32'24.43"

Sample Site: ~15m u/s of bridge

Site Photos: August 13, 1997

1) U/s: yellow flagging at site (left of cooler)

2) D/s: bridge overgrown with vegetation; yellow flagging center of photo



E226228
Lower Seven Mile Creek at Caycuse ML

Access: Caycuse ML deactivated NE of junction at Caycuse ML, Carmanah Main, Rosander ML, & West Hatton/Carmanah ML (also referred to as a continuation of Carmanah Main)

Via Nitinat route: access Caycuse ML via One-Way E, J1, F1, turn W on Caycuse ML

Via Nixon Creek route (also called Caycuse ML): Follow Caycuse ML to site just past turnoff onto F1

Park: pullout E side bridge at '7-mile' sign

Hike through alder near '7-mile' sign down to creek

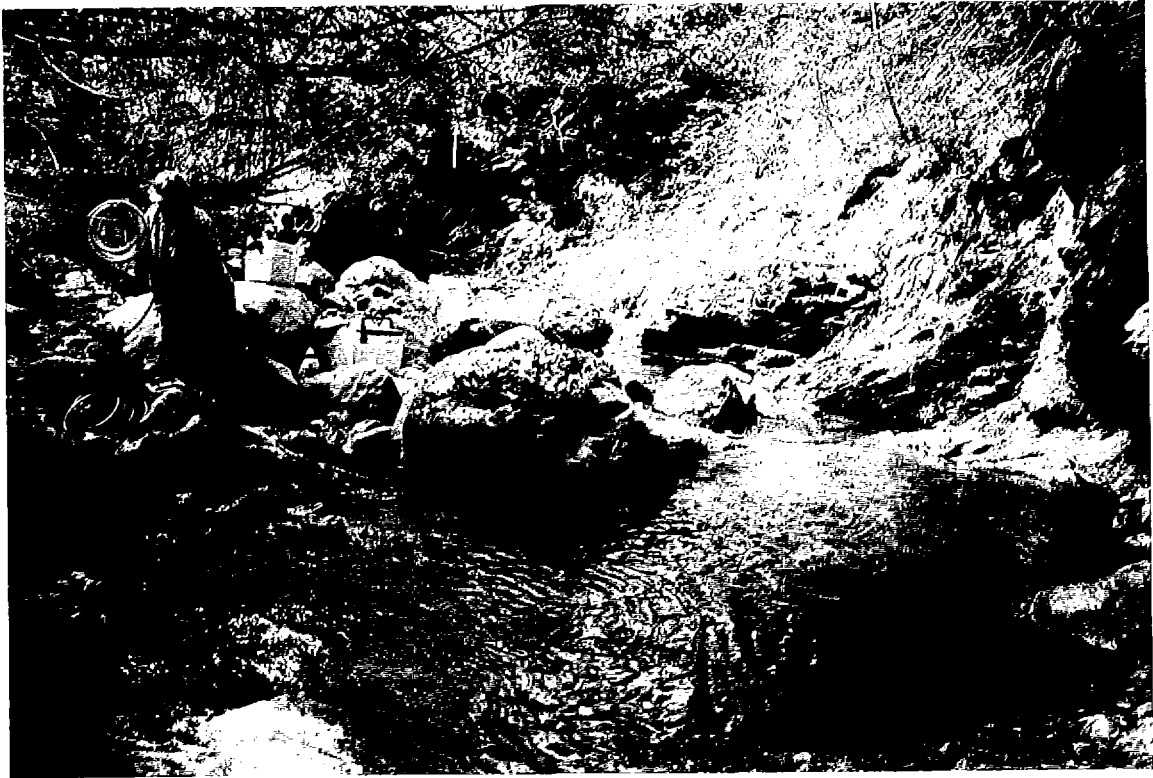
N48°49'05.52" W124°32'28.13"

Sample Site: ~15m u/s of bridge below rock step-pool

Site Photos: August 13, 1997

- 1) U/s: Barbara taking site notes
- 2) D/s: Barbara setting up g/c apparatus
- 3) D/s: bridge at top of photo (barely visible due to vegetation)





E226231

Caycuse River at Hatten ML

Access: 4km S of McLure Junction down Caycuse ML to Hatten Junction sign
Stay left, 3.3km down Hatten ML
Park in front of large woodpile (small cedar pink flagging)
Follow creek that flows through a culvert towards Caycuse R; bushwhack through
brush (path has been cleared); once in the middle of brush area aim for two large
Douglas-fir trees (should be on your left); watch footing on cliff - many holes;
climb down to river
N48°47'57.07" W124°29'08.86"

Sample Site: ~500m u/s of bridge

Site Photos: August 11, 1997

- 1) U/s: DO meter and cooler at general chemistry sampling location; large, cracked log without bark laying into river on left
- 2) D/s: Western hemlock on right with 'L' formed trunk ~half way up the tree



E226232
Cedar Creek at Caycuse 9

Access: 0.35km N of McLure Junction on Caycuse ML
Turn W onto C9: 1km to site
Park on side of C9
Hike through brush just SW of embankment
N48°49'58" W124°31'33"

Sample Site: base of the waterfall

Site Photos: July 3 (photos 1, 3-5) August 11 (photo 2)

- 1) Rick holding red alder back on C9
- 2) Looking E at access point - yellow flagging
Landmark: rock cut
- 3) U/s: Barbara heading to collect water samples; Cheryl setting up g/c hose
- 4) From above the site looking at Barbara collecting water samples at the base of the waterfall
- 5) One of the most incredible sites...



Putting Rick to work...





A perfect ending to a great day of sampling.



Nature has a way of humbling oneself and washing away the cares of the world...
Photo credit to Rick Nordin

E226234
Mistery Creek at McLure ML

Access: 3.9km N of E226235 on McLure ML
8.0km S of McLure Junction at Caycuse ML
Walk down NE side of bridge
N48°48'05.06" W124°26'59.36"

Sample Site: ~10m u/s of bridge in pool area

Site Photos: July 3, 1997

- 1) From bridge looking u/s: Barbara taking site notes on right; Cheryl collecting water samples
- 2) From creek level looking u/s: repeat of photo 1
- 3) D/s: access on right, bridge in background





*Don't ever plan with your partner to use syringes as waterguns on your supervisor. It only backfires in your face - literally!!! All the while your partner and supervisor will laugh on shore and hide behind a camera so you can't absolutely soak them.
no photos available - It was hilarious...for them!*

E226235
McLure River at McLure ML & M10

Access: 4.1km N of E226236 on McLure ML
7.1km S of McLure Junction at Caycuse ML
Turnoff on W side McLure ML just N of M10 (sign on tree)
Park: camp site
Walk down bridge logs on NW side of bridge
N48°46'44.50" W124°27'57.89"

Sample Site: ~15m u/s of bridge
Site not flagged

Site Photos: July 3, 1997

- 1) From bridge looking u/s: Barbara rinsing bottle; Cheryl taking site notes
- 2) U/s: Cheryl taking site notes
- 3) From site looking d/s at bridge





E226236

McLure River at McLure ML Bridge

Access: 11.8km S of McLure Junction at Caycuse ML on McLure ML
4.1km S of E226235
N end of McLure Lake
Park: pullout NW side McLure ML
Walk down gravel bar from pullout, through red alder to river
N48°45'09.08" W124°29'51.28"

Sample Site: ~5m d/s of bridge; lake outflow

Site Photos: August 11, 1997 (photo 1) July 3, 1997 (photos 2 & 3)

- 1) U/s: Barbara collecting water samples
- 2) From bridge looking d/s at Barbara taking site notes and Cheryl collecting water samples
- 3) Close-up of photo 2: Cheryl collecting DOC sample



*We didn't believe John Deniseger when he said we'd be sampling in shorts and tevas
by the end of the summer...*
Moral of the story: don't doubt your supervisor especially when 'recreation' may be involved!



E226237
Upper Haddon Creek at H500

Access: Carmanah Main (heading E then S)
Stay left at fork in Carmanah Main
Cross Haddon Creek bridge
Take center road (right of Haddon 300) to Haddon 500
Left on Haddon 500
Sample at first bridge (small)
Hike down rock embankment
N48°43'52.62" W124°35'07.70"

Sample Site: ~10m u/s of bridge

Site Photos: July 3, 1997

- 1) From N bank at bridge looking S across Haddon Creek: access to site behind Cheryl
- 2) D/s: bridge; site access right of red alder tree; Cheryl setting up g/c apparatus



Gordon River Monitoring Group

Note: For brevity, site notes indicate #km from Chicken Joe's on Gordon River ML. This distance includes travelling 9.1km on Caycuse-Gordon River Hookup to the intersection of Gordon River ML.

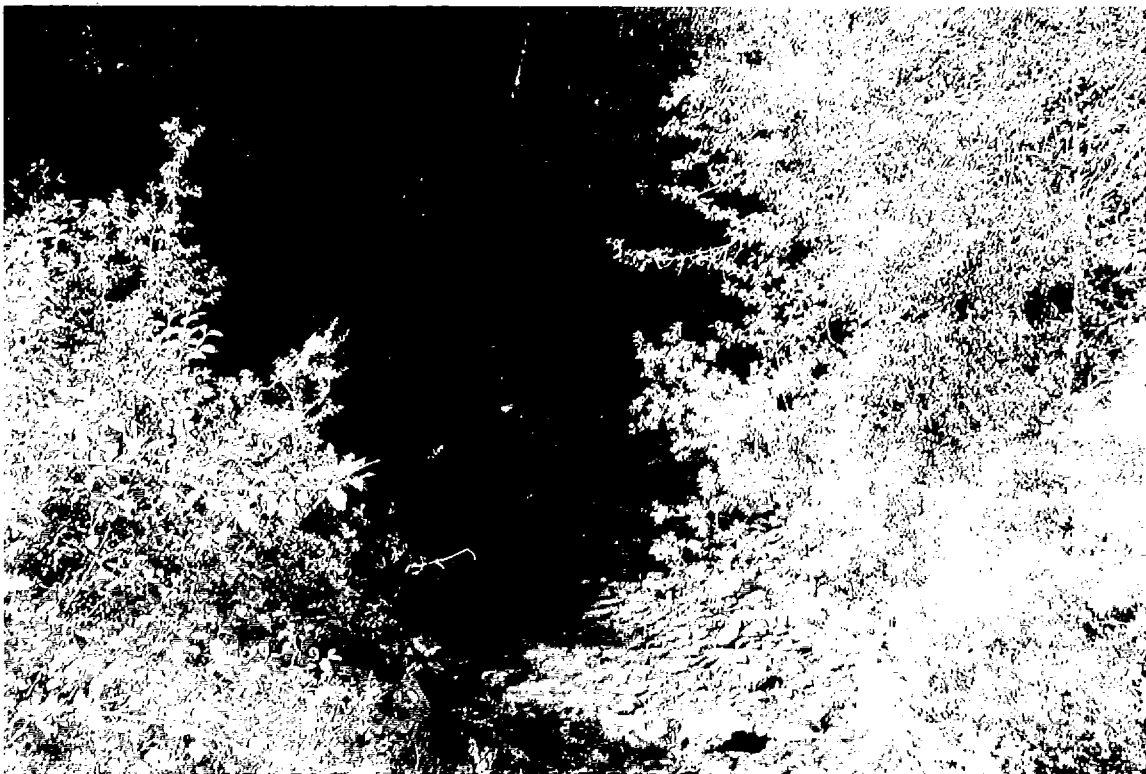
E226238
Gordon River Upstream Gordon River Camp

Access: Just N of Gordon River Camp
13km S of Chicken Joe's on Gordon River ML
Park: side of intersection in front of signs & 'defensive driving' crushed car
Warning!!! This is an extremely busy intersection during logging season.
Hike down ditch and riverbank on SW side of bridge; stay close to alder trees
(hint of a path located there)
N48°46'23.52" W124°20'10.34"

Sample Site: ~45m u/s of bridge

Site Photos: August 18, 1997

- 1) From bridge looking u/s: site on left behind willow
- 2) U/s: access directly left of large rock by Barbara
- 3) D/s: bridge; Barbara taking site notes - access directly right of her





E226239
Upper Gordon River at Gordon River ML

Access: ~1km N of Gordon River Camp on Gordon River ML
11.5km S of Chicken Joe's
2.5km S of Gordon River Main & Caycuse Gordon River Hookup intersection
Park: roadside by culvert
Walk down W side road along culvert drainage to river
N48°47'07.34" W124°19'33.86"

Sample Site: ~5m d/s of culvert drainage path
*do not wait for the dust to settle while sampling...it doesn't

Site Photos: August 18, 1997

- 1) U/s: access on right via rock path behind large rock in water
- 2) D/s: access on left via rock path behind leaning red alder tree





E226240

Gordon River at TR4

Access: 7.6km N of E226241

3.4km S of entrance to Gordon River Camp on Gordon River ML

Just N of call point 4 & across from TR4

Park: pullout W of bridge (E side Gordon River ML)

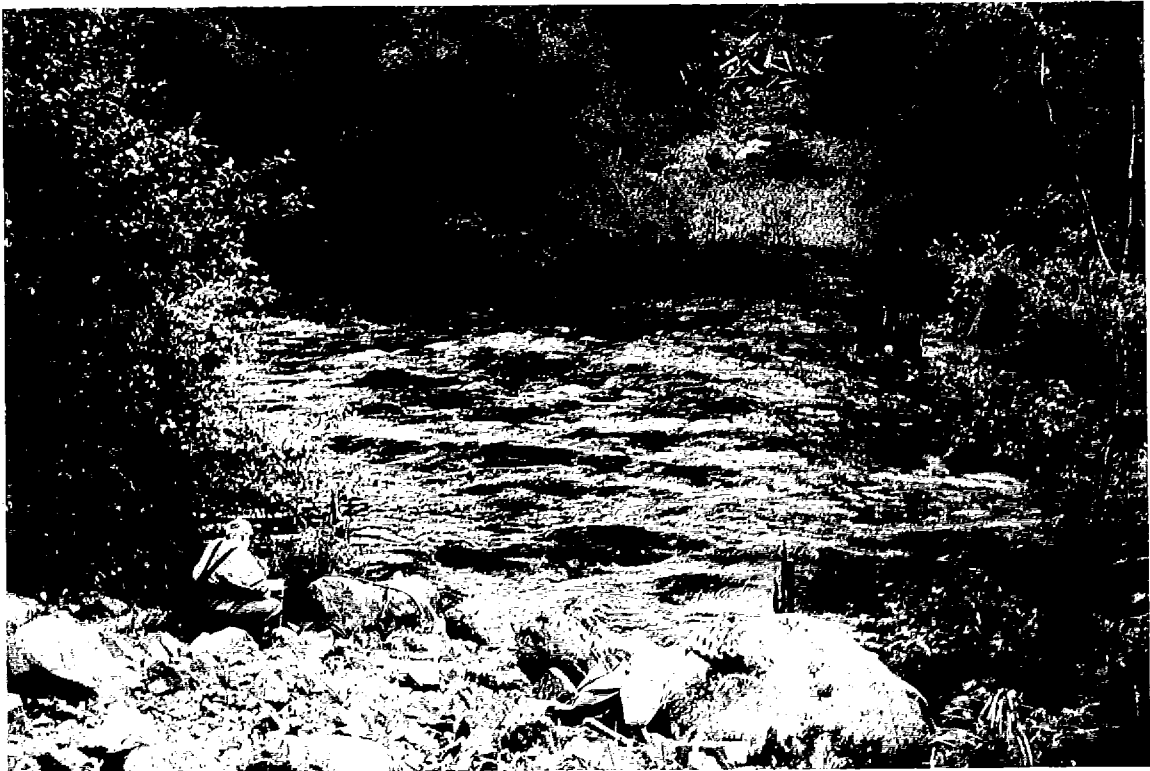
Walk down W side bridge through clearing

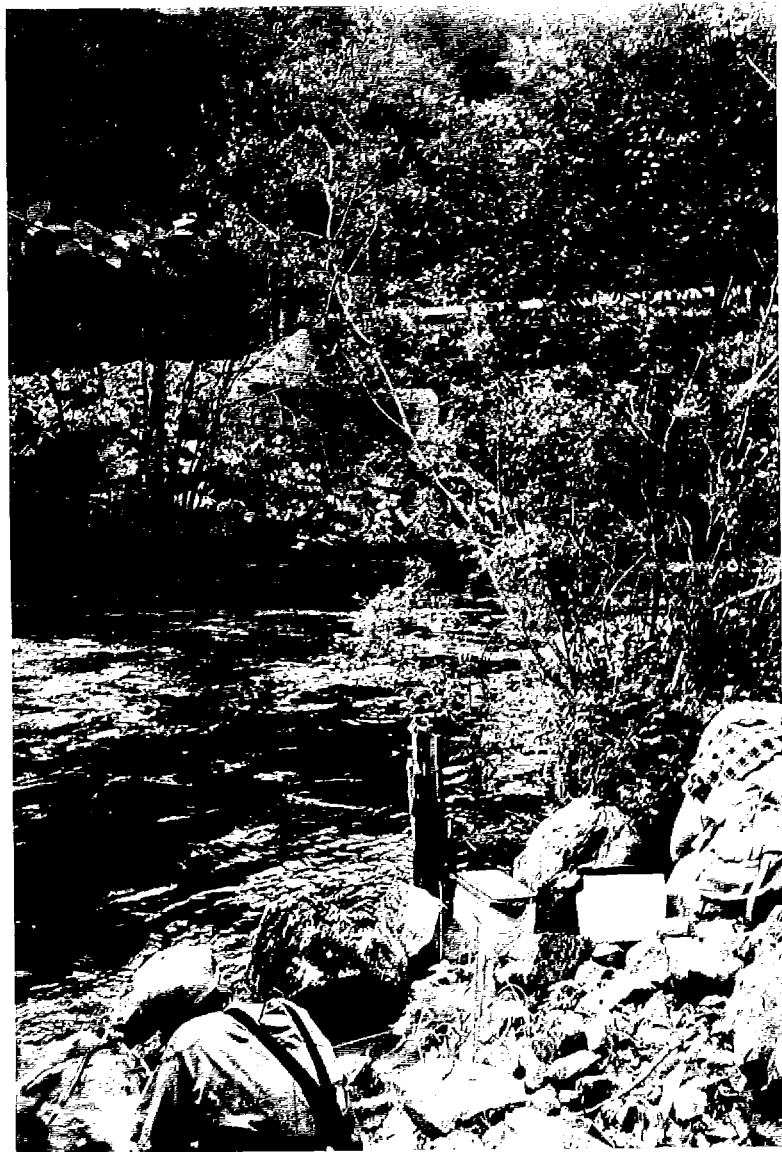
N48°44'46.92" W124°21'48.50"

Sample Site: ~40m u/s of bridge

Site Photos: July 9, 1997

- 1) U/s: two pilings in center stream & old road with log/debris pile on opposite shore; Cheryl taking site notes by g/c apparatus
- 2) D/s: bridge (do not cross the bridge to access the site)





E226241

Gordon River at TR10

Access: 3.6km N of E226242

Just N of TR11

11.0km S of entrance to Gordon River Camp on Gordon River ML

7.6km S of E226240

Park: between Tr10 and runaway ramp

Climb down rocks alongside culvert on E side road: Caution!!! difficult access

N48°41'55.10" W124°24'45.85"

Sample Site: ~15m u/s of culvert outfall

Site Photos: July 9, 1997

1) From roadside looking u/s Gordon River

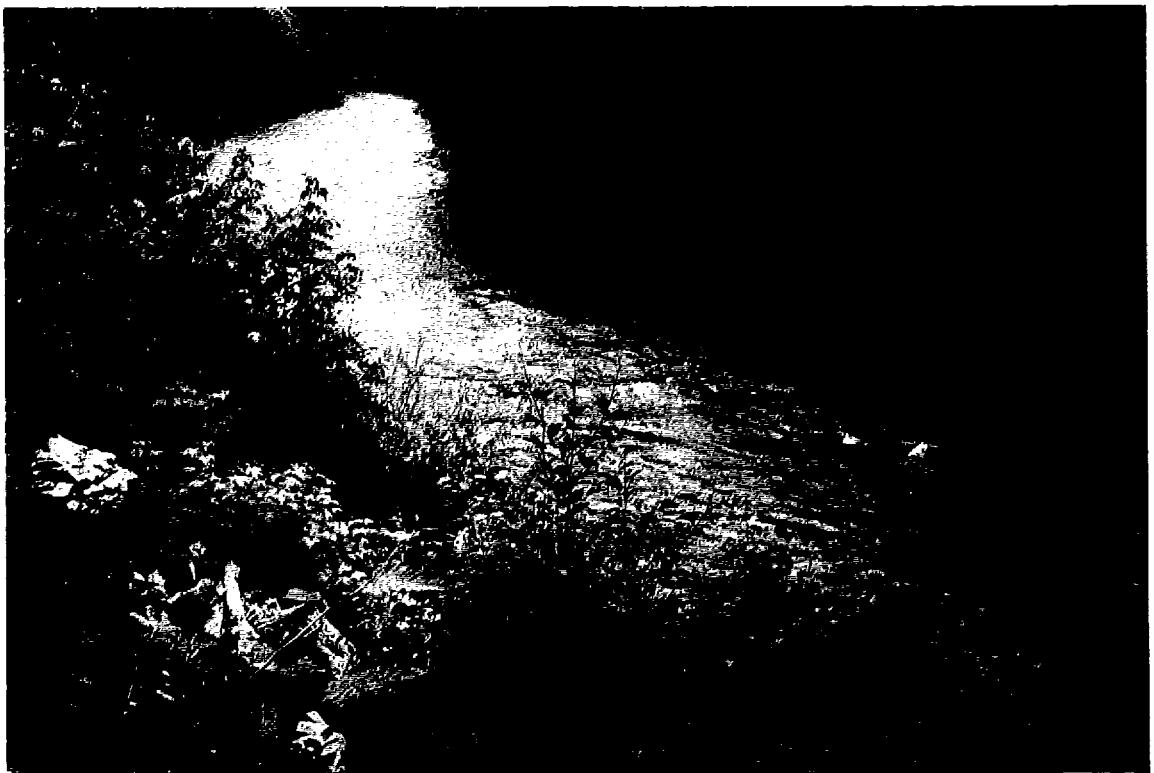
Site access: we bushwhacked through the alder down the bank on the first round

In the future go down by the culvert S (right) of this.

Barbara in gray/black plaid jacket at site

2) U/s: Barbara calibrating the DO meter

3) D/s: culvert access is near red alder on right





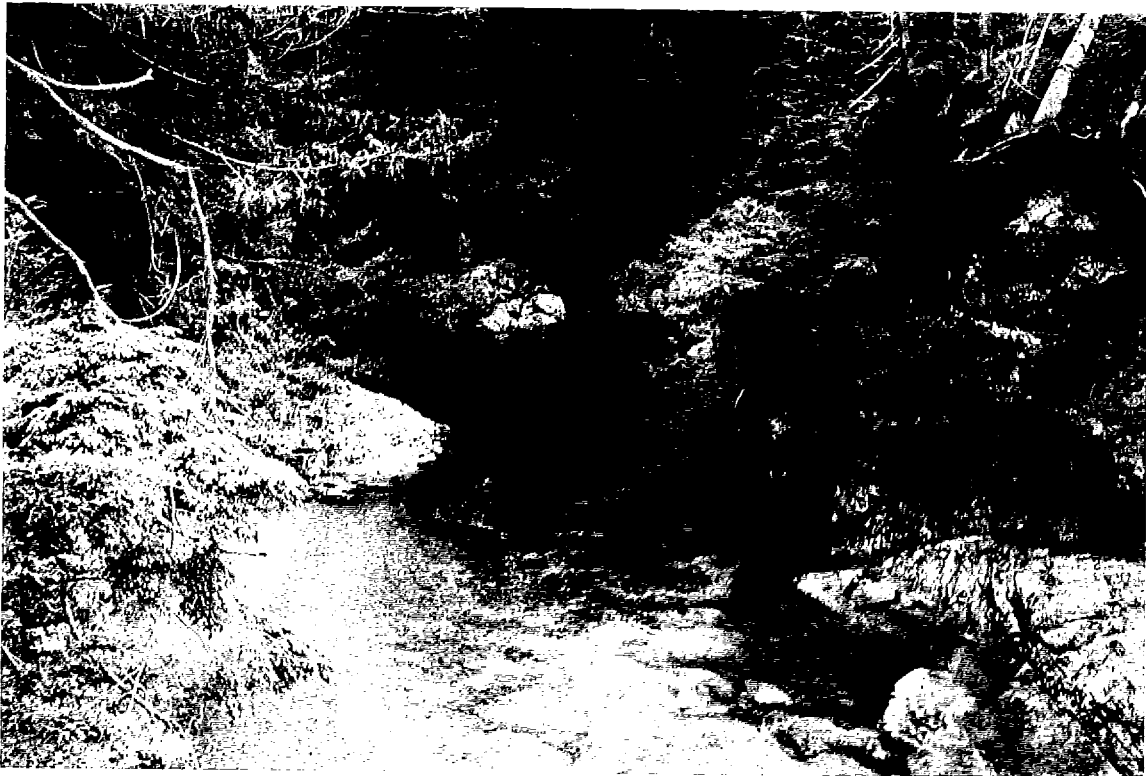
E226242
Loup Creek at Gordon River ML

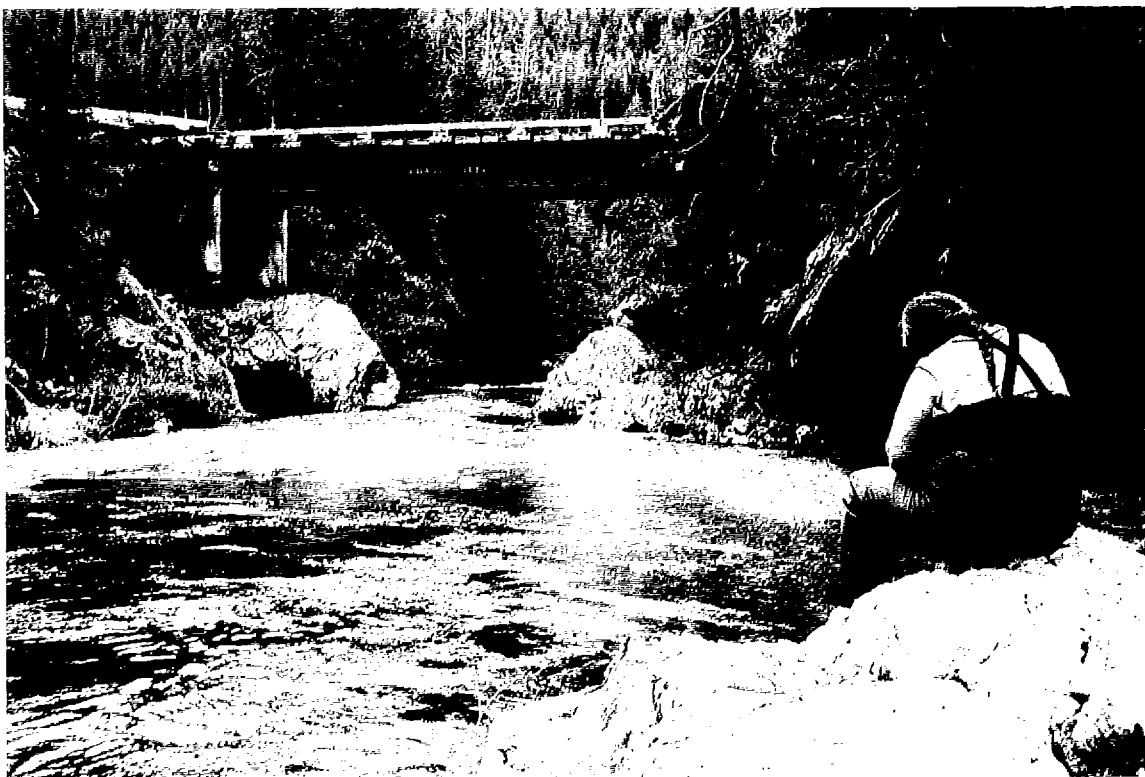
Access: 10.1km N of E226244
14.6km S of entrance to Gordon River Camp on Gordon River ML
3.6km S of E226241
Park: roadside
Hike down old road bed and path down riverbank on SW side bridge
N48°40'30.34" W124°25'50.56"

Sample Site: ~50m u/s of bridge off large rock

Site Photos: July 9, 1997

- 1) From bridge looking u/s: sample location off rock on left
- 2) U/s: Barbara taking site notes at g/c sample location
- 3) D/s: bridge; Barbara taking site notes





Another great swimming (I mean sampling) spot!

E226244

Gordon River at Baird Creek

Access: 1.2km N of E226246
24.7km S of entrance to Gordon River Camp on Gordon River ML
10.1km S of E226242
Park: small pullout at 44k sign (N of bridge)
Hike ~100m down steep path; walk through Baird Creek to access Gordon River
N48°36'45.76" W124°25'59.43"

Sample Site: ~200m u/s of Baird Creek Bridge
~5m u/s of Baird Creek behind two red alder trees and willow bushes

Site Photos: July 9, 1997 (photos 1-3) August 18 (photo 4)

- 1) From bridge looking u/s: Baird Creek (brown color) flowing into Gordon River on left
Initial sample location behind two alder trees and willow bushes at mouth of Baird Creek
- 2) U/s: Barbara maintaining her balance and collecting water samples
- 3) D/s: bridge; Barbara on right at sample site
- 4) From bridge looking u/s
Sample site 1 on left edge of photo behind two alder trees and willow bushes (in the large shadow closest to left side of photo)
Sample site 2 on right at base of riffle





*One expects little creeks to dry up over the summer,
but the reality of water level fluctuations on the West Coast
becomes very obvious with dramatic changes in rivers such as this...*

E226246

Browns Creek at Gordon River ML

Access: 3.9km N of junction at Gordon River ML and Harris Creek ML
25.9km S of entrance to Gordon River Camp on Gordon River ML
1.2km S of E226244
Creek is hidden by red alder and flows through culverts under the road
Park: pullout on E side of road ~50m S of site
N48°36'16.10" W124°26'03.29"

Sample Site: ~10m u/s of culverts in small rock bed at base of what looks to be a man-made rock 'dam'

Site Photos: July 9, 1997

- 1) From access point looking across and u/s: Barbara set up g/c apparatus at base of rapids
- 2) D/s: access on left through red alder; two culverts pass under Gordon River ML behind Barbara



*San Juan River
Monitoring Group*

E226190
Bavis Creek at Red Creek ML

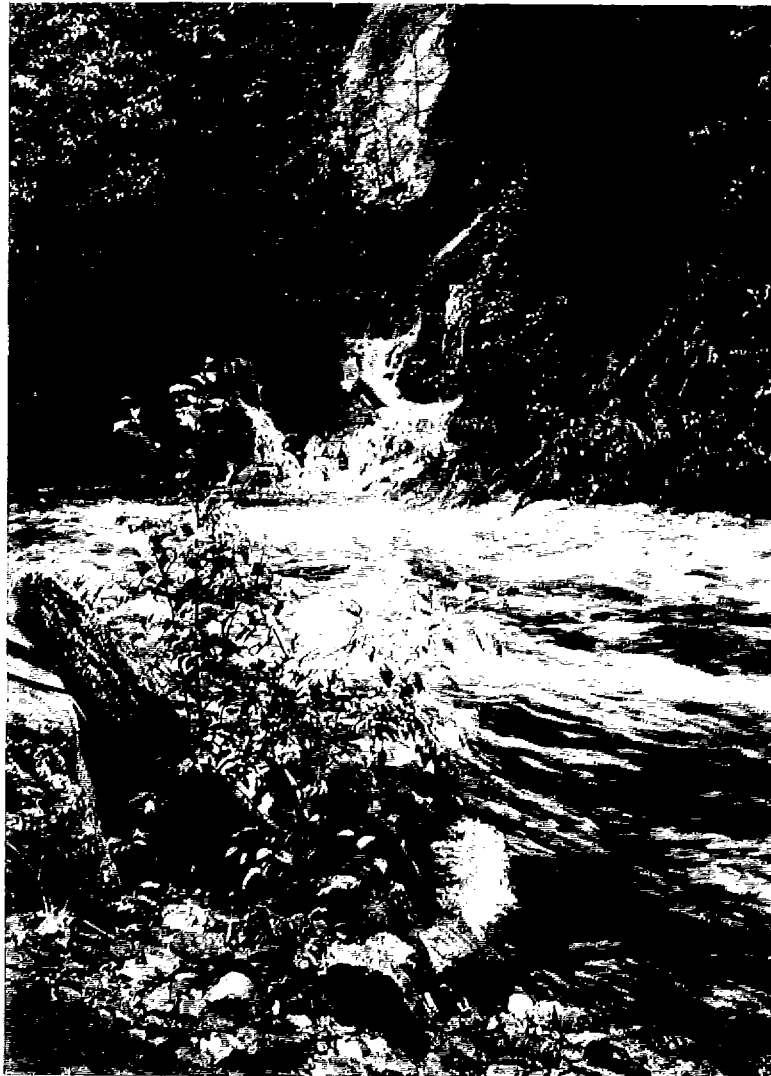
Access: From Port Renfrew Recreation Center 2.2 km NE on West Coast Road to Red Creek
ML (a.k.a. Bear Creek Trail)
8.3km NE on Red Creek ML
(4.8km E of E226410)
Park: SW side bridge
Walk down path on shale to creek
N24°34'32" W124°16'02"

Sample Site: ~20m u/s of bridge; waterfall opposite side of creek by bridge

Site Photos: July 8, 1997

- 1) U/s: Barbara at sample site on right
- 2) D/s: bridge; waterfall on right
- 3) D/s: close-up of base of waterfall; g/c hose hooked through red alder in forefront





There is just one word to describe this whole trip... SOGGY!

E226408
Fairy Creek at Harris Creek ML

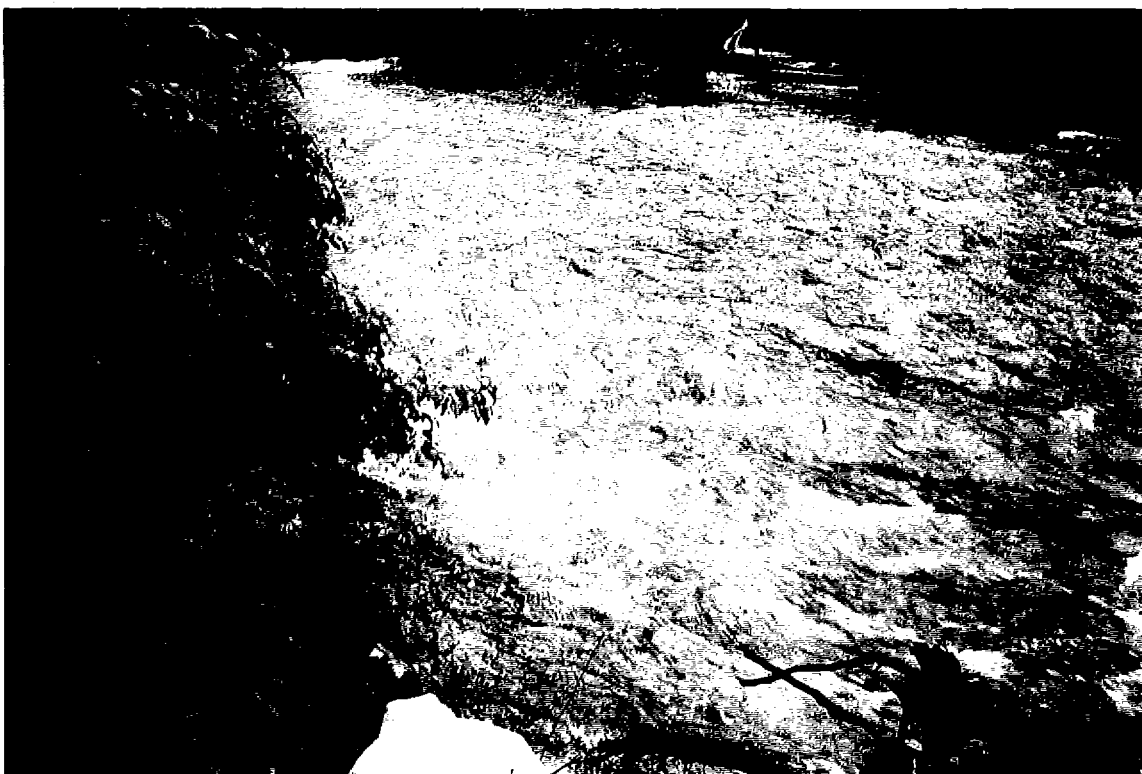
Access: 2.6km NE of junction at Gordon River ML and Harris Creek ML
5.5km SW of E226548
Park: SE of bridge
Hike down to creek on NW side of bridge, u/s of rubble slide
N48°35'13" W124°21'24"

Sample Site: ~150m u/s of bridge on W bank next to uprooted tree

Site Photos: July 8, 1997

- 1) From NE corner of bridge looking u/s: Barbara in yellow raincoat (barely visible) on left at site
- 2) From above the site (standing on uprooted tree) looking u/s





Soggier...

E226410
Mosquito Creek at Red Creek ML

Access: From Port Renfrew Recreation Center 2.2 km NE on West Coast Road to Red Creek ML (a.k.a. Bear Creek Trail)
3.5km NE on Red Creek ML
(4.8km W of E226190)
Hike down SW side of bridge on Red Creek ML
N48°34'13" W124°19'50"

Sample Site: ~15m u/s of bridge

Site Photos: July 8, 1997 (Photo 1) August 18, 1997 (Photos 2-4)

- 1) From bridge looking u/s: Barbara in yellow raincoat at site
- 2) Across (looking E) site: flagging top of photo
- 3) From under bridge looking u/s: Cheryl about to check flow meter reading on the g/c apparatus
- 4) D/s: bridge; Cheryl taking site notes





*Did you know that Port Renfrew and surrounding area received the July annual rainfall in
18 hours - we were sampling during 10 of it.
But you'll hear few complaints from us as we'd rather be SOGGY than be in the office!*



'Say what?'



Much better conditions! (Notice these photos are from a different month.)

E226548
Renfrew Creek at Harris Creek ML

Access: 8.1km NE of junction at Gordon River ML and Harris Creek ML
5.5km NE of E226408
2.0km W of E225549
Road to creek on SE side of bridge
Walk u/s along E bank to gravel bar
N48°35'52" W124°17'15"

Sample Site: ~100m u/s of bridge

Site Photos: July 8, 1997

- 1) U/s: maple covered in moss across from site before bend in river; Barbara taking site notes by g/c apparatus on right
- 2) D/s: bridge



*You know those wrinkles you get after sitting in the hottub?
We've got them - and believe me we're only dreaming about hottubs!*

E226549
Harris Creek at Harris Creek ML

Access: 10.1km NE of junction at Gordon River ML and Harris Creek ML

2.0km W of E226548

2.5km SE of E226553

Drive down path on SW side of bridge but DO NOT drive under the bridge once at the bottom unless you have a 4x4.

N48°35'34.46" W124°15'41.04"

Sample Site: ~125m u/s of bridge

Site Photos: August 19, 1997

1) From under bridge looking u/s

2) D/s: bridge; swinging tire beneath bridge; Cheryl taking DO measurement





*Barbara loves exploring a little tooooo much...!
Takes two women and four men to get out of this site without a 4x4!!!*

Fortunately after a lot of rock flying, a fisherman passing by and three men who tired of hearing rocks flying while they were trying to enjoy a beer peacefully by the river came by to check out our scene. Let me set that for you: truck stuck in unstable rock path...coolers strewn on the side of the path, Barbara and Cheryl making a ramp out of rock and wood to drive up the last stretch of the hill. We'd come a long way and were pleased to know that none of the men had any better suggestions for getting out! We were happy to have more person-power though and to have a good cheer and laugh with all of them when we got out!

no photo available...use your imagination!

E226550
Upper Lens Creek at Lens Main West

Access: 0.8km N of junction at Lens Main W and Fleet ML
17.6km NE of junction at Lens ML and Harris Creek ML on Lens Main W
Hike down rocks on NE side of bridge
N48°41'40.18" W124°07'55.33"

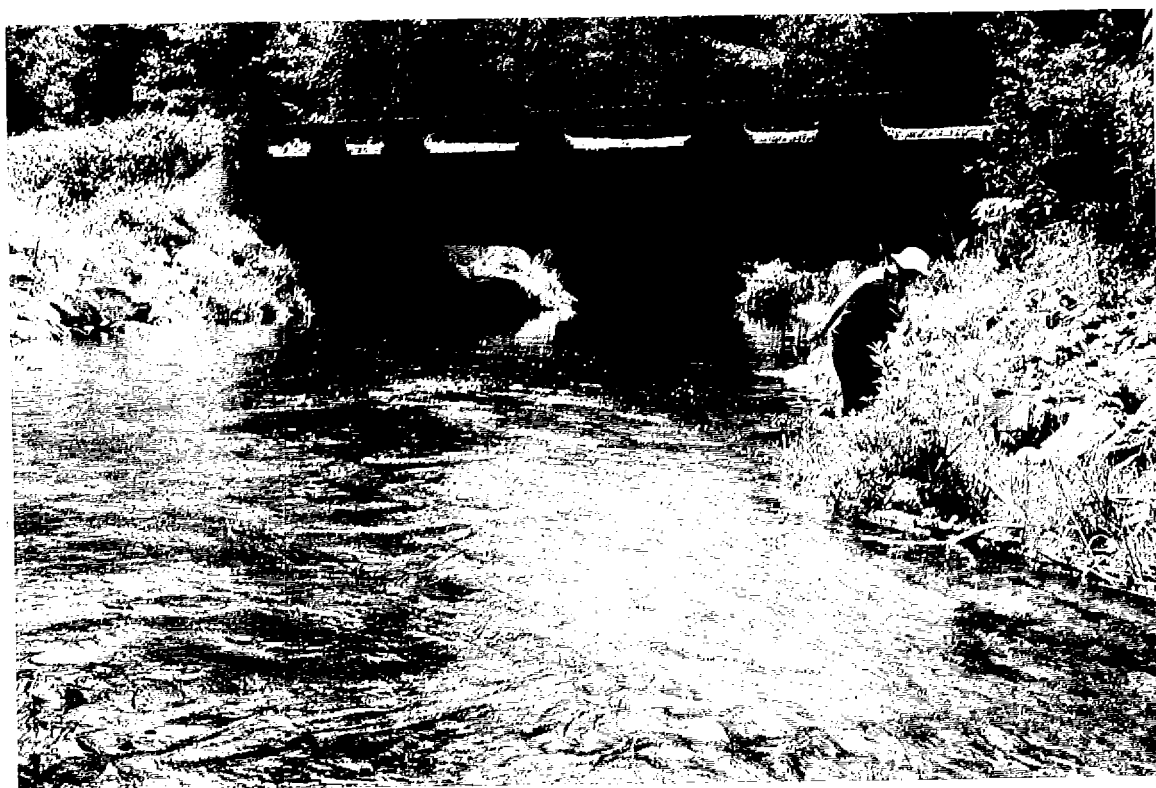
Sample Site: ~8m u/s of bridge

Site Photos: July 14, 1997

- 1) From bridge looking u/s: Barbara just flagged the site
- 2) D/s: bridge; Barbara at base of access point



*Notice that grin...
Barbara in water + sunshine = one really happy camper!
(I mean employee...)*



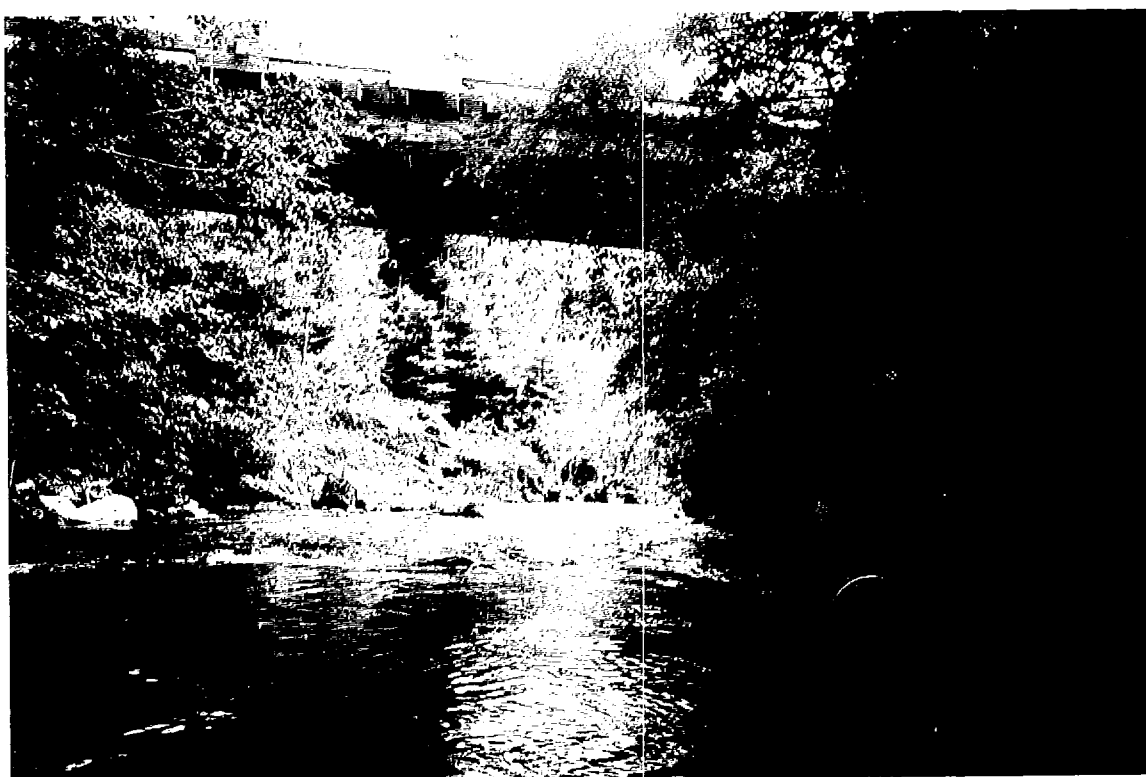
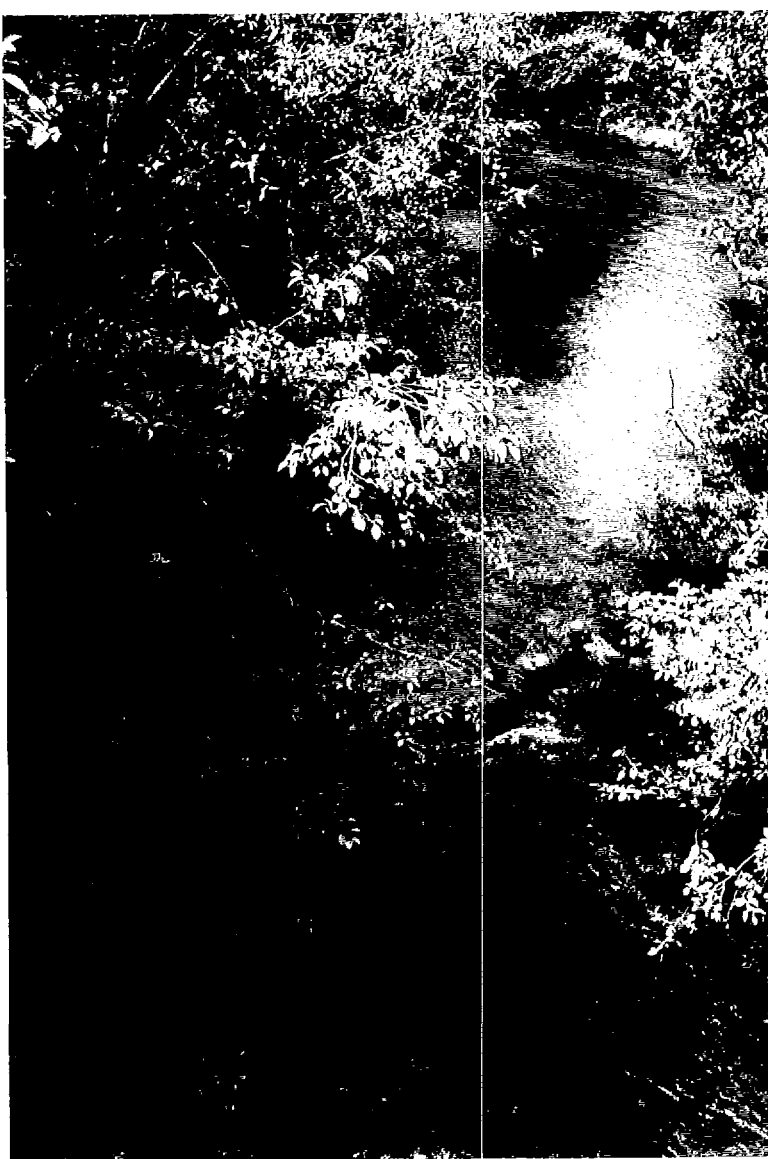
E226551
Upper Lens Creek at Lens Main West & TR8

Access: 14.8km NE of junction at Lens ML and Harris Creek ML on Lens Main W
7.9km NE of E226552
2.8km SW of E226550
Hike down runoff ditch on SW side of bridge
N48°40'15.86" W124°08'18.80"

Sample Site: ~8m u/s of bridge

Site Photos: July 14, 1997

- 1) From bridge looking u/s: grassy outjut into creek u/s of sample site (visible from the road);
Barbara at site
- 2) D/s: bridge; Barbara by sampling equipment on right



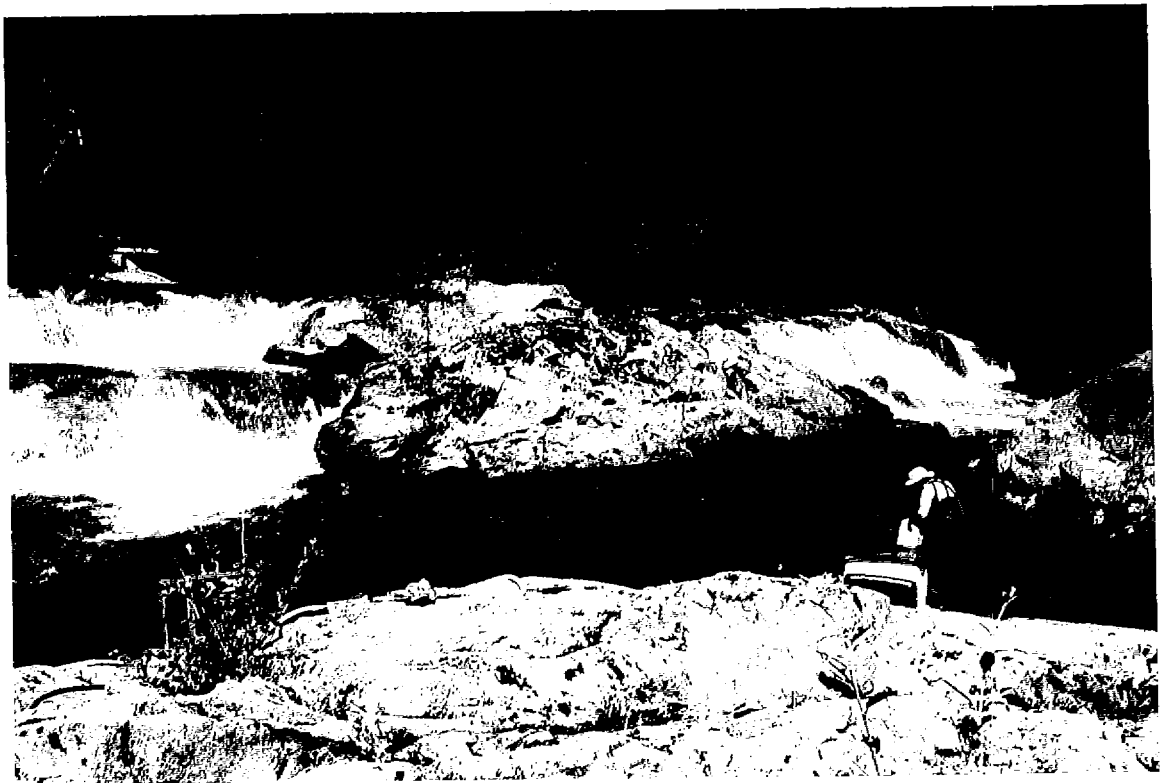
E226552
Lens Creek at Lens ML & Modeste Main

Access: 6.9km NE of junction at Lens ML and Harris Creek ML on Lens ML
8.7km NE of E226553
7.9km SW of E226551
Hike down rock path on NW side of bridge
N48°38'18.63" W124°10'28.51"

Sample Site: ~75m u/s of bridge at base of two waterfalls

Site Photos: July 14, 1997

- 1) From W side of bridge looking u/s: Cheryl on boulder lowering g/c hose into water
- 2) U/s: Barbara collecting water samples



You've just gotta love this job!
The scenery, the fish, the swimming holes...(we're still waiting for this site to warm up a bit!)

E226553
Lens Creek at Lens ML & Harris Creek ML

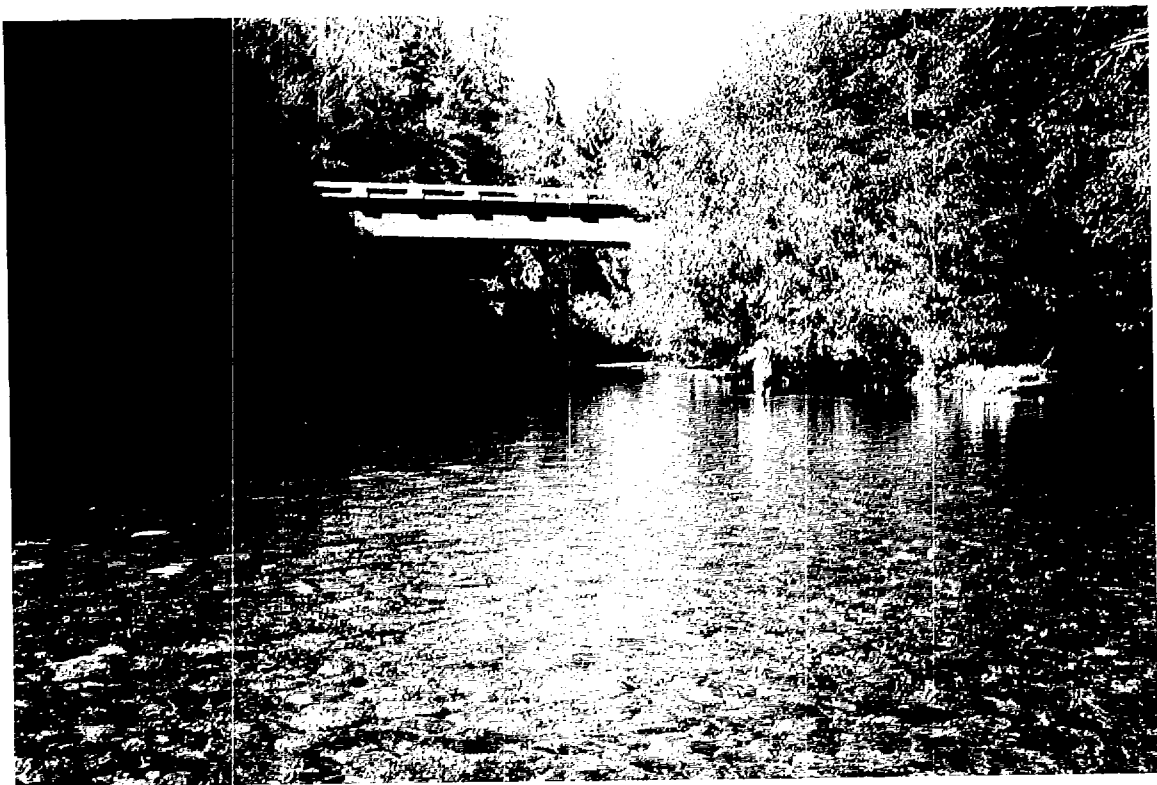
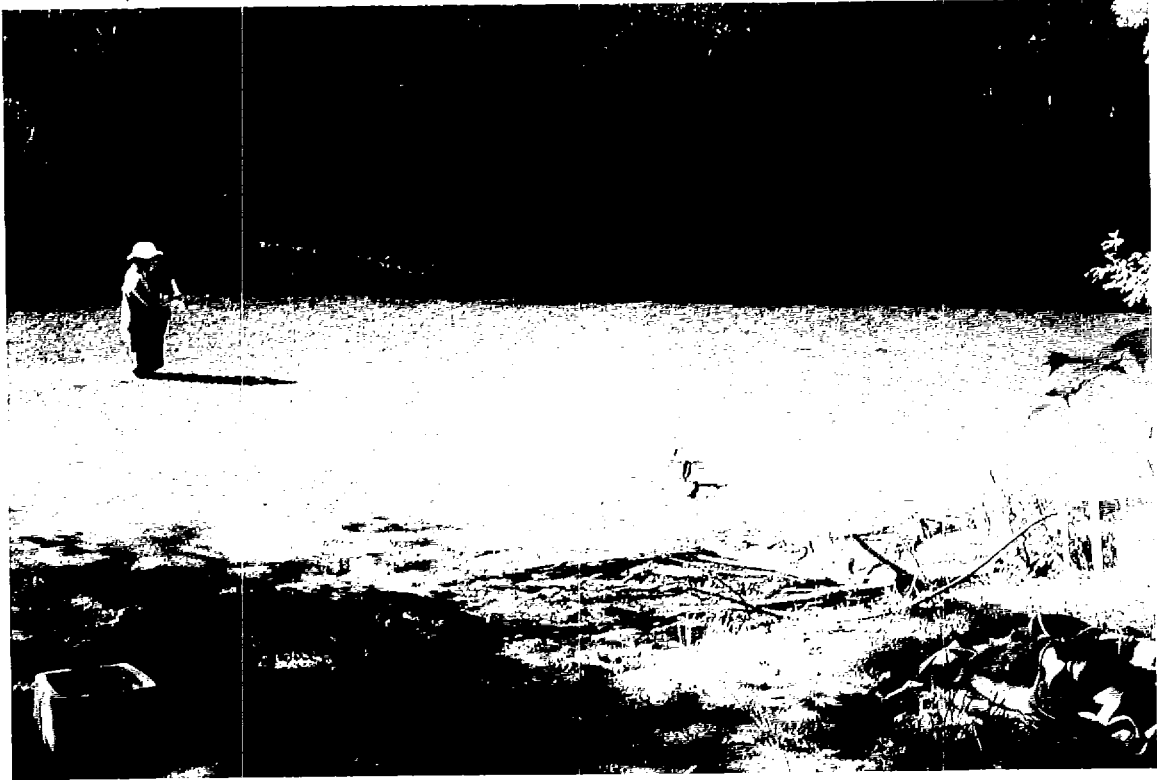
Access: 12.6km NE of junction at Gordon River ML and Harris Creek ML
2.5km NE of E226549
1.8km SW of junction at Lens ML and Harris Creek ML
8.7km SW of E226552
Drive down Lens Creek trail; right at first campsite
Walk down old road path to Lens Creek
N48°35'51.63" W124°13'59.94"

Sample Site: ~100m d/s of bridge
No access u/s of bridge

Site Photos: July 14, 1997

- 1) From bridge looking d/s: sample location in opening between two groups of red alder on left
- 2) Across Lens Creek: Barbara collecting DOC sample
- 3) U/s: bridge; site access by equipment on right





E226554
San Juan River at San Juan Bridge Campsite

Access: 2.1km SE of junction at Harris Creek ML, Lens ML and Shawnigan ML (a.k.a. Bear Creek ML) on Shawnigan ML
9.2kmNW of E226556
Campground on S side of bridge
Park in second campsite
Walk down path to river
N48°35'17.86" W124°11'11.90"

Sample Site: ~125m u/s of bridge
~50m u/s and across river from red triangle nailed onto a red alder tree
Across from swimming rope (hangs from tree)

Site Photos: August 19, 1997

- 1) U/s: rock bar and large Douglas-fir
- 2) D/s: bridge; red triangle on red alder tree on right



E226556

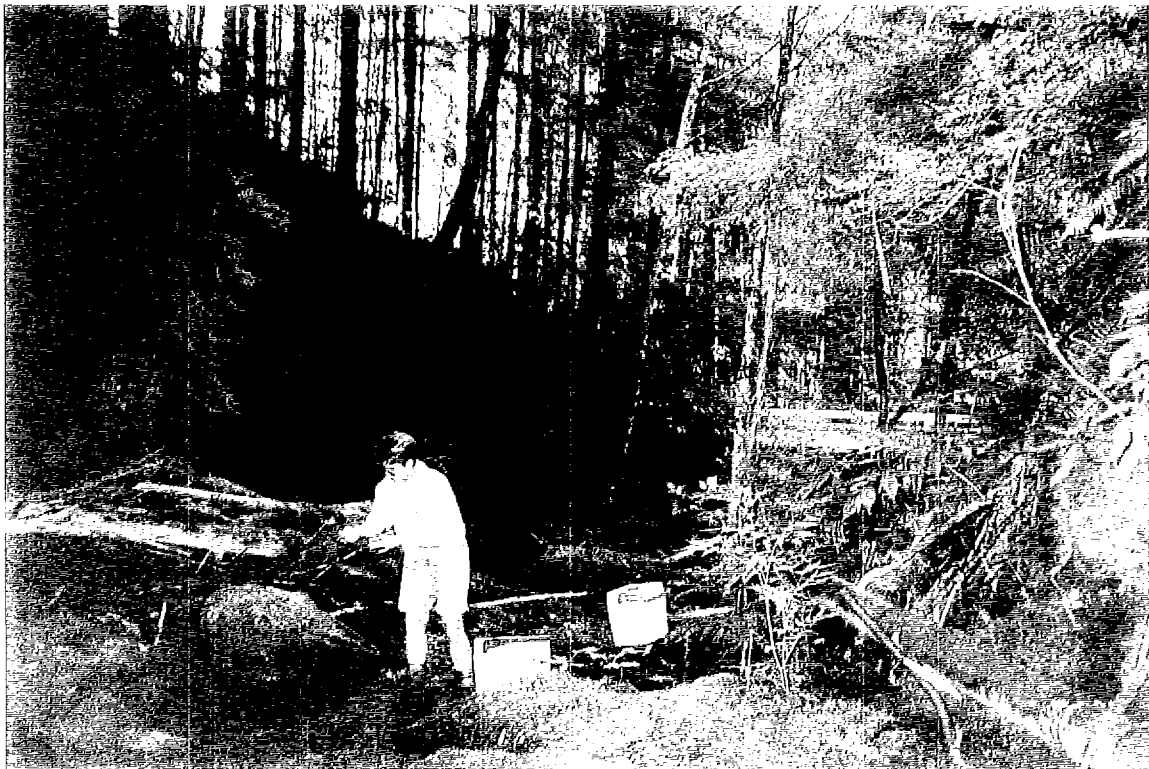
Garbage Creek at Shawnigan ML

Access: 11.3km SE of junction at Harris Creek ML, Lens ML and Shawnigan ML on
Shawnigan ML
9.2km SE of E226554
Walk behind gray gauging station (metal shed)
N48°34'45" W124°06'09"

Sample Site: ~85m d/s of man-made weir
~50m u/s of bridge with yellow rails

Site Photos: August 19, 1997

- 1) U/s: Cheryl taking site notes; log across stream
- 2) D/s: yellow bridge in background; Cheryl collecting water samples



*This is Barbara's description of how she felt after driving down Shawnigan ML.
"Whoooo...I feel like I just came out of the ring cycle on a washing machine."*

I totally agreed with her. When you and your partner both comment on making dentist appointments at the same time, you know the road is beyond 'rough'...

E226560
San Juan River Upstream Williams Creek

Access: 20.1km SE of junction at Lens ML and Fleet ML on Fleet ML
10.1km SE of E226561
Slide (I mean hike?) down NE side of bridge
N48°35'24.60" W123°59'53.32"

Sample Site: ~25m u/s of bridge

Site Photos: August 19, 1997

- 1) From center bridge looking u/s: huge boulder u/s on left; red alder covered in moss near site on right; Cheryl heading for shore after collecting water samples
- 2) D/s: bridge; Cheryl measuring DO



E226561
Fleet River at Fleet ML

Access: 10.0km SE of junction at Lens ML and Fleet ML on Fleet ML
10.1km NW of E226560
Large bridge just S of junction at Fleet ML and Maid Lake ML
Hike down boulders NW side bridge - steep
N48°38'02.09" W124°03'45.49"

Sample Site: ~20m u/s of bridge

Site Photos: August 19, 1997

- 1) From bridge looking u/s: Barbara at g/c apparatus
- 2) D/s: access on right down boulders in front of bridge; Cheryl collecting DOC sample



Maybe we should make a movie of this whole experience!

This document would be incomplete without the following sites...

Accommodation

E226591

Nitinat Fish Hatchery

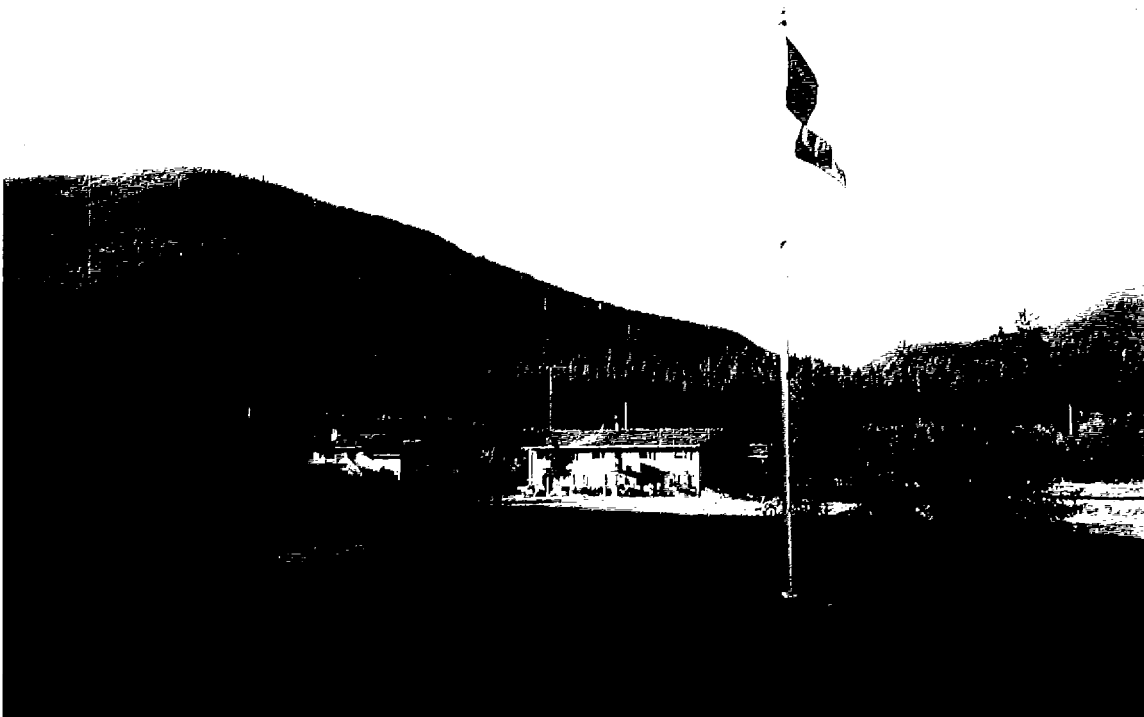
Access: Nitinat ML

Turn left at Nitinat River Hatchery sign

Sample Site: Tap water in coffee room in office
Sampled well #4.

Site Photo:

- 1) The managers residence is on the left. The main residence, on the right, is equipped with every kitchen appliance one would want; a mini grocery store; huge, comfy sofa's; a big screen television, vcr and satellite dish; games from pool to shuffleboard; bunks for the guys; an ensuite for the women; etc. etc. etc. You name it - they've got it!



Home away from home...

The luxuries of returning 'home' each night to an excellent hot meal, entertaining company, a warm place to sleep, and the serenity of the outdoors. I mean - where else do you wake up at 4am to a beautiful orchestra of birds singing as the sun rises?

Gallager's Fish Camp Port Renfrew

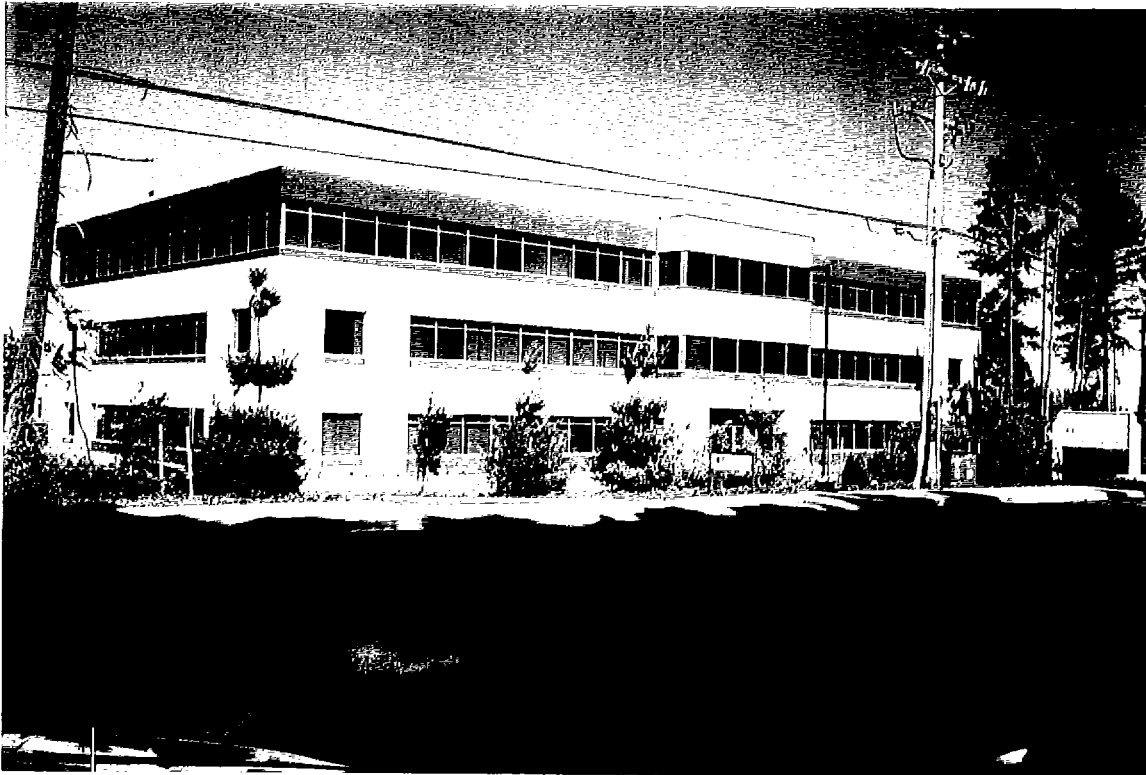
Photo:

Our cabin 'home' overlooking the San Juan River is on the left and the manager's residence is on the right.



*Wow! - what a magical place...
service with a smile, a camp fire, free crab, great conversation,
freezer space...a place to hang wet rain gear, sounds of the ocean near...*

the Office...



Ministry of Environment, Lands and Parks
2080-A Labieux Road
Nanaimo, British Columbia
V9T 6J9

Yes, we did actually spend approximately 25% of our time in this building.



*The West Island Limnological Duo Water Inventory Monitoring Investigation Network's office.
Incuse you haven't figured that out - it stands for WILD WIMIN!
Imagine that - our supervisors gave us this label before we started field work...*

Barbara..."coffee-please...need more coffee"... (I had to put that in somewhere Barbara!)



This is the water prep room (my hideaway). Approximately half of our office time was spent here preparing for the next trip. The mountain bikes... lets just say this was our way of saying 'thanks' to the people at the Nitinat Hatchery for everything they did for us...