# VOLUME 1

# 1998 STREAM INVENTORY REPORT

# GOSNELL CREEK WATERSHED

## WATERSHED CODE: 460-600600-50800-00500

**Prepared by**

**DAVID BUSTARD AND ASSOCIATES LTD.**

**for**

**NORTHWOOD INC.**
**(Funded by Forest Renewal BC)**

**March 1999**

## Project Reference Information

| | |
|---|---|
| MELP Project Number | NOR-C087-001-1999 |
| FRBC Project Number | HRFRBC #15 |
| FDIS Project Number | 06-MORR-0002-0001-1998 |
| FRBC Region | Skeena-Bulkley |
| MELP Region | 6-Skeena |
| MELP District | Morice |
| FW Management Unit | 6-9 |
| Fisheries Planning Unit | North Coast Division |
| DFO Sub-District | Smithers |
| Forest Region | Prince Rupert |
| Forest District | Morice |
| Forest Licensee and Tenure # | Northwood Inc. Tenure FL #16824 |
| First Nations Claim Area | Gitksan, Wet'Suwet'En |

Watershed Information

| | |
|---|---|
| Watershed Group | MORR |
| Watershed Name | Gosnell Creek |
| Watershed Code | 460-600600-50800-00500 |
| UTM at Mouth | 9 607833.4 6007835.5 |
| Watershed Area | 685 $km^2$ |
| Total of All Stream Lengths | 400 km |
| Stream Order | 6 |
| NTS Maps | 93L03; 93L04; 93L05; 93L06 |
| Trim Maps | 93L022; 93L023; 93L024; 93L002; 93L012; 93L013 |
| BEC Zone | ESSFk |
| Air Photos | BC83046:245-260; 120-130; 150-155 |

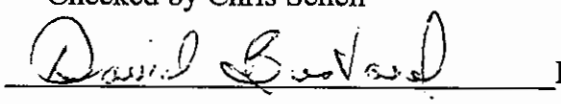
BCB 91181: 43-51; BCB 91180: 1-18; 137-153; 154-162; BCB 91179: 7-28; 86-103; 219-236; BCB 91178: 60-80; 94-113; 231-248 BCB91113: 101-122; BC891112: 118-120; 247-258 BCC96063: 1-16 BCC96049: 157-173 BCC 96050; 43-62; 73-92; 187-203 BCC 96071: 82-97 BCC96123: 189-200 BCC 96138: 11-25; 209-218 BCC 96156: 82-89

Sample Summary Information

| | |
|---|---|
| Total Number of Reaches | 567 |
| Random Sampling Sites | 114 (not used - intensive inventory ) |
| Discretionary Sample Sites | 257 |
| Total Sample Sites | 302 |
| Field Sampling Dates | Aug 8 to Oct 21/98 |
| Fish Species in Watershed | BT, CAS, CH, CO, CT, DV, LKC, LNC, LSU, MW, PK, PL, RB, SST |

**Contractor Information**

| | |
|---|---|
| Project Manager: | David Bustard R.P.Bio<br>Box 2792, Smithers, BC V0J 2N0<br>250-847-2963 |
| Field Crew: | Rob Dams; Kate Portman; Dean Allen; Graham Maclean; Ian Bergsma; David Bustard |
| Data Entry by: | Kate Portman |
| Report Prepared by: | Dave Bustard |
| Report Edited by: | Rob Dams; Kate Portman |
| Maps Prepared by: | Rob Dams |
| GIS Services: | Western GIS Services<br>Carl; Nancy Elliott; John Rustad<br>#310-1370 Seventh Ave.,<br>Prince George, BC V2L 3P1<br>250-564-9191 |
| Aging sample analysis: | |
| Fin Rays: | North-South Consultants<br>1475 Chevrier Blvd.,<br>Winnipeg, Manitoba, Canada R3T 1Y7<br>204-284-3366 |
| Scales: | David Bustard RPBio |
| Genetic Samples: | Forwarded to MELP, Victoria<br>Susan Pollard |
| Voucher Species ID by: | Rob Dams<br>Checked by Chris Schell |

CONTRACTOR SIGNATURE:  RPBio

## PROVINCIAL DISCLAIMER

*"This product has been accepted as being in accordance with approved standards within the limits of the Ministry quality assurance procedures. Users are cautioned that interpreted information on this product developed for the purposes of the Forest Practices Code Act and Regulations, for example stream classifications, is subject to review by a statutory decision maker for the purposes of determining whether or not to approve an operational plan."*

# ACKNOWLEDGMENTS

Funding for this project was provided by the Operational Inventory Program of Forest Renewal BC with Northwood Inc. as the project proponent. The overall inventory program was coordinated by John Brockley of Northwood Inc. Paul Giroux of the Ministry of Environment, Lands and Parks was the project monitor. The field studies were conducted under the capable supervision of Rob Dams. Field surveys were conducted by Kate Portman, Graham Maclean, Ian Bergsma , Dave Bustard and Dean Allen. Kate Portman and Rob Dams were responsible for all data compilation and draft map preparations. Western Geographic Information Systems Inc. was responsible for GIS digital mapping. The quality assurance (QA) review was conducted by Chris Schell.

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# LIST OF ATTACHMENTS

The following information/files/maps are available at the MELP office in Smithers:

- Original field cards
- Digital and hard copies of Fisheries Project and Fisheries Interpretive maps
- Associated photo CD's (6 discs)
- Photo documentation binder including photo thumbnails and negatives
- Digital copy of field data and post-field sample analysis results entered into FDIS v6.5; file name: fdisdat.mdb
- Digital copy of watershed report
- Updated FISS maps and summaries have been sent to MELP Victoria

# 1.0 INTRODUCTION

An aquatic inventory was conducted in the Gosnell Creek Watershed located in the Morice Forest District during the summer and fall of 1998. Recent fisheries inventory studies in the adjacent Thautil River suggested that Gosnell may have both bull trout (*Salvelinus confluentus*) and Dolly Varden (*Salvelinus malma*) present (Bustard 1997b). As well there is considerable concern for the status of Bulkley River coho salmon (*Oncorhynchus kisutch*) stocks. Gosnell Creek is also a significant producer of summer steelhead trout (*Oncorhynchus mykiss*). Extensive forest harvesting is scheduled for the Gosnell during the next decade.

With this as background, the Gosnell was identified by staff from the Ministry of Environment, Lands and Parks (MELP) as a watershed that should receive a more intensive landscape-based inventory that goes beyond the reconnaissance level inventory identified in *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures* (Resource Inventory Committee 1998). A more complete delineation of fish distribution and some abundance estimates, particularly in the bull trout and coho sections of the watershed were identified as an appropriate level of inventory for this watershed.

This report presents an overview of the key results of the fish and habitat sampling program including fish distribution, abundance, life history information and a comparison to historical data where available. As well, it identifies key habitats and patterns of fish use by those fish species using Gosnell Creek. The detailed design and project planning information (Phases 1-3) for the Gosnell is presented in Bustard (1998a).

Detailed results for each tributary are included in digital format (FDIS v6.5) and in hardcopy (Volume 2 Parts A and B) with the locations for all sites shown on 1:20,000 maps accompanying the report. Photodocumentation information including negatives and digital CD format photos have been submitted to MELP (two copies) and Northwood Inc. (one copy). A photodocumentation summary is presented as Appendix 10 of this report.

## 1.1 STUDY OBJECTIVES

The specific objectives of the program were as follows:

- To delineate the distribution of fish and fish habitat throughout the watershed[1] at a scale of 1:20,000 to allow for the identification and classification of fish-bearing streams under the Forest Practices Code (FPC)[2].

- Compile fish and habitat data summaries, report and mapping as outlined in the in *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures* (Resource Inventory Committee 1998).

- To identify key habitat features/sites requiring special management attention during the watershed inventory.

- To determine bull trout distributions within the watershed and identify critical bull trout habitats (spawning, rearing, staging areas).

- To provide FPC riparian classification for stream reaches sampled during the watershed inventory at a scale of 1:20,000.

A major emphasis of the study was to provide a broad-based aquatic inventory at an operational and landscape level to facilitate planning for forest development that minimizes impacts on important aquatic resources of the area. A high emphasis was placed on describing accurately the distribution of fish within the watershed. This resulted in a greater frequency of site sampling within the watershed and included more intensive inventory in key stream sections using ground surveys and establishing fish index sites to delineate critical habitats and to allow for comparisons to past studies in the watershed.

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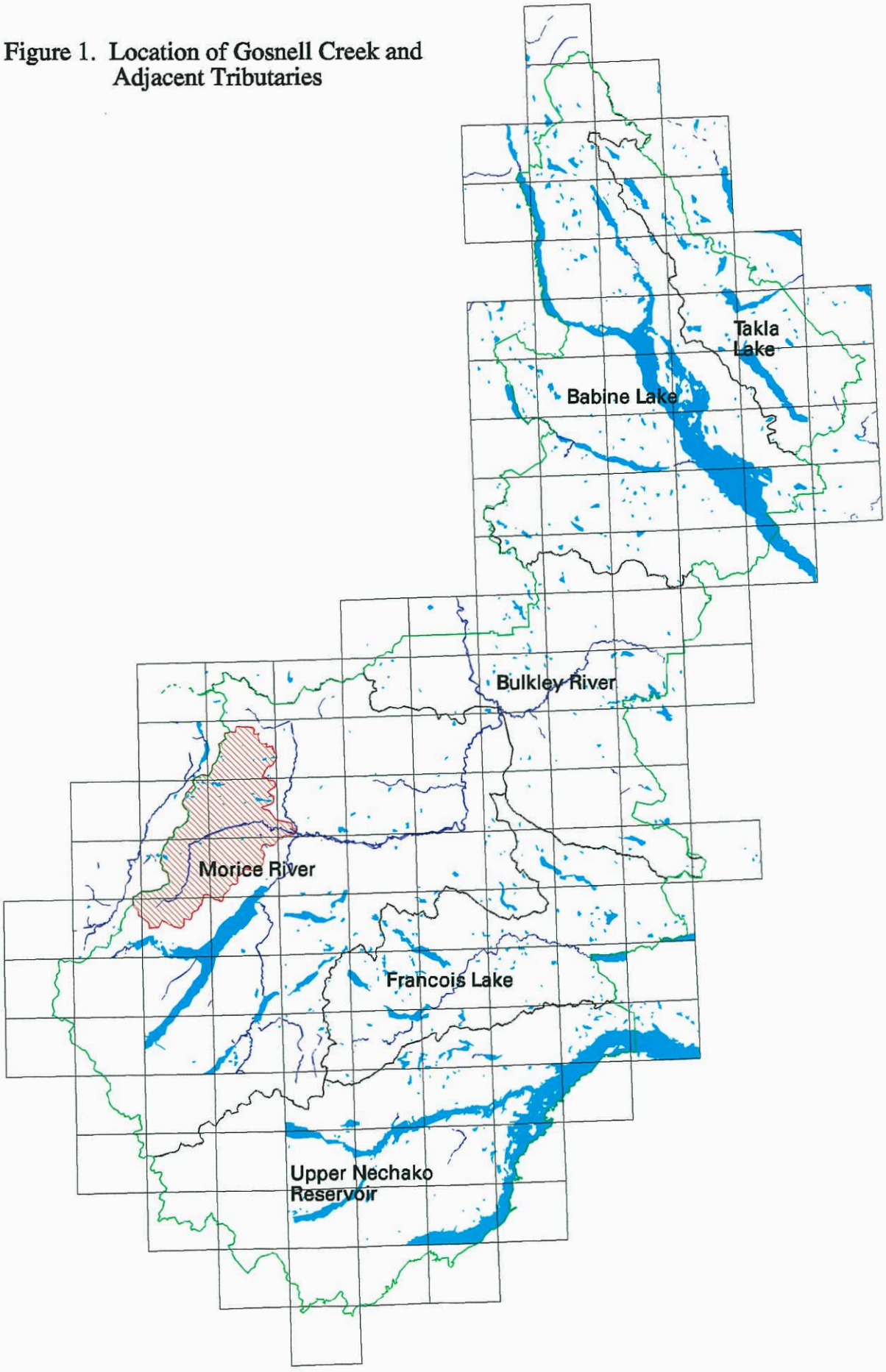
[1] This Gosnell inventory does not include the upper portion of the Shea Creek Watershed (i.e., that portion of the watershed located upstream from an impassable falls located below Shea Lake. The falls represent the upper extent of anadromous fish access in this watershed, and only resident fish species are present upstream from the falls. A reconnaissance level stream inventory was undertaken in the upper Shea Creek Watershed in 1997 by Triton Environmental Consultants Ltd.

[2] Lake surveys were specifically excluded in this contract. The main lake in the study (Julian Holland) was surveyed in 1996 (Degisi and Schell 1997).

Figure 1. Location of Gosnell Creek and Adjacent Tributaries



### 1.2 PROJECT LOCATION

Gosnell Creek is located in the Morice Watershed which is situated in the north-central interior of British Columbia approximately 50 km west of Houston by logging road (Figure 1). The upper sections of the Gosnell Watershed are located approximately 75 km southwest of Smithers.

The lower sections of the study including lower Shea and Crystal creeks are reached by logging road from Houston. Access is via the Morice Forest Road to Lamprey Creek (43 km) and then onto the Morice West Road for approximately 18 km. This road crosses the Morice River and leads directly into the Gosnell Watershed. Mainline forestry roads have been developed into the lower 20 km of the Gosnell on both sides of Gosnell Creek. There are no roads in the upper half of the watershed.

## 2.0 RESOURCE INFORMATION

### 2.1 STUDY AREA DESCRIPTION

The headwaters of Gosnell Creek are located in the Hazelton Mountains of the Bulkley Range. Steeper mountains ranging from 1800 to 2100 m on the south and west portions of the watershed include Nanika Mountain, Mount Loring and Corona Peak. Herd Dome is the dominant landscape feature on the more gentle north side slopes of the watershed.

Gosnell Creek flows in a northeast direction through a U-shaped valley for approximately 40 km to join the Morice River 13 km downstream from Morice Lake. The main valley is characterized by a wide floodplain with extensive wetlands, particularly in the mid and lower reaches of the watershed. The forested sections of the watershed lie in the Engleman Spruce Subalpine Fir (ESSFk) biogeoclimatic zone.

Significant tributaries include Crystal Creek, a high gradient glacial system entering the lower south side of Gosnell Creek, and Shea Creek, a lower gradient lake-headed tributary on the north side entering Gosnell Creek approximately 10 km upstream from the Morice confluence. As well, many smaller tributaries enter directly into the mainstem along the length of the system.

Although there is not a stream gauging station on Gosnell Creek, some streamflow and water temperature information is available from data collected at the Gosnell/Thautil confluence with the Morice during the Kemano Completion Studies (Envirocon 1984). Discharge normally peaks during the late May and early June snowmelt freshet, with a second high occurring during some years associated with fall rains in October and November. Streamflows remain relatively high through until the mid-summer period due to high elevation snowmelt. Lowest flows in the Gosnell occur during the late winter.

Many of the smaller, low elevation tributaries also experience low flows and channel dewatering during the late summer.
High elevation snowmelt in the upper watershed helps to keep mainstem Gosnell Creek water temperatures below 15° C year-round, with temperatures exceeding 10° C during the period July through early September (Envirocon 1984).

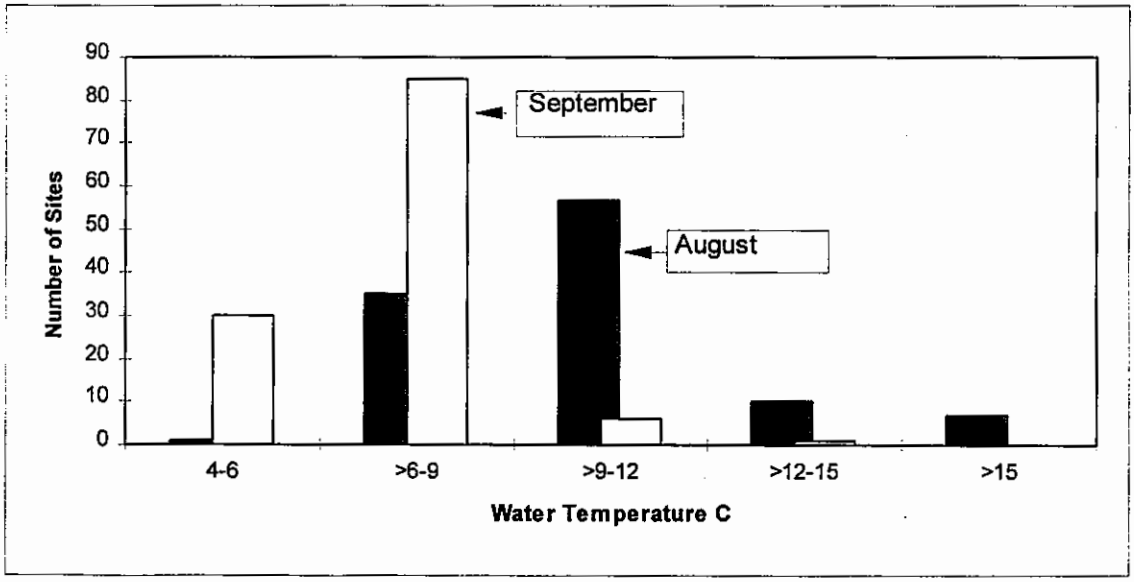
Water temperatures in some of the steeper headwater tributaries probably do not exceed 10° C, while temperatures in some of the wetland ponds and small outlet creeks can exceed 20° C (Table 1) during hot dry periods in the late summer.

**Table 1. Mean and Range of Spot Water Temperatures in Gosnell Watershed During August and September 1998.**

| | Aug | Sept |
|---|---|---|
| Sample Size | 110 | 121 |
| Mean Temperature °C | 10.9 | 7.2 |
| Range of Temperatures °C | 6.0-23.5 | 4.0-12.5 |

Figure 2 shows a summary of water temperatures taken during the August and September field studies and indicates that during the August surveys, most tributaries are in the 6-12° C range. Water temperatures remain below 5° C throughout most of the watershed from late October to late May.

**Figure 2. Water Temperature Summary for Sample Sites in the Gosnell Watershed During August and September 1998.**



## 2.2 LAND-USE ACTIVITIES

Forestry is the main land-use activity in the Gosnell Watershed. Mainline logging roads have been extended approximately 20 km up both sides of the Gosnell, and forest harvesting activity has been active off these two road for the past 15 years. Extensive logging is planned in the watershed during the next decade. There is no road access to the upper reaches of the watershed.

Other activities in the watershed include hunting and trapping. The Gosnell Watershed has significant populations of moose, black and grizzly bears, and wolves, as well as mountain goats on the surrounding mountains. Caribou have historically used the Herd Dome area. More detailed information outlining the wildlife resources of the watershed is presented in the Gosnell Resource Plan[3].

## 2.3 BACKGROUND FISHERIES STUDIES

A number of fisheries studies have been conducted in Gosnell Creek for the past 50 years. DFO has conducted limited aerial salmon spawning observations in the Gosnell beginning in 1949 (Hancock et al. 1983; Stream Information Summaries, data on file, MELP, Smithers), identifying this system as a significant coho salmon producer. Spawner counts were initiated in 1955, and because of poor access into the watershed, counts relied on fixed-wing aircraft and some helicopter surveys. These techniques provide some distribution and relative abundance of salmon in the watershed.

More extensive inventory was undertaken in the watershed during the 1970's and early 1980's including studies by Shepard and Algard (1977), Carswell (1979), Hatlevik (1981), and Hazelwood (1981). As well, studies associated with the Kemano Completion Project added some additional fish distribution and abundance information for the Gosnell (Envirocon Ltd. 1984; Shepherd 1979). These surveys added information outlining other fish species present in the watershed and tended to rely more on juvenile fish sampling for species distribution an abundance. However, the Envirocon Ltd. (1984) studies also provided more detailed information on pink salmon and steelhead trout spawning in the watershed.

The Fish Habitat Improvement Section of MELP conducted a program of juvenile fish sampling at a small number of sites in the Gosnell and Shea creeks during the period 1980 to 1982 (Tredger 1981-83). As well, additional index sampling was conducted at these locations by Bustard (1992 and 1993) and Beere (1993); and as part of DFO's coho index site monitoring since 1995 (Taylor (1995, 1996 and 1998) and Bustard (1997)). Some adult coho surveys have also been conducted for DFO by Saimoto (1994 and 1997). Northwood Inc. has had a limited amount of stream inventory work conducted in

[3] Gosnell Resource Plan. Prepared by Northwood Inc. The wildlife information is based on surveys conducted during the period 1979 and 1980 in conjunction with MELP, Smithers.

the last several years, usually related to specific stream crossings associated with road building (Silvicon Services Inc. 1997; Triton Environmental Consultants Ltd. 1997).

A lake survey was conducted on West Julian Holland Lake by Degisi and Schell (1997).

Nearly all of the above studies tended to focus on the mainstem of Gosnell and Shea creeks. The studies indicate that Gosnell Creek is a significant producer of coho salmon, and to a lesser extent summer steelhead and cutthroat trout, pink salmon, and char. Small numbers of mountain whitefish, chinook salmon juveniles, longnose dace, prickly sculpins, lake chub and Pacific lamprey have been noted during some of the surveys.

A review of the historical fish information indicates that the distribution and abundance of fish using the smaller tributaries, as well as the delineation of fish use in the upper ends of the main tributaries and mainstem Gosnell is not well understood. Available fish distribution mapping to date has been at a large scale, mainly limited to a few mainstem sites, and is inadequate from a forest planning and operational basis.

As well, recent observations in adjacent watersheds and some juvenile sampling in Gosnell Creek itself (Bustard 1997a) suggests that both bull trout and Dolly Varden occur in the Gosnell. Nearly all past studies have not differentiated these two species. The extent of bull trout use in the Gosnell watershed (an identified wildlife species under the Forest Practices Code and a blue-listed species) is an important aspect of the 1998 studies.

# 3.0 METHODS

## 3.1 PLANNING

A detailed sampling strategy was developed for the Gosnell Watershed during the winter and spring of 1997/98 (Appendix 11 and Bustard 1998a). A total of 567 stream reaches were identified in the planning stage. If a standard reconnaissance level inventory was undertaken, then 114 sample sites would be undertaken in the Gosnell, representing 20% of the total reaches identified.

The more intensive inventory site selection methods developed for the Gosnell plan used air photo and operational maps to identify a maximum of 320 potential sample sites (Table 2). Most of these sites were in the potential fish-bearing reaches of tributaries in the Gosnell, but they also included at least 20 sites in steeper stream gradients (>13%)[4] . Based on field limitations (lack of road or ATV access and no helicopter landing site in vicinity), it was estimated that approximately 257 sites would be examined[5] (Table 2). In

[4] This is the maximum gradient utilized by fish in the adjacent Thautil Watershed.

[5] It was assumed that 20% of the originally identified sites would not be sampled, mainly due to poor access (e.g., no landing site nearby).

**Table 2. Summary of Number of Proposed Sample Sites in Planning Document Compared to the Actual Number Completed in the Field Studies.**

| Method of Access | Planning Document | | Field - Actual |
|---|---|---|---|
| | Number of Potential Sites | Best Estimate of Sites to be Sampled | Total Sites Completed in this Project |
| Road | 158 | 126 | 164 |
| Helicopter (including optional & habitat sites during ground surveys) | 162 | 131 | 137 |
| Total number of sites | 320 | 257 | 302 |

total, 302 sites were examined during the field studies. The revised reach planning summaries prepared after the field studies are included in Appendix 11.

## 3.2 TIMING AND LOGISTICS

All of the field studies were undertaken between August 8 and October 2, 1998[6]. Streamflows in Gosnell Creek remained low during the August and September field surveys, allowing for excellent visibility and good sampling conditions.

The two field crews of two were based out of Houston and drove or flew out to the study area on a daily basis.

The inventory relied on a combination of vehicle and helicopter access. A total of 47 hours of helicopter time was used during the field studies[7]. Considerable time was saved during the studies by coordinating the helicopter use with other forestry contractors and Northwood Inc. staff undertaking planning and operational activities in the watershed.

In total, 302 sites were completed during the field studies representing 53% of the total number of reaches identified during the planning phase. This included 165 sites accessible from roads by vehicle or ATV, and 137 sites that used helicopter access (Table 2). Of this total, fish sampling was conducted at 216 sites. The remaining 85 sites were

[6] The exception to this was a ground/snorkel survey of the mainstem Gosnell above the main falls to determine whether coho spawners were present in an area of previous redd observations. This survey was conducted on October 21 following a small freshet.

[7] Westland Helicopters was used for most of the project.

not sampled due to dry or steep channels (typically >20% gradient), no visible channel, or poor access to the site[8]. Electrofishing was undertaken at 178 sites, minnow trapping at 37 sites (total 337 overnight sets) and angling (as the only method of sampling) at one site. Angling was also used as a second sampling method at several small lakes and ponds.

## 3.3 FISH AND HABITAT SAMPLING

Three levels of sampling were conducted during the program.

### 3.3.1 RIC Standard Site and Fish Samples

Standard fish sampling and habitat assessments were conducted according to RIC standard methods[9]. This sampling was undertaken at most of the 302 sample sites examined during the studies. Site cards (but not fish cards) only were completed at those sites that were either dry, too steep (15-20% and greater range depending upon channel size) or otherwise unsuitable for fish sampling.

This sampling included:

- Collect full site description data at each reach sample site and record on FDIS (v6.5) Site form. It should be noted that a single photo was taken in the upstream direction at each site. Additional photos showing significant habitat features were also taken.

- Conduct fish sampling at all suitable sites and record all fish collection and individual data on FDIS (v6.5) Individual Fish Data Forms.

- Collect and preserve genetic, voucher and aging structures for fish species (this is discussed in more detail in Section 3.3.4).

A major difference between the Gosnell field surveys and the RIC standards was that this study placed a major emphasis on delineating more accurately the distribution of fish species in the tributary streams compared to the RIC methods. In order to do this, stream sections upstream and downstream from the sample site were examined in an effort to determine where barriers and the upper extent of fish access occurred. This level of detail is particularly important to ensure that the forest industry, a major user of the information, is in compliance with the Forest Practices Code.

This format also meant that a considerable amount of habitat/distribution information was placed on the Site Form. Stream classification information, including the rationale for the classification was also included on the Site Form.

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[8] I.e., habitat observations made during ground surveys along key fisheries sections.

[9] *Reconnaissance (1;20,000) Fish and Fish Habitat Inventory: Standards and Procedures April 1998.*

Determining fish distribution typically involved walking stream sections associated with the sample sites, and measuring distances to the upper extent of potential use with a hip chain. Some transition zones were classified as suspected non fish-bearing when they increased sharply to the range of 20%. In a number of instances where ground access was poor, a helicopter was used to locate the upstream barrier. Stream reaches classified as non-fish bearing during helicopter flights only occurred when the stream gradient climbed sharply to >20%. Where the upper extent could not be determined in these manners, the upper extent of fish access was marked as suspected based on channel characteristics.

### 3.3.2 Detailed Ground Surveys

More detailed ground surveys were conducted on the main fish-producing sections of the mainstem Gosnell and larger tributaries including Shea, Crystal and one unnamed creek (Tributary 5730)[10]. These surveys provided site specific habitat information including the location of bull trout and coho adults and spawning redds as well as observations of newly-emerged fry. Careful attention was placed on locating specific redd sites (hip chain distance from a known location in conjunction with air photos) and in locating key features like debris jams, major slumps, and beaver dams.

The ground surveys also enabled the observers to examine the lower end of tributaries adjacent critical habitats in areas that were not accessible by ground or helicopter and to observe sidechannel and groundwater inflows. An electroshocker was normally carried by the crew to sample the lower ends of these tributaries.

A total of 62 km of stream channel were examined during the ground surveys (Table 3). One section of the mainstem Gosnell was re-examined in mid-October to verify whether or not coho spawners were utilizing this stream section (upstream from the mainstem falls).

### 3.3.3 Fish Index Sites

Index sites were established at 17 locations in the key fish-producing sections of Gosnell Creek and Crystal and Shea creeks as shown in Table 4. These sites were enclosed with stopnets and two-pass removal electroshocking was conducted to establish estimates of fish production on a $m^2$ basis. This allowed for comparison between reaches within the watershed for key species (bull trout, coho, steelhead and Dolly Varden). Information from some of these sites is also useful for comparison to past surveys conducted as part of the steelhead stock assessment for the Morice River tributaries.

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[10] In this report, tributaries that do not have a local name are referred to numerically based on their key (watershed code identifiers). ILP numbers increased from the lower end of Gosnell Creek upstream.

**Table 3. Summary of Ground Surveys for Important Reaches of the Mainstem Gosnell and Selected Tributaries.**

| System | Reach | Distance Examined (km) |
|---|---|---|
| Gosnell Mainstem[11] | 2 | 3.2 |
| | 3 | 6.1 |
| | 5 | 6.0 |
| | 7[12] | 7.2 |
| | 8 | 2.2 |
| | 9 | 2.4 |
| | Total | **27.1** |
| Crystal Creek | 1 | 4 |
| | 2 | 6.6 |
| | 3 | 3.5 |
| | 4 | 5.5 |
| | 5 | 0.3 |
| | Total | **19.9** |
| Shea Creek | 1 | 5.8 |
| | 2 | 4.6 |
| | Total | **10.4** |
| Tributary 5730 | 1 | 1.1 |
| | 2 | 3.8 |
| | Total | **4.9** |

Site and Individual Fish Forms were also completed at the index sites.

### 3.3.4 Detailed Fish Measurements

All fish sampled during the field surveys were separated by species and measured to the nearest mm fork length. Weights for biomass calculations were obtained from nearly all fish captured at the index sites.

Branchiostegal ray counts were conducted on char larger than 50 mm fork length, and these counts in conjunction with head shape were used to separate bull trout and Dolly

[11] Gosnell Reaches 1 and 5 were low gradient (lower spawning suitability) and Reach 6 was a canyon section.

[12] Examined twice - Sept 29-30th and again on Oct 21/98 (two snorkellers and one observer from bank).

**Table 4. Location and Number of Fish Index Sites in the Gosnell.**

| Sub-drainage[13] | Number of Sites | Key Fish Species |
|---|---|---|
| Gosnell - Lower reaches | 4 | Steelhead |
| Gosnell - Mid reaches | 3 | Steelhead, coho, bull trout |
| Gosnell - Upper reaches | 5 | Dolly Varden, bull trout |
| Shea Creek | 3 | Steelhead, coho, Dolly Varden |
| Crystal Creek | 2 | Steelhead, bull trout, Dolly Varden |

Varden juveniles in the field without sacrificing the specimens. Field crew leaders had at least three years experience separating the two species, and have had their identification checked with DNA analysis to confirm accuracy.

A total of 15 genetic samples were retained from each of the following fish species: Dolly Varden, bull trout, cutthroat trout. These samples were submitted to Susan Pollard, B.C. Ministry of Fisheries, Victoria.

Voucher specimens were collected of all fish species encountered in the Gosnell Watershed. A minimum of three examples of each species was retained and examined by the MELP contract monitor during the field program review.

Scales for age analyses were collected and mounted on microscope slides for reading. In total 114 scales from a range of size of juvenile fish were collected as follows: 38 steelhead; 33 cutthroat; 30 coho; 3 Dolly Varden; 2 bull trout; and 8 mountain whitefish. As well fin rays were collected from 26 Dolly Varden and 29 bull trout. These samples were sent to North/South Consultants in Winnipeg for aging of the fin structures.

### 3.3.5 Field Equipment

A detailed list of sample equipment used during the Gosnell Watershed Project is presented in Appendix 1 Table 1.

[13] Fish information from smaller Gosnell tributaries has been combined into three groupings: lower Gosnell includes all tributaries entering the lower 3 reaches of Gosnell Creek (Shea Creek downstream); mid Gosnell incudes all tributaries entering Reaches 4-6 (top of canyon - falls area); and upper Gosnell includes all tributaries entering Reaches 7-10 (upstream from the canyon/falls area).

# 4.0 RESULTS AND DISCUSSION

## 4.1 OVERVIEW OF FISH DISTRIBUTION AND ABUNDANCE

A total of 302 sites were examined for fish use in Gosnell Creek during the field surveys (Table 5). Fish were either sampled or assumed to be present at 163 of these sites[14]. No fish were present at 139 of the sites. A **Fish-Bearing Reach Summary** is presented in Appendix 2 Table 1. The **Non Fish-Bearing Reach Summary** is presented in Appendix 2 Table 2.

Dolly Varden were the most widely distributed fish species in the watershed, and were present at 132 of the sites. Cutthroat trout were present at 42 locations while steelhead juveniles were present at 26 sample sites and resident rainbow trout at one location[15]. Bull trout juveniles were present at 14 locations scattered throughout the watershed. Mountain whitefish and lake chub were present at 6 and 13 locations respectively, while prickly sculpins were captured at one sample site.

**Table 5. Summary of Number of Sites with Different Fish Species Present in the Gosnell Watershed.**

| Species | Number of Sites |
|---|---|
| Steelhead | 26 |
| Rainbow | 1 |
| Coho | 34 |
| Cutthroat | 42 |
| Dolly Varden | 132 |
| Bull trout | 14 |
| Mountain whitefish | 6 |
| Prickly sculpin | 1 |
| Lake chub | 13 |

[14] In some instances, fish sampling was not conducted but fish were assumed to be present based on presence upstream or direct access to stream sections with fish present.

[15] Resident rainbow trout and juvenile steelhead are visually very similar and difficult to distinguish. Steelhead adults are known to be present in the Gosnell, and we assume that most juvenile rainbow captured in the mainstem Gosnell and accessible tributaries are progeny of these steelhead. Some of these fish may be resident rainbow trout. The one definite resident rainbow trout site is located in the lake at the top end of Tributary 5730 (Site 245) upstream from a definite barrier to steelhead. We suspect the resident rainbow population entered this lake from the adjacent watershed (Burnie River).

### 4.1.1 Stream Gradient and Width Characteristics

Figure 3 indicates that 66% of the stream channels examined in the Gosnell Watershed with gradients less than 2% had fish present, while just over 50% of the sites examined with slopes less than 8% were utilized by fish. Frequency of fish presence dropped to between 30 and 40% at sites ranging from 8-15%. No fish were present at the 21 sites examined where slopes exceeded 15%. A more detailed breakdown is provided in Appendix 2 Table 3.

The individual site summaries for fish-bearing and non fish-bearing reaches are presented in Appendix 2 Tables 1 and 2. Many of the lower gradient sites that did not have fish present were either dry during the late summer field season (42 sites), or had barriers located at downstream locations.

**Figure 3. Summary of Gosnell Watershed Fish Sample Sites by Gradient.**

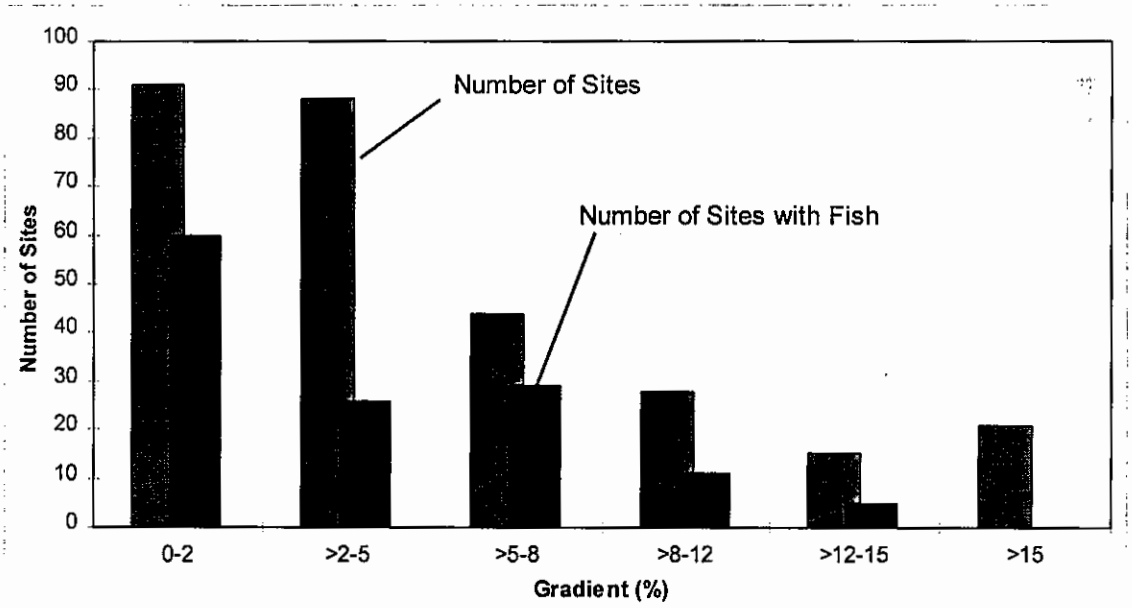



Figure 4 shows the breakdown of fish presence at sites based on channel widths. The summary indicates that 65% of the sites where the stream channel is less than 1.5 m did not have fish present. However some channels as narrow as 0.3 m did have fish present (Appendix 2 Table 1). As channel width increased, the likelihood of fish being present also increased. Approximately 73% of the sites with channel widths greater than 5 m had fish present in the Gosnell Watershed.

**Figure 4. Summary of Gosnell Watershed Sample Sites by Channel Width.**

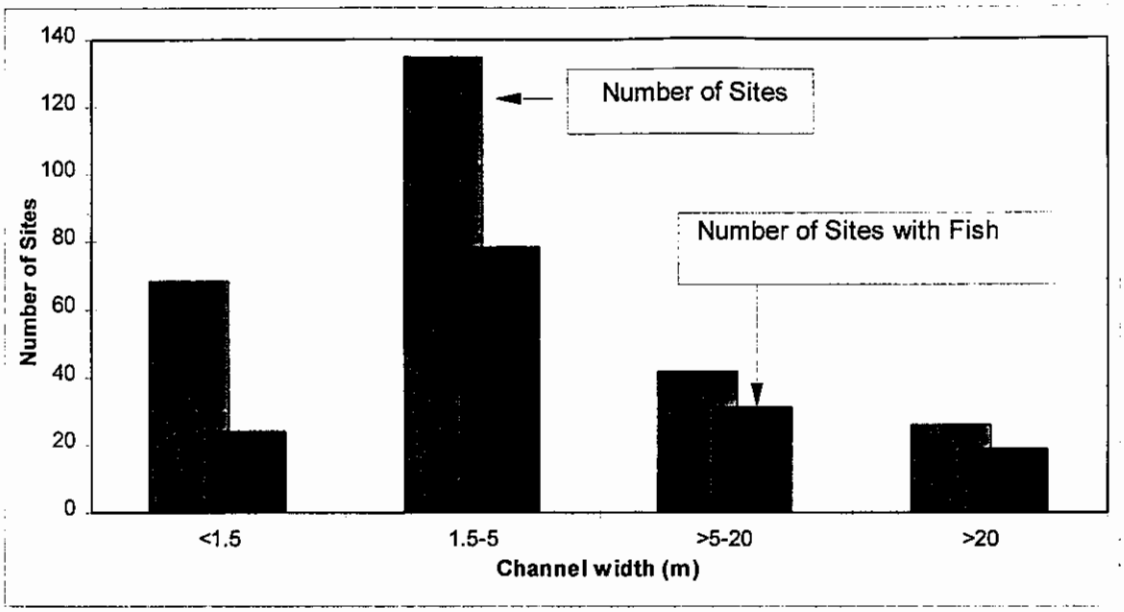



Table 6 summarizes some of the habitat characteristics of sites in the Gosnell Watershed utilized by the five principal fish species present in 1998. The 26 locations utilized by steelhead in the Gosnell Watershed ranged from 1-8% slope and tended to be in the larger channels (average width of 20.5 m). The smallest channel width was 1.5 m.

Coho salmon were found at sites ranging from 0-8% and had the lowest average slope for all species. There was a wide range in channel widths for the 34 locations utilized by coho in the Gosnell with the smallest channel 1.3 m wide.

Cutthroat trout utilized similar gradients to coho, but tended to be found in smaller channels down to less than 1 m wide with an average width of 3.6 m for the 42 locations that had cutthroat trout present.

Dolly Varden were the most widely dispersed fish species in the watershed. They were found at sites ranging from 0 to 15% slope, with an average slope of 4%. Dolly Varden were found in the smallest channels (0.3 m) but were also present in fan areas up to 95 m wide.

Bull trout had a more limited distribution in the watershed. They occupied stream sections with similar slopes to those utilized by Dolly Varden, but tended to be found in larger channels with a mean width of 16 m. The smallest channel utilized by bull trout was 1.3 m wide.

**Table 6. Summary of Channel Characteristics for the Five Principal Fish Species Sampled in the Gosnell Watershed.**

| SPECIES | Slope (%) | | Channel Width (m) | | N |
|---|---|---|---|---|---|
| | Range | Mean | Range | Mean | |
| **Steelhead** | 1.0-8.3 | 3.2 | 1.5-55.0 | 20.5 | 26 |
| **Coho** | 0-8.0 | 2.4 | 1.3-43.5 | 12.0 | 34 |
| **Cutthroat** | 0-8.0 | 2.8 | 0.8-19.8 | 3.6 | 42 |
| **Dolly Varden** | 0-14.7 | 4.2 | 0.3-95.0 | 9.6 | 131 |
| **Bull Trout** | 1-14.5 | 4.1 | 1.3-48.2 | 16.3 | 14 |

### 4.1.2 Overall Species Composition

Of the total 2414 fish captured at the sample sites (Table 7), Dolly Varden comprised 47% of the catch, followed by juvenile steelhead (21%), cutthroat trout (18%), juvenile coho (10%), bull trout (2%), mountain whitefish (<1%) and a small number of prickly

**Table 7. Percentage Composition by Species of Fish Sampled at All Sites in the Gosnell Watershed in 1998 Compared to Studies in 1978-80.**

| | 1998 | | 1978-80[16] | |
|---|---|---|---|---|
| **Species** | **Number** | **%** | **Number** | **%** |
| **Steelhead/Rainbow**[17] | 503 | 20.8 | 51 | 17.7 |
| **Coho** | 242 | 10.0 | 137 | 47.6 |
| **Chinook** | 0 | 0 | 2 | 0.7 |
| **Cutthroat** | 444 | 18.4 | 17 | 5.9 |
| **Dolly Varden** | 1135 | 47.0 | 80 | 27.8 |
| **Bull Trout** | 53 | 2.2 | na | |
| **Mountain Whitefish** | 19 | 0.8 | 1 | 0.3 |
| **Prickly Sculpin** | 18 | 0.8 | 0 | 0.0 |
| **Lake chub** | Present-see footnote[18] | | | |
| **TOTAL** | 2414 | 100 | 288 | 100 |

[16] Data compiled from information provided in Hatlevik (1981). This includes data from 17 mainstem locations and 13 tributary sites.

[17] Only one of these fish was a definite rainbow trout.

[18] A very large number of lake chub were sampled in minnow traps at three locations. Including these numbers in this table was felt to not be representative of this species' overall presence in the watershed.

sculpins (<1%). Lake chub have been excluded from the percentage composition estimates due to the exceptionally large numbers caught in minnow traps at several locations during the 1998 sampling. A total of 2282 lake chub were sampled, mainly at three locations in mid-Gosnell tributaries.

It should be noted that pink salmon are present in the lower three reaches of the mainstem Gosnell Creek and in lower Shea Creek. However, since pink salmon fry leave shortly after emergence, the they do not appear in the sample data collected during the August and September period.

A more detailed summary of the catch distribution has been prepared separating the species by major sections (mainstem Gosnell, Shea Creek, Crystal Creek, and the lower, mid and upper Gosnell tributaries) and is presented in Appendix 3 Table 1.

## 4.2 DISTRIBUTION, ABUNDANCE AND KEY HABITATS BY PRINCIPAL FISH SPECIES

The following section summarizes the distribution and abundance, including comparisons to past years when available, of the five principal fish species found in the Gosnell Watershed during the 1998 studies. As well, key habitats identified during the studies will be highlighted for each of the species. The five species in order of discussion are steelhead trout, coho salmon, bull trout, Dolly Varden and cutthroat trout.

### 4.2.1 Steelhead Trout

#### 4.2.1.1 Steelhead Distribution in the Gosnell Watershed

Steelhead fry and parr were present at index sites throughout the lower five reaches of the mainstem Gosnell Creek, throughout Shea Creek up to the impassable falls at the top of Reach 2[19], and in the lower two reaches of Crystal Creek and two of its tributaries. Newly-emerged steelhead fry were also sampled at one location in Reach 7 approximately 2 km upstream from the falls. Steelhead juveniles were also captured in the lower two reaches of Tributaries 5200 and 5610 entering the mid-reaches of Gosnell Creek and a suspected steelhead redd was observed in the lower reach of Tributary 5730.

We have assumed that all of the juveniles captured in these stream sections are progeny of steelhead trout as they are directly accessible from the mainstem Morice River and steelhead spawners have been tracked using radio telemetry into Gosnell and Shea creeks (Envirocon Ltd. 1984).

[19] Hatlevik (1981) reports a steelhead was angled in June just below this falls.

#### 4.2.1.2 Steelhead Life History Information

The 1998 field studies were not conducted during the adult steelhead spawning period. As a result, we are dependent upon past studies in this watershed for timing information for Gosnell steelhead. Studies conducted on the Morice River in 1979 by Envirocon Ltd. (1984) indicated that two of 18 radio-tagged steelhead (both females) eventually spawned in the Gosnell Watershed.

One of these steelhead was tagged during February in the mainstem Morice upstream from the Gosnell confluence. This fish was recorded moving upstream in Gosnell Creek during mid-May and located in Reach 2 of Shea Creek (spawning location) during the period May 19 to June 1. The second fish was also tagged in the mainstem Morice upstream from Gosnell in February and was located at the mouth of Gosnell Creek on May 27 and in lower Shea Creek on June 11 and 12.

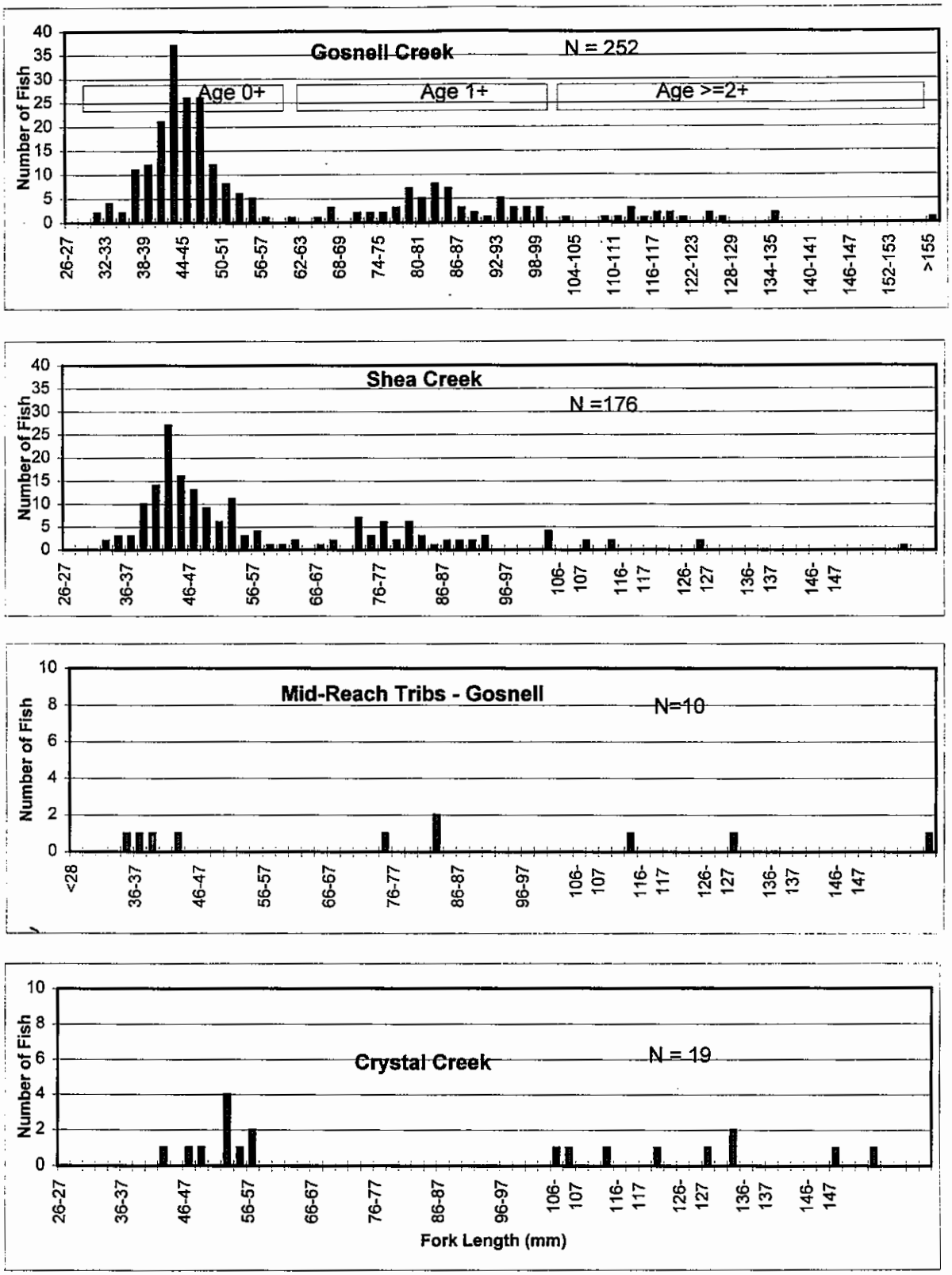
These observations suggest that most Gosnell steelhead overwinter in the Morice River and move upstream into the Gosnell during mid to late May. Spawning occurs during late May through until the middle of June. This is consistent with observations made in other Morice River steelhead tributaries (Envirocon Ltd. 1984).

Steelhead fry emergence in the Morice Watershed typically occurs during August in most systems, but may begin in July in some of the warmer tributaries (Envirocon Ltd. 1984) Newly-emerged steelhead fry have been captured in the Owen Watershed as early as June 30$^{th}$ (Bustard 1999) reflecting the influence of a warm headwater lake leading to higher water temperatures during June compared to other locations.

By late August and September, steelhead fry ranged from 31 to 57 mm fork length in the Gosnell Watershed (Figure 5 and Appendix 4 Table 1). Age 1+ steelhead ranged from 59-99 mm and a small number of older steelhead parr were sampled at the sites in the mainstem Gosnell, Shea Creek and lower Crystal Creek (Figure 5). Whately et. al. (1978) determined that most Morice steelhead spend 3 or 4 years in freshwater prior to leaving as smolts. Typically steelhead move downstream into larger systems as they grow.

Fish length data collected in the Gosnell in 1998 suggests that most of the steelhead parr sampled in 1998 were age 1+ (Figure 5). This may partially reflect the difficulty of sampling deeper water in the mainstem of Gosnell Creek. However, we suspect that many of the older parr move downstream from Gosnell Creek into the mainstem of the Morice and Bulkley rivers. The 1998 age-length data is based on scale aging information summarized in Appendix 5 Table 1.

**Figure 5. Length-Frequency Distribution of Juvenile Steelhead in the Gosnell Watershed, 1998.**

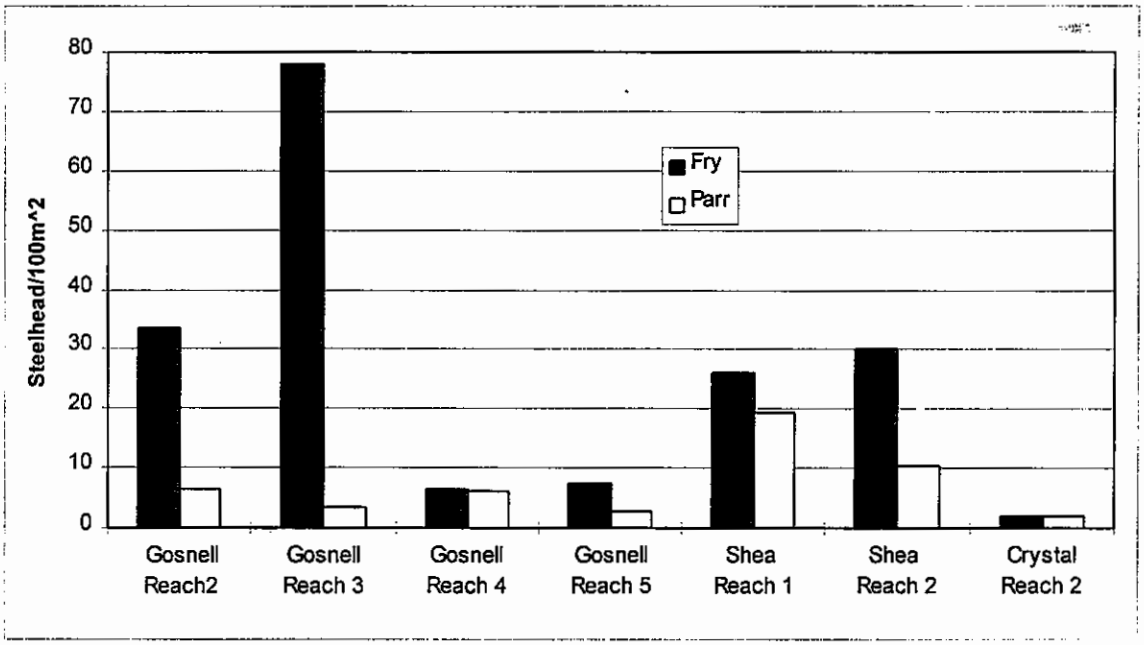


#### 4.2.1.3 Key Steelhead Habitats

Figure 6 summarizes the densities of steelhead fry and parr in the main steelhead rearing sections of the Gosnell Watershed. Shea Creek and Reaches 2 and 3 of the lower Gosnell (downstream from Shea Creek) stand out as the key areas for steelhead production in this watershed. Steelhead fry and parr were also present in lower densities throughout reaches 4 and 5 of the Gosnell and throughout Reach 2 of Crystal Creek. In most cases the density estimates are based on the combined results from two index sites in each reach (Appendix 6 Table 1).

Newly-emerged steelhead fry were also sampled along the mainstem Gosnell margin at the very lower end of Reach 7 (spot shocking only so fry density estimates are not available for Reach 7). This is upstream from the canyon, and was the only site above the canyon where steelhead were captured. No steelhead parr were captured in this area.

**Figure 6. Comparison of Steelhead Fry and Parr Densities in the Main Steelhead Areas in the Gosnell Watershed.**




Reaches 2, 3, and the top of Reach 5, and Reach 7 of Gosnell Creek as well as the upper sections in Reach 1 of Shea Creek offer good potential spawning sites for steelhead. The very high steelhead fry densities of 78 fry/100m$^2$ obtained in Reach 3 of the Gosnell suggests steelhead spawning probably occurred in this reach. Alternatively, this reach is located immediately downstream from Shea Creek and steelhead fry may disperse downstream from this tributary into the mainstem Gosnell. Radio telemetry studies in 1979 indicated that significant steelhead spawning occurs in Shea Creek (Envirocon Ltd. 1984).

Steelhead parr densities were highest in Shea Creek where they achieved densities approaching 20 parr/100m$^2$ in Reach 1 and 10 parr/100m$^2$ in Reach 2. The cobble-sized bed material present throughout much of Shea Creek provides excellent potential steelhead parr rearing areas. The higher gradient and larger bed material present in the Shea Creek channel probably accounts for better steelhead parr rearing than in lower Gosnell Creek. Together these areas are the key steelhead spawning and rearing habitats in the Gosnell Watershed.

The presence of steelhead fry in Reach 2 of Crystal Creek and steelhead parr presence at both index sites and two other locations in tributaries to Crystal Creek indicate that although densities are not high, this system is utilized by steelhead for spawning and offers potential steelhead parr rearing throughout.

Surprisingly, only two other tributaries to Gosnell Creek were identified as being utilized by steelhead juveniles (Tributaries 5200 and 5610). Together, approximately 2 km of habitat was utilized in these tributaries. Steelhead fry were captured in Tributary 5610 suggesting steelhead spawning in the lower reach. As well a suspected old steelhead redd was identified in the lower 500 m of Tributary 5730 during ground surveys (Appendix 7 Table 4). This section of Tributary 5730 was not sampled for juveniles. These results indicate that steelhead production in smaller Gosnell Creek tributaries is a minor component of the overall system production, and that the mainstem Gosnell up to the canyon and Shea Creek to the impassable falls downstream from the lake account for the majority of steelhead production in the system. There was evidence of limited steelhead use in the mainstem Gosnell upstream from the canyon for a short distance based on the capture of steelhead fry at one site.

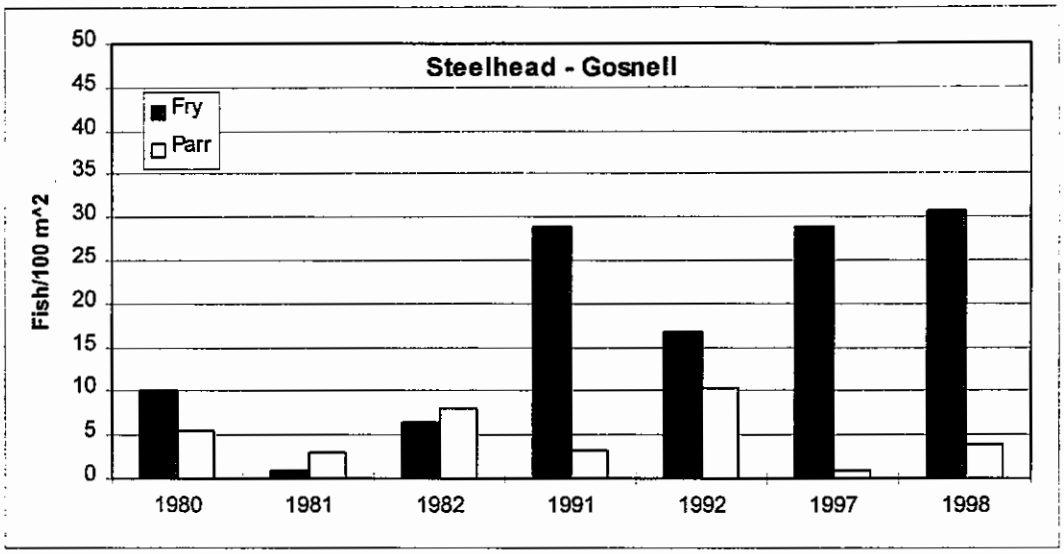
#### 4.2.1.4 Comparison of Steelhead Rearing Densities Between Years

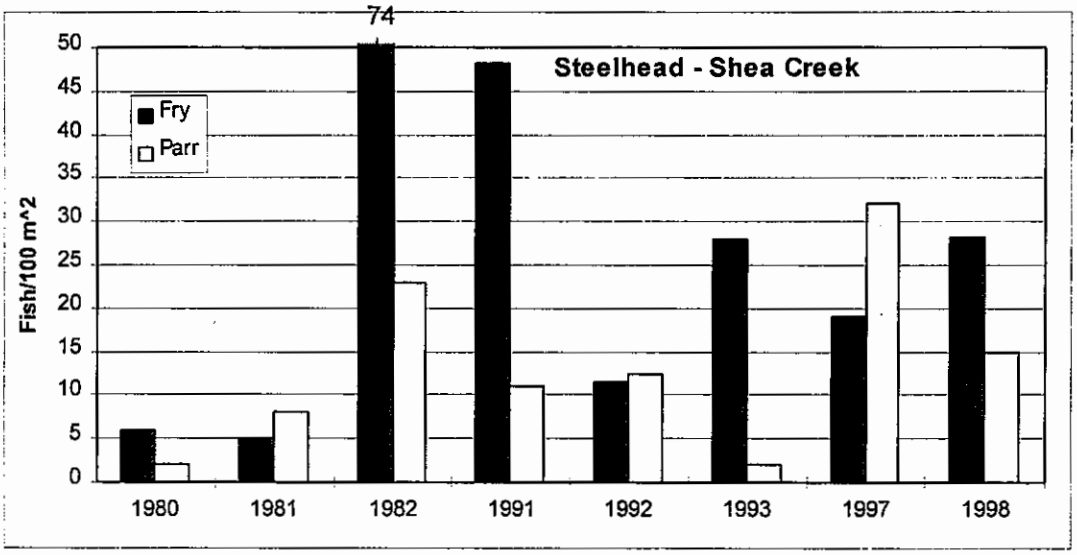
Figure 7 summarizes steelhead fry and parr rearing densities measured in the lower Gosnell and in Shea Creek since 1980. Data is available for 7 years in lower Gosnell Creek and for 8 years in Shea Creek. More detailed historical summaries are presented in Appendix 6 Tables 19 and 20.

The data indicates that the 1998 surveys were conducted during a year of high steelhead fry recruitment in the lower Gosnell and are in the mid-range compared to past sampling in Shea Creek sites. The figures indicate that more recent steelhead fry recruitment in the mainstem Gosnell has been considerably higher than in the early 1980's. Similarly, the abundance of steelhead fry at Shea Creek sites has been higher than results in the early 1980's, except for very high densities obtained in Shea Creek in 1982[20].

[20] The 1982 data is based on a single small site using one pass and a low probability of capture estimate (Tredger 1983).

**Figure 7. Comparison of Steelhead Fry and Parr Densities in Lower Gosnell and Shea Creeks Since 1980.**




The historical data indicates that steelhead parr densities obtained in Shea Creek in 1998 (mean of 15 parr/100 $m^2$ for the two reaches) are in the mid-range of those measured in this system during past sampling. They also indicate that densities have consistently been higher in Shea Creek than in the mainstem of Gosnell Creek. Steelhead parr estimates in the 15-20 parr/100$m^2$ range are in the upper range of those obtained for Morice River steelhead tributaries (Bustard 1992 and 1993), emphasizing that the 10 km of accessible channel in Shea Creek is very important steelhead spawning and rearing habitat for the Morice River steelhead population.

### 4.2.2 Coho Salmon

As a general comment, information describing the distribution and abundance of coho juveniles in the Gosnell watershed in the summer of 1998 describes this population at a relatively low point in its abundance. Spawner escapements to the watershed have been poor in the previous year - to the point of triggering a crisis in coho management[21]. We suspect that during years of higher coho escapements combined with high fall flows, coho would be more widely distributed in this watershed than reported in this study.

#### 4.2.2.1 Coho Distribution in the Gosnell Watershed

Juvenile coho were present throughout the mainstem of Gosnell Creek to the top of Reach 5 and in both reaches of Shea Creek and in the lower ends of three Shea Creek tributaries. Coho juveniles were also present in the lower reach of Crystal Creek and a tributary stream to Crystal Creek.

In addition, coho juveniles were present in 15 other tributary streams to the mainstem Gosnell. Coho juveniles were captured in five lower Gosnell tributaries (i.e. downstream from Shea Creek). These include the following tributaries: Tributary ILP 1406; Tributary 1890; Tributary 2000; Tributary ILP 1431; and Tributary 2520.

Coho juveniles were widely distributed in tributaries to the mid-reaches of Gosnell Creek (Shea Creek to the canyon in Reach 6). They were present in 10 tributaries in this section including the following: Tributary 3140; Tributary 3770; Tributary 3900; Tributary 4290; Tributary 4730; Tributary 5200; Tributary 5470; Tributary 5610; Tributary 5730; and Tributary 6260.

In a number of instances, only a single individual coho was captured - sometimes just yearlings. This is indicative of very low juvenile abundance in the tributaries, and suggests that some Gosnell coho tributaries may not have been identified during these surveys due to low recruitment in the past several years.

No coho juveniles or adults were observed upstream from the 1.9 m falls in Reach 6 of the mainstem Gosnell during the 1998 field surveys. However, historical information presented in Envirocon Ltd. (1984) indicated that coho juveniles were present at a sample site upstream from the falls during 1979. Similar to Hatlevik (1981), our field observations suggest that the falls and chutes in the canyon do not present a barrier to coho and that the upstream areas may be used by coho during some years - although not frequently.

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[21] Coho Backgrounder Paper 1998. Prepared by Coho Response Team. Department of Fisheries and Oceans.

#### 4.2.2.2 Coho Life History Information

Surveys conducted during the Kemano Completion Studies (Envirocon Ltd 1984) indicate that coho first arrive in the upper Morice in mid-August. Large groups of coho (200+) have been noted holding at the Morice/Gosnell confluence during the first week of September. Ground surveys during the 1998 field studies indicated that adult coho migration into lower Gosnell Creek was underway during the period September 23 to 30th. No coho were in lower Shea Creek during the September 22 ground surveys (Appendix 7 Table 5).

Coho redd construction was underway during the late September ground surveys in Reaches 2, 3 and 5 of Gosnell Creek. Hancock et al. (1983) report the peak of coho spawning in Gosnell Creek occurs during late October and is finished by early November.

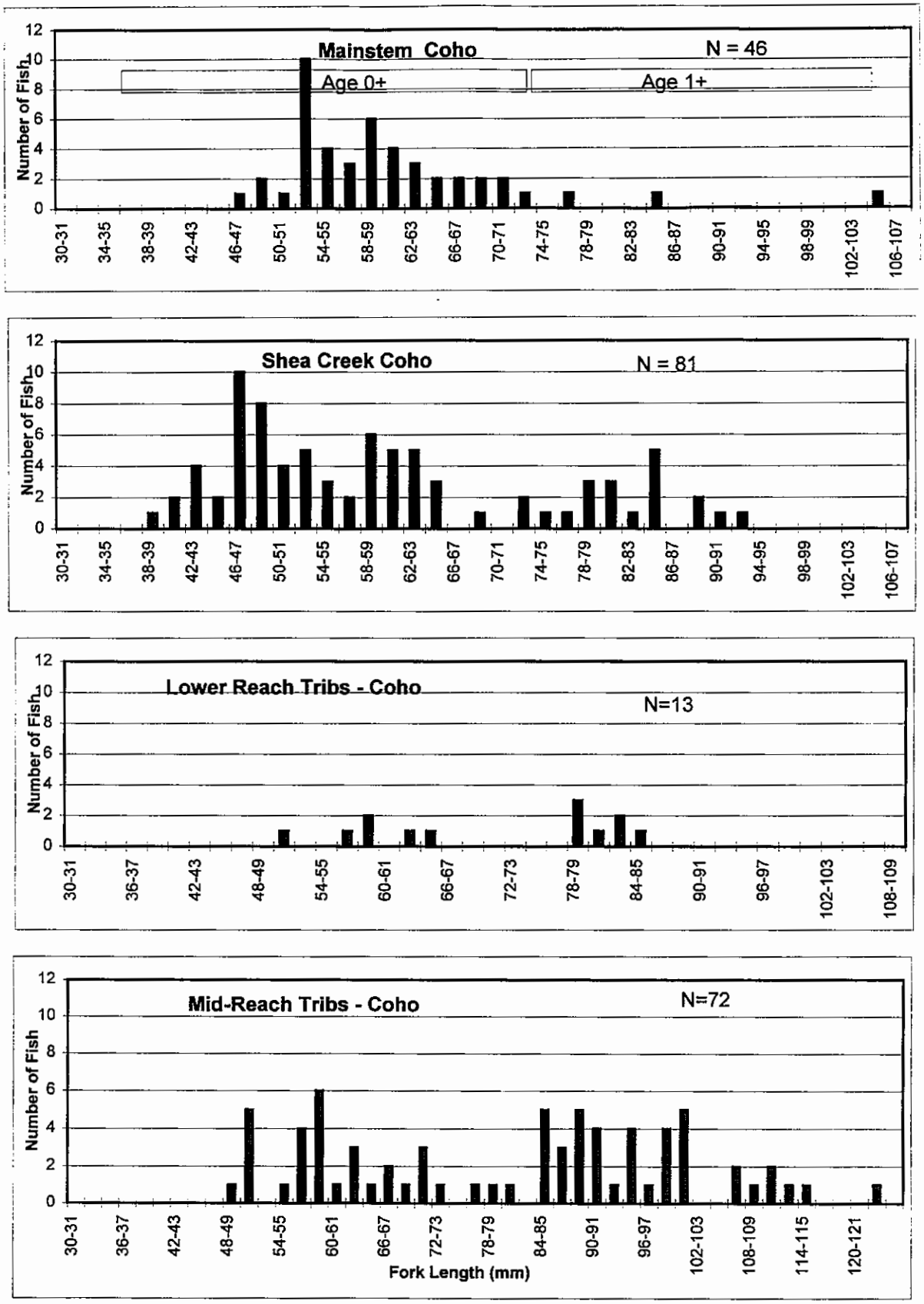
Coho fry emergence begins in mid-May, peaks in June and may continue into early July in this watershed (Envirocon Ltd. 1984). Analyses of scales from returning adults indicate that Morice coho remain in freshwater for one (75%) or two (25%) winters prior to smolting (Shepherd 1979). Peak downstream smolt movement from Morice tributaries occurs during late May through mid-June (Smith and Berezay 1983).

By late August and September, coho fry ranged from 38-74 mm fork length (Figure 8). Yearlings ranged from 76 to 122 mm fork length. Yearlings were more prevalent in the catches in Shea Creek and in the mid-reach tributaries to Gosnell Creek. A detailed summary of coho juvenile length information is summarized in Appendix 4, Tables 1 to 6. The 1998 age-length data is based on scale aging information summarized in Appendix 5, Table 1 combined with the length-frequency distributions in Figure 8.

#### 4.2.2.3 Key Coho Habitats

Sampling throughout the Gosnell Watershed indicates that coho were widely dispersed throughout the lower and mid-reaches of the watershed. Our observations suggest that the combination of excellent spawning habitat in the mainstem Gosnell and in key tributaries, in conjunction with extensive rearing in numerous smaller tributaries and off-channel habitats associated with the Gosnell floodplain combine to make the Gosnell a productive coho system.

**Figure 8. Length-Frequency Distribution of Juvenile Coho in the Gosnell Watershed, 1998.**



**Coho Spawning Locations**

Observations conducted during late September and early October indicate that coho redds were present throughout Reaches 2 and 3 of Gosnell Creek. This section also is a key staging and holding area, with over 100 coho migrants observed in one run in late September (Appendix 7 Table 2). Reach 5 of the mainstem Gosnell also provides significant spawning, particularly in the upper sections of the reach (upstream from Tributary 5730). This section was judged to offer some of the best coho spawning habitat in the watershed. Reach 7 of the Gosnell (upstream from the 1.9 m falls) has good potential spawning, and may be used during years of high escapement in combination with the right flow conditions in the canyon to make it passable.

Shea Creek also provides important coho spawning based on the presence of abundant fry and good potential spawning habitat. Reach 1 offers excellent coho spawning areas, especially in the sidechannels in the upper section of the reach.

Three other tributaries to the Gosnell also provide good potential coho spawning opportunities. Tributary 4290 has excellent potential coho spawning habitat in Reach 2 (Photo 1). Tributary 5610 has good potential spawning in the upper sections of Reach 1. Twelve coho spawners entered this creek following the removal of a beaver dam in late September. Tributary 5730 has good potential coho spawning up to a falls in Reach 2. The upper section of Reach 1 and Reach 2 of Tributary 3770 had good coho spawning potential.

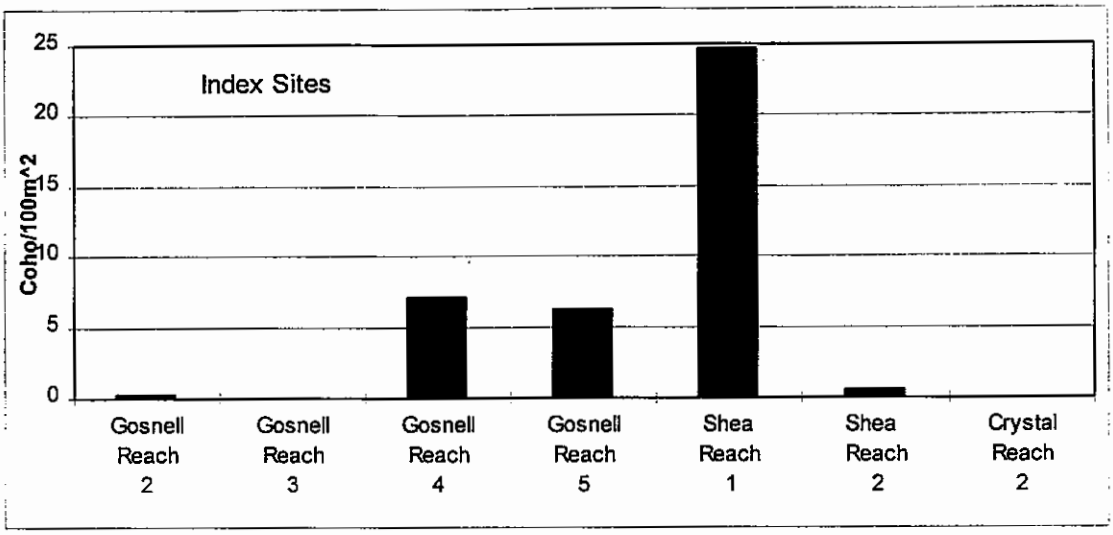
This section has outlined some of the key spawning locations identified during this study. We suspect that other sites occur in the watershed that will be used on an opportunistic basis depending upon flow conditions and escapements in the watershed.

**Coho Rearing Locations**

Coho salmon have developed an effective strategy for fry dispersal into the lower sections of smaller tributaries during high flow conditions in the spring. Based on this, juveniles are present in the lower sections of many of the smaller accessible tributaries, wetlands and off-channel pond habitats in the Gosnell floodplain (Photo 2). While, each small system may in itself not appear to offer outstanding habitat or high use, the composite of all of the smaller tributaries together is probably the key to coho production in the Gosnell. The extensive amount of off-channel habitat and accessible small tributaries makes the Gosnell a major coho tributary, assuming adequate adult escapements reach the system.

Figure 9 summarizes the densities of juvenile coho in the mainstem Gosnell, Shea and Crystal creeks during the 1998 studies. These were the main systems where fish density information was collected. The results indicate that for these areas, the highest densities

**Figure 9. Comparison of Juvenile Coho Densities at the Gosnell Index Sites, 1998.**




of coho juveniles were obtained in the lower reach of Shea Creek with an average density of 25 coho/100m$^2$ at the two index sites. Reaches 4 and 5 of the mainstem Gosnell were the only other stream sections with significant juvenile coho presence based on the index site work. Densities were relatively low at 6-7 coho/100m$^2$ at these locations.

We suspect that many of the smaller tributaries would attain higher densities than this and that levels in the mainstem would also be much higher, following good adult escapement years.

Tributaries that stand out as offering some of the best potential rearing (often due to extensive pond and wetland habitats) include the following seven systems: Tributary 2000; Tributary 3140; Tributary 3770; Tributary 3900; Tributary 4290; Tributary 5610; and Tributary 5730.

#### 4.2.2.4 Comparison of Coho Rearing Densities Between Years

Figure 10 summarizes juvenile coho rearing densities measured in Gosnell and Shea creeks since 1980. Historical summaries used in preparing this figure are presented in Appendix 6 Tables 19 and 20. It should be emphasized that the location of index sites in Gosnell Creek has varied considerably between years. Shea Creek sites have been more consistent and are probably more representative of the system over time.

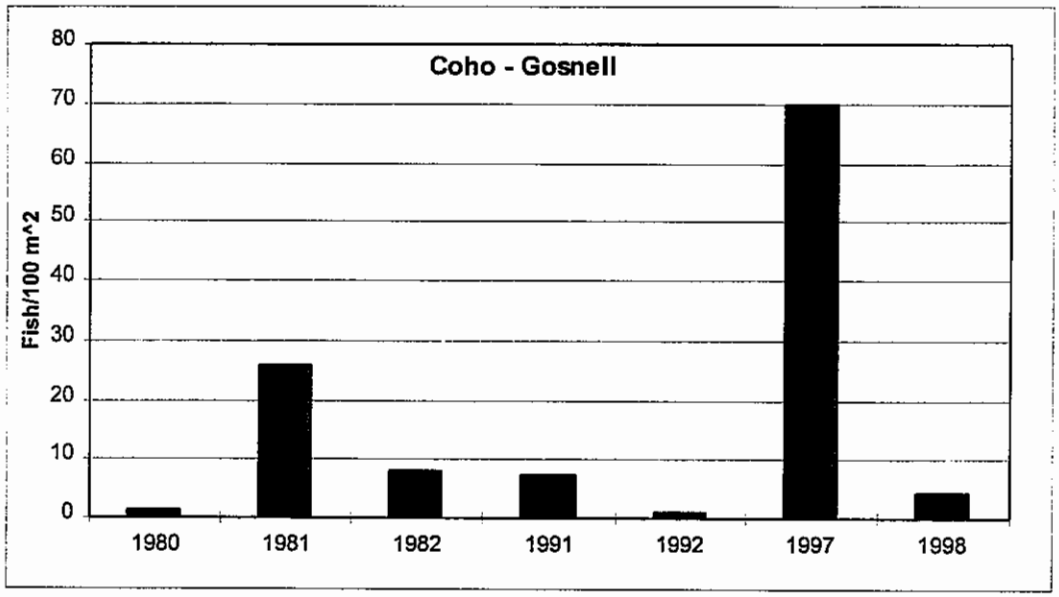
The data indicate that coho juvenile densities in lower Gosnell Creek have been low for at least five of seven years of sampling. The 1997 data is high, and is based on captures at a confined site below a spawning tributary and we suspect overestimated densities for the mainstem Gosnell for that year.

**Photo 1. Tributary 4290 is one of a number of coho tributaries offering good potential coho rearing and spawning habitat.**

**Photo 2. Gosnell Creek has an excellent combination of extensive off-channel wetland habitat for rearing coho as well as mainstem spawning areas in mid-reach sections.**

The historical data indicates that juvenile coho densities of 25 coho/100m$^2$ in Shea Creek are in the mid-range of densities measured since 1980. During high years, coho can achieve levels of 70 coho/100m$^2$, while on poor years densities have been in the range of 10 coho/100m$^2$. Estimates in Shea Creek have typically been higher than those measured in the mainstem Gosnell.

**Figure 10. Comparison of Juvenile Coho Densities in Lower Gosnell Creek and Shea Creeks Since 1980.**



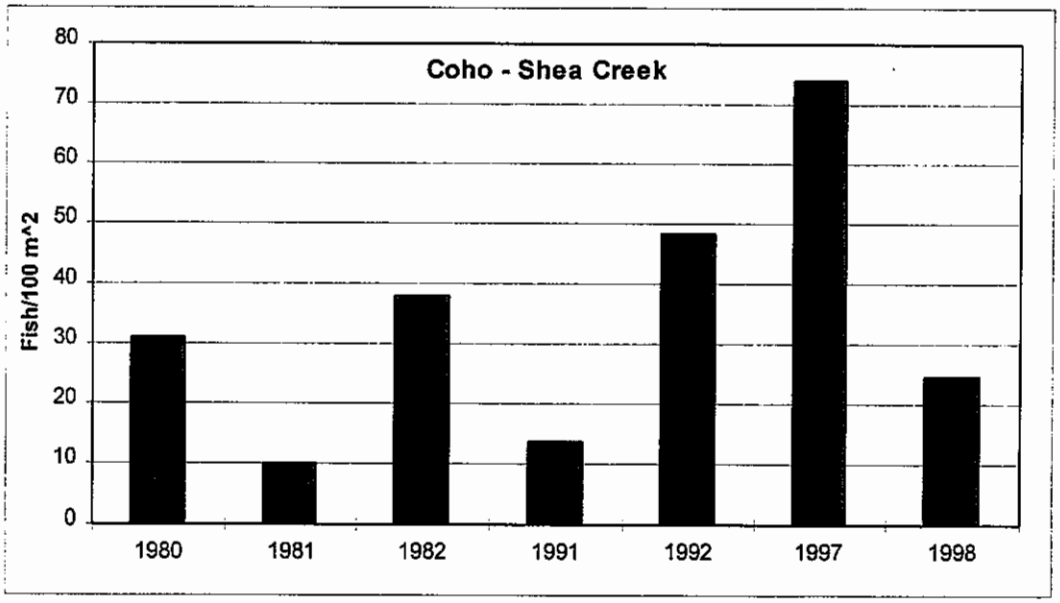




Table 7 provides some historical evidence that coho formerly comprised a higher proportion of the overall fish catch in the period 1978 to 1980 compared to 1998. During that period, coho comprised approximately 48% of the overall catch compared to 10% in

1998. This comparison is limited due to considerable differences in sampling methods and locations between the two periods.

### 4.2.3 Bull Trout

#### 4.2.3.1 Bull Trout Distribution in the Gosnell Watershed

Bull trout distribution information is based on a combination of juvenile and adult surveys conducted during the August and September period.

Bull trout juveniles had a limited distribution in the Gosnell Watershed primarily restricted to the mainstem Gosnell and Crystal Creeks. Bull trout were located at 14 sites in the watershed, including eight sites in Crystal Creek and tributaries and three mainstem Gosnell locations. As well, bull trout juveniles were captured in Tributary 5200 in the mid-Gosnell and in Tributaries 8460 and 9170 in the upper reaches of the Gosnell Watershed. Dolly Varden juveniles were present at all of the sites utilized by bull trout.

Bull trout redds were present in the mainstem Gosnell to Reach 9 near the headwaters (Appendix 7 Table 2). The ground observations in Crystal Creek also indicate that bull trout spawners utilize this system as far upstream as Reach 4.

#### 4.2.3.2 Bull Trout Life History Information

Limited information is available documenting bull trout life history in the Morice drainage. We suspect that most bull trout juveniles sampled in the Gosnell are progeny of fluvial bull trout that live in the Morice River during their sub-adult and adult phase, but spawn and spend their early rearing phase in cooler tributaries.

Some adult bull trout observations were made during the August and early September field surveys in Crystal Creek. Six adults were observed during this period including an upstream migrant in Reach 2 of Crystal Creek on August 6 and two pairs on redds on September 1 and 2$^{nd}$ (Appendix 7 Table 3). These fish ranged in size from 30-45 cm fork length (visual estimate).

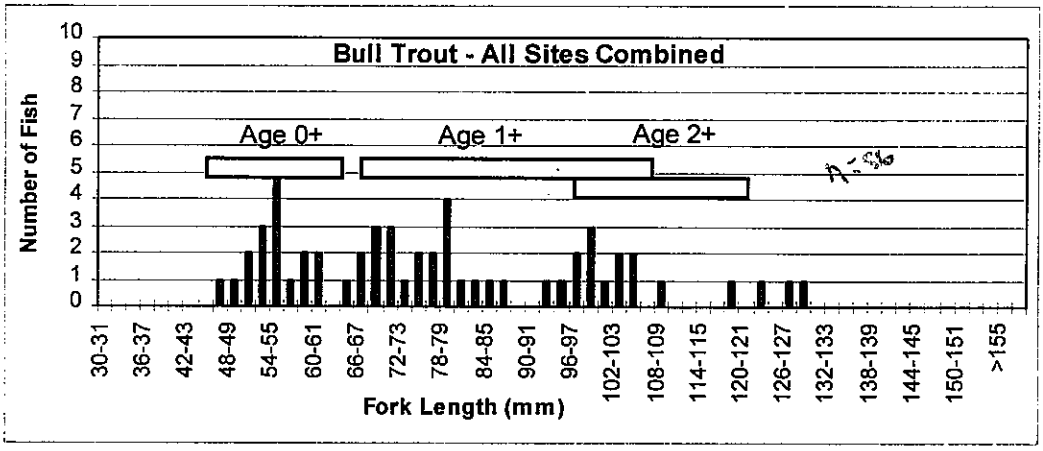
Ground surveys in the upper reaches of the mainstem Gosnell were conducted during late September, and no adults were observed. However, 57 bull trout redds were identified in Reaches 5 to 9 indicating that bull trout had utilized this section and left by late September.

Hatlevik (1981) reported that "angling below the falls[22] produced about 15 large Dolly Varden[23], up to 2.3 kg (5lbs), nearly all of which were in spawning condition. The water was very clear and many more could be seen in pools for about 100 meters downstream. This area was checked again on September 23, but Dolly Varden were not present".

We suspect that this canyon area is a major staging area for the Gosnell bull trout population. Presumably these fish move up the Gosnell during late July and August, hold in the pool areas in the vicinity of the falls until late August, and then move up past the falls (Photo 3) into Reaches 7 to 9 of the mainstem Gosnell to spawn at the end of August and early September.

Data collected from 56 juvenile bull trout captured in Gosnell Creek and tributaries (mainly Crystal Creek), indicated that bull trout fry were up to 66 mm fork length by the end of the first season[24]. Fin ray aging (Appendix 5 Table 2) indicated a wide overlap between age 1+ and age 2+ bull trout (presumably reflecting variable rearing conditions). The largest bull trout juvenile captured during this study was 128 mm fork length. We assume that bull trout juveniles drop down out of the Gosnell as they grow to the 100 mm fork length range.

**Figure 11. Length-Frequency Distribution of Juvenile Bull Trout in the Gosnell Watershed, All Sites Combined, 1998.**




[22] The falls referred to here is the 1.9 m high drop in the canyon in Reach 6.

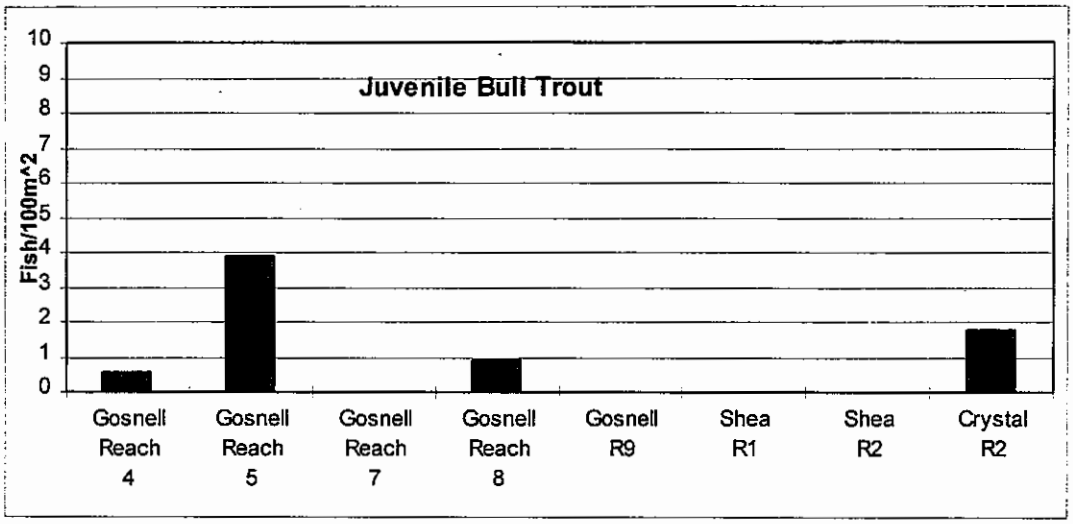
[23] We suspect the Dolly Varden referred to here are actually bull trout.

[24] Char fry less than 50 mm fork length cannot be visually separated between bull trout and Dolly Varden. Some of these fry were probably bull trout fry, but have been included with the Dolly Varden sample that tended to dominate most locations.

### 4.2.3.3 Key Bull Trout Habitats

Figure 12 summarizes the density of bull trout juveniles at the index sites in the mainstem Gosnell, Shea and Crystal Creeks. The data indicate that bull trout juvenile densities were low (<5 fish/100m$^2$) at all sites sampled. Sample data for other sites where bull trout were present but where density estimates were not obtained indicate that numbers

**Figure 12. Summary of Bull Trout Juvenile Densities at Gosnell Index Sites, 1998.**




were also very low, and it is highly unlikely that densities would have exceeded those obtained at the index sites.

The densities of <5 bull trout juveniles/100m$^2$ of habitat were similar to those obtained in the adjacent Thautil Watershed (Bustard 1997). However, Thautil River bull trout juveniles were more widely distributed and tended to achieve slightly higher densities than in the Gosnell. We suspect this reflects more steeper gradient and colder tributaries preferred by bull trout present in the Thautil than in the Gosnell Watershed.

The ground surveys indicate that the mainstem Gosnell provides important spawning areas for bull trout. A total of 61 bull trout redds were identified during the study, including 47 in Reach 7 of Gosnell Creek indicating this reach provides very important spawning habitat for bull trout.

Other areas identified as key bull trout spawning habitats include sections of Crystal Creek and several other reaches of Gosnell Creek, including some sites in Reach 5 below the canyon and falls. Detailed locations for the redd sites are shown on the 1:20,000 maps accompanying this report.

Bull trout spawning sites were located in stream reaches exceeding 10 m channel width and in gradients ranging from 1 to 4%. All but one of the bull trout rearing sites

**Photo 3. Bull trout spawners stage in this section of Gosnell Creek downstream from a 1.9 m falls and move up to spawn in Reach 7 of the Gosnell during early September.**

**Photo 4. Bull trout juveniles rear in moderately steep and wide channel sections of upper Crystal Creek such as this location at Site 66.**

exceeded 5 m channel width, with stream gradients ranging from 1 to 14.5% (Table 6 and Photo 4).

The low abundance of juvenile bull trout in the Gosnell Creek mainstem does not seem to account for the number of juveniles that might be expected given the number of bull trout redd sites identified, particularly in Reach 7. The wide spacing between the mainstem juvenile sites may have meant some more heavily used sections of Gosnell Creek were missed by the surveys. Alternatively, past recruitment may have been lower than noted during the 1998 surveys, or Gosnell bull trout juveniles may have a rearing strategy that is not adequately understood (i.e., early outmigration from the mainstem).

**Table 8. Number and Location of Bull Trout Redds in the Gosnell Watershed, 1998.**

| System | Reach | Number of Bull Trout Redds |
|---|---|---|
| **Gosnell** | 5 | 2 |
| | 7 | 47 |
| | 8 | 6 |
| | 9 | 2 |
| **Crystal Creek** | 2 | 1 |
| | 3 | 1 |
| | 4 | 2 |
| **Total** | | 61 |

Adult bull trout staging areas prior to spawning comprise an important component of this species habitat. Adults may hold for up to a month at key sites during the summer prior to spawning. The section of the Gosnell immediately downstream from the falls is one of these important holding sites. Similarly, we suspect that the confluence area of the Morice and Gosnell is an important staging area for bull trout during the early summer, although this has not been verified.

### 4.2.4 Dolly Varden

#### 4.2.4.1 Dolly Varden Distribution in the Gosnell Watershed

Dolly Varden were widely dispersed throughout the Gosnell Watershed, and dominated the fish catches in many of the small tributaries. Dolly Varden were sampled at 132 locations (Table 5) characterized by a wide range in slope and channel characteristics (Table 6).

The smallest channel utilized was 0.3 m wide (small tributary to Tributary 3770) and the steepest gradient where Dolly Varden were located was 14.7% (headwater tributary to Crystal Creek).

Dolly Varden were only sampled in one tributary that was definitely isolated from the mainstem Gosnell. Sites in the upper sections of Tributary 5730 had a Dolly Varden population in stream reaches separated from the Gosnell mainstem by a 4 m high falls. We suspect that Dolly Varden accessed the section of stream above the falls by means of a crossover at the headwater lakes from the Burnie River. There is evidence of overflow channels between the two headwater lake systems. This concept is also supported by the presence of resident rainbow trout in the headwater lake. This is also the only confirmed incidence of resident rainbow in the Gosnell Watershed.

Two sites on the mainstem Gosnell are presently judged to be barriers to Dolly Varden[25], but do have Dolly Varden upstream from them. The 1.9 m falls in the Reach 6 canyon as well as a 1.5 m falls at the top of Reach 9 both have Dolly Varden present upstream. We suspect that these falls have increased in size or flows are reduced since early Dolly Varden colonization following glacial retreat in this watershed.

#### 4.2.4.2 Dolly Varden Life History Information

Figure 13 summarizes the fork lengths of Dolly Varden sampled throughout the Gosnell Watershed in 1998. In total, 25 Dolly Varden exceeded 150 mm fork length. This represents less than 2% of the total number of Dolly Varden measured during the study. The largest Dolly Varden captured was 230 mm mature male captured in a small seepage draining a wetland area in the upper reaches of the Gosnell (Site 278).

Field observations suggested that many of the Dolly Varden exceeding 110 mm fork length were sexually maturing, ripe and in some instances spent fish. These fish were typically aged 2+ to 4+ (Appendix 5 Table 2).

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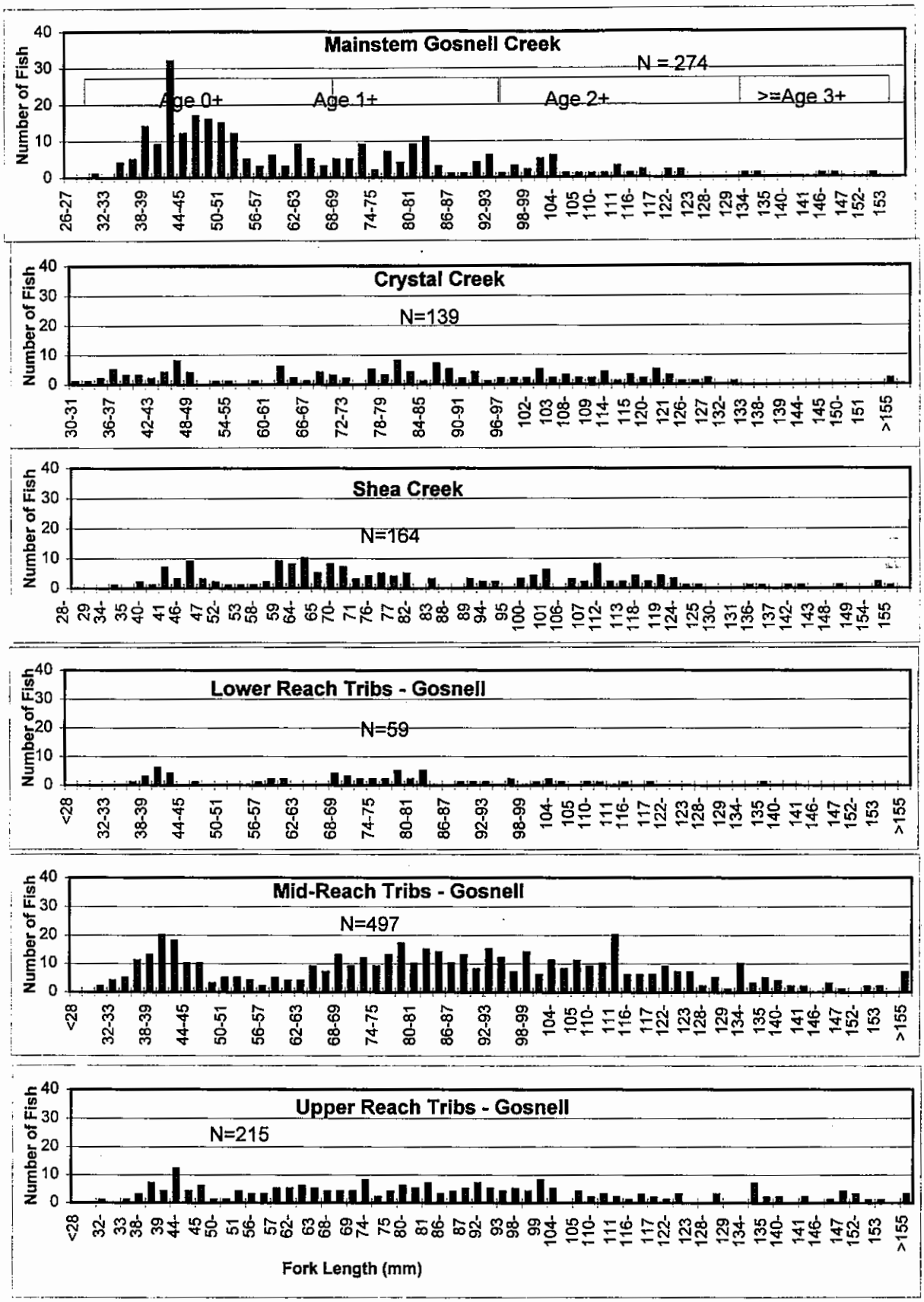
[25] We assume these falls are barriers to Dolly Varden but not to bull trout, steelhead and coho based on the small size of Dolly Varden relative to the height of the falls. The other fish species are larger and capable of jumping these falls during suitable flow conditions.

**Figure 13. Length-Frequency Distribution of Dolly Varden in the Gosnell Watershed, 1998.**



A review of all of the observations of ripe and spent Dolly Varden, as well as direct observations of spawning fish and Dolly Varden redds, suggest that most spawning occurs from mid-September onward into October (Appendix 8 Table 1). There were many direct observations of Dolly Varden spawners on redds in the upper watershed during the period September 15 to September 29. Redd sites and some spawning activity was noted as early as August 26 and September 1 in Tributary 3770 and in upper Crystal Creek respectively.

Based on the condition of fish and the numbers of fish still actively spawning in late September, we suspect that spawning continues into early October in many of the tributaries with a peak at the end of September. Field observations in the adjacent Thautil Watershed suggested that Dolly Varden spawning was completed by approximately October 15th (Bustard 1997b).

The timing of Dolly Varden spawning at most sites in the Gosnell appears to be approximately 3 weeks to a month later than that for bull trout based on a limited number of direct observations and inferences from bull trout redd sites. This is consistent with other Skeena River locations where spawning observations have been conducted at sites where both species are present (e.g., Thautil and Goathorn/Tenas creeks in the Telkwa Bustard et al. 1998).

#### 4.2.4.3 Key Dolly Varden Habitats

Forty-two locations were identified as Dolly Varden spawning locations during the 1998 field surveys. These included 15 smaller tributary sites with ripe fish on redds, kelts or redds directly observed. Direct observations of redds or spawners were made in four reaches of the upper Gosnell (Reaches 5, 7, 8 and 9), two reaches of Crystal Creek and in the two reaches of Shea Creek downstream from the impassable falls.

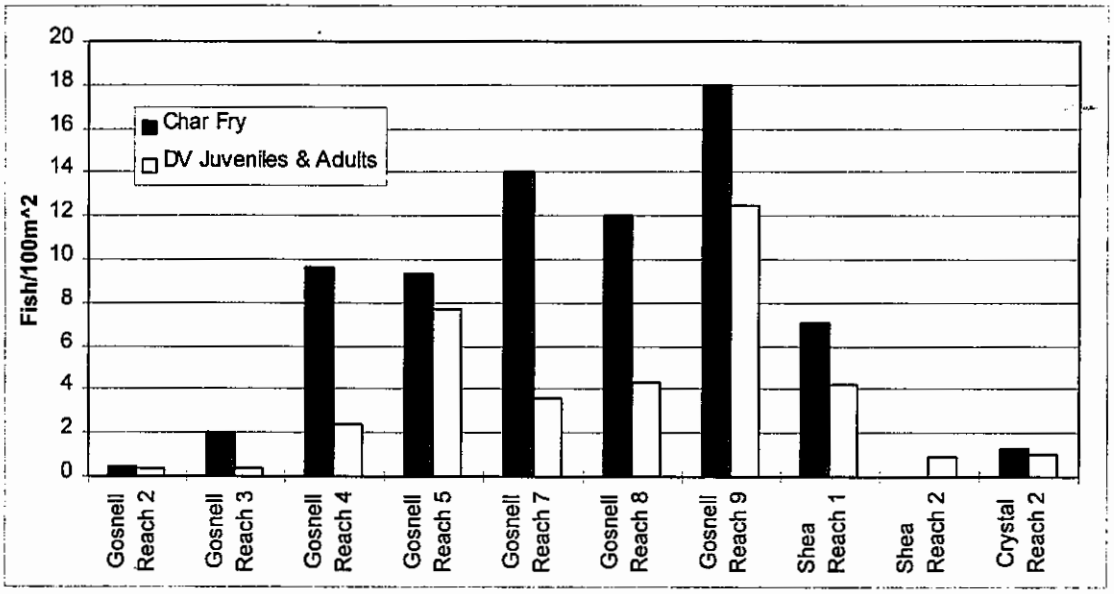
Much of the field sampling was conducted during August and early September, prior to spawning. We identified 17 locations that had maturing fish, recently-emerged Dolly Varden fry and suitable habitat for Dolly Varden spawning, and have assumed that Dolly Varden spawn in these stream sections. We also assume that many more Dolly Varden spawning locations are present throughout the watershed, presumably in most of the tributaries where Dolly Varden were found.

Although Dolly Varden spawning was identified along the mainstem margins of Gosnell Creek, we suspect that the bulk of spawning occurs in tributaries to the mainstem. The importance of tributaries and frequency of observations appeared to increase in the upper sections of the watershed. For example, the lower ends of many of the tributaries entering the Gosnell upstream from Reach 6 (canyon and falls section), had Dolly Varden spawners and redds present during the field studies.

The index site sampling provides some information describing rearing densities of Dolly Varden at a range of sites in the Gosnell Watershed (Figure 14). The data indicates that Dolly Varden fry and juveniles rear at relatively low densities at most sites (<10 fish/100m$^2$), with the lowest densities occurring in the lower sections of the watershed. There was a tendency for char fry and juvenile/adult abundance to increase in the upper sections of the watershed with the highest abundance in the uppermost reach of Gosnell Creek (Reach 9 and Photo 5).

Char fry densities were near 10 fry/100m$^2$ from Reach 4 upstream to the headwaters of Gosnell Creek. Some of these fry may be bull trout since we were unable to distinguish fish less than 50 mm fork length in the field.

**Figure 14. Comparison of Dolly Varden Densities at Index Sites in Gosnell, Shea and Crystal Creeks, 1998.**




Reach 1 of Shea Creek also had moderate abundance of Dolly Varden fry and juveniles present. Ground surveys indicate that Dolly Varden spawning occurred in at least three different locations in this lower reach during late September.

Density estimates are not available for the many small tributaries with Dolly Varden present due to sampling methods used in the smaller creeks. However, Dolly Varden use of the small streams was widespread, and we suspect that in some locations densities exceeded those measured in the mainstem habitats.

Groundwater seepage areas appear to be important components of Dolly Varden spawning and rearing habitat, both along the mainstem and in tributaries. Many of these sites do not appear on the 1:20,000 base maps (Photo 6).

#### 4.2.4.4 Comparison of Char Rearing Densities Between Years.

Figure 15 summarizes the char fry and juvenile/adult rearing densities in Gosnell and Shea Creek index sites since 1980. The summaries include bull trout and Dolly Varden combined for Gosnell Creek, since the two species were not separated in past studies. Bull trout do not appear to be present in Shea Creek. The Gosnell information is for the lower five reaches only - i.e., stream sections that have been sampled in past studies. Shea Creek information is a mix of Reach 1and 2 data (see Appendix 6 Table 20) for more information).

The summaries indicate that char densities have been consistently low in the mainstem Gosnell lower reaches, and that the 1998 data represents some of the higher densities recorded for fry and juveniles. Densities have been below 10 fish/100m$^2$ for all years of sampling.

Shea Creek densities have also been in the less than 10 fish/100m$^2$ range for all years except 1997. In 1997 Shea Creek had unusually high Dolly Varden juvenile (34 fish/100m$^2$) and fry densities (14 fry/100m$^2$). The 1997 sampling was conducted at the same location as previous years, and 3-pass removal was used in making the estimates.

### 4.2.5 Cutthroat Trout

#### 4.2.5.1 Cutthroat Trout Distribution in the Gosnell Watershed

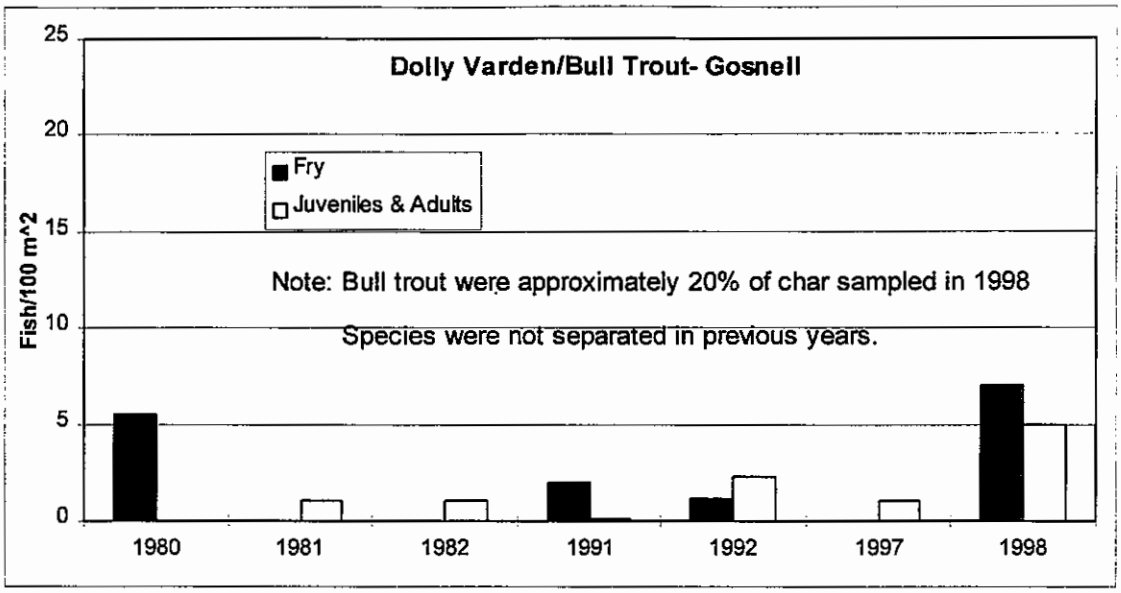
Cutthroat trout were present at 42 locations in the Gosnell Watershed (Table 5). They were present in 10 tributary streams, located in the lower and mid-reaches of Gosnell Creek. All but one of these tributaries had a lake or extensive pond habitat in the watershed, indicating a strong association between cutthroat trout and lakes in this watershed (Photo 7).

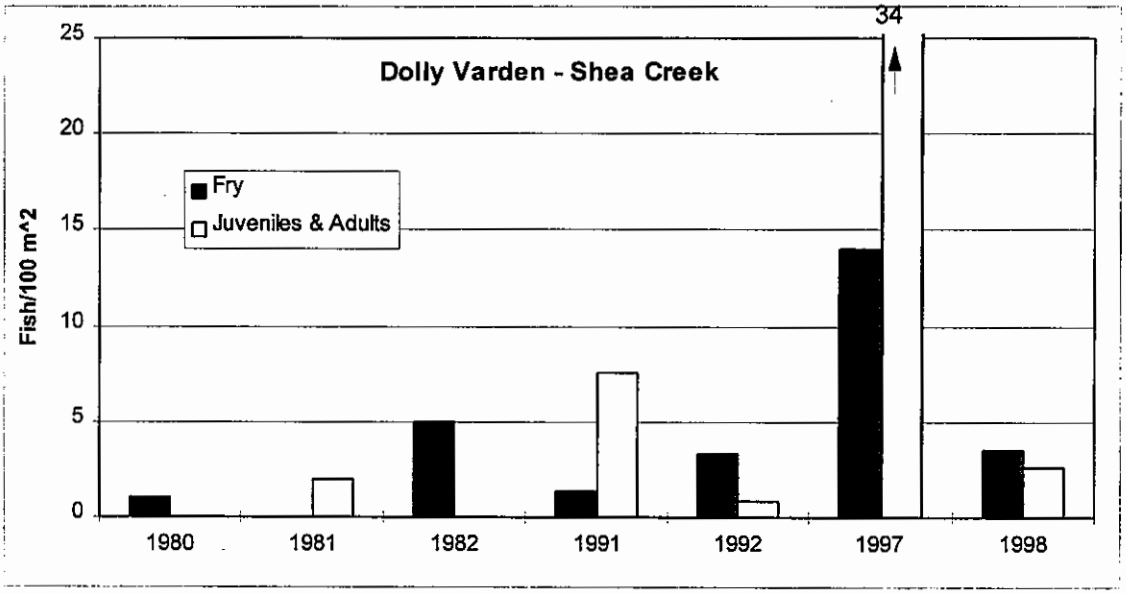
Significant cutthroat tributaries in the project area include Tributary 2520 and Tributary ILP 1717 in the lower Reaches of Gosnell Creek; Julian Holland Lake Watershed throughout; Tributaries 3770; Tributary 3900 and associated lake; Tributary 4290; Tributary 4490; Tributary 4730 and Tributary 5610 in the mid-reaches of Gosnell Creek.

**Photo 5. The highest abundance of Dolly Varden occurred in the uppermost reaches of Gosnell Creek such as this site in Reach 9.**

**Photo 6. Small seepage areas such as this site in Upper Gosnell provide important spawning and early rearing habitat for Dolly Varden. Some of these locations do not appear on 1:20,000 mapping.**

**Figure 15. Comparison of Char Rearing Densities in Gosnell and Shea Creeks Since 1980.**




Cutthroat trout were not present in the mainstem Gosnell Creek or Crystal Creek, and only a single specimen was captured in mainstem Shea Creek. Resident cutthroat trout are widely distributed in Shea Creek upstream from the falls (outside the project area - Hatlevik 1981). As well, no cutthroat trout were located in tributaries upstream from Reach 5 on Gosnell Creek.

### 4.2.5.2 Cutthroat Trout Life History Information

The 1998 field studies were not conducted during the spawning period of cutthroat trout in the Gosnell Watershed - so timing of spawning is based on observations in adjacent watersheds. Ripe spawners were captured during the end of May in Tagit Creek, while kelts were captured from mid-June through early July (Bustard 1998c). Based on these observations, we suspect that most spawning occurs in Gosnell Creek during June.

Newly-emerged cutthroat trout fry (25-30 mm fork length) were captured in Tributary 4290 and Tributary 3770 during the period August 10-20th. Many fry during this period were larger than this suggesting that most cutthroat emregence occurred during July and early August.

By the mid-August and September sample period, cutthroat trout fry ranged from 25 to 47 mm fork length (Figure 16). Yearling cutthroat ranged from 46 to 92 mm. Most of the cutthroat parr sampled during the field studies were age 1+ and age 2+. The age separations are based on a combination of scale analysis and the length-frequency distribution (Appendix 5 Table 1). We suspect that larger cutthroat move into the pond and lake habitats that were associated with the streams that are used for spawning and the early rearing stages.

The largest cutthroat sampled during this study was a 24 cm cutthroat angled in the lake on Tributary 3900 (Site 196). Northwood Inc. staff report that this lake has some "larger" cutthroat. Resident cutthroat trout spawner size in the adjacent Tagit Creek ranged from 20 to 28 m fork length (Bustard 1998c). Cutthroat trout in the 27-30 cm fork length range have been angled in the small lakes along the mainstem Gosnell[26]. The largest cutthroat taken during lake surveys in Julian Holland Lake was 31 cm fork length (Degisi and Schell, 1997).

### 4.2.5.3 Key Cutthroat Trout Habitats

Density data for cutthroat trout is not available since this species was not present at the index sites sampled. Instead, cutthroat trout appeared to be widely dispersed in those tributaries in the lower and mid-sections of the watershed that had lakes and pond habitat. We suspect that the lakes are utilized by the older age classes of cutthroat and are an important component of cutthroat habitat. The ability for juvenile cutthroat to freely move upstream into lake habitat is an important consideration in these systems.

The presence of cutthroat fry in most of the stream systems sampled suggests that cutthroat populations probably reside within each stream system and that spawning probably occurs over a range of sites within the tributaries.

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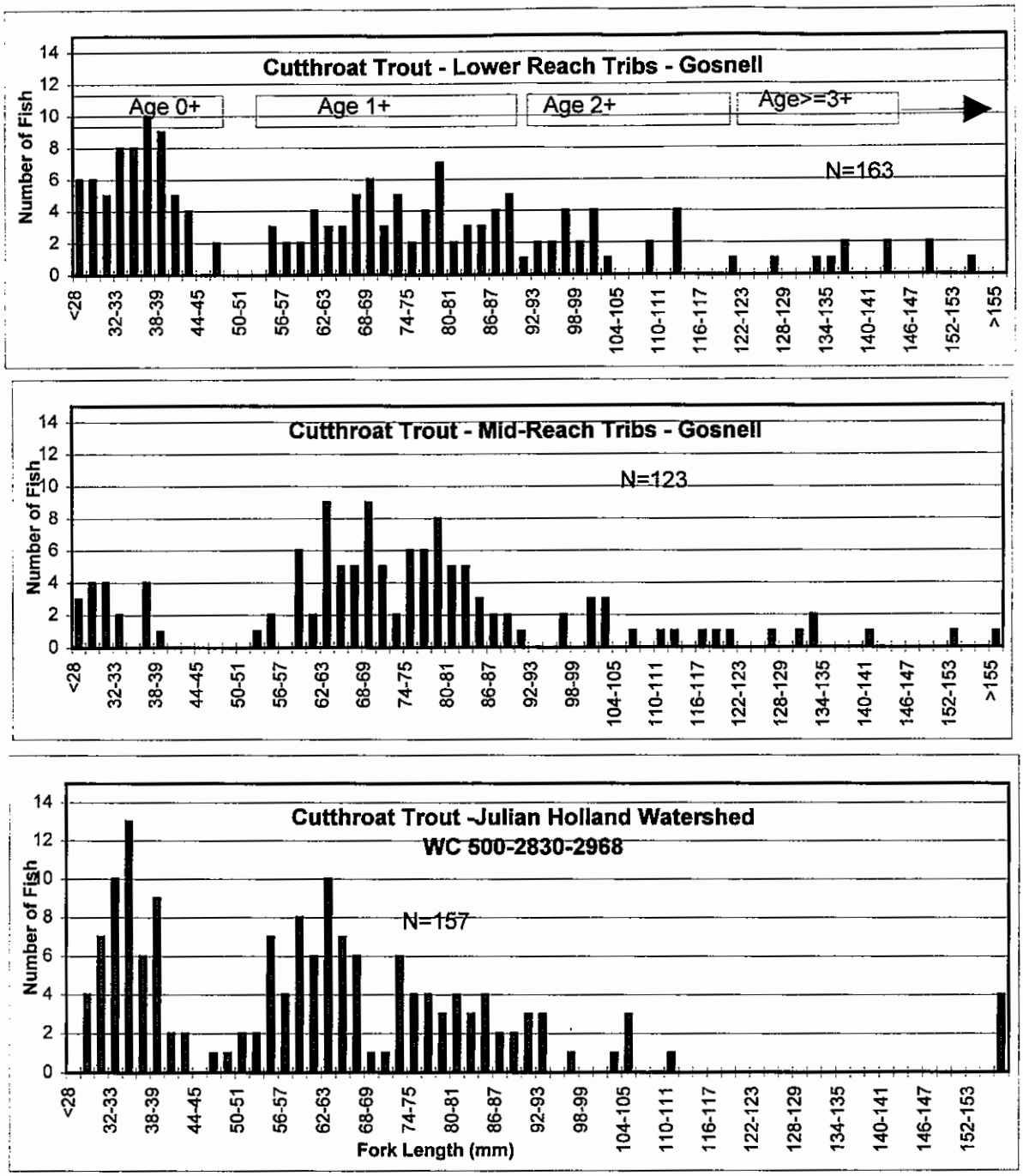
[26] Based on information in memo from Grant Hazelwood (Northwood Inc.) to MELP fish permit officer, 1980.

**Photo 7. Cutthroat trout were found in stream systems that had small lake habitat such as this lake at Site 196 in the Gosnell Watershed.**

**Photo 8. This large unstable bank along Gosnell Creek is located in Reach 5 upstream from some of the best coho spawning habitat in the watershed. Any logging in this area should stay well back from Gosnell Creek in this section.**

**Figure 16. Length-Frequency Distribution of Cutthroat Trout in the Gosnell Watershed , 1998.**



Those systems with a combination of spawning sites, adequate early rearing for juveniles and a lake/pond complex for older fish are the key cutthroat streams. The Julian Holland Lakes and associated streams appear to be a major cutthroat production area within the project area.

It is interesting to note that not a single cutthroat trout was recorded during extensive surveys in the adjacent Thautil Watershed. We suspect that this reflects a lack of accessible lake habitats in that watershed compared to Gosnell Creek.

### 4.2.6 Other Species

#### 4.2.6.1 Pink Salmon

A small run of pink salmon utilize the lower reaches of Gosnell Creek during some years. Pinks were first reported in 1975 in the lower 3-4 km of Gosnell Creek (Hancock et al. 1983). Studies by Envirocon Ltd. in 1979 indicated approximately 125 pink spawners utilized the section of Gosnell Creek 1-2 km downstream from Shea Creek, and that spawning probably peaked in the Gosnell in mid-September, slightly later than in the mainstem Morice River.

Ground surveys on September 23 resulted in counts of 7 pink redds in Reach 2 and 11 pink redds in Reach 3 of Gosnell Creek (Appendix 7 Tables 1 and 4). Spawning was finished, and only a single pink carcass was found. Three pink redds were also observed in the lower reach of Shea Creek. Redd sites have been marked on the 1:20,000 mapsheets.

Pink salmon fry emergence in the Morice occurs mainly during the period May1-15$^{th}$ (Envirocon Ltd. 1984). We suspect the timing is similar in Gosnell Creek.

#### 4.2.6.2 Mountain Whitefish

Mountain whitefish were present at five locations in the lower and mid reaches of Gosnell Creek and the lower reach of Crystal Creek (Table 5). In total, 18 mountain whitefish were sampled during the program, representing less than 1% of the overall catch. The whitefish captured were a mix of age 0 and age 1+ fish.

This information indicates that mountain whitefish are a minor species in the watershed during the August and September sample period of 1998. Studies conducted in the Morice River in 1979 indicated that while mountain whitefish were common throughout the Morice River, juveniles were infrequent in both the mainstem and throughout tributaries. Mainstem sampling indicated more whitefish were present in subsequent

years, suggesting that floods during the fall of 1978 had a large impact on the subsequent year's fry production.

#### 4.2.6.3 Lake Chub

Lake chub were sampled at 12 locations in six tributaries in the Gosnell Watershed during the 1998 studies. Nearly all of the sites were associated with ponds and small lakes, and most of the lake chub were captured in minnow traps. A total of 2172 lake chub were captured at these sites, sometimes with several hundred lake chub in a single trap. Fork lengths ranged from 24 to 114 mm. Lake chub were often associated with sites that appear to have poor water quality, warm water temperatures and typically low abundance of other species.

Tributaries with lake chub present include Tributary 2520; Tributary 3140; Tributary 3900; Tributary 4290; and Tributary 5610.

#### 4.2.6.4 Prickly Sculpins

Prickly sculpins were only present at a single sample site (Site 196) in Tributary 3900. The 18 sculpins captured at this site represent less than 1% of the overall fish catch in the Gosnell (Table 7).

# 5.0 CONCLUSIONS AND RECOMMENDATIONS

## 5.1 SIGNIFICANT FISH AND FISH HABITAT FEATURES

A review of the fish and fish habitat studies conducted in 1998 in addition to information collected in past studies highlights some critical fish habitat components to the Gosnell Watershed. These include the following:

### 5.1.1 Steelhead

Shea Creek mainstem up to the impassable falls below Shea Lake provides the best combination of spawning and rearing habitat for steelhead in the watershed. Reaches 2, 3 and the top of Reach 5 on mainstem Gosnell Creek also provide important steelhead spawning habitat. Rearing along the mainstem of Gosnell Creek, while good for steelhead fry, is not as suited for steelhead parr rearing. In general, smaller tributaries to Gosnell Creek are of minor importance to steelhead production in the watershed. The main holding and overwintering areas for Gosnell Creek adult steelhead are in the mainstem Morice both upstream and below the Gosnell confluence. The falls in Reach 6 may be a point of difficult passage for steelhead during the high streamflow conditions in May.

### 5.1.2 Coho

The combination of excellent spawning habitat in the mainstem Gosnell (Reaches 2, 3 and especially upper Reach 5) and several key tributaries, in conjunction with a wide valley flat that has extensive rearing in numerous smaller tributaries and off-channel pond and wetland habitats, makes Gosnell Creek the top coho tributary in the Morice Watershed. Each of the 15 coho tributaries identified in this study is contributing to overall coho production in the watershed, and adult and juvenile access in these tributaries is critical to maintaining their productivity. Tributaries 4290, 5610 and 5730 are probably the best coho spawning tributaries to Gosnell Creek.

The main holding/staging area for Gosnell Creek coho is in the section of the Morice River downstream from the confluence of the Gosnell. The falls in Reach 6 are not considered a barrier to coho, and juveniles have been captured upstream during some years.

### 5.1.3 Bull Trout

Reach 7 of the mainstem Gosnell is the key bull trout spawning habitat in Gosnell Creek. The abundance of bull trout redds observed in this reach are the highest that we have observed in any tributary in the Morice/Bulkley system. Other minor spawning areas include Reaches 5, 8, and 9 of the mainstem Gosnell and the mid and upper reaches of Crystal Creek.

Index site sampling in the mainstem of Gosnell Creek indicated scattered rearing from Reach 8 downstream, with the highest abundance in Reach 5 (Figure 12). The low abundance of juveniles does not account for the number of juvenile bull trout that might be expected given the number of redd sites identified. The index sites may have been too widely spaced to specifically identify key rearing habitats along the mainstem. Bull trout juveniles were also located at eight sites in Crystal Creek, indicating that this tributary provides important rearing habitat for this species. A few bull trout juveniles were captured in three other Gosnell Creek tributaries.

The falls and canyon section in Reach 6 of Gosnell Creek was identified as a key staging area for bull trout. The falls was not a barrier to fish passage.

### 5.1.4 Dolly Varden

Dolly Varden had a widespread distribution throughout the watershed, Although no single critical habitat component was identified during the studies, there was an increase in Dolly Varden spawner and rearing abundance in the upper sections of the watershed. This increased abundance in the upper watershed may reflect less competition from salmon and steelhead compared to sites in the lower watershed. As well, groundwater seepage areas appear to be important habitats for Dolly Varden.

### 5.1.5 Cutthroat Trout

Cutthroat trout were also widely distributed in 10 tributaries in the lower and mid reaches of Gosnell Creek. A common characteristic of the cutthroat tributaries was the presence of a lake or pond in the system - and we suspect that these are essential for adult cutthroat trout. The ability for adult and juveniles to freely move between the lake and spawning and rearing habitat in the inlet and outlet streams is important for this species.

## 5.2 FOLLOW-UP FISH SAMPLING

The fish sampling program that was undertaken during the 1998 field program was extensive and thorough, and we suggest the resulting information is a good reflection of fish distribution and relative abundance in the watershed at a 1:20,000 scale. No major areas requiring re-sampling were identified.

Appendix 9 Table 1 reviews all of the non fish-bearing reaches identified during the 1998 field surveys, the resulting stream classification (including the rationale for the classification), and whether or not follow-up sampling is recommended.

We have typically been conservative in our stream classification and have tended to classify areas as fish habitat or suspected fish habitat, if they had good access and appeared to have potential fish use - even if no fish were sampled at these locations. This is particularly relevant on the main Gosnell floodplain, where fish (particularly coho)

may access sites during high flow events during some years. We would recommend that those areas that are identified as suspected fish habitat are the main areas that would need to be re-sampled if operations are planned in their vicinity and if there was a desire to downgrade their classification. Re-sampling of these locations should be undertaken during the late summer and early fall period.

As well, Appendix 9 Table 1 identifies a number of sites located upstream from beaver dam barriers that were non fish-bearing based on minnow trapping. These sites tended to have poor water quality and low or no discharge at the outlets. These areas were classified as non fish-bearing, but some have been recommended for re-sampling if future activities are planned in their vicinity. As well, a small number of sites in the upper sections of tributaries that could only be assessed by aerial observation were classed as non fish-bearing. Several of these were identified for re-sampling when there is better access to these reaches.

Four areas located in the vicinity of future cutblocks were identified as sites needing more detailed assessment of fish and habitat potential. All of these sites were located on fans and had complex unmapped seepage channels that had potential fish use. These areas were in the vicinity of Sites 250, Site 270, 274 and 276.

The final area that could be re-examined is Gosnell Creek in the vicinity of the falls in Reach 6 and the spawning area in Reach 7 during the period mid-August through early September. The 1998 field studies in this section were conducted too late to directly observe adult bull trout in these section, and only bull trout redds were found during the late September surveys. Future observations would probably best be conducted as part of an overall adult bull trout study proposed for the Morice River and tributaries.

## 5.3 HABITAT PROTECTION CONCERNS AND RECOMMENDATIONS

During the course of the 1998 field surveys observations were made of number of fish habitat protection concerns in the Gosnell Watershed. Many of these observations were related to road crossings - both existing and planned crossing sites. As well, observations related to cutblock layout relative to streams (existing and proposed) were made and are outlined in the following section.

### 5.3.1 Stream Crossings

#### 5.3.1.1 Proposed Crossing Sites

1. Sites 125 and 146 (Tributary 2830-2968). These two crossing sites have temporary bridges. These are important cutthroat spawning creeks, and any replacement crossings at these two sites should be open-bottomed structures - not standard culvert installations.

2. Site 173 (Tributary 3770) - The old bridge was removed at this site. This is an important coho creek and has cutthroat and Dolly Varden present. We suggest that future road access at this site should use a bridge crossing.

3. Site 207 (Tributary 4290) - This proposed crossing site should have a bridge installation. This is A coho, Dolly Varden and cutthroat spawning stream, and it is important that fry can access the upstream wetlands.

4. Site 227 (Tributary 5610) - This proposed crossing site should have a bridge installation. This is a good coho, steelhead, cutthroat and Dolly Varden spawning stream. Fry movements up into wetland areas are critical.

5. Site 232 (Tributary 5610-0640) - Poor water quality upstream from this site, with only lake chub present. There is no spawning opportunity in the lake outlet and we suspect salmonids use only in the lower section of this creek. A culvert installation is suitable at this location.

6. Site 240 (Tributary 5730) - This site should have a bridge installation to ensure fry upstream movements into wetlands.

7. Site 281 (Tributary 8250), Site 282 (Tributary ILP 1720), and 283 (Tributary 8460) have dynamic unstable fans on their lower sections and should all be crossed upstream from the fan areas.

#### 5.3.1.2 Existing Crossing Sites

No stream crossings were identified during the field program that were obvious blockages restricting fish access to important habitat upstream.

Recent culvert placements in the Gosnell have involved installing large culverts at a low gradient embedded into the streambed. While this has helped to alleviate the problems of impassable drops developing at the outlet, there are a number of instances where the tops of the culverts are points of difficult passage for juveniles due to steep drops at the culvert invert. In some instances, this may be rectified over time with bed material downcutting and partially infilling the culvert. Our assessment during the field surveys suggests these kinds of culvert placements on creeks in the 4-5% gradient range are only partially effective.

Following is a review of some of the more important road crossings on fish streams:

1. Site 46 (Tributary 1730-3150-166) - Erosion occurring at the approaches to this stream crossing have created a sediment source that is the worst observed in the Gosnell Watershed. Site rehabilitation should be undertaken at this crossing area.

2. Site 83 (Tributary 2440) - This is a single long culvert with a high fill placed on a Dolly Varden spawning creek. There is some sediment input from the fill. This is a marginal installation that probably should have used a larger culvert embedded into the streambed. We are unsure whether spawning fish upstream are residents, or whether they have been able to pass through this structure. Not recommended for replacement.

3. Site 91 (Tributary 2520-6980) - Two 1.7 m by 18 m long culverts placed on a cutthroat and Dolly Varden spawning creek. We suspect this culvert is passable to adults but probably not passable to fry or smaller juveniles.

4. Site 97 (ILP 1704) - Small unmapped cutthroat spawning creek. Dolly Varden are also present. We recommend this culvert be removed after logging is completed at this site.

5. Sites 108 & 109 (Tributary 2830-2715) - Coho, Dolly Varden, cutthroat and steelhead are present below this culvert. This creek is dry upstream during the late summer surveys. We suspect this 4% by 18 m long culvert is impassable to juveniles and this may restrict seasonal use in a short section (100 m) of potential habitat upstream.

6. Site 185 (Tributary 3770-3470-2410) - Dolly Varden and cutthroat spawning creek. 2 m by 18 m long culvert partly buried. There is a small drop at the inlet end of this culvert, but it appears to be passable.

7. Site 187 (ILP 1314) - Dolly Varden spawning creek. This 2 m by 17 m long culvert has an upstream inlet drop. Fish are present to the inlet of the culvert but are not present in the 80 m of potential habitat upstream from the culvert.

### 5.3.2 Cutblock Layout

The following habitat issues were noted at proposed and existing cutblocks during the 1998 field studies:

#### 5.3.2.1 Proposed Cutblocks

1. Block GSNL CR4 - Crystal Creek - There are unstable banks along this section of Crystal Creek. The proposed cutblock should be kept well back from the edge of these areas of instability.

2. Block GSNL 0G4 - Site 213 (Tributary 4290-2871) - This is an unstable creek. The edge of the setting should be well back from this stream.

3. Site 230 (Tributary 5610) - This is a very unstable fan and the road crossing would have been better upstream from the present location. We recommend avoiding logging on this fan that is used by Dolly Varden spawners.

4. Block GNSL G13 - Mainstem Gosnell Creek - Field observations indicated that fine-textured unstable banks were located along the bench in this section (Photo 8). The edge of any cutblocks in this section should be located well back from the edge of the bench in these areas of instability.

5. Block GSNL N12 - A high water channel of the Gosnell runs through the middle of this proposed cutblock which is located just upstream from some of the best coho spawning habitat in the watershed. This area should be treated as floodplain, and logging plans should recognize that the mainstem creek may shift into this area.

6. Block GSNL N16 - (Tributary 5730) This block has a creek with an unstable gully running through the middle of it. The design of this block should recognize that both forks of this creek are used by fish.

#### 5.3.2.2 Past logging

1. Site 49 (Tributary ILP 1701) - Logged across a fish section of the tributary stream to Crystal Creek in this cutblock. This stream was previously incorrectly classified in its upper section.

2. Site 87 (Tributary 2520) - An inadequate riparian reserve was left along this cutthroat trout lake.

3. Block GSNL 0G3 (Tributary ILP 1605) - No reserve was left along this Dolly Varden creek in the vicinity of Sites 111 and 114.

4. Site 116 (Tributary 2830-2798) - Blowdown and slumps have occurred in the creek gully that flows directly into a key spawning section of Shea Creek.

## 5.4 SPORT FISHERY POTENTIAL FOR GOSNELL WATERSHED

Although the Gosnell is utilized by bull trout, coho and steelhead, it is primarily a spawning and rearing tributary for these species. Any sport fishery for these species should be conducted downstream from the Gosnell in the Morice, Bulkley and Skeena River systems depending upon escapements and management objectives.

The development of road access in the vicinity of the falls and canyon section in Reach 6 of the Gosnell should be avoided. This is a staging area for bull trout, and a potential area for illegal angling.

The small lakes in the watershed offer a limited opportunity for a cutthroat trout fishery. Direct vehicle access to these lakes should be avoided. Julian Holland Lakes provide a high catch per effort of moderately-sized cutthroat trout (to 31 cm) and no special angling or access management was recommended for these lakes (Degisi and Schell 1997).

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| **Appendix 1 Table 1. Sampling Equipment List for Gosnell Watershed Project** |
|---|
| 3 Smith-Root electroshockers Model 15-C with gas-powered Honda EX350 generators |
| Waders/vests/lineman gloves/scoops/site and fish cards/field note books |
| 15-30-50 foot stopnets- 2 of each with 6 aluminum bipods and ropes |
| 100 Gee minnow traps and salmon roe bait |
| 4 Icom programmable radios |
| Misc. fish measuring boards and buckets/alka seltzer/micrscope slides |
| Sartorius electronic balance |
| Ohaus electronic balance |
| 3 hip-chains and thread/flagging tape |
| 3 Sunto clinometers/compasses |
| Pocket thermometers |
| 3 pH meters - pHTestr2 |
| 3 TDS meters - Testr2 |
| 2 Cameras - Pentax Zoom 90WR - 35 mm |
| Formalin/whirlpacks for voucher specimens |
| Elsom 30 and 50 m tapes/meter sticks for depths etc. |
| Polaris ATV for access |
| 2 - four wheel drive rental trucks |
| 2 Dry suits |
| Survival kit and first aid kits with backpacks for each crew |
| Bear sprays and 12 gauge shotgun for mainstem Gosnell |
| Polarized glasses and ball cap for each crew member |
| Tool kits for repairs |
| Project air photos and maps |
| Angling gear (collapsible rod and spinners) |

## Appendix 2 Table 1. Fish Bearing Reaches of Gosnell Watershed.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond | Channel Width | Channel Gradient | RBT | COHO | CT | DV | BT | MW | SCULPINS | LAKE CHUB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gosnell mainstem | 460-600600-50800-00500 | 2 | 1 | 980921 | 9.5 | 50 | 55 | 1.5 | 1 | 1 | | 1 | | 1 | | |
| Gosnell mainstem | 50800-00500 | 2 | 2 | 980922 | 7 | 70 | 52 | 1 | 1 | | | 1 | | 1 | | |
| Gosnell mainstem | 50800-00500 | 3 | 3 | na | | | 34.8 | 1 | 1 | | | 1 | | | | |
| Gosnell mainstem | 50800-00500 | 3 | 4 | 980922 | 8.3 | 50 | 50.9 | 1 | 1 | | | 1 | | 1 | | 1 |
| Gosnell mainstem | 50800-00500 | 4 | 5 | 980923 | 6 | 70 | 26.2 | 2 | 1 | 1 | | 1 | 1 | 1 | | |
| Gosnell mainstem | 50800-00500 | 5 | 6 | 980822 | 8 | | 43.5 | 1 | 1 | 1 | | 1 | | 1 | | |
| Gosnell mainstem | 50800-00500 | 5 | 7 | 980930 | 8.2 | 60 | 11.5 | 2 | | 1 | | | | | | |
| Gosnell mainstem | 50800-00500 | 5 | 8 | 980923 | 7 | 70 | 21.3 | 1 | 1 | 1 | | 1 | 1 | | | |
| Gosnell mainstem | 50800-00500 | 7 | 9 | 980923 | 6.5 | | 66.0 | 1 | | | | 1 | | | | |
| Gosnell mainstem | 50800-00500 | 7 | 10 | 980923 | 8 | 60 | 39.0 | 3 | | | | 1 | | | | |
| Gosnell mainstem | 50800-00500 | 8 | 11 | 980923 | 7.5 | | 18.5 | 1 | | | | 1 | 1 | | | |
| Gosnell mainstem | 50800-00500 | 9 | 12 | 980925 | 5.5 | 40 | 24.4 | 1 | | | | 1 | | | | |
| Gosnell mainstem | 50800-00500 | 9 | 13 | 980923 | na | | 7.2 | 0.5 | | | | 1 | | | | |
| Gosnell mainstem | 50800-00500 | 9 | 14 | 980929 | 6 | 10 | 1.9 | 1 | | | | 1 | | | | |
| Lower Gosnell tribs | ILP 1717 | 2 | 16 | 980805 | 11.5 | 40 | 1.3 | 3.3 | | | 1 | | | | | |
| Lower Gosnell tribs | ILP 1717 | 3 | 17 | 980806 | 10 | 50 | 0.9 | 4 | | | | | | | | |
| Lower Gosnell tribs | ILP 1406 | 1 | 19 | 980807 | 11 | 30 | 1.5 | 8 | 1 | 1 | | 1 | | | | |
| Lower Gosnell tribs | 50800-00500 | 2 | 23 | 92298 | 7.7 | 70 | 4.6 | 2 | 1 | 1 | | | | | | |
| Lower Gosnell tribs | ILP 1424 | 2 | 27 | 980805 | na | | na | na | | | | | | | | |
| Crystal Creek | 50800-00500-1730 | 1 | 28 | 980903 | 12 | 50 | 35.3 | 1 | 1 | 1 | | 1 | | 1 | | |
| Crystal Creek | 50800-00500-1730 | 2 | 29 | 980917 | 8.5 | 40 | 20 | 3 | 1 | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730 | 2 | 30 | 980806 | 13 | 60 | 26.1 | 2.5 | 1 | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730 | 2 | 31 | 980914 | 8 | | 48.2 | 4 | 1 | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730 | 3 | 32 | 980902 | 9 | 80 | 12.0 | 6.5 | | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730 | 5 | 33 | 980901 | 9 | 60 | 9.6 | 4 | | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730-2300 | 1 | 36 | 980806 | 12 | 100 | 2.0 | 7.3 | 1 | 1 | | 1 | | | | |
| Crystal Creek | ILP 1282 | 1 | 39 | 980810 | na | | na | na | | | | | | | | |
| Crystal Creek | 50800-00500-1730-3150 | 1 | 41 | 980902 | 9 | 40 | 5.4 | 1.5 | 1 | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-3150 | 2 | 42 | 980917 | 6 | 30 | 4.4 | 6.5 | 1 | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-3150 | 2 | 43 | 980821 | 12.5 | 50 | 2.6 | 2.5 | | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-3150 | 4 | 44 | 980924 | 9 | | 2.0 | 5 | | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-3150-166 | 1 | 45 | 980917 | 7.8 | 20 | 3.1 | 7 | 1 | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-3150-408 | 1 | 47 | 980917 | 6.5 | 20 | 1.2 | 14.7 | | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-3150-408 | 2 | 48 | 980917 | 8 | 20 | na | na | | | | | | | | |

## Appendix 2 Table 1. Fish Bearing Reaches of Gosnell Watershed.

| Stream Name | Watershed Code | Reach | Site | Date | Temp | Cond | Channel | | RBT | COHO | CT | DV | BT | MW | SCULPINS | LAKE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | or ILP | | | m/d/y | C | | Width | Gradient | | | | | | | | CHUB |
| Crystal Creek | ILP 1701 | 1 | 49 | 980924 | 8 | | 2.8 | 11 | | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-6460 | 1 | 62 | 980827 | 8 | 50 | 2.0 | 8.5 | | | | 1 | | | | |
| Crystal Creek | 50800-00500-1730-6790 | 1 | 65 | 980827 | 7.5 | 40 | 5.3 | 14.5 | | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730 | 4 | 66 | 980827 | 8 | 60 | 12.1 | 3 | | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730-7540 | 1 | 67 | 980901 | 10 | 50 | 9.3 | 12.5 | | | | 1 | | | | |
| Crystal Creek | ILP 1221 | 1 | 70 | 980901 | 8 | 40 | 1.3 | 1.5 | | | | 1 | 1 | | | |
| Crystal Creek | 50800-00500-1730-8850 | 1 | 72 | 980901 | 9 | 60 | 16.7 | 5.5 | | | | 1 | | | | |
| Lower Gosnell tribs | 50800-00500-1890 | 1 | 73 | 980806 | 9 | 70 | 1.4 | 1 | | 1 | | | | | | |
| Lower Gosnell tribs | 50800-00500-2000 | 1 | 77 | 980915 | 5 | 100 | 1.4 | 5.5 | | 1 | | | | | | |
| Lower Gosnell tribs | ILP 1431 | 1 | 80 | 980915 | 4 | 60 | 1.3 | 5 | | 1 | | | | | | |
| Lower Gosnell tribs | 50800-00500-2400 | 1 | 81 | 980818 | 8 | 100 | 1.6 | 1.5 | | | | 1 | | | | |
| Lower Gosnell tribs | 50800-00500-2440 | 2 | 83 | 980806 | 11 | 80 | 2.0 | 3.5 | | | | 1 | | | | |
| Lower Gosnell tribs | 50800-00500-2520 | 2 | 84 | 980819 | 13 | 60 | 3.2 | 1 | | 1 | 1 | 1 | | | | |
| Lower Gosnell tribs | 50800-00500-2520 | 3 | 85 | 980818 | 12 | 60 | 3.4 | 2 | | 1 | 1 | 1 | | | | |
| Lower Gosnell tribs | 50800-00500-2520 | 4 | 86 | 980805 | 12 | 70 | 4.7 | 2.5 | | | 1 | 1 | | | | |
| Lower Gosnell tribs | 50800-00500-2520 | 8 | 87 | 980811 | 17 | 60 | na | 0 | | | 1 | | | | | 1 |
| Lower Gosnell tribs | 50800-00500-2520-6980 | 2 | 91 | 980805 | na | 50 | 3.4 | 2.5 | | | 1 | 1 | | | | |
| Lower Gosnell tribs | 50800-00500-2520-6980 | 3 | 92 | 980810 | 9 | 30 | 2.0 | 3.5 | | | | | | | | |
| Lower Gosnell tribs | 50800-00500-2520-6980 | 4 | 93 | 980810 | 9 | 30 | 2.5 | 11 | | | | | | | | |
| Lower Gosnell tribs | ILP 1319 | 1 | 95 | 980810 | 9 | 80 | 0.8 | 6 | | | 1 | 1 | | | | |
| Lower Gosnell tribs | ILP 1320 | 2 | 96 | 981001 | 7 | na | 1.2 | 5.8 | | | 1 | | | | | |
| Lower Gosnell tribs | ILP 1704 | 1 | 97 | 980810 | 12 | 60 | 1.1 | 5.5 | | | 1 | 1 | | | | |
| Shea Creek | 50800-00500-2830 | 1 | 100 | 980923 | 8 | na | 14.6 | 1 | 1 | 1 | 1 | 1 | | | | |
| Shea Creek | 50800-00500-2830 | 1 | 101 | 980831 | 15 | na | 19.8 | 1 | 1 | 1 | 1 | 1 | | | | |
| Shea Creek | 50800-00500-2830 | 1 | 102 | 980903 | 12 | 40 | 8.2 | 2 | 1 | 1 | | 1 | | | | |
| Shea | 500-2830 | 2 | 103 | 980922 | 6.5 | na | 18.3 | 3 | 1 | 1 | | 1 | | | | |
| Shea | 500-2830 | 2 | 104 | 980922 | 6.5 | na | 17.2 | 1 | 1 | 1 | | 1 | | | | |
| Shea | 500-2830-2623 | 2 | 106 | 980817 | na | | na | na | | | | | | | | |
| Shea | 500-2830-2715 | 1 | 108 | 980826 | 9 | 50 | 1.7 | 6 | 1 | 1 | 1 | 1 | | | | |
| Shea | ILP 1605 | 1 | 110 | 980813 | 10 | 70 | 5.4 | 0.5 | | 1 | | 1 | | | | |
| Shea | ILP 1605 | 2 | 111 | 980818 | 13 | 40 | 1.7 | 3 | | | | 1 | | | | |
| Shea | 500-2830-3013 | 1 | 119 | 980922 | 7 | na | 1.4 | 4 | | | | 1 | | | | |
| Shea | 500-2830-2968 | 1 | 121 | 980922 | 7 | | 3.9 | 2 | | 1 | 1 | | | | | |
| Shea | 500-2830-2968 | 2 | 122 | 980901 | 12.5 | | 4.3 | 0.5 | | | | 1 | | | | |

## Appendix 2 Table 1. Fish Bearing Reaches of Gosnell Watershed.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond | Channel Width | Channel Gradient | RBT | COHO | CT | DV | BT | MW | SCULPINS | LAKE CHUB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shea | 500-2830-2968 | 2 | 123 | 980825 | 12 | 40 | 5.3 | 4 | | | 1 | 1 | | | | |
| Shea | 500-2830-2968 | 4 | 124 | 980903 | 8.5 | 50 | 3.7 | 0.5 | | | 1 | 1 | | | | |
| Shea | 500-2830-2968 | 5 | 125 | 980813 | 11 | 40 | 3.1 | 4 | | | 1 | | | | | |
| Shea | 500-2830-2968 | 6 | 126 | 980813 | 16 | 70 | 2.2 | 0.75 | | | 1 | | | | | |
| Shea | ILP 1594 | 1 | 134 | 980901 | na | | na | na | | | | | | | | |
| Shea | 500-2830-2968-433-179 | 1 | 135 | 980901 | na | | na | 0 | | | 1 | | | | | |
| Shea | 500-2830-2968-433-179 | 3 | 136 | 980903 | na | | na | 0 | | | | | | | | |
| Shea | 500-2830-2968-477 | 1 | 139 | 980903 | 8 | 20 | 1.7 | 5 | | | 1 | 1 | | | | |
| Shea | 500-2830-2968-477 | 2 | 140 | 980901 | na | | na | 0 | | | 1 | | | | | |
| Shea | 500-2830-2968-477 | 4 | 141 | 980903 | 8 | 40 | 0.4 | 3 | | | | | | | | |
| Shea | 500-2830-2968-507 | 1 | 143 | 980903 | 9 | 60 | 1.7 | 2 | | | 1 | 1 | | | | |
| Shea | 500-2830-2968-566 | 1 | 146 | 980820 | 10 | 50 | 2.4 | 2 | | | 1 | 1 | | | | |
| Shea | 500-2830-2968-566 | 1 | 147 | 980903 | 9 | 40 | 2.4 | 6.5 | | | 1 | | | | | |
| Shea | 500-2830-3266 | 1 | 148 | 980922 | 7.5 | na | 1.8 | 3.5 | | | | | | | | |
| Mid Gosnell Tribs | 500-3080 | 2 | 156 | 980812 | 9 | 50 | 1.1 | 8 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-3140 | 1 | 161 | 980824 | 10.5 | 90 | na | 0 | | 1 | | | | | | 1 |
| Mid Gosnell Tribs | 500-3140 | 3 | 162 | 980807 | na | | na | | | | | | | | | |
| Mid Gosnell Tribs | 500-3140-3350 | 1 | 163 | 980824 | 17 | 70 | 2.3 | 0.5 | | | | | | | | 1 |
| Mid Gosnell Tribs | 500-3140-3350 | 2 | 164 | 980825 | 11 | 90 | 2.0 | 3 | | 1 | | 1 | | | | |
| Mid Gosnell Tribs | ILP 1467 | 1 | 165 | 980818 | 23.5 | 140 | 1.6 | 0.3 | | | | | | | | 1 |
| Mid Gosnell Tribs | ILP 1466 | 1 | 167 | 980818 | na | 60 | 0.7 | 5 | | | | | | | | |
| Mid Gosnell Tribs | ILP 1466 | 1 | 168 | 980807 | na | | na | | | | | | | | | |
| Mid Gosnell Tribs | 500-3770 | 1 | 172 | 980818 | 9.1 | 60 | 4.5 | 1 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-3770 | 2 | 173 | 980805 | 11 | 70 | 5.6 | 4 | | 1 | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-3770 | 3 | 174 | 980812 | 11 | 70 | 3.6 | 5 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-3770 | 4 | 175 | 980820 | 11 | 80 | 2.2 | 0.5 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-3770 | 4 | 176 | 980826 | 9 | 60 | 3.2 | 3.5 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | ILP 1307 | 1 | 179 | 980821 | 11 | 60 | na | na | | | | | | | | |
| Mid Gosnell Tribs | 00926MORR | 2 | 180 | 980806 | na | | na | 0 | | | 1 | | | | | 1 |
| Mid Gosnell Tribs | 500-3770-3470 | 1 | 181 | 980811 | 8 | 60 | 1.9 | 4 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-3770-3470-241 | 2 | 185 | na | na | 60 | 2.9 | 5 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-3770-3470-241 | 2 | 186 | 980813 | 9 | 60 | 2.4 | 4.5 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-3770-3470-241 | 1 | 187 | 980813 | 9 | 60 | 1.9 | 4 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-3770-3470-241 | 3 | 188 | 980813 | 9 | 70 | 0.3 | 6 | | | | 1 | | | | |

## Appendix 2 Table 1. Fish Bearing Reaches of Gosnell Watershed.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond | Channel Width | Channel Gradient | RBT | COHO | CT | DV | BT | MW | SCULPINS | LAKE CHUB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mid Gosnell Tribs | ILP 1803 | 1 | 193 | 980826 | 7 | 70 | 2.2 | 7.5 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-3900 | 1 | 196 | 980824 | na | | na | 0 | | | 1 | | | | 1 | 1 |
| Mid Gosnell Tribs | 500-4490 | 1 | 200 | 980825 | 9 | 30 | 3.2 | 2 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-4490 | 1 | 201 | 980807 | 11 | 70 | 2.6 | 4 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-4490 | 2 | 202 | 980811 | 9 | 80 | 4.7 | 7.8 | | | | 1 | | | | |
| Mid Gosnell Tribs | ILP 1454 | 1 | 203 | 980811 | 9 | 100 | 1.4 | 9 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-4490-4260 | 1 | 205 | 980811 | 9 | 100 | 0.5 | 2 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-4290 | 1 | 206 | 980814 | 10 | 60 | 4.9 | 1 | | 1 | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-4290 | 2 | 207 | 980820 | 9 | 50 | 4.2 | 2 | | 1 | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-4290 | 3 | 208 | 980825 | 13 | 110 | 4 | 0.5 | | | | 1 | | | | 1 |
| Mid Gosnell Tribs | ILP 1299 | 1 | 210 | 980814 | 9 | 60 | 0.9 | 1.5 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | ILP 1299 | 2 | 211 | 980814 | 9 | 50 | 1.7 | 11 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-4290-2871 | 2 | 212 | 980814 | 9 | 70 | 2.5 | 2 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-4730 | 3 | 217 | 980807 | 11 | 120 | 9.0 | 6.5 | | 1 | | 1 | | | | |
| Mid Gosnell Tribs | 500-4730-0990 | 1 | 218 | 980825 | 10 | 90 | 3.7 | 6 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-4730-0990 | 2 | 219 | 980812 | 10 | na | 2.7 | 6 | | | | 1 | | | | |
| Mid Gosnell Tribs | ILP 1197 | 1 | 220 | 980812 | 10 | na | 2.1 | 6 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-4730-1870 | 1 | 221 | 980810 | 11 | 100 | 1.3 | 4 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | ILP 1194 | 1 | 222 | 980810 | 13 | 50 | 0.6 | 10 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5200 | 1 | 223 | 980813 | 10 | 70 | 6.1 | 5.5 | 1 | 1 | | 1 | 1 | | | |
| Mid Gosnell Tribs | 500-5200 | 2 | 224 | 980812 | 11 | na | 7.5 | 8.3 | 1 | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5610 | 1 | 227 | 980825 | 11 | 40 | 4.4 | 1..5 | 1 | 1 | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-5610 | 3 | 228 | 980825 | 11 | 40 | 2.4 | 0.5 | | 1 | 1 | 1 | | | | 1 |
| Mid Gosnell Tribs | 500-5610 | 3 | 229 | 980825 | 11 | 20 | 3.1 | 2 | | | 1 | 1 | | | | |
| Mid Gosnell Tribs | 500-5610 | 4 | 230 | 980819 | 11 | 40 | 6.1 | 4 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5610 | 5 | 231 | 980820 | 11 | 40 | 22 | 11.5 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5610-0640 | 1 | 232 | 980915 | 5.8 | 60 | 1.1 | 6.0 | | | | | | | | 1 |
| Mid Gosnell Tribs | 500-5610-0640 | 2 | 233 | 980915 | na | | na | 0 | | | | | | | | 1 |
| Mid Gosnell Tribs | 500-5610-2790 | 1 | 234 | 980821 | 11 | 60 | 22.5 | 0.5 | | | | 1 | | | | 1 |
| Mid Gosnell Tribs | 500-5610-3720 | 1 | 236 | 980820 | 11 | 40 | 3.9 | 5 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5730 | 1 | 240 | 980930 | 7.2 | 60 | 7.9 | 1.5 | | 1 | | 1 | | | | |
| Mid Gosnell Tribs | 500-5730 | 1 | 241 | 980915 | 4.5 | 60 | 8.6 | 0.5 | | 1 | | 1 | | | | |
| Mid Gosnell Tribs | 500-5730 | 2 | 242 | 980915 | 7 | 40 | 6.3 | 3 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5730 | 2 | 243 | 980925 | 7 | na | 5.8 | 3.5 | | | | 1 | | | | |

## Appendix 2 Table 1. Fish Bearing Reaches of Gosnell Watershed.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond | Channel Width | Channel Gradient | RBT | COHO | CT | DV | BT | MW | SCULPINS | LAKE CHUB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mid Gosnell Tribs | 500-5730 | 3 | 245 | 980915 | na | | na | 0 | 1 | | | | | | | |
| Mid Gosnell Tribs | 500-5730-0240 | 1 | 246 | 980928 | 7 | 70 | 1.5 | 14.3 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5730-3200 | 2 | 250 | 980915 | 6 | 80 | 1.3 | 4.5 | | | | 1 | | | | |
| Mid Gosnell Tribs | ILP 1708 | 1 | 251 | 980929 | 6.5 | 70 | 3.1 | 3 | | | | 1 | | | | |
| Mid Gosnell Tribs | ILP 1709 | 1 | 252 | 980916 | 6 | 40 | 2.6 | 8 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5730-5370 | 1 | 256 | 980916 | 7 | 20 | 3.9 | 5 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-5730-5370-5830 | 1 | 258 | 980915 | 7 | 50 | 3.2 | 5 | | | | 1 | | | | |
| Mid Gosnell Tribs | 500-6260 | 2 | 263 | 980915 | 8 | 50 | 40 | 0 | | 1 | | 1 | | | | |
| Upper Gosnell Tribs | ILP 1712 | 2 | 269 | 980916 | 7 | 40 | 3.1 | 5 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-7260 | 3 | 270 | 980916 | 8 | 90 | 1.4 | 6 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-7260-4815 | 1 | 271 | 980916 | 8 | 90 | 2.0 | 4 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-7520 | 1 | 272 | 980918 | 6.5 | 90 | 11.6 | 9.8 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-7690 | 2 | 274 | 980918 | 8.5 | 50 | 2.4 | 2.5 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-7790 | 2 | 275 | 980918 | 7.5 | 30 | 1.9 | 9 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-7930 | 1 | 276 | 980918 | 6.5 | 130 | 2.2 | 1.5 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-7930 | 2 | 277 | 980918 | 6.5 | 130 | 1.1 | 6.3 | | | | | | | | |
| Upper Gosnell Tribs | ILP 1713 | 1 | 278 | 980918 | 7 | 90 | 2.2 | 1.5 | | | | 1 | | | | |
| Upper Gosnell Tribs | ILP 1713 | 1 | 279 | 980925 | 7 | 40 | 4.8 | 5 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-8250 | 1 | 280 | 980922 | 6.5 | na | 1.8 | 7.5 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-8250 | 1 | 281 | 980925 | 4.5 | 50 | 10.0 | 4 | | | | 1 | | | | |
| Upper Gosnell Tribs | ILP 1720 | 1 | 282 | 980929 | 8.3 | 80 | 95 | 4 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-8460 | 1 | 283 | 980918 | 8.2 | 100 | 15.1 | 3.5 | | | | 1 | 1 | | | |
| Upper Gosnell Tribs | 500-8850 | 1 | 288 | 980925 | 6 | 70 | 2.5 | 5.5 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-9170 | 2 | 290 | 980925 | 6 | 60 | 6.8 | 5 | | | | 1 | 1 | | | |
| Upper Gosnell Tribs | 500-9310 | 1 | 291 | 980925 | 6 | 60 | 3.2 | 8 | | | | 1 | | | | |
| Upper Gosnell Tribs | ILP 1086 | 1 | 293 | 980929 | 5.5 | 40 | 2.6 | 4 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-9430 | 1 | 294 | 980929 | 6.5 | 30 | 3.9 | 3 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-9430 | 1 | 295 | 980929 | 6 | 30 | 26.8 | 5 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-9490 | 2 | 297 | 980925 | 6 | 40 | 3.8 | 7 | | | | 1 | | | | |
| Upper Gosnell Tribs | ILP 1094 | 1 | 298 | 980929 | 5.5 | 50 | 2.3 | 4.5 | | | | 1 | | | | |
| Upper Gosnell Tribs | ILP 1094 | 2 | 299 | 980929 | 5 | 30 | 5.9 | 12 | | | | 1 | | | | |
| Upper Gosnell Tribs | 500-9690 | 2 | 300 | 980929 | 7 | 30 | 2.5 | 3 | | | | 1 | | | | |

## Appendix 2 Table 2. Non Fish-Bearing Reaches of the Gosnell Watershed 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond (uS) | Gradient (%) | Trap # | Shocker Specs Time (sec) | Shocker Specs Length (m) | COMMENT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lower Gosnell tribs | ILP 1717 | 1 | 15 | 980805 | 12 | 50 | 0.8 | | 507 | 100 | |
| Lower Gosnell tribs | ILP 1423 | 1 | 18 | 980806 | 11 | 60 | 0.8 | | 402 | 100 | |
| Lower Gosnell tribs | ILP 1406 | 2 | 20 | 980807 | na | | 1 | | | | Channel dry |
| Lower Gosnell tribs | ILP 1406 | 4 | 21 | 980806 | na | | 4 | | | | Channel dry |
| Lower Gosnell tribs | ILP 1407 | 1 | 22 | 980810 | na | | 6.5 | | | | Channel dry |
| Lower Gosnell tribs | 50800-00500-1060 | 2 | 24 | 980806 | na | | 3 | | | | Channel dry |
| Lower Gosnell tribs | 50800-00500-1060 | 3 | 25 | 980806 | na | | 1 | | | | Channel dry |
| Lower Gosnell tribs | ILP 1424 | 2 | 26 | 980805 | 16 | 90 | 0.8 | | 373 | 100 | |
| Crystal Creek | ILP 1248 | 1 | 34 | 980813 | na | | 3.5 | | | | Channel dry |
| Crystal Creek | ILP 1248 | 2 | 35 | 980806 | na | | 4 | | | | Channel dry |
| Crystal Creek | 50800-00500-1730-2300 | 2 | 37 | 980811 | 13 | 30 | 0 | 9 | | | Pond |
| Crystal Creek | 50800-00500-1730-2300 | 3 | 38 | 980810 | 15 | 80 | 4.5 | 9 | | | Pond |
| Crystal Creek | ILP 1800 | 1 | 40 | 980806 | 9 | 50 | 3 | | | | Not enough water to sample drop at mouth |
| Crystal Creek | 50800-00500-1730-3150-166 | 1 | 46 | 980917 | 8 | 20 | 8.5 | | 325 | 70 | Assume fish presence in lower 400 m. |
| Crystal Creek | ILP 1701 | 2 | 50 | 980924 | 8 | | 15 | | | | Very low flow with no potential |
| Crystal Creek | 50800-00500-1730-3920 | 1 | 51 | 980902 | 8 | 30 | 19 | | | | Not accessible past barrier at mouth - too steep |
| Crystal Creek | 50800-00500-1730-3920 | 1 | 52 | 980917 | 7 | 30 | 22 | | 120 | 100 | Sampled but too steep |
| Crystal Creek | ILP 1240 | 1 | 53 | 980902 | 7.5 | 70 | 14 | | | | Steepens quickly - flows too low |
| Crystal Creek | 50800-00500-1730-4680 | 1 | 54 | 980902 | na | | 17 | | | | Dry channel |
| Crystal Creek | 50800-00500-1730-5210 | 1 | 55 | 980902 | 8 | 40 | 27 | | | | Too steep and no access |
| Crystal Creek | ILP 1278 | 1 | 56 | 980902 | na | | 27.5 | | | | Dry steep channel |
| Crystal Creek | ILP 1277 | 1 | 57 | 980902 | na | | 45 | | | | No visible channel |
| Crystal Creek | 50800-00500-1730-5460 | 1 | 58 | 980902 | 7 | 40 | 33 | | | | Too steep and no access |
| Crystal Creek | 50800-00500-1730-5750 | 1 | 59 | 980802 | na | | 30 | | | | Dry channel |
| Crystal Creek | ILP 1270 | 1 | 60 | 980902 | 7.9 | 40 | 50 | | | | Too steep to support fish |
| Crystal Creek | 50800-00500-1730-6550 | 1 | 63 | 980827 | 7 | 50 | 17 | | 361 | 70 | Too steep to support fish |
| Crystal Creek | ILP 1231 | 1 | 64 | 980902 | 7 | 40 | 30 | | | | Too small and too steep |
| Crystal Creek | 50800-00500-1730-7540 | 3 | 68 | 980929 | 6 | 40 | 10 | | 590 | 100 | Impassable chute in lower section |
| Crystal Creek | 50800-00500-1730-8220 | 1 | 69 | 980901 | 9 | 30 | 16 | | 292 | 70 | Difficult access in lower end - steep |

## Appendix 2 Table 2. Non Fish-Bearing Reaches of the Gosnell Watershed 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond (uS) | Gradient (%) | Trap # | Shocker Specs Time (sec) | Shocker Specs Length (m) | COMMENT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crystal Creek | 50800-00500-1730-8630 | 1 | 71 | 980901 | na | | 28 | | | | Dry channel - steep |
| Lower Gosnell tribs | 50800-00500-1890 | 2 | 74 | 980805 | 11.5 | 40 | 5.8 | | 402 | 100 | Steep at bottom end |
| Lower Gosnell tribs | ILP 1429 | 1 | 75 | 980915 | 4.5 | 90 | 6 | | 173 | 100 | |
| Lower Gosnell tribs | ILP 1429 | 2 | 76 | 980805 | 11 | | 6.7 | | | | Very low flows |
| Lower Gosnell tribs | 50800-00500-2000 | 2 | 78 | 980924 | 8 | 130 | 0.5 | | 600 | 100 | |
| Lower Gosnell tribs | 50800-00500-2000 | 2 | 79 | 980806 | 12 | 100 | 1.5 | | | | Flows too low to sample |
| Lower Gosnell tribs | ILP 1441 | 1 | 88 | 980825 | 15 | 80 | 1 | 10 | | | |
| Lower Gosnell tribs | 50800-00500-2520-3700 | 1 | 89 | 980812 | na | | 30 | | | | Dry channel and steep |
| Lower Gosnell tribs | ILP 1444 | 1 | 90 | 980812 | na | | 15 | | | | Dry channel and steep |
| Lower Gosnell tribs | ILP 1319 | 1 | 94 | 980813 | 18 | 40 | 0.5 | | 400 | 100 | Based on visual observations |
| Lower Gosnell tribs | ILP 1704 | 2 | 98 | 980810 | 18 | 80 | 0.5 | 12 | | | Pond |
| Lower Gosnell tribs | ILP 1321 | 1 | 99 | 980810 | 9 | na | 12 | | | | Steep with very low flows |
| Shea | 500-2830-2623 | 1 | 105 | 980923 | na | | 3 | | | | Channel dry |
| Shea | ILP 1731 | 3 | 107 | 980817 | na | | na | 10 | | | Wetland |
| Shea | 500-2830-2715 | 1 | 109 | 980807 | na | | 6 | | | | Channel dry |
| Shea | ILP 1605 | 3 | 112 | 980819 | 11.5 | 50 | 5 | | 533 | 100 | |
| Shea | ILP 1729 | 4 | 113 | 980818 | na | | na | 10 | | | Pond |
| Shea | ILP 1603 | 1 | 114 | 980819 | 11 | 70 | 2 | | 363 | 100 | |
| Shea | 500-2830-2798 | 1 | 115 | 980820 | na | | 5 | | | | Channel dry |
| Shea | 500-2830-2798 | 2 | 116 | 980812 | 10 | na | 3 | | 614 | 100 | DV present below falls. |
| Shea | 500-2830-2895 | 1 | 117 | 980819 | 10 | 70 | 4 | | 422 | 100 | |
| Shea | ILP 1477 | 2 | 120 | 980922 | na | | 17 | | | | Channel dry |
| Shea | 500-2830-2968-268 | 1 | 127 | 980901 | na | | 15 | 6 | | | Very steep just u/s from mouth |
| Shea | 500-2830-2968-268 | 2 | 128 | 980901 | na | | 0 | 6 | | | Pond |
| Shea | 500-2830-2968-422 | 3 | 129 | 980903 | na | | 0 | 7 | | | Pond |
| Shea | 500-2830-2968-433 | 4 | 130 | 980831 | na | | 0 | 10 | | | Pond |
| Shea | 500-2830-2968-433-086 | 1 | 131 | 980901 | na | | 4 | | | | Channel dry |
| Shea | 500-2830-2968-433-086 | 1 | 132 | 980901 | 11 | na | 1 | | 200 | 100 | |
| Shea | 500-2830-2968-433-086 | 2 | 133 | 980901 | na | | 0 | 10 | | | Pond |
| Shea | ILP 1602 | 1 | 137 | 980901 | na | | na | | | | No visible channel |

## Appendix 2 Table 2. Non Fish-Bearing Reaches of the Gosnell Watershed 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond (uS) | Gradient (%) | Trap # | Shocker Specs Time (sec) | Shocker Specs Length (m) | COMMENT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Shea | ILP 1600 | 1 | 138 | 981001 | na | | 15.4 | | | | Channel dry |
| Shea | 500-2830-2968-477 | 5 | 142 | 980903 | na | | 0 | | | | Lake-angled; classed as suspected fish |
| Shea | 500-2830-2968-507 | 3 | 144 | 980920 | 9.5 | 60 | 8 | | 538 | 90 | |
| Shea | ILP 1597 | 1 | 145 | 980820 | na | | 11 | | | | Channel dry-steep |
| Shea | 500-2830-3266 | 2 | 149 | 980827 | 8 | na | 1.5 | | 540 | 100 | Barrier d/s |
| Shea | 500-2830-2798 | 4 | 150 | 980827 | 11 | na | 3 | | 430 | 100 | |
| Shea | 500-2830-3322 | 2 | 151 | 980827 | 9 | na | 0.5 | | 635 | 100 | |
| Shea | ILP 1483 | 1 | 152 | 980922 | na | | 13 | | | | Channel dry |
| Shea | ILP 1483 | 2 | 153 | 980827 | 8 | 50 | 8.5 | | 335 | 100 | |
| Shea | 500-2830-3452 | 1 | 154 | 980922 | na | | 6 | | | | Channel dry |
| Shea | 500-2830-3452 | 2 | 155 | 980827 | 9 | na | 3 | | 395 | 100 | |
| Mid Gosnell Tribs | ILP 1730 | 2 | 157 | 980806 | na | | 0 | 9 | | | Pond-classed as suspected - also angled |
| Mid Gosnell Tribs | 500-3080 | 3 | 158 | 980812 | 12 | 30 | 1 | | 270 | 80 | |
| Mid Gosnell Tribs | ILP 1609 | 1 | 159 | 980805 | na | | 12 | | | | Channel dry |
| Mid Gosnell Tribs | 500-3080 | 4 | 160 | 980805 | na | | 11 | | | | Channel dry |
| Mid Gosnell Tribs | ILP 1467 | 2 | 166 | 980818 | na | | 8 | | | | Channel dry |
| Mid Gosnell Tribs | 500-3650 | 1 | 169 | 980818 | na | | na | | | | No visible channel |
| Mid Gosnell Tribs | 500-3650 | 2 | 170 | 980818 | na | | na | | | | Channel dry and steep |
| Mid Gosnell Tribs | 500-3650 | 3 | 171 | 980807 | 11 | 110 | 5 | | 533 | 100 | |
| Mid Gosnell Tribs | 500-3770 | 4 | 177 | 980824 | 12 | 50 | 0.5 | 9 | | | Pond |
| Mid Gosnell Tribs | 500-3770 | 4 | 178 | 980824 | 9 | 40 | 4 | | 255 | 115 | |
| Mid Gosnell Tribs | 500-3770-3470 | 2 | 182 | 980818 | 6 | 60 | 7 | | 1069 | 200 | |
| Mid Gosnell Tribs | ILP 1706 | 1 | 183 | 980821 | na | | 7 | | | | Channel dry |
| Mid Gosnell Tribs | ILP 1706 | 2 | 184 | 980821 | na | | 14 | | | | Channel dry |
| Mid Gosnell Tribs | ILP 1311 | 1 | 189 | 980818 | na | | 15 | | | | Channel dry and steep |
| Mid Gosnell Tribs | 500-3770-5510 | 1 | 190 | 980826 | 12 | 50 | 0.5 | 10 | | | Pond - Assumed fish present |
| Mid Gosnell Tribs | ILP 1323 | 1 | 191 | 980826 | 9 | 70 | 10 | | 475 | 75 | Only 75 m of channel wetted |
| Mid Gosnell Tribs | ILP 1323 | 2 | 192 | 981001 | 6.5 | 60 | 17.5 | | | | Channel too steep for fish use |
| Mid Gosnell Tribs | 500-3770-7220 | 1 | 194 | 980824 | 11 | 70 | 0.9 | | 785 | 108 | |
| Mid Gosnell Tribs | 500-3770-7220 | 2 | 195 | 980824 | 12 | 70 | 4 | | 375 | 100 | |

## Appendix 2 Table 2. Non Fish-Bearing Reaches of the Gosnell Watershed 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond (uS) | Gradient (%) | Trap # | Shocker Specs Time (sec) | Shocker Specs Length (m) | COMMENT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mid Gosnell Tribs | 500-3900 | 2 | 197 | 980827 | na | | 0.5 | | | | Channel dry |
| Mid Gosnell Tribs | 500-3900 | 2 | 198 | 980811 | 11 | 50 | 9 | | 576 | 100 | |
| Mid Gosnell Tribs | 500-3900 | 3 | 199 | 980807 | 11 | 60 | 10.3 | | 720 | 100 | |
| Mid Gosnell Tribs | ILP 1454 | 2 | 204 | 980811 | 9 | 130 | 18 | | 164 | 100 | Steep small creek |
| Mid Gosnell Tribs | 500-4290 | 4 | 209 | 980819 | 11 | 50 | 4 | | 1176 | 169 | |
| Mid Gosnell Tribs | 500-4290-2871 | 3 | 213 | 980814 | na | | 14.5 | | | | Dry channel |
| Mid Gosnell Tribs | 500-4290-2871 | 1 | 214 | 980818 | na | | 4 | | | | Mainly no channel through this section |
| Mid Gosnell Tribs | 500-4290-2871 | 2 | 215 | 980818 | 9.5 | 60 | 5 | | 582 | 100 | |
| Mid Gosnell Tribs | ILP 1293 | 1 | 216 | 980819 | na | | 4 | | | | Small dry channel |
| Mid Gosnell Tribs | 500-5380 | 2 | 225 | 980924 | 8 | 40 | 9.5 | | 512 | 100 | |
| Mid Gosnell Tribs | 500-5470 | 2 | 226 | 980928 | 8 | 60 | 8 | | 650 | 100 | |
| Mid Gosnell Tribs | 500-5610-2790 | 2 | 235 | 980820 | 12 | 40 | 1 | | 156 | 30 | Only habitat available - mostly dry |
| Mid Gosnell Tribs | 500-5610-3720 | 2 | 237 | 980819 | 11 | 30 | 4 | | 780 | 100 | Impassable in lower reach |
| Mid Gosnell Tribs | ILP 1152 | 1 | 238 | 980915 | 9 | 40 | 0 | 10 | | | Wetland pond - also angled - poor access |
| Mid Gosnell Tribs | ILP 1707 | 2 | 239 | 980928 | 6.5 | 70 | 11.3 | | 590 | 100 | |
| Mid Gosnell Tribs | 500-5730 | 2 | 244 | 980916 | na | | 3.5 | | | | Channel dry |
| Mid Gosnell Tribs | 500-5730-0690 | 2 | 247 | 980928 | 6.5 | 40 | 13.5 | | 380 | 100 | |
| Mid Gosnell Tribs | 500-5730-2280 | 2 | 248 | 981002 | na | | 3.5 | | | | Dry channel |
| Mid Gosnell Tribs | 500-5730-2280 | 2 | 249 | 980925 | 8 | 40 | 8 | | 589 | 100 | |
| Mid Gosnell Tribs | ILP 1709 | 2 | 253 | 980918 | 8 | 50 | 3 | | 580 | 100 | Inaccessible due to d/s canyon |
| Mid Gosnell Tribs | 500-5730-5210 | 1 | 254 | 980925 | 7.5 | | 3 | | | | Channel too small or not visible |
| Mid Gosnell Tribs | 500-5730-5210 | 1 | 255 | 980916 | 8 | 30 | 0 | 10 | | | Wetland |
| Mid Gosnell Tribs | ILP 1710 | 1 | 257 | 980915 | 7 | 30 | 2.5 | | 358 | 50 | Sampled small seepage section |
| Mid Gosnell Tribs | 500-5730-5370-6240 | 1 | 259 | 980915 | 7.5 | 50 | 3 | | 526 | 100 | Assume fish use due to good access |
| Mid Gosnell Tribs | 500-5730-5370-7320 | 1 | 260 | 980925 | na | | 5 | | | | Dry channel |
| Mid Gosnell Tribs | ILP 1176 | 1 | 261 | 980906 | na | | 1 | | | | Dry channel - assume fish use due to good access |
| Mid Gosnell Tribs | 500-5730-5370-8930 | 2 | 262 | 980916 | 7 | 30 | 8 | | 495 | 80 | |
| Mid Gosnell Tribs | 500-6580 | 2 | 264 | 980915 | 7 | 50 | 4 | | 762 | 110 | Impassable chute d/s |
| Mid Gosnell Tribs | ILP 1711 | 1 | 265 | 980915 | 8 | 40 | 3 | | 351 | 50 | Impassable chute d/s |
| Mid Gosnell Tribs | 500-6830 | 1 | 266 | 980918 | 7 | 10 | 42.5 | | | | Too steep |

## Appendix 2 Table 2. Non Fish-Bearing Reaches of the Gosnell Watershed 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Date m/d/y | Temp C | Cond (uS) | Gradient (%) | Trap # | Shocker Specs Time (sec) | Shocker Specs Length (m) | COMMENT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mid Gosnell Tribs | 500-7110 | 1 | 267 | 980916 | 5 | 60 | 10.0 | | 732 | 100 | |
| Mid Gosnell Tribs | ILP 1712 | 1 | 268 | 980916 | 6.5 | na | 16 | | 298 | 100 | Too steep |
| Upper Gosnell Tribs | 500-7520 | 2 | 273 | 980918 | 7 | 90 | 10.3 | | 819 | 1000 | Bedrock canyon in lower end |
| Upper Gosnell Tribs | ILP 1720 | 3 | 284 | 980929 | 4 | 70 | 9.8 | | 1169 | 100 | |
| Upper Gosnell Tribs | ILP 1724 | 1 | 285 | 980929 | 5 | 10 | 12 | | 541 | 100 | |
| Upper Gosnell Tribs | 500-8460 | 2 | 286 | 980929 | 4 | 80 | 8 | | 1245 | 100 | |
| Upper Gosnell Tribs | 500-8840 | 1 | 287 | 980925 | 6 | 80 | 18 | | | | Steep and dry |
| Upper Gosnell Tribs | ILP 1104 | 2 | 289 | 980925 | 6 | 80 | 13 | | 357 | 80 | |
| Upper Gosnell Tribs | ILP 1714 | 1 | 292 | 980925 | 6.8 | 60 | 2.5 | | 504 | 100 | Impassable falls d/s |
| Upper Gosnell Tribs | 500-9430 | 2 | 296 | 980929 | 6 | 30 | 10 | | 474 | 100 | 5m high impassable falls d/s |
| Upper Gosnell Tribs | 500-9640 | 2 | 301 | 980929 | 6 | 30 | 6.5 | | 219 | 45 | Only available habitat was sampled |
| Lower Gosnell tribs | ILP 1424 | 3 | 302 | 980902 | 6 | | 0 | 10 | | | Pond |
| Lower Gosnell tribs | 50800-00500-2400 | 3 | 82 | 980810 | na | | 3 | | | | No visible channel |

**Appendix 2 Table 3. Summary of Gradient and Channel Width Information for Fish-Bearing and Non Fish-Bearing Streams.**

| Slope | Total Sites | Sites with Fish | Sites with No Fish | % of Sites with Fish |
|---|---|---|---|---|
| | | | | |
| 0-2 | 91 | 60 | 31 | 65.9 |
| >2-5 | 88 | 26 | 62 | 29.5 |
| >5-8 | 44 | 29 | 15 | 65.9 |
| >8-12 | 28 | 11 | 17 | 39.3 |
| >12-15 | 15 | 5 | 10 | 33.3 |
| >15 | 21 | 0 | 21 | 0.0 |
| | | | | |
| TOTAL | 287 | 131 | 156 | 45.6 |

| Channel Width (m) | Total | Fish | No Fish | % of Sites with Fish |
|---|---|---|---|---|
| | | | | |
| <1.5 | 68 | 24 | 44 | 35.3 |
| 1.5-5 | 135 | 78 | 57 | 57.8 |
| >5-20 | 42 | 31 | 11 | 73.8 |
| >20 | 26 | 19 | 7 | 73.1 |
| | | | | |
| TOTAL | 271 | 152 | 119 | 56.1 |

**Appendix 3 Table 1. Summary of Total Fish Captured in Gosnell Creek by Section in 1998.**

| LOCATION | | RBT (Steelhead) | COHO | CT | DV | BT | MW | SCULPINS | TOTAL | LAKE CHUB |
|---|---|---|---|---|---|---|---|---|---|---|
| Mainstem Gosnell | n | 252 | 47 | 0 | 275 | 20 | 17 | | 611 | 4 |
| | % | *41.2* | *7.7* | *0.0* | *45.0* | *3.3* | *2.8* | | *100* | |
| Shea Creek | n | 180 | 65 | 158 | 164 | 0 | 0 | | 567 | |
| | % | *31.7* | *11.5* | *27.9* | *28.9* | *0.0* | *0.0* | | *100* | |
| Crystal Creek | n | 41 | 9 | 0 | 140 | 32 | 2 | | 224 | |
| | % | *18.3* | *4.0* | *0.0* | *62.5* | *14.3* | *0.9* | | *100* | |
| Lower Gosnell Tribs | n | 20 | 13 | 163 | 59 | 0 | 0 | | 255 | 6 |
| (Reaches 1-3) | % | *7.8* | *5.1* | *63.9* | *23.1* | *0.0* | *0.0* | | *100* | |
| Mid Gosnell Tribs | n | 10 | 108 | 123 | 497 | 1 | 0 | 18 | 757 | 2272 |
| (Reaches 4-6) | % | *1.3* | *14.3* | *16.2* | *65.7* | *0.1* | *0.0* | *2.4* | *100* | |
| Upper Gosnell Tribs | n | 0 | 0 | 0 | 215 | 5 | 0 | 0 | 220 | |
| (Reaches 7-10) | % | *0.0* | *0.0* | *0.0* | *97.7* | *2.3* | *0.0* | *0.0* | *100* | |
| **TOTAL** | n | 503 | 242 | 444 | 1135 | 53 | 19 | 18 | 2414 | 2282 |
| | % | 20.8 | 10.0 | 18.4 | 47.0 | 2.2 | 0.8 | 0.7 | *100.0* | |

**Appendix 4 Table 1. Summary of Fish Fork Lengths in the Mainstem Gosnell, 1998.**

| | | Steelhead | Coho | DV | BT | MW | Lake Chub |
|---|---|---|---|---|---|---|---|
| **Age 0+** | Avg | 43.6 | 58.1 | 47.8 | 57.7 | 61.8 | |
| | Count | 173 | 44 | 173 | 12 | 10 | 4 |
| | Std | 4.9 | 6.4 | 8.1 | 8.20 | 8.1 | |
| | Max | 56 | 72 | 68 | 75 | 79 | |
| | Min | 31 | 47 | 31 | 46 | 50 | |
| | | | | | | | |
| | | | | | | | |
| **Age 1+** | Avg | 82.6 | 88.7 | 80.3 | 83.6 | 85 | |
| | Count | 61 | 3 | 69 | 8 | 1 | |
| | Std | 9.1 | 13.9 | 7.7 | 9.2 | | |
| | Max | 99 | 104 | 96 | 102 | | |
| | Min | 60 | 77 | 69 | 76 | | |
| | | | | | | | |
| | | | | | | | |
| **Age 2+** | Avg | 122.3 | | 112.8 | | | |
| | Count | 18 | | 33 | | | |
| | Std | 19.4 | | 14.9 | | | |
| | Max | 192 | | 153 | | | |
| | Min | 103 | | 97 | | | |

| Appendix 4 Table 2. Summary of Fish Fork Lengths in Shea Creek, 1998. | | | | |
|---|---|---|---|---|
| | Steelhead | Coho | Cutthroat | DV |
| | | | All | |
| Count | 180 | 65 | 158 | 164 |
| % | 31.7 | 11.5 | 27.9 | 28.9 |
| Avg | 58.5 | 54.7 | 62.0 | 81.0 |
| Max | 163 | 89 | 220 | 186 |
| Min | 32 | 38 | 29 | 34 |
| Std | 23.2 | 10.6 | 30.1 | 29.0 |
| | | | | |
| | Age 0+ | | | |
| Count | 119 | 61 | 53 | 30 |
| Avg | 44.4 | 52.9 | 34.7 | 45.1 |
| Max | 56 | 74 | 43 | 54 |
| Min | 32 | 38 | 29 | 34 |
| Std | 5.1 | 7.9 | 3.5 | 4.3 |
| | | | | |
| | Age 1+ | | | |
| Count | 46 | 4 | 94 | 81 |
| Avg | 76.6 | 83.0 | 68.5 | 71.0 |
| Max | 93 | 89 | 92 | 95 |
| Min | 57 | 78 | 46 | 57 |
| Std | 9.4 | 5.0 | 12.0 | 9.6 |
| | | | | |
| | >=Age 2+ | | | |
| Count | 15 | | 11 | 53 |
| Avg | 114.6 | | 138.2 | 116.7 |
| Max | 163 | | 220 | 186 |
| Min | 102 | | 97 | 98 |
| Std | 16.3 | | 45.8 | 17.1 |
| | | | | |

| Appendix 4 Table 3. Summary of Fish Fork Lengths in Crystal Creek. | | | | | |
|---|---|---|---|---|---|
| | Steelhead | Bull Trout | Dolly Varden | Coho | Whitefish |
| | | | All | | |
| Count | 41 | 32 | 140 | 9 | 2 |
| % | 18.3 | 14.3 | 62.5 | 4.0 | 0.9 |
| Avg | 93.7 | 83.6 | 81.0 | 91.3 | 70.0 |
| Max | 184 | 128 | 170 | 101 | 70 |
| Min | 43 | 48 | 31 | 82 | 70 |
| Std | 36.8 | 22.7 | 29.3 | 7.3 | 0.0 |
| | | | | | |
| | | | Age 0+ | | |
| Count | 11 | 6 | 35 | | |
| Avg | 51.5 | 53.5 | 42.3 | No fish | |
| Max | 56 | 59 | 55 | | |
| Min | 43 | 48 | 31 | | |
| Std | 4.2 | 4.0 | 5.7 | | |
| | | | | | |
| | | | Age 1+ | | |
| Count | 12 | 14 | 60 | 9 | |
| Avg | 80.8 | 75.9 | 78.4 | 91.3 | |
| Max | 99 | 96 | 95 | 101 | |
| Min | 57 | 64 | 59 | 82 | |
| Std | 15.2 | 9.8 | 9.8 | 7.3 | |
| | | | | | |
| | | | >=Age 2+ | | |
| Count | 18 | 12 | 45 | | |
| Avg | 128.1 | 107.8 | 114.5 | | |
| Max | 184 | 128 | 170 | | |
| Min | 103 | 98 | 97 | | |
| Std | 22.6 | 11.3 | 14.4 | | |

| Appendix 4 Table 4. Summary of Fish Fork Lengths in the Lower Gosnell Tributaries, 1998. | | | | | |
|---|---|---|---|---|---|
| | Steelhead | Coho | Cutthroat | Dolly Varden | L Chub |
| | All | | | | |
| Count | 20 | 13 | 163 | 59 | 6 |
| % | 7.8 | 5.1 | 63.9 | 23.1 | 2.3 |
| Avg | 48.7 | 70.3 | 66.5 | 72.3 | 75.0 |
| Max | 90 | 84 | 154 | 136 | 96 |
| Min | 38 | 51 | 25 | 37 | 54 |
| Std | 11.1 | 12.0 | 31.6 | 24.0 | 16.5 |
| | | | | | |
| | Age 0+ | | | | |
| Count | 19 | 6 | 63 | 15 | |
| Avg | 46.5 | 58.3 | 34.7 | 40.8 | |
| Max | 58 | 64 | 47 | 47 | |
| Min | 38 | 51 | 25 | 37 | |
| Std | 5.4 | 4.5 | 5.3 | 2.4 | |
| | | | | | |
| | Age 1+ | | | | |
| Count | 1 | 7 | 69 | 33 | |
| Avg | 90.0 | 80.6 | 73.4 | 74.6 | |
| Max | 90 | 84 | 92 | 92 | |
| Min | 90 | 78 | 55 | 57 | |
| Std | | 2.4 | 10.5 | 9.1 | |
| | | | | | |
| | >=Age 2+ | | | | |
| Count | | | 31 | 11 | |
| Avg | | | 115.6 | 108.3 | |
| Max | | | 154 | 136 | |
| Min | | | 94 | 96 | |
| Std | | | 19.1 | 11.5 | |

| Appendix 4 Table 5. Summary of Fish Fork Lengths in the Mid Gosnell Tributaries, 1998. | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Steelhead** | **Coho** | **Cutthroat** | **Dolly Varden** | **Bull Trout** | **Sculpins** | **Lake Chub** |
| **Count** | 10 | 108 | 123 | 497 | 1 | 18 | 2272 |
| **%** | 1.3 | 14.3 | 16.2 | 65.7 | 0.1 | 2.4 | |
| **Avg** | 81.8 | 81.2 | 74.0 | 85.3 | 90 | 84.1 | 59.2 |
| **Max** | 185 | 122 | 240 | 176 | 90 | 104 | 114 |
| **Min** | 34 | 49 | 25 | 31 | 90 | 50 | 24 |
| **Std** | 48.8 | 20.0 | 29.6 | 31.4 | 0 | 12.3 | 20.2 |
| | | | | | | | |
| | **Age 0+** | | | | | | |
| **Count** | 4 | 29 | 18 | 107 | | | |
| **Avg** | 38.3 | 59.7 | 31.3 | 41.7 | | | |
| **Max** | 43 | 72 | 39 | 54 | | | |
| **Min** | 34 | 49 | 25 | 31 | | | |
| **Std** | 3.8 | 6.8 | 4.2 | 5.2 | | | |
| | | | | | | | |
| | **Age 1+** | | | | | | |
| **Count** | 3 | 44 | 84 | 207 | | | |
| **Avg** | 79.7 | 95.4 | 71.5 | 78.6 | | | |
| **Max** | 82 | 122 | 91 | 96 | | | |
| **Min** | 75 | 76 | 52 | 55 | | | |
| **Std** | 38.0 | 10.9 | 9.1 | 10.6 | | | |
| | | | | | | | |
| | **Age >=2+** | | | | | | |
| **Count** | 3 | | 21 | 183 | | | |
| **Avg** | 142.0 | | 120.9 | 118.3 | | | |
| **Max** | 185 | | 240 | 176 | | | |
| **Min** | 113 | | 96 | 96 | | | |
| **Std** | 38.0 | | 31.5 | 16.8 | | | |
| | | | | | | | |

| Appendix 4 Table 6. Summary of Fish Fork Lengths in Upper Gosnell Creek, 1998. | | |
|---|---|---|
| | | |
| | **Dolly Varden** | **Bull Trout** |
| | **All** | |
| **Count** | 215 | 5 |
| **%** | 97.7 | 2.3 |
| **Avg** | 84.3 | 77.2 |
| **Max** | 230 | 118 |
| **Min** | 31 | 52 |
| **Std** | 33.6 | 28.2 |
| | | |
| | **Age 0+** | |
| **Count** | 48 | 2 |
| **Avg** | 43.8 | 53.5 |
| **Max** | 58 | 55 |
| **Min** | 31 | 52 |
| **Std** | 5.9 | 2.1 |
| | | |
| | **Age 1+** | |
| **Count** | 91 | 2 |
| **Avg** | 75.3 | 80.5 |
| **Max** | 93 | 94 |
| **Min** | 57 | 67 |
| **Std** | 10.9 | 19.1 |
| | | |
| | **>=Age 2+** | |
| **Count** | 76 | 1 |
| **Avg** | 120.7 | 118.0 |
| **Max** | 230 | 118 |
| **Min** | 94 | 118 |
| **Std** | 23.8 | na |
| | | |

**Appendix 5 Table 1. Summary of Fish Scale Aging for Gosnell Watershed, 1998.**

| Site Number | Sample Number FDIS | Sample Number on Slide | Species | Fork Length | Scale Age |
|---|---|---|---|---|---|
| 101 | 10 | 29-10 | RB | 51 | 0 |
| 1 | 19 | 1-19 | RB | 52 | 0 |
| 1 | 20 | 1-20 | RB | 53 | 0 |
| 1 | 21 | 1-21 | RB | 55 | 0 |
| 101 | 5 | 29-5 | RB | 69 | 1 |
| 1 | 6 | 1-6 | RB | 70 | 1 |
| 102 | 4 | H21-4 | RB | 72 | 1 |
| 1 | 13 | 1-13 | RB | 74 | 1 |
| 223 | 2 | 156A-2 | RB | 75 | 1 |
| 1 | 1 | 1-1 | RB | 78 | 1 |
| 1 | 12 | 1-12 | RB | 81 | 1 |
| 101 | 6 | 29-6 | RB | 81 | 1 |
| 1 | 5 | 1-5 | RB | 82 | 1 |
| 74 | 12 | 21-12 | RB | 83 | 1 |
| 102 | 5 | H21-5 | RB | 88 | 1 |
| 1 | 11 | 1-11 | RB | 97 | 1 |
| 31 | 6 | 41-6 | RB | 105 | 2 |
| 102 | 6 | H21-6 | RB | 111 | 1 |
| 1 | 14 | 1-14 | RB | 113 | 2 |
| 1 | 3 | 1-3 | RB | 117 | 2 |
| 1 | 4 | 1-4 | RB | 117 | 2 |
| 31 | 4 | 41-4 | RB | 120 | 2 |
| 1 | 15 | 1-15 | RB | 125 | 2 |
| 74 | 10 | 21-10 | RB | 126 | 2 |
| 1 | 2 | 1-2 | RB | 126 | 2 |
| 74 | 11 | 21-11 | RB | 127 | 2 |
| 29 | 7 | 43-7 | RB | 129 | 2 |
| 29 | 8 | 43-8 | RB | 132 | 2 |
| 29 | 9 | 43-9 | RB | 132 | 2 |
| 1 | 16 | 1-16 | RB | 135 | 2 |
| 31 | 5 | 41-5 | RB | 148 | 3 |
| 31 | 8 | 41-8 | RB | 155 | 3 |
| 31 | 7 | 41-7 | RB | 184 | 3 |
| 5 | 1 | H88-1 | MW | 60 | 0 |
| 4 | 4 | H87-4 | MW | 60 | 0 |
| 4 | 5 | H87-5 | MW | 63 | 0 |
| 4 | 3 | H87-3 | MW | 63 | 1 |
| 4 | 2 | H87-2 | MW | 64 | 1 |
| 4 | 1 | H87-1 | MW | 67 | 1 |
| 2 | 1 | 85-1 | MW | 79 | 1 |
| 1 | 10 | 1-10 | MW | 85 | 1 |
| 101 | 17 | 29-17 | DV | 63 | 1 |
| 101 | 4 | 29-4 | DV | 68 | 1 |

**Appendix 5 Table 1. Summary of Fish Scale Aging for Gosnell Watershed, 1998.**

| Site Number | Sample Number FDIS | Sample Number on Slide | Species | Fork Length | Scale Age |
|---|---|---|---|---|---|
| 101 | 10 | 29-10 | RB | 51 | 0 |
| 1 | 19 | 1-19 | RB | 52 | 0 |
| 1 | 20 | 1-20 | RB | 53 | 0 |
| 1 | 21 | 1-21 | RB | 55 | 0 |
| 101 | 5 | 29-5 | RB | 69 | 1 |
| 1 | 6 | 1-6 | RB | 70 | 1 |
| 102 | 4 | H21-4 | RB | 72 | 1 |
| 1 | 13 | 1-13 | RB | 74 | 1 |
| 223 | 2 | 156A-2 | RB | 75 | 1 |
| 1 | 1 | 1-1 | RB | 78 | 1 |
| 1 | 12 | 1-12 | RB | 81 | 1 |
| 101 | 6 | 29-6 | RB | 81 | 1 |
| 1 | 5 | 1-5 | RB | 82 | 1 |
| 74 | 12 | 21-12 | RB | 83 | 1 |
| 102 | 5 | H21-5 | RB | 88 | 1 |
| 1 | 11 | 1-11 | RB | 97 | 1 |
| 31 | 6 | 41-6 | RB | 105 | 2 |
| 102 | 6 | H21-6 | RB | 111 | 1 |
| 1 | 14 | 1-14 | RB | 113 | 2 |
| 1 | 3 | 1-3 | RB | 117 | 2 |
| 1 | 4 | 1-4 | RB | 117 | 2 |
| 31 | 4 | 41-4 | RB | 120 | 2 |
| 1 | 15 | 1-15 | RB | 125 | 2 |
| 74 | 10 | 21-10 | RB | 126 | 2 |
| 1 | 2 | 1-2 | RB | 126 | 2 |
| 74 | 11 | 21-11 | RB | 127 | 2 |
| 29 | 7 | 43-7 | RB | 129 | 2 |
| 29 | 8 | 43-8 | RB | 132 | 2 |
| 29 | 9 | 43-9 | RB | 132 | 2 |
| 1 | 16 | 1-16 | RB | 135 | 2 |
| 31 | 5 | 41-5 | RB | 148 | 3 |
| 31 | 8 | 41-8 | RB | 155 | 3 |
| 31 | 7 | 41-7 | RB | 184 | 3 |
| 5 | 1 | H88-1 | MW | 60 | 0 |
| 4 | 4 | H87-4 | MW | 60 | 0 |
| 4 | 5 | H87-5 | MW | 63 | 0 |
| 4 | 3 | H87-3 | MW | 63 | 1 |
| 4 | 2 | H87-2 | MW | 64 | 1 |
| 4 | 1 | H87-1 | MW | 67 | 1 |
| 2 | 1 | 85-1 | MW | 79 | 1 |
| 1 | 10 | 1-10 | MW | 85 | 1 |
| 101 | 17 | 29-17 | DV | 63 | 1 |
| 101 | 4 | 29-4 | DV | 68 | 1 |

**Appendix 5 Table 1. Summary of Fish Scale Aging for Gosnell Watershed, 1998.**

| Site Number | Sample Number FDIS | Sample Number on Slide | Species | Fork Length | Scale Age |
|---|---|---|---|---|---|
| 101 | 20 | 29-20 | DV | 77 | 1 |
| 91 | 11 | 76-11 | CT | 47 | 1 |
| 101 | 16 | 29-16 | CT | 54 | 0 |
| 91 | 15 | 76-15 | CT | 57 | 1 |
| 91 | 10 | 76-10 | CT | 58 | 1 |
| 176 | 4 | 123-4 | CT | 59 | 1 |
| 91 | 12 | 76-12 | CT | 61 | 1 |
| 91 | 9 | 76-9 | CT | 63 | 1 |
| 176 | 2 | 123-2 | CT | 63 | 1 |
| 201 | 6 | 127-6 | CT | 64 | 1 |
| 174 | 3 | 104-3 | CT | 66 | 1 |
| 91 | 5 | 76-5 | CT | 66 | 1 |
| 91 | 14 | 76-14 | CT | 66 | 1 |
| 201 | 4 | 127-4 | CT | 69 | 1 |
| 91 | 13 | 76-13 | CT | 71 | 1 |
| 201 | 5 | 127-5 | CT | 74 | 1 |
| 174 | 2 | 104-2 | CT | 78 | 1 |
| 174 | 4 | 104-4 | CT | 78 | 1 |
| 91 | 8 | 76-8 | CT | 83 | 2 |
| 91 | 6 | 76-6 | CT | 92 | 2 |
| 91 | 4 | 76-4 | CT | 94 | 2 |
| 91 | 3 | 76-3 | CT | 97 | 2 |
| 91 | 7 | 76-7 | CT | 100 | 2 |
| 176 | 3 | 123-3 | CT | 100 | 2 |
| 91 | 1 | 76-1 | CT | 101 | 2 |
| 91 | 2 | 76-2 | CT | 102 | 2 |
| 176 | 1 | 123-1 | CT | 107 | 2 |
| 174 | 1 | 104-1 | CT | 118 | 2 |
| 87 | 12 | 70-12 | CT | 137 | 3 |
| 87 | 9 | 70-9 | CT | 142 | 3 |
| 87 | 8 | 70-8 | CT | 143 | 3 |
| 87 | 10 | 70-10 | CT | 148 | 3 |
| 87 | 7 | 70-7 | CT | 148 | 3 |
| 87 | 11 | 70-11 | CT | 154 | 3 |
| 102 | 7 | H21-7 | CO | 48 | 0 |
| 101 | 3 | 29-3 | CO | 53 | 0 |
| 101 | 9 | 29-9 | CO | 53 | 0 |
| 101 | 19 | 29-19 | CO | 54 | 0 |
| 101 | 24 | 29-24 | CO | 55 | 0 |
| 102 | 9 | H21-9 | CO | 56 | 0 |
| 101 | 1 | 29-1 | CO | 58 | 0 |
| 101 | 11 | 29-11 | CO | 59 | 0 |
| 101 | 13 | 29-13 | CO | 59 | 0 |

## Appendix 5 Table 1. Summary of Fish Scale Aging for Gosnell Watershed, 1998.

| Site Number | Sample Number FDIS | Sample Number on Slide | Species | Fork Length | Scale Age |
|---|---|---|---|---|---|
| 102 | 2 | H21-2 | CO | 59 | 0 |
| 102 | 1 | H21-1 | CO | 60 | 0 |
| 102 | 13 | 29-13 | CO | 60 | 0 |
| 101 | 18 | 29-18 | CO | 60 | 0 |
| 101 | 22 | 29-22 | CO | 61 | 0 |
| 102 | 15 | 29-15 | CO | 62 | 0 |
| 1 | 8 | 1-8 | CO | 62 | 0 |
| 101 | 14 | 29-14 | CO | 63 | 0 |
| 101 | 23 | 29-23 | CO | 63 | 0 |
| 101 | 21 | 29-21 | CO | 64 | 0 |
| 101 | 2 | 29-2 | CO | 65 | 0 |
| 101 | 14 | 29-14 | CO | 65 | 0 |
| 101 | 8 | 29-8 | CO | 69 | 0 |
| 5 | 2 | H88-2 | CO | 70 | 0 |
| 102 | 14 | 29-14 | CO | 74 | 1 |
| 102 | 8 | H21-8 | CO | 78 | 1 |
| 102 | 3 | H21-3 | CO | 80 | 1 |
| 101 | 7 | 29-7 | CO | 85 | 1 |
| 1 | 7 | 1-7 | CO | 85 | 1 |
| 101 | 12 | 29-12 | CO | 89 | 1 |
| 1 | 9 | 1-9 | CO | 104 | 1 |

Summary of Age Break-offs:

| | RB | MW | DV | CT | CO |
|---|---|---|---|---|---|
| 0+ | <55 | <64 | | <55 | <74 |
| 1+ | 56-100 | 64-85 | 63-77 | 55-80 | >74 |
| 2+ | 100-135 | | See fin | 81-120 | |
| 3+ | >135 | | rays | >120 | |

**Appendix 5 Table 2. Summary of Fin Ray Aging for Gosnell Char 1998.**

| Site Number | Sample Number | Species | Fork Length | Fin Ray Age |
|---|---|---|---|---|
| 5 | H88-3 | Bull trout | 51 | 0 |
| 29 | 43-6 | BT | 56 | 0 |
| 29 | 43-5 | BT | 59 | 0 |
| 29 | 43-4 | BT | 66 | 0 |
| 31 | 41-17 | BT | 71 | 1 |
| 31 | 41-16 | BT | 73 | 1 |
| 8 | H84-2 | BT | 75 | 1 |
| 8 | H84-1 | BT | 78 | 1 |
| 8 | H84-6 | BT | 78 | 1 |
| 5 | H88-4 | BT | 79 | 1 |
| 8 | H84-5 | BT | 81 | 1 |
| 8 | H84-4 | BT | 84 | 1 |
| 224 | 156-A | BT | 90 | 1 |
| 8 | H84-3 | BT | 96 | 1 |
| 31 | 41-13 | BT | 98 | 1 |
| 31 | 41-1 | BT | 108 | 1 |
| 29 | 43-1 | BT | 92 | 2 |
| 31 | 41-3 | BT | 96 | 2 |
| 31 | 41-14 | BT | 100 | 2 |
| 29 | 43-2 | BT | 102 | 2 |
| 29 | 43-3 | BT | 105 | 2 |
| 31 | 41-11 | BT | 105 | 2 |
| 290 | 78-2 | BT | 52 | only |
| 290 | 78-1 | BT | 55 | scales |
| 31 | 41-2 | BT | 71 | not |
| 31 | 41-15 | BT | 71 | satisfactory |
| 31 | 41-12 | BT | 75 | aging |
| 284 | 71-2 | BT | 76 | " |
| 8 | H84-7 | BT | 78 | " |
| 31 | 41-10 | BT | 98 | " |
| 284 | 71-1 | BT | 102 | " |
| 6 | 53-3 | Dolly Varden | 58 | 0 |
| 6 | 53-4 | DV | 59 | 0 |
| 43 | 55-1 | DV | 68 | 0 |
| 6 | 53-1 | DV | 71 | 1 |
| 6 | 53-7 | DV | 79 | 1 |
| 111 | 29A-3 | DV | 81 | 1 |
| 1 | 1-17 | DV | 81 | 1 |
| 6 | 53-10 | DV | 85 | 1 |
| 217 | 159-2 | DV | 91 | 1 |
| 43 | 55-3 | DV | 92 | 1 |
| 111 | 29A-2 | DV | 94 | 1 |
| 1 | 1-18 | DV | 98 | 1 |
| 217 | 159-3 | DV | 111 | 1 |
| 43 | 55-4 | DV | 97 | 2 |
| 201 | 127-2 | DV | 98 | 2 |
| 6 | 53-9 | DV | 101 | 2 |
| 6 | 53-2 | DV | 112 | 2 |
| 101 | 29-25 | DV | 116 | 2 |
| 217 | 159-1 | DV | 124 | 2 |
| 6 | 53-6 | DV | 145 | 2 |

**Appendix 5 Table 2. Summary of Fin Ray Aging for Gosnell Char 1998.**

| Site Number | Sample Number | Species | Fork Length | Fin Ray Age |
|---|---|---|---|---|
| 6 | 53-5 | DV | 120 | 3 |
| 201 | 127-3 | DV | 124 | 3 |
| 201 | 127-1 | DV | 132 | 3 |
| 111 | 29A-1 | DV | 155 | 3 |
| 43 | 55-2 | DV | 122 | 4 |
| 101 | 29-20 | DV | 77 | not |
| 101 | 29-17 | DV | 63 | included |
| 101 | 29-4 | DV | 68 | in sample |
| 6 | 53-8 | DV | 73 | |

| | BT | | DV | |
|---|---|---|---|---|
| Break-off summary: | Age | Length | Age | Length |
| | 0+ | <=68 | 0+ | <=68 |
| | 1+ | 69-96 | 1+ | 69-96 |
| | 2+ | 97-105 | 2+ | 97-124 |
| | | | 3+ | 125-155 |

**Appendix 6 Table 1. Summary of Fish Abundance at Index Sites in Mainstem Gosnell, Shea and Crystal Creeks.**

| SYSTEM | Reach | Site | Steelhead | | Coho | Dolly Varden | | Bull Trout | | Area Sampled |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Fry | Parr | | Fry | Juv & Adults | Fry | Juv | m^2 |
| Mainstem Gosnell | 2 | 1&2 | 33.5 | 6.4 | 0.4 | 0.5 | 0.4 | 0.0 | 0.0 | 873.3 |
| | 3 | 3&4 | 77.9 | 3.3 | 0.0 | 2.0 | 0.4 | 0.0 | 0.0 | 316.8 |
| | 4 | 5 | 6.5 | 5.9 | 7.0 | 7.3 | 2.4 | 2.3 | 0.6 | 171.5 |
| | 5 | 6&8 | 7.5 | 2.6 | 6.3 | 6.1 | 7.7 | 3.3 | 3.9 | 449.3 |
| | 7 | 9&10 | 0.0 | 0.0 | 0.0 | 14.0 | 3.6 | 0.0 | 0.0 | 376.6 |
| | 8 | 11 | 0.0 | 0.0 | 0.0 | 12.0 | 4.3 | 0.0 | 0.9 | 214.5 |
| | 9 | 12&13 | 0.0 | 0.0 | 0.0 | 18.0 | 12.5 | 0.0 | 0.0 | 397.1 |
| Shea Creek | 1 | 101&102 | 26.3 | 19.3 | 24.8 | 7.1 | 4.3 | 0.0 | 0.0 | 521.2 |
| | 2 | 104 | 30.0 | 10.4 | 0.5 | 0.0 | 0.9 | 0.0 | 0.0 | 213.5 |
| Crystal Creek | 2 | 29&31 | 2.1 | 1.9 | 0.0 | 0.0 | 1.1 | 1.3 | 1.8 | 566.3 |
| | | | | | | | | | | |
| | | | | | | | | | | 4100.1 |

## Appendix 6 Table 2. Detailed Sample Site Information for Gosnell Index Site 1.

### GOSNELL INDEX SITE 1998

SITE: 1 REACH: 2 MAP : 93I024 PHOTO: R17:4&5 DATE: Sept 21/98

SITE LOCATION: Sidechannel on mainstem Gosnell 50 m u/s from main bridge crossing on right side.

| | | | |
|---|---|---|---|
| | | ACCESS: | VEH |
| | EFFORT: | PASS 1 | 1686 secs |
| | | PASS 2 | 1719 secs |
| M = MARGIN / F = FULL: | F | | |
| | SLOPE (%): 1.5 | TEMP (C): | 9.5 |
| S = SIDE / M = MAIN: | S | TIME: | 1600 |
| | | TDS (ppm): | 50 |

SAMPLING COMMENTS: 2-pass removal with u/s and d/s stopnets.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 50-51 | 50.3 | 3 | 0 | 3 | 3.0 | 0.0 | 0.007 | 10.0 | 1.20 | 0.008 |
| DV | juv | 81-98 | 89.5 | 2 | 0 | 2 | 2.0 | 0.0 | 0.005 | 6.7 | 7.00 | 0.032 |
| DV | adults | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | 85 | 85.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.002 | 3.3 | 4.20 | 0.010 |
| RBT | 0+ | 31-55 | 46.4 | 61 | 26 | 87 | 106.3 | 12.1 | 0.243 | 354.4 | 1.15 | 0.279 |
| RBT | 1+ | 56-97 | 80.5 | 15 | 4 | 19 | 20.5 | 2.2 | 0.047 | 68.2 | 5.80 | 0.271 |
| RBT | >1+ | 113-135 | 121.7 | 7 | 0 | 7 | 7.0 | 0.0 | 0.016 | 23.3 | 19.10 | 0.306 |
| Coho | 0+ | 62 | 62.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.002 | 3.3 | 2.60 | 0.006 |
| Coho | 1+ | 85-104 | 94.5 | 2 | 0 | 2 | 2.0 | 0.0 | 0.005 | 6.7 | 9.10 | 0.042 |
| TOTAL | | | | | | | 142.8 | | 0.326 | 475.9 | | 0.954 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 15.9 |
| 3 | 14.2 |
| 6 | 12.3 |
| 9 | 13.7 |
| 12 | 14.8 |
| 15 | 16.6 |
| 18 | |
| 20 | |
| 24 | |
| | 14.6 |

AREA (M*M) 437.5 MARGIN (M) 30

HABITAT COMMENTS:
Unembedded cobble throughout site provides good cover for parr/fry.

## Appendix 6 Table 3. Detailed Sample Information for Gosnell Index Site 2.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 2 | REACH: 2 | MAP : 93L023 | PHOTO: R17: 6&7 | DATE: | Sept 22/98 |

SITE LOCATION: Sidechannel index site in Reach 2 of Gosnell on river left.

| | | | | | |
|---|---|---|---|---|---|
| GPS | 54/12/59" | | | ACCESS: | HEL |
| | 127/24/38" | | EFFORT: | PASS 1 | 3241 secs |
| | | | | PASS 2 | 2189 secs |
| M = MARGIN / F = FULL: | | F | | | |
| | | | SLOPE (%): 1 | TEMP (C): | 7 |
| S = SIDE / M = MAIN: | | S | | TIME: | 1030 |
| | | | | TDS (ppm): | 70 |

SAMPLING COMMENTS: 2 pass removal with u/s and d/s 50' stopnets.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 54 | 54.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.002 | 2.9 | 1.70 | 0.004 |
| DV | juv | 80 | 80.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.002 | 2.9 | 6.30 | 0.014 |
| DV | adults | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | 79 | 79.0 | 0 | 1 | 1 | 1.0 | 0.0 | 0.002 | 2.9 | 3.30 | 0.008 |
| RBT | 0+ | 31-53 | 43.3 | 145 | 32 | 177 | 186.1 | 4.8 | 0.427 | 547.2 | 0.95 | 0.406 |
| RBT | 1+ | 72-99 | 85.8 | 13 | 6 | 19 | 24.1 | 6.9 | 0.055 | 71.0 | 7.40 | 0.410 |
| RBT | >1+ | 108-118 | 112.8 | 4 | 0 | 4 | 4.0 | 0.0 | 0.009 | 11.8 | 15.60 | 0.143 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 217.2 | | 0.498 | 638.8 | | 0.985 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 11.6 |
| 3 | 11.3 |
| 6 | 10.9 |
| 9 | 10.6 |
| 12 | 15.7 |
| 15 | 16.8 |
| 18 | |
| 20 | |
| | 12.8 |

AREA (M*M) 435.8 MARGIN (M) 34

HABITAT COMMENTS:
Sidechannel with riffle-run section and cobble bed material. Good fry and parr habitat in unembedded cobbles.
Good fry habitat along margin.

## Appendix 6 Table 4. Detailed Sample Information for Gosnell Index Site 3.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 3 | REACH: 3 | MAP : 93L023 | PHOTO: R8: 22/23 | DATE: | Sept 22/98 |
| SITE LOCATION: | Margin site along mainstem in Reach 3. | | | | |
| GPS: | 154/13/38" | | | ACCESS: | HEL |
| | 127/26/56" | | EFFORT: | PASS 1 | 1015 secs |
| | | | | PASS 2 | 1086 secs |
| M = MARGIN / F = FULL: | M | | | | |
| | | | SLOPE (%): 1 | TEMP (C): | na |
| S = SIDE / M = MAIN: | M | | | TIME: | 1340 |
| | | | | TDS (ppm): | na |
| SAMPLING COMMENTS: | Site enclosed with rebar - 2 pass removal. | | | | |

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 53 | 53.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.008 | 5.7 | 1.40 | 0.012 |
| DV | juv | 85 | 85.0 | 0 | 1 | 1 | 1.0 | 0.0 | 0.008 | 5.7 | 7.20 | 0.060 |
| DV | adults | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 36-48 | 43.2 | 91 | 39 | 130 | 159.3 | 15.0 | 1.331 | 904.8 | 1.00 | 1.331 |
| RBT | 1+ | 66-92 | 76.4 | 6 | 1 | 7 | 7.2 | 0.6 | 0.060 | 40.9 | 5.70 | 0.343 |
| RBT | >1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 168.5 | | 1.408 | 957.1 | | 1.745 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 5.0 |
| 3 | 4.1 |
| 6 | 6.4 |
| 9 | 9.0 |
| 12 | 9.5 |
| 15 | |
| 18 | |
| 20 | |
| | 6.8 |
| AREA (M*M) | 119.7 |
| MARGIN (M) | 18 |

HABITAT COMMENTS:
Excellent fry habitat with high concentrations along margin- particularly at side bars.
Juveniles in mid slow-flowing sections as well as edges. Some brush and undercut banks.
Pinks spawn in this section.

## Appendix 6 Table 5. Detailed Sample Information for Gosnell Index Site 4.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 4 | REACH: 3 | MAP : 93L023 | PHOTO: R17: 9 | DATE: | Sept 22/98 |
| SITE LOCATION: | Short sidechannel in Gosnell mainstem - Reach 3 | | | | |
| GPS: | 54/13/25" | | | ACCESS: | HEL |
| | 127/29/07" | | EFFORT: | PASS 1 | 1789 secs |
| | | | | PASS 2 | 1463 secs |
| M = MARGIN / F = FULL: | F | | | | |
| | | | SLOPE (%): 1 | TEMP (C): | 8.3 |
| S = SIDE / M = MAIN: | S | | | TIME: | 1600 |
| | | | | TDS (ppm): | 50 |
| SAMPLING COMMENTS: | Used 50' net at u/s end and 30' net at d/s end. | | | | |

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 47-50 | 49.0 | 5 | 1 | 6 | 6.3 | 0.8 | 0.032 | 25.0 | 1.20 | 0.038 |
| DV | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| DV | adults | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | 60-67 | 63.4 | 2 | 3 | 5 | 5.0 | na | 0.025 | 20.0 | 2.32 | 0.059 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 33-51 | 42.5 | 39 | 5 | 44 | 44.7 | 1.1 | 0.227 | 178.9 | 0.90 | 0.204 |
| RBT | 1+ | 76 | 76.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.005 | 4.0 | 4.80 | 0.024 |
| RBT | >1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Lake Chub | 0+ | 27-33 | 30.5 | 3 | 1 | 4 | 4.5 | 1.5 | 0.023 | 18.0 | 0.48 | 0.011 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 61.5 | | 0.312 | 245.9 | | 0.337 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 4.6 |
| 3 | 8.0 |
| 6 | 9.0 |
| 9 | 8.6 |
| 12 | 11.9 |
| 15 | 5.2 |
| 18 | |
| 20 | |
| | 7.9 |
| AREA (M*M) | 197.1 |
| MARGIN (M) | 25 |

HABITAT COMMENTS:
Small cobble and gravel bed material - good fry habitat but not very good for parr - litte site complexity.
Excellent potential adult spawning through this section.

## Appendix 6 Table 6. Detailed Sample Information for Gosnell Index Site 5.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 5 | REACH: 4 | MAP : 93L023 | PHOTO: R17: 10&11 | DATE: | Sept 23/98 |

SITE LOCATION: Sidechannel section of Gosnell in Reach 4

| | | | | | |
|---|---|---|---|---|---|
| GPS: | 54/12/20" | | | ACCESS: | HEL |
| | 127/35/32" | | EFFORT: | PASS 1 | 2198 secs |
| | | | | PASS 2 | 1406 secs |
| M = MARGIN / F = FULL: | | F | | | |
| | | | SLOPE (%):2 | TEMP (C): | 6 |
| S = SIDE / M = MAIN: | | S | | TIME: | 1000 |
| | | | | TDS (ppm): | 70 |

SAMPLING COMMENTS: Sidechannel on river left. Used 30' and 50' stopnets.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 44-60 | 49.8 | 5 | 3 | 8 | 12.5 | 10.6 | 0.073 | 35.7 | 1.30 | 0.095 |
| DV | juv | 73-82 | 77.5 | 2 | 0 | 2 | 2.0 | 0.0 | 0.012 | 5.7 | 4.40 | 0.051 |
| DV | adults | 116-123 | 119.5 | 1 | 1 | 2 | 2.0 | na | 0.012 | 5.7 | 16.40 | 0.191 |
| BT | 0+ | 55-68 | 61.0 | 2 | 1 | 3 | 4.0 | 3.5 | 0.023 | 11.4 | 2.40 | 0.056 |
| BT | juv | 79 | 79.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.006 | 2.9 | 4.90 | 0.029 |
| MW | 0+ | 50-59 | 53.3 | 2 | 1 | 3 | 4.0 | 3.5 | 0.023 | 11.4 | 1.20 | 0.028 |
| RBT | 0+ | 33-55 | 42.5 | 10 | 1 | 11 | 11.1 | 0.4 | 0.065 | 31.7 | 0.90 | 0.058 |
| RBT | 1+ | 65-93 | 79.5 | 4 | 2 | 6 | 8.0 | 4.9 | 0.047 | 22.9 | 5.90 | 0.275 |
| RBT | >1+ | 103-112 | 107.5 | 1 | 1 | 2 | 2.0 | na | 0.012 | 5.7 | 12.50 | 0.146 |
| Coho | 0+ | 52-70 | 61.6 | 6 | 3 | 9 | 12.0 | 6.0 | 0.070 | 34.3 | 2.90 | 0.203 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 58.6 | | 0.342 | 167.5 | | 1.132 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 6.0 |
| 3 | 5.0 |
| 6 | 4.9 |
| 9 | 5.5 |
| 12 | 4.9 |
| 15 | 3.1 |
| 18 | |
| 20 | |
| | 4.9 |

AREA (M*M) 171.5 MARGIN (M) 35

HABITAT COMMENTS:
Good fry cover in unembedded gravel along margins.
Good parr cover in undercut banks and in LOD in pools.
Spawning gravels in this section of the Gosnell.

## Appendix 6 Table 7. Detailed Sample Information for Gosnell Index Site 6.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 6 | REACH: 5 | MAP : 93L012 | PHOTO: R18: 24&25 | DATE: | Sept 22/98 |

SITE LOCATION: Enclosed mainstem section in Reach 5 of Gosnell.

| | | | |
|---|---|---|---|
| | | ACCESS: | HEL |
| | EFFORT: | PASS 1 | 2150 secs |
| | | PASS 2 | 1844 secs |
| M = MARGIN / F = FULL: | F | | |
| | SLOPE (%): 1 | TEMP (C): | 8 |
| S = SIDE / M = MAIN: | M | TIME: | 1400 |
| | | TDS (ppm): | na |

SAMPLING COMMENTS: Barely able to hold entire river in this section. Had to choose site carefully. Lamprey ammocoetes present in site.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 43-66 | 53.6 | 4 | 6 | 10 | 10.0 | na | 0.029 | 32.3 | 1.70 | 0.050 |
| DV | juv | 71-103 | 86.6 | 8 | 3 | 11 | 12.8 | 3.2 | 0.037 | 41.3 | 6.70 | 0.251 |
| DV | adults | 112-145 | 125.7 | 0 | 1 | 1 | 1.0 | na | 0.003 | 3.2 | 21.60 | 0.063 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | 62-65 | 63.5 | 1 | 1 | 2 | 1.0 | na | 0.003 | 3.2 | 2.40 | 0.007 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 34-48 | 41.8 | 26 | 12 | 38 | 48.3 | 9.8 | 0.141 | 155.8 | 0.80 | 0.113 |
| RBT | 1+ | 70-97 | 84.8 | 9 | 1 | 10 | 10.1 | 0.4 | 0.030 | 32.7 | 7.30 | 0.216 |
| RBT | >1+ | 112-192 | 137.0 | 4 | 0 | 4 | 4.0 | 0.0 | 0.012 | 12.9 | 33.70 | 0.394 |
| Coho | 0+ | 47-72 | 57.0 | 26 | 5 | 31 | 32.2 | 1.6 | 0.094 | 103.8 | 2.20 | 0.207 |
| Coho | 1+ | 77 | 77.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.003 | 3.2 | 4.80 | 0.014 |
| TOTAL | | | | | | | 120.4 | | 0.352 | 388.4 | | 1.315 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 9.4 |
| 3 | 10.2 |
| 6 | 10.1 |
| 9 | 13.7 |
| 12 | 12.9 |
| 15 | 9.9 |
| 18 | |
| 20 | |
| | 11.0 |
| AREA (M*M) | 342.0 |
| MARGIN (M) | 31 |

HABITAT COMMENTS:
Good mix of pool/run/riffle.
Good coho rearing in LOD complexing; good steelhead fry in slow riffle areas.

## Appendix 6 Table 8. Detailed Sample Information for Gosnell Index Site 8.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 8 | REACH: 5 | MAP : 93L024 | PHOTO: R17: 12&13 | DATE: | Sept 23/98 |

SITE LOCATION: Small sidechannel of mainstem Gosnell in Reach 5.

| | | | | | |
|---|---|---|---|---|---|
| GPS: | 54/10/41" | | | ACCESS: | HEL |
| | 127/39/24" | | EFFORT: | PASS 1 | 1032 secs |
| | | | | PASS 2 | na secs |
| M = MARGIN / F = FULL: | | F | | | |
| | | | SLOPE (%): 1 | TEMP (C): | 7 |
| S = SIDE / M = MAIN: | | S | | TIME: | 1230 |
| | | | | TDS (ppm): | 70 |

SAMPLING COMMENTS: Small sidechannel on river left. Two pass removal with stopnets.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 44-55 | 50.5 | 10 | 0 | 10 | 10.0 | 0.0 | 0.093 | 35.7 | 1.20 | 0.112 |
| DV | juv | 76-103 | 88.5 | 7 | 3 | 10 | 12.3 | 4.2 | 0.114 | 43.8 | 7.00 | 0.799 |
| DV | adults | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| BT | 0+ | 46-60 | 53.9 | 7 | 0 | 7 | 7.0 | 0.0 | 0.065 | 25.0 | 1.60 | 0.104 |
| BT | juv | 75-96 | 81.4 | 5 | 2 | 7 | 8.3 | 2.9 | 0.078 | 29.8 | 4.60 | 0.357 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 42 | 42.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.009 | 3.6 | 0.90 | 0.008 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | 135 | 135.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.009 | 3.6 | 27.20 | 0.253 |
| Coho | 0+ | 53-62 | 57.3 | 3 | 0 | 3 | 3.0 | 0.0 | 0.028 | 10.7 | 1.80 | 0.050 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 42.6 | | 0.397 | 152.1 | | 1.684 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 4.3 |
| 3 | 3.8 |
| 6 | 3.6 |
| 9 | 4.2 |
| 12 | 3.6 |
| 15 | 3.5 |
| 18 | |
| 20 | |
| | 3.8 |

AREA (M*M) 107.3 MARGIN (M) 28

HABITAT COMMENTS:
Small sidechannel with good complexity; margins are cover for fry; also undercut banks and LOD in pools.
Lots of alder along banks.

## Appendix 6 Table 9. Detailed Sample Information for Gosnell Index Site 9.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 9 | REACH: 7 | MAP : 93L012 | PHOTO: R8: 26-28 | DATE: | Sept 23/98 |

SITE LOCATION: Multi-channeled section of Gosnell u/s from mainstem falls. Sidechannel.

| | | | | | |
|---|---|---|---|---|---|
| GPS: | 54/07/58" | | | ACCESS: | HEL |
| | 127/40/08" | | EFFORT: | PASS 1 | 1016 secs |
| | | | | PASS 2 | 946 secs |
| M = MARGIN / F = FULL: | | F | | | |
| | | | SLOPE (%): 1 | TEMP (C): | 6.5 |
| S = SIDE / M = MAIN: | | S | | TIME: | 1000 |
| | | | | TDS (ppm): | na |

SAMPLING COMMENTS: Sampled sidechannel on extreme river left. Very complex site with good stopnets.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 34-65 | 47.4 | 18 | 9 | 27 | 36.0 | 10.4 | 0.185 | 109.1 | 1.20 | 0.222 |
| DV | juv | 72-80 | 75.8 | 4 | 0 | 4 | 4.0 | 0.0 | 0.021 | 12.1 | 4.40 | 0.090 |
| DV | adults | 120 | 120.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.005 | 3.0 | 17.20 | 0.088 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 41.0 | | 0.211 | 124.2 | | 0.401 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 5.6 |
| 3 | 5.6 |
| 6 | 4.1 |
| 9 | 3.7 |
| 12 | 3.3 |
| 15 | 4.5 |
| 18 | 12.8 |
| 20 | 7.6 |
| | 5.9 |

AREA (M*M) 194.7 MARGIN (M) 33

HABITAT COMMENTS:
Lots of LOD creating complex habitat in this reach. Numerous sidechannels. Good potential coho habitat.
Lots of bar development in this aggrading reach.

## Appendix 6 Table 10. Detailed Sample Information for Gosnell Index Site 10.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 10 | REACH: 7 | MAP : 93L012 | PHOTO: 17: 14&15 | DATE: | Sept 23/98 |

SITE LOCATION: Mainstem Gosnell in Reach 7.

| | | | | |
|---|---|---|---|---|
| GPS: | 54/07/07" | | ACCESS: | HEL |
| | 127/41/05" | EFFORT: | PASS 1 | 1978 secs |
| | | | PASS 2 | 1570 secs |
| M = MARGIN / F = FULL: | F | | | |
| | | SLOPE (%): 3 | TEMP (C): | 8 |
| S = SIDE / M = MAIN: | M | | TIME: | 1500 |
| | | | TDS (ppm): | 60 |

SAMPLING COMMENTS: Mainstem site with u/s and d/s stopnets and two-pass removal.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 31-68 | 49.1 | 15 | 2 | 17 | 17.3 | 0.7 | 0.095 | 54.1 | 1.50 | 0.143 |
| DV | juv | 72-106 | 90.4 | 6 | 1 | 7 | 7.2 | 0.6 | 0.040 | 22.5 | 10.20 | 0.404 |
| DV | adults | 113 | 113.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.005 | 3.1 | 15.50 | 0.085 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 25.5 | | 0.140 | 79.7 | | 0.632 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 6.4 |
| 3 | 5.8 |
| 6 | 4.7 |
| 9 | 5.7 |
| 12 | 5.8 |
| 15 | 5.7 |
| 18 | |
| 20 | |
| | 5.7 |
| AREA (M*M) | 181.9 |

MARGIN (M) 32

HABITAT COMMENTS:
Deep pool at the top of the site and lots of undercut bank and debris providing good juvenile cover.

## Appendix 6 Table 11. Detailed Sample Information for Gosnell Index Site 11.

**GOSNELL INDEX SITE 1998**

| | | | | | | |
|---|---|---|---|---|---|---|
| SITE: 11 | REACH: 8 | MAP : 93L002 | PHOTO: R9: 1&2 | | DATE: Sept 23/98 | |
| SITE LOCATION: | Mainstem site in Reach 8 of Gosnell. | | | | | |
| GPS: | 54/05/38" | | | ACCESS: | HEL | |
| | 127/43/14" | | EFFORT: | PASS 1 | 1564 | secs |
| | | | | PASS 2 | 1540 | secs |
| M = MARGIN / F = FULL: | F | | | | | |
| | | | SLOPE (%): 1 | TEMP (C): | 7.5 | |
| S = SIDE / M = MAIN: | M | | | TIME: | 1300 | |
| | | | | TDS (ppm): | na | |
| SAMPLING COMMENTS: | Mainstem blocked with stopnets and two-pass removal. | | | | | |

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 34-65 | 44.5 | 19 | 5 | 24 | 25.8 | 2.4 | 0.120 | 86.0 | 0.90 | 0.108 |
| DV | juv | 72-91 | 78.1 | 8 | 1 | 9 | 9.1 | 0.5 | 0.043 | 30.5 | 5.20 | 0.222 |
| DV | adults | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| BT | juv | 76-102 | 89.0 | 2 | 0 | 2 | 2.0 | 0.0 | 0.009 | 6.7 | 6.80 | 0.063 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 36.9 | | 0.172 | 123.1 | | 0.393 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 5.6 |
| 3 | 5.2 |
| 6 | 5.9 |
| 9 | 6.1 |
| 12 | 8.9 |
| 15 | 11.2 |
| 18 | |
| 20 | |
| | 7.2 |
| AREA (M*M) | 214.5 |
| MARGIN (M) | 30 |

HABITAT COMMENTS:
Main juvenile cover from LOD along bank. Also cobble bed material for fry cover.
Stable channel, but eroding cutbank located upstream.

## Appendix 6 Table 12. Detailed Sample Information for Gosnell Index Site 12.

**GOSNELL INDEX SITE 1998**

| | | | | | | |
|---|---|---|---|---|---|---|
| SITE: 12 | REACH: 9 | MAP : 93L002 | PHOTO: R17: 8&9 | DATE: | Sept 25/98 | |
| SITE LOCATION: | Upper Gosnell in Reach 9 | | | | | |
| GPS: | 54/05/36" | | | ACCESS: | HEL | |
| | 127/44/45" | | EFFORT: | PASS 1 | 1581 | secs |
| | | | | PASS 2 | 1521 | secs |
| M = MARGIN / F = FULL: | | F | | | | |
| | | | SLOPE (%): 1 | TEMP (C): | 5.5 | |
| S = SIDE / M = MAIN: | | M | | TIME: | 1030 | |
| | | | | TDS (ppm): | 40 | |
| SAMPLING COMMENTS: | Two pass removal with stopnets. | | | | | |

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 40-67 | 52.9 | 13 | 5 | 18 | 21.1 | 4.3 | 0.147 | 84.5 | 1.50 | 0.221 |
| DV | juv | 69-114 | 85.2 | 10 | 3 | 13 | 14.3 | 2.2 | 0.100 | 57.1 | 6.70 | 0.668 |
| DV | adults | 122 | 122.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.007 | 4.0 | 16.30 | 0.114 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 36.4 | | 0.254 | 145.6 | | 1.003 |

| LOCATION | WIDTH (m) | | |
|---|---|---|---|
| 0 | 5.9 | | |
| 3 | 6.2 | | |
| 6 | 5.8 | | |
| 9 | 5.4 | | |
| 12 | 5.5 | | |
| 15 | 5.6 | | |
| 18 | | | |
| 20 | | | |
| | 5.7 | | |
| AREA (M*M) | 143.3 | MARGIN (M) | 25 |

HABITAT COMMENTS:
Moderate complexity with LOD in pools and unembedded cobbles along the margins.
Cutbanks along river's left margin.

## Appendix 6 Table 13. Detailed Sample Information for Gosnell Index Site 13.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 13 | REACH: 9 | MAP : 93L002 | PHOTO: R9: 3&4 | DATE: | Sept 23/98 |

SITE LOCATION: Located in meadow section in Gosnell headwaters - Reach 9.

| | | | | | |
|---|---|---|---|---|---|
| GPS: | 54/04/38" | | | ACCESS: | HEL |
| | 127/45/51" | | EFFORT: | PASS 1 | 1146 secs |
| | | | | PASS 2 | 1120 secs |
| M = MARGIN / F = FULL: | | F | | | |
| | | | SLOPE (%): 0.5 | TEMP (C): | na |
| S = SIDE / M = MAIN: | | M | | TIME: | 1700 |
| | | | | TDS (ppm): | na |

SAMPLING COMMENTS: Enclosed with stopnets and two-pass removal.
Poor catch decline - high disturbance of fines resulted in poor water clarity.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 34-63 | 44.8 | 31 | 23 | 54 | 54.0 | na | 0.213 | 130.1 | 1.00 | 0.213 |
| DV | juv | 69-110 | 86.0 | 18 | 12 | 30 | 30.0 | na | 0.118 | 72.3 | 8.20 | 0.969 |
| DV | adults | 113-153 | 132.7 | 6 | 0 | 6 | 6.0 | 0.0 | 0.024 | 14.5 | 19.90 | 0.470 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 90.0 | | 0.355 | 216.9 | | 1.652 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 6.0 |
| 3 | 6.2 |
| 6 | 5.1 |
| 9 | 6.2 |
| 12 | 6.1 |
| 15 | 7.1 |
| 18 | |
| 20 | |
| | 6.1 |

AREA (M*M) 253.8 MARGIN (M) 42

HABITAT COMMENTS:
Low gradient stable section of Gosnell with seepage inflows in adjacent meadows.
Boulder/cobble cover predominant with some deep pools.

## Appendix 6 Table 14. Detailed Sample Information for Gosnell Index Site 101.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 101 | REACH: 1 | MAP : 93L023 | PHOTO: R14: 22 | DATE: | Aug 31/98 |

SITE LOCATION: Shea Creek Reach 1. Site located approximately 50 m d/s from bridge crossing.

| | | | | |
|---|---|---|---|---|
| | | ACCESS: | V2 | |
| | EFFORT: | PASS 1 | 1474 | secs |
| | | PASS 2 | 1595 | secs |
| M = MARGIN / F = FULL: F | | | | |
| | SLOPE (%): 1 | TEMP (C): | 15 | |
| S = SIDE / M = MAIN: M | | TIME: | 1800 | |
| | | TDS (ppm): | na | |

SAMPLING COMMENTS: Stopnet enclosure of full channel with 2-pass removal.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 45-68 | 51.4 | 4 | 4 | 8 | 8.0 | na | 0.019 | 22.9 | 1.50 | 0.029 |
| DV | juv | 77 | 77.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.002 | 2.9 | 5.60 | 0.014 |
| DV | adults | 116 | 116.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.002 | 2.9 | 16.80 | 0.041 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 32-56 | 42.8 | 36 | 16 | 52 | 64.8 | 10.4 | 0.158 | 185.1 | 0.90 | 0.142 |
| RBT | 1+ | 59-81 | 71.5 | 2 | 2 | 4 | 4.0 | na | 0.010 | 11.4 | 3.70 | 0.036 |
| CT | 0+ | 54 | 54.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.002 | 2.9 | 1.90 | 0.005 |
| Coho | 0+ | 40-69 | 57.8 | 17 | 6 | 23 | 26.3 | 4.0 | 0.064 | 75.1 | 2.10 | 0.134 |
| Coho | 1+ | 85-89 | 87.0 | 1 | 1 | 2 | 2.0 | na | 0.005 | 5.7 | 5.00 | 0.024 |
| TOTAL | | | | | | | 108.1 | | 0.263 | 308.8 | | 0.425 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 8.0 |
| 3 | 6.7 |
| 6 | 7.9 |
| 9 | 10.3 |
| 12 | 18.9 |
| 15 | 18.6 |
| 18 | |
| 20 | |
| | 11.7 |

AREA (M*M) 410.7 MARGIN (M) 35

HABITAT COMMENTS:
Excellent spawning and rearing habitat. High site complexity in slow-flowing water.
Warm water temperatures and lots of algae present in site.

## Appendix 6 Table 15. Detailed Sample Information for Gosnell Index Site 102.

**GOSNELL INDEX SITE 1998**

| | | | | | | |
|---|---|---|---|---|---|---|
| SITE: 102 | REACH: 1 | MAP : 93L023 | PHOTO: R17: 8&9 | DATE: | Sept 3/98 | |
| SITE LOCATION: | Mid-section of Shea Creek in the identical site as index sampling in past years. | | | | | |
| GPS: | 54/15/16.5 | | | ACCESS: | HEL | |
| | 127/30/47.0 | | EFFORT: | PASS 1 | 1405 | secs |
| | | | | PASS 2 | 1340 | secs |
| M = MARGIN / F = FULL: | F | | | | | |
| | | | SLOPE (%): 2 | TEMP (C): | 12 | |
| S = SIDE / M = MAIN: | M | | | TIME: | 1600 | |
| | | | | TDS (ppm): | 40 | |
| SAMPLING COMMENTS: | Stopnets with 2-pass removal. Clipped fish from DFO sampling present at site. | | | | | |

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | 39-68 | 48.3 | 9 | 3 | 12 | 13.5 | 2.6 | 0.122 | 45.0 | 1.30 | 0.159 |
| DV | juv | 72-108 | 85.0 | 6 | 0 | 6 | 6.0 | 0.0 | 0.054 | 20.0 | 7.30 | 0.396 |
| DV | adults | 117-126 | 121.0 | 3 | 0 | 3 | 3.0 | 0.0 | 0.027 | 10.0 | 18.90 | 0.513 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 35-49 | 43.6 | 18 | 10 | 28 | 40.5 | 14.9 | 0.367 | 135.0 | 1.00 | 0.367 |
| RBT | 1+ | 57-92 | 75.8 | 22 | 7 | 29 | 32.3 | 3.7 | 0.292 | 107.6 | 5.10 | 1.489 |
| RBT | >1+ | 102-127 | 112.1 | 8 | 1 | 9 | 9.1 | 0.5 | 0.083 | 30.5 | 15.60 | 1.291 |
| Coho | 0+ | 38-74 | 49.5 | 26 | 11 | 37 | 45.1 | 7.7 | 0.408 | 150.2 | 1.60 | 0.653 |
| Coho | 1+ | 78-80 | 79.0 | 2 | 0 | 2 | 2.0 | 0.0 | 0.018 | 6.7 | 5.60 | 0.101 |
| TOTAL | | | | | | | 151.5 | | 1.371 | 504.9 | | 4.969 |

| LOCATION | WIDTH (m) | | |
|---|---|---|---|
| 0 | 3.4 | | |
| 3 | 4.3 | | |
| 6 | 4.0 | | |
| 9 | 3.7 | | |
| 12 | 2.6 | | |
| 15 | 4.1 | | |
| 18 | | | |
| 20 | | | |
| | 3.7 | | |
| AREA (M*M) | 110.5 | MARGIN (M) | 30 |

HABITAT COMMENTS:
Good coho habitat in slow run areas with some debris.
Good steelhead juvenile habitat in cobble riffles. Also suspect old steelhead redd in site.

## Appendix 6 Table 16. Detailed Sample Information for Gosnell Index Site 104.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 104 | REACH: 2 | MAP : 93L023 | PHOTO: R8: 20&21 | DATE: | Sept 22/98 |

SITE LOCATION: Upper section of Shea Creek in Reach 2 - below falls.

| | | | | | |
|---|---|---|---|---|---|
| GPS: | na | | | ACCESS: | HEL | |
| | | | EFFORT: | PASS 1 | 1596 | secs |
| | | | | PASS 2 | 1496 | secs |
| M = MARGIN / F = FULL: | | F | | | | |
| | | | SLOPE (%): 1 | TEMP (C): | 6.5 | |
| S = SIDE / M = MAIN: | | M | | TIME: | 1030 | |
| | | | | TDS (ppm): | na | |

SAMPLING COMMENTS: Two-pass removal with stopnets.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| DV | juv | 77-102 | 89.5 | 1 | 1 | 2 | 2.0 | na | 0.009 | 6.7 | 8.40 | 0.079 |
| DV | adults | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| BT | juv | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 35-56 | 47.1 | 24 | 15 | 39 | 64.0 | 27.8 | 0.300 | 213.3 | 1.30 | 0.390 |
| RBT | 1+ | 57-93 | 80.0 | 10 | 3 | 13 | 14.3 | 2.2 | 0.067 | 47.6 | 5.80 | 0.388 |
| RBT | >1+ | 103-163 | 118.3 | 4 | 2 | 6 | 8.0 | 4.9 | 0.037 | 26.7 | 18.80 | 0.704 |
| Coho | 0+ | 63 | 63.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.005 | 3.3 | 7.60 | 0.036 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 89.3 | | 0.418 | 297.6 | | 1.597 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 8.8 |
| 3 | 6.8 |
| 6 | 5.0 |
| 9 | 6.2 |
| 12 | 6.8 |
| 15 | 9.1 |
| 18 | |
| 20 | |
| | 7.1 |

AREA (M*M) 213.5 MARGIN (M) 30

HABITAT COMMENTS:
Excellent cobble and boulder habitat for juvenile cover. Fry cover on margins.
Surprised at low steelhead catch relative to habitat. Above main spawning area??
Channel fairly stable with large bed material - too large for spawning.

## Appendix 6 Table 17. Detailed Sample Information for Gosnell Index Site 29.

**GOSNELL INDEX SITE 1998**

| | | | | | | |
|---|---|---|---|---|---|---|
| SITE: 29 | REACH: 2 | MAP : 93L013 | PHOTO: R8: 8&9 | DATE: | Sept 17/98 | |
| SITE LOCATION: | Crystal Creek - lower index site located approximately 50 m u/s from bridge. | | | | | |
| | | | | ACCESS: | V2 | |
| | | | EFFORT: | PASS 1 | 1460 | secs |
| | | | | PASS 2 | 1380 | secs |
| M = MARGIN / F = FULL: | F | | | | | |
| | | | SLOPE (%): 3 | TEMP (C): | 8.5 | |
| S = SIDE / M = MAIN: | M | | | TIME: | 1430 | |
| | | | | TDS (ppm): | 40 | |
| SAMPLING COMMENTS: | Two-pass removal with stopnets. | | | | | |

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| DV | juv | 70-106 | 88.0 | 1 | 1 | 2 | 2.0 | na | 0.007 | 6.7 | 8.50 | 0.063 |
| BT | 0+ | 56-66 | 60.3 | 3 | 0 | 3 | 3.0 | 0.0 | 0.011 | 10.0 | 2.30 | 0.025 |
| BT | juv | 92-105 | 99.7 | 3 | 0 | 3 | 3.0 | 0.0 | 0.011 | 10.0 | 9.60 | 0.106 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | 43-57 | 51.6 | 10 | 1 | 11 | 11.1 | 0.4 | 0.041 | 37.0 | 1.70 | 0.069 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | 106-132 | 122.2 | 4 | 1 | 5 | 5.3 | 1.0 | 0.020 | 17.8 | 21.20 | 0.416 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 24.4 | | 0.090 | 81.5 | | 0.679 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 10.4 |
| 3 | 8.6 |
| 6 | 8.6 |
| 9 | 9.2 |
| 12 | 8.7 |
| 15 | 8.9 |
| 18 | |
| 20 | |
| | 9.1 |
| AREA (M*M) | 272.0 |
| MARGIN (M) | 30 |

HABITAT COMMENTS:
Bull trout mainly in slow cobble sections along margins.
Cobble and boulder riffle habitat provides good rearing habitat for parr - typical habitat for this reach..

## Appendix 6 Table 18. Detailed Sample Information for Gosnell Index Site 31.

**GOSNELL INDEX SITE 1998**

| | | | | | |
|---|---|---|---|---|---|
| SITE: 31 | REACH: 2 | MAP : 93L023 | PHOTO: R14: 24 | DATE: | Sept 14/98 |

SITE LOCATION: Upper Crystal Creek index site - access from Block 539#2.

| | | | |
|---|---|---|---|
| | | ACCESS: | V4 - foot |
| | EFFORT: | PASS 1 | 2100 secs |
| | | PASS 2 | 1786 secs |
| M = MARGIN / F = FULL: | F | | |
| | SLOPE (%): 4 | TEMP (C): | 8 |
| S = SIDE / M = MAIN: | M | TIME: | 1600 |
| | | TDS (ppm): | na |

SAMPLING COMMENTS: Used two 30' nets for this site - marginal. Should use longer nets.

POPULATION ESTIMATES:

| SPECIES | AGE | FL RANGE | FL MEAN | PASS 1 | PASS 2 | U1+U2 | NUMBER | S.E. | N/M*M | N/100M | MEAN WT | BIOMASS g/m*m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Char | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| DV | juv | 98 | 98.0 | 1 | 0 | 1 | 1.0 | 0.0 | 0.003 | 3.7 | 10.00 | 0.034 |
| BT | 0+ | 48-55 | 51.5 | 4 | 0 | 4 | 4.0 | 0.0 | 0.014 | 14.8 | 1.50 | 0.020 |
| BT | juv | 71-108 | 86.8 | 8 | 2 | 10 | 10.7 | 1.4 | 0.036 | 39.5 | 7.50 | 0.272 |
| MW | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| MW | >=1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| RBT | >1+ | 105-184 | 142.4 | 4 | 1 | 5 | 5.3 | 1.0 | 0.018 | 19.8 | 33.00 | 0.598 |
| Coho | 0+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| Coho | 1+ | | | | | 0 | 0.0 | 0.0 | 0.000 | 0.0 | | 0.000 |
| TOTAL | | | | | | | 21.0 | | 0.071 | 77.8 | | 0.924 |

| LOCATION | WIDTH (m) |
|---|---|
| 0 | 9.9 |
| 3 | 11.3 |
| 6 | 13.7 |
| 9 | 12.6 |
| 12 | 11.6 |
| 15 | 9.4 |
| 18 | 7.8 |
| 20 | |
| | 10.9 |

AREA (M*M) 294.3 MARGIN (M) 27

HABITAT COMMENTS:
Lots of cobble and boulder cover for juveniles. Also some deep pools with LOD associated with log jams.

**Appendix 6 Table 19. Summary of Historical Sampling at Mainstem Gosnell Creek Index Sites Since 1980.**

| Year | Reach | Steelhead/100m^2 | | Coho | Dolly Varden | |
|---|---|---|---|---|---|---|
| | | Fry | Parr | | Fry | Juv & Adults |
| 1980 | R2 | 18.0 | 11.0 | 0.0 | 4.0 | 0.0 |
| | R4 | 2.0 | 0.0 | 3.0 | 7.0 | 0.0 |
| | Mean | 10.0 | 5.5 | 1.5 | 5.5 | 0.0 |
| 1981 | R2 | 0.0 | 6.0 | 31.0 | 0.0 | 0.0 |
| | R4 | 2.0 | 0.0 | 21.0 | 0.0 | 2.0 |
| | Mean | 1.0 | 3.0 | 26.0 | 0.0 | 1.0 |
| 1982 | R2 | 13.0 | 8.0 | 0.0 | 0.0 | 2.0 |
| | R4 | 0.0 | 8.0 | 16.0 | 0.0 | 0.0 |
| | Mean | 6.5 | 8.0 | 8.0 | 0.0 | 1.0 |
| 1991 | R2 | 27.7 | 4.4 | 0.0 | 0.0 | 0.3 |
| | R3 | 54.6 | 5.4 | 5.1 | 3.0 | 0.0 |
| | R4 | 4.1 | 0.0 | 17.3 | 2.8 | 0.0 |
| | Mean | 28.8 | 3.3 | 7.5 | 1.9 | 0.1 |
| 1992 | R2 | 12.0 | 14.7 | 0.0 | 2.2 | 4.5 |
| | R3 | 21.6 | 6.1 | 2.0 | 0.0 | 0.0 |
| | Mean | 16.8 | 10.4 | 1.0 | 1.1 | 2.3 |
| 1997 | R5 | 29 | 1 | 70 | 0 | 1 |
| 1998 | R2 | 33.5 | 6.4 | 0.4 | 0.5 | 0.4 |
| | R3 | 77.9 | 3.3 | 0.0 | 2.0 | 0.4 |
| | R4 | 6.5 | 5.9 | 7.0 | 9.6 | 3.0 |
| | R5 | 7.5 | 2.6 | 6.3 | 9.4 | 11.6 |
| | Mean | 30.6 | 3.9 | 4.4 | 7.0 | 5.0 |

1980 to 1982 - Tredger (1981 to 1983)
1991 & 1992 - Bustard (1992 and 1993)
1993 - Beere (1993)
1997 - Bustard (1997)

**Appendix 6 Table 20. Summary of Historical Sampling at Shea Creek Index Sites Since 1980.**

| Year | Reach | Steelhead/m^2 | | Coho | Dolly Varden | |
|---|---|---|---|---|---|---|
| | | Fry | Parr | | Fry | Juv & Adults |
| 1980 | | 6.0 | 2.0 | 31.0 | 1.0 | 0.0 |
| 1981 | | 5.0 | 8.0 | 10.0 | 0.0 | 2.0 |
| 1982 | | 74.0 | 23.0 | 38.0 | 5.0 | 0.0 |
| 1991 | 1 | 55.8 | 10.0 | 13.8 | 1.3 | 12.9 |
| | 2 | 40.4 | 12.2 | na | 1.5 | 2.3 |
| | Mean | 48.1 | 11.1 | 13.8 | 1.4 | 7.6 |
| 1992 | 1 | 16.2 | 19.5 | 48.4 | 6.6 | 1.7 |
| | 2 | 6.9 | 5.2 | na | 0.0 | 0.0 |
| | Mean | 11.6 | 12.4 | 48.4 | 3.3 | 0.9 |
| 1993 | na | 28.0 | 2.0 | na | na | na |
| 1997 | 1 | 19.0 | 32.0 | 74.0 | 14.0 | 34.0 |
| 1998 | 1 | 26.3 | 19.3 | 24.8 | 7.1 | 4.3 |
| | 2 | 30.0 | 10.4 | na | 0.0 | 0.9 |
| | | 28.2 | 14.9 | 24.8 | 3.6 | 2.6 |

1980 to 1982 - Tredger (1981 to 1983)
1991 & 1992 - Bustard (1992 and 1993)
1993 - Beere (1993)
1997 - Bustard (1997)
Site 2 in Shea Creek has not been used in the coho estimates as it is u/s from main area of use.

**Appendix 7 Table 1. Summary of Redd and Spawner Observations During Ground Surveys.**

| Stream | Reach | Redd Observations | | | | | Adult Observations | | |
|---|---|---|---|---|---|---|---|---|---|
| | | BT | Coho | Pink | DV | Sthd | BT | Coho | DV |
| Gosnell Mainstem* | 2 | | 2 | 7 | | 1 | | 12 | |
| | 3 | | 10 | 11 | | | | 127 | |
| | 5** | 2 | 12 | | 3 | | | 20 | 1 |
| | 7 | 47 | | | 1 | | | | |
| | 8 | 6 | | | 3 | | | | |
| | 9 | 2 | | | 5 | | | | |
| Total | | 57 | 24 | 18 | 12 | 1 | 0 | 159 | 1 |
| Crystal Creek | 1 | | | | | | 1 | | |
| | 2 | 1 | | | | | 3 | | |
| | 3 | 1 | | | | | | | |
| | 4 | 2 | | | | | 3 | | |
| | 5 | 0 | | | | | 0 | | |
| Total | | 4 | | | | | 7 | | |
| Shea Creek | 1 | | | 5 | 10 | 2 | | | |
| Creek 500-5730 | 1 | | | | | 1 | | | |
| | 2 | | | | 15 | | | | 5 |

*Reaches 4 and 6 were not examined. These reaches offered low potential spawning.

** Two additional redds - either BT of Coho.

| Appendix 7 Table 2. Redd and Spawner Observations During Ground Surveys in Gosnell Creek Mainstem. | | | |
|---|---|---|---|
| **Location** | **Redd Observations** | **Fish Observations** | **Habitat & Fish Comments** |
| **Reach 2 - 3.2 km** | | | |
| Timing & Extent: | Oct 2/98 - from Site 2 to Site 4. | | |
| | Sept 23/98 - Shea Creek to Site 4 | | |
| 1800 m below Crystal Ck. | 1 coho redd | 8 coho + 1 jack | |
| 1730 m below Crystal Ck | 7 pink redds - old | | |
| 500 m below Crystal Ck. | | 1 pink carcass | |
| 400 m below Crystal Ck. | 1 coho redd | 2 coho on redd | |
| 100 m below Crystal Ck. | 1 sthd redd | | Old suspected redd |
| 50 m below Crystal Ck. | | 1 coho | |
| Total Reach 2 | 2 coho redds | 12 coho | |
| | 7 pink redds | | |
| | 1 sthd redd | | |
| **Reach 3 - 6.1 km** | | | |
| 200 m above Crystal Ck. | 4 coho redds | 5 coho adults | Coho holding in pool. |
| 400 m below Site 3 | | 4 coho | Coho holding in pool. |
| 3200 m below Site 4 | 2 pink redds | | Vicinity of juvenile index site. |
| 2639 m to 2898 m below Site 4. | | 111 coho + 3 jacks | Fish holding in this section. |
| 1900 m to 1968 m below Site 4. | 3 coho redds | 3 coho | Coho holding in pool. |
| 1631 m below Site 4 | 7 pink redds | | |
| 1313 m below Site 4 | 2 coho redds | | |
| 870 m below Site 4. | 2 pink redds | | Part of pink carcass found d/s. |
| 100 m below Site 4. | | 12 mountain whitefish | 20-30 cm in length. |
| 200 m below Shea Ck. | 1 coho redd | 1 coho | Large male |
| Total Reach 3 | 10 coho redds | 127 coho | |
| | 11 pink redds | 12 m whitefish | |
| **Reach 5 - 6 km** | | | |
| Timing & Extent: | Sept 30/98 - 200 m u/s from 500- 5200 to top of Reach 5. | | |
| 5345 m below top of reach | | 11 coho | Two fish tagged on left side - 1 pink & 1 white. |
| | | | Holding in pool below beaver dam at Ck 5610. |
| 4918 m below top of reach | 2 coho redds | 3 adult coho | |
| 3460 m below top of reach | 3 coho redds | 1 male coho | Reach 5 sidechannel below Site 7. |
| 3464 m below top of reach | 1 DV redd | 1 mature male DV | Mainstem margin |
| 3410 m below top of reach | 1 coho redd | 1 coho | Spent female. Redd 4.4x1.2 m. |
| 3400 m below top of reach | 3 coho redds | | Just starting to excavate. |
| 3330 m below top of reach | 2 coho redds | 4 coho adults 1 jack | |
| 2900 m below top of reach | 1 DV redd | | |

| Appendix 7 Table 2. Redd and Spawner Observations During Ground Surveys in Gosnell Creek Mainstem. | | | |
|---|---|---|---|
| **Location** | **Redd Observations** | **Fish Observations** | **Habitat & Fish Comments** |
| 2516 m below top of reach | 1 DV redd | | In mainstem fine gravels |
| 1464 m below top of reach | 1 Co/BT redd? | | |
| 1140 m below top of reach | 1 coho redd | | Redd 4.0 x 1.2 m |
| 1100 m below top of reach | 1 Co/BT redd? | | Braided section |
| 400 m below top of Reach 5 | 2 BT redds | | Bottom end of canyon |
| Good spawning potential from top of Reach 5 d/s to Ck 5730. Below this Reach 5 is mainly lower gradient fines with some pockets of spawning potential. Reach 4 is low gradient and more ponded - less spawning potential. | | | |
| Total Reach 5 | 12 coho redds | 20 coho | |
| | 2 Co/BT redds | 1 DV | |
| | 2 BT redds | | |
| | 3 DV redds | | |
| **Reach 7 - 7.2 km** | | | |
| Timing & Extent: | Sept 29 & 30/98 | | |
| 300 m above Ck 7260 | 3 BT redds | | |
| 200 m below Ck 7520 | 1 BT redd | | |
| 300 m above Ck 7250 | 6 BT redds | | 300 m section |
| Ck 7930 to Ck 7790 | 9 BT redds | | |
| Ck 7930 u/s for 300 m | 7 BT redds | | |
| 520 m above Ck 7930 | 2 BT redds | | |
| 1300 m below Ck 8250 | 4 BT redds | | |
| 1200 m below Ck 8250 | 2 BT redds | | |
| 900 m below Ck 8250 fan | 2 BT redds | | |
| 650 m below Ck 8250 fan | 1 BT redds | | |
| 280 m below Ck 8250 fan | 2 BT redds | | |
| 160 m below Ck 8250 fan | 2 BT redds | | |
| 100 m below Ck 8250 fan | 1 BT redd | | |
| 549 m below top of Ck 8250 fan | 1 BT redd | | |
| 440 m below top of Ck 8250 fan | 1 BT redd | | |
| 550 m below top of reach | 2 BT redds | | On top of eachother |
| 500 m below top of reach | 1 BT redd | | |
| 200 m below top of reach | 1 DV redd | | In sidechannel at confluence |
| Total Reach 7 | 47 BT redds | | |
| | 1 DV redd | | |
| Note: - Reach 7 was re-examined on Oct. 21/98 to verify whether any coho spawners were present in this section. There had been high water conditions between Oct 2 ground surveys and Oct. 21 snorkel and ground surveys. A total of 7 redds were observed by 2 snorkellers - redds were difficult to see and some had been scoured by recent high water. There was no evidence of new redds or recent spawning (I.e., coho spawners). No fish or carcasses were | | | |

| Appendix 7 Table 2. Redd and Spawner Observations During Ground Surveys in Gosnell Creek Mainstem. | | | |
|---|---|---|---|
| **Location** | **Redd Observations** | **Fish Observations** | **Habitat & Fish Comments** |
| observed and we assume all redds observed during the Oct 2. surveys were bull trout redds. | | | |
| **Reach 8 - 2.2 km** | | | |
| Timing & Extent: | Sept 29/98 | | Areas of good potential spawning through- |
| | | | out this reach. |
| 220 m below Ck 8460 | 1 BT redd | | |
| 100 m below Ck 8460 | 1 BT redd | | |
| 1479 m below top of Reach 8 | 1 BT redd | | |
| 990 m below top of Reach 8 | 3 BT redds | | Small redds - may be hybrids |
| 815 m below top of Reach 8 | 3 DV redds | | |
| Total Reach 8 | 6 BT redds | | |
| | 3 DV redds | | |
| **Reach 9 - 2.4 km** | | | |
| Timing & Extent: | Sept 29/98 - Examined sections from Ck 9430 to Ck 9310 and from | | |
| | Ck 9170 to bottom of reach. | | |
| 1780 m below Ck 9170 | 3 DV redds | | |
| | 1 BT redd | | |
| 650 to 2000 m below Ck 9170 | | | Areas of good potential spawning |
| 970 m below Ck 9170 | 1 BT redd | | |
| 20 m below Ck 9310 | 2 DV redds | | |
| Total Reach 9 | 2 BT redds | | |
| | 5 DV redds | | |

| Appendix 7 Table 3. Summary of Redd and Spawner Observations During Ground Surveys in Crystal Creek. | | | |
|---|---|---|---|
| | | | |
| **Timing & Extent** | Main ground surveys were conducted on Sept 1-2. Also misc. observations | | |
| | during early August and mid-September. Surveys focused on Reaches 3 & 4 | | |
| | and the lower 300 m of Reach 5. | | |
| | | | |
| **Location** | **Redd** | **Fish** | **Habitat & Fish Comments** |
| | **Observations** | **Observations** | |
| | | | |
| | | | |
| **Reach 1 - 4.1 km** | None | None | May have some coho spawning potential |
| | | | but quite unstable with sediment wedges |
| | | | and frequent lateral channel movements. |
| | | | Some pockets of potential bull trout |
| | | | spawning. |
| | | | |
| **Reach 2 - 6.6 km** | | | Had the best potential steelhead and |
| | | | coho spawning habitat in Crystal Creek. |
| Site 30 | | 1 BT migrant | Observed on August 6. |
| 100 m u/s of Site 31 | 1 BT redd - Sept 1 | Pair of BT at redd | Bull trout estimated size - 30-35 cm. |
| | | Sept 2. | |
| | | | |
| **Reach 3 - 3.5 km** | | | Limited but some good pockets of potential |
| | | | bull trout spawning in Reach 3. |
| 300 m u/s from Site 32 | 1 BT reddd | | |
| | | | |
| **Reach 4 - 5.5 km** | | | Unstable cobble channel with wide flood |
| | | | plain. Redds in more confined section. |
| 500 m u/s from Site 66 | 1 BT redd | 1 male BT - 40 cm | |
| 600 m u/s from Site 66 | 1 BT redd | Pair of BT on redd | Female - 45 cm; male 38 cm |
| | | | |
| **Reach 5 - 0.3 km** | | | Limited spawning potential in lower 300 m |
| | | | of this reach. Dominated by boulder riffles. |
| **TOTAL** | 4 BT redds | 6 BT spawners | |
| | | | |
| Observations suggest that peak of bull trout spawning in this system is in late August and early September. | | | |

| Appendix 7 Table 4. Observations During Ground Surveys in Tributary 5730. | | | |
|---|---|---|---|
| | | | |
| **Timing & Extent** | Ground survey conducted on Sept 25 and 30th 1998. | | |
| | Top and bottom sections of Reach 1 and all of Reach from lake outlet. | | |
| | | | |
| | | | |
| **Location** | **Redd Observations** | **Fish Observations** | **Habitat & Fish Comments** |
| | | | |
| **Reach 1 - 1.1 km** | | | Lower 600 m and top 500 m examined. |
| | | | |
| 550 m u/s from mouth | 1 suspected old sthd redd | | Good potential steelhead and coho spawning. |
| | | | |
| Top 500 m of Reach 1 | | | Excellent potential coho spawning. |
| | | | |
| **Reach 2 - 3.8 km** | | | |
| | | | |
| Lower 400 m of Reach 2 | 13 DV redds | 4 adults | Excellent potential coho spawning. |
| | | 1 carcass | D/s from impassable falls. |
| | | | DV were 13-15 cm in length. |
| | | | |
| 475 m below Site 255 | | | Large unstable bank. |
| 200 m below 5730-5210 | 2 DV redds | 1 DV | 15 cms long |
| | | | |
| Creek is dewatered from unnamed lake d/s for 900 m in Reach 2. | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Observations indicate limited pink spawning completed and Dolly Varden spawning underway. Coho are not in creek yet. | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| Appendix 7 Table 5. Summary of Redd and Spawner Observations During Ground Surveys in Shea Creek. | | | |
|---|---|---|---|
| | | | |
| **Timing & Extent** | Main ground surveys were conducted on Sept 22-23. | | |
| | Surveys focused on Reaches 1 and 2. | | |
| | | | |
| | | | |
| **Location** | **Redd** | **Fish** | **Habitat & Fish Comments** |
| | **Observations** | **Observations** | |
| | | | |
| | | | |
| **Reach 1 - 5.8 km** | | | Areas of good potential spawning in Reach 1. |
| | | | Excellent coho and steelhead spawning in |
| | | | sidechannel located u/s from bridge crossing. |
| 180 m u/s from mouth | 3 suspected lamprey redds | | |
| 50 m above Site 100 | 1 suspected old sthd redd | | |
| 1600 m d/s from bridge | 1 DV redd | | |
| 1398 m d/s from bridge | 2 suspected pink redds | | |
| 1130-1160 m d/s from bridge | 3 new pink redds | | |
| 1040 m d/s from bridge | 3 DV redds | | |
| 600 m d/s from bridge | 6 DV redds | | Left sidechannel location |
| 500 m d/s from Site 102 | 1 suspected old sthd redd | | |
| Site 102 | 2 suspected lamprey redds | | Top of sidechannel at this site |
| | | | |
| | | | |
| **Reach 2 - 4.6 km** | | | Limited pockets of potential spawning. |
| | | | |
| 300 m below Site 104 | 1 suspected old sthd redd | | |
| 100 m below Site 104 | | 3 DV on redd | Sidechannel location |
| | | | Fish were approx. 15 cm in length. |
| | | | |
| Observations indicate limited pink spawning completed and Dolly Varden spawning underway. Coho are not in creek yet. | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| Appendix 8 Table 1. Detailed Summary of Dolly Varden Spawning Locations and Dates, 1998. | | |
|---|---|---|
| | | |
| | | |
| **Location** | **Date** | **Comment** |
| | | |
| **Ground Surveys:** | | |
| Reach 5 - Gosnell mainstem | Sep-30 | 2 DV redds present along mainstem - mature male |
| Reach 7 | Sep-30 | 1 DV redd at top of reach |
| Reach 8 | Sep-29 | 3 DV redds in reach |
| Reach 9 | Sep-29 | At least 5 DV redds along mainstem |
| | | |
| Creek 5730 | Sep-25 | 15 DV redds - active spawning underway - 5 adults |
| | | |
| Shea Creek | Sept 22-23 | 10 DV redds in Reach 1 |
| | | 3 DV on redds in sidechannel of Reach 2 |
| | | |
| | | |
| Reach 9 - mainstem Site 14 | Sep-23 | Mature spawners at this index site. -seepage channel |
| | | |
| **Sample Site Summaries:** | | |
| Crystal Reach 2 | Aug-21 | DV fry - assume DV spawn in this reach. |
| Crystal Reach 4 | Sep-24 | 1 DV redd - good potential throughout. |
| | | DV fry at Site 66 |
| ILP 1221 - Site 70 - Crystal | Sep-01 | 1 DV redd and pair of fish spawning - numerous fry |
| | | Major spawning seepage. |
| Site 91 Trib 2520-6980 | Oct-01 | 1 DV redd observed above road. |
| Site 176- Creek 3770 | Aug-26 | 3 DV redds up to 350 m u/s-good sp potential |
| Site 185 - Creek 3770-3470-241 | Aug-13 | Good potential and adults in area |
| Site 187- ILP 1314 | Aug-13 | Good DV spawning potential - fry and adults at site. |
| Site 201- Trib 4490 | Aug-07 | Good DV spawning potential - fry and adults at site. |
| Site 217 - Trib 4730 | Aug-10 | DV adults and fry present - not good potential. |
| Site 224 - Trib 5200 | Aug-12 | DV adults and fry present - not good potential. |
| Site 230 - Trib 5610 | Aug-19 | DV adults and fry present - not good potential. |
| Site 236 - Trib 5610-3720 | Aug-20 | DV adults and fry present - good potential -isolated. |
| Site 239 -ILP 1707 | Sep-28 | Pair of DV spawners 60 m u/s from mouth. Good pot. |
| Site 242 - Trib 5730 | Sep-15 | Good potential with adults and fry in area. |
| Site 256 - Trib 5730-5370 | Sep-16 | Good potential habitat with maturing adults present. |
| Site 258 - Trib 5730-5830 | Sep-15 | Good potential habitat with maturing adults present. |
| Site 270 - Trib 7260 | Sep-16 | Good potential and DV fry present. |
| Site 217 - Trib 7260-4815 | Sep-16 | Good potential and DV fry present. |
| Site 272 - Trib 7520 | Sep-18 | Presence of fry - suspect spawning in lower reach. |
| Site 274 - Trib 7690 | Sep-18 | Good potential and DV fry present. |
| Site 275 - Trib 7790 | Sep-18 | Good potential and DV fry present. |
| Site 276 - Trib 7930 | Sep-18 | Heavy DV spawning - 6 redds and 2 pairs of fish obs. |
| | | Lots of associated seepages with DV potenial. |
| Site 277 - Trib 7930 | Sep-18 | DV redd at 635 m - good gravels. |
| Site 278 - ILP 1713 | Sep-18 | Good potential and DV fry present. |
| Site 279 - Creek 8240 | Sep-25 | Redds and 1 kelt observed in mid-reach. |
| Site 290- Trib 9170 | Sep-25 | Fry present a long way u/s - assume spawning. |

| Appendix 8 Table 1. Detailed Summary of Dolly Varden Spawning Locations and Dates, 1998. | | |
|---|---|---|
| | | |
| | | |
| **Location** | **Date** | **Comment** |
| | | |
| Site 291- Trib 9310 | Sep-25 | Captured DV kelt - 8 DV redds below sample site. |
| | | Pair of DV on redd. |
| Site 293 - ILP 1086 | Sep-29 | DV adults and fry present - good potential. |
| | | Several spent adults. |
| Site 294 - Trib 9430 | Sep-29 | A spent female and DV fry captured and redd 50 m d/s. |
| Site 295 -Trib 9295 | Sep-29 | Spent female at site. DV fry present. |
| Site 297 - Trib 9490 | Sep-25 | 3 DV redds obs. - active spawning |
| Site 298 - ILP 1094 | Sep-29 | Spent adults and active spawning during sample - fry present |
| Site 299 - ILP 1094 | Sep-29 | Spent female spawner at site. |
| Site 300 - Trib 9640 | Sep-29 | Spawners observed -fry present |
| Site 301 - Trib 9640 | Sep-29 | 2 redds and actively spawning fish present. |
| | | |

## Appendix 9 Table 1. Re-Sampling Recommendations and Rationale for Non Fish-Bearing Reaches of the Gosnell Watershed, 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Fish Sample | Method | Classification ( ) = suspected | Recommend Re-sampling | Rationale |
|---|---|---|---|---|---|---|---|---|
| Lower Gosnell tribs | ILP 1717 | 1 | 15 | Y | EF | S3 | No | Should treat as high flow refuge |
| Lower Gosnell tribs | ILP 1423 | 1 | 18 | Y | EF | S4 to BD | Yes | Area above beaver dam S6 may change with time |
| Lower Gosnell tribs | ILP 1406 | 2 | 20 | N | | S4 in lower 500 m | Yes | Only to downgrade classification |
| Lower Gosnell tribs | ILP 1406 | 4 | 21 | N | | S6 | No | Channel was dry and on bench with no potential |
| Lower Gosnell tribs | ILP 1407 | 1 | 22 | N | | S6 | No | Channel dry - NVC |
| Lower Gosnell tribs | 50800-00500-1060 | 2 | 24 | N | | S4 in lower 200 m | No | Channel disappears above 200 m - steep bench |
| Lower Gosnell tribs | 50800-00500-1060 | 3 | 25 | N | | S6 | No | Small dry channel in grassy bog - no potential |
| Lower Gosnell tribs | ILP 1424 | 2 | 26 | Y | EF | S6 | No | Steep bench along Gosnell restricting access |
| Crystal Creek | ILP 1248 | 1 | 34 | N | | S3 & (S3) | Yes | Only to downgrade R1 classification |
| Crystal Creek | ILP 1248 | 2 | 35 | N | | S6 | No | Low seasonally-wetted channel - No potential |
| Crystal Creek | 50800-00500-1730-2300 | 2 | 37 | Y | MT | S3 & (S3) | Yes | Only to downgrade classification |
| Crystal Creek | 50800-00500-1730-2300 | 3 | 38 | Y | MT | S3 & S6 above BD | Yes | S6 area above beaver dam may change with time. |
| Crystal Creek | ILP 1800 | 1 | 40 | N | | S4 & S6 | No | Very short accessible section classed as fish habitat |
| Crystal Creek | 50800-00500-1730-3150-166 | 1 | 46 | Y | EF | S3 &S5 & S6 | No | 6 m high falls d/s |
| Crystal Creek | ILP 1701 | 2 | 50 | N | | S6 | No | Very small steep creek - no potential |
| Crystal Creek | 50800-00500-1730-3920 | 1 | 51 | N | | S6 | No | Not accessible past barrier at mouth - too steep |
| Crystal Creek | 50800-00500-1730-3920 | 1 | 52 | Y | EF | S6 | No | 15-25% gradient to mouth - too steep |
| Crystal Creek | ILP 1240 | 1 | 53 | N | | S6 above 30 m | No | Steepens to 18% plus quickly - flows too low |
| Crystal Creek | 50800-00500-1730-4680 | 1 | 54 | N | | (S6) & S6 | Yes | Sample only if plans near mouth- suspected section |
| Crystal Creek | 50800-00500-1730-5210 | 1 | 55 | N | | S5 & S6 | No | 20% in lower 80 m and 35% above |
| Crystal Creek | ILP 1278 | 1 | 56 | N | | S6 | No | Dry steep channel (25-30%) |
| Crystal Creek | ILP 1277 | 1 | 57 | N | | NVC | No | No visible channel |
| Crystal Creek | 50800-00500-1730-5460 | 1 | 58 | N | | S5 & S6 | No | Too steep (33%) and no access |
| Crystal Creek | 50800-00500-1730-5750 | 1 | 59 | N | | S6 | No | Dry channel - 30% slope |
| Crystal Creek | ILP 1270 | 1 | 60 | N | | S6 | No | Too steep to support fish - 50% slope |
| Crystal Creek | 50800-00500-1730-6550 | 1 | 63 | Y | EF | S5 & S6 | No | 15-18% slope - too steep & confined |
| Crystal Creek | ILP 1231 | 1 | 64 | N | | S6 | No | Too small and too steep (30%) with 1.5 m drops |
| Crystal Creek | 50800-00500-1730-7540 | 3 | 68 | Y | EF | S6 | No | Impassable 5 m high chute & 2 m falls in lower section |
| Crystal Creek | 50800-00500-1730-8220 | 1 | 69 | Y | EF | (S3) & S6 | No | Gradient >18% after 50 m. |
| Crystal Creek | 50800-00500-1730-8630 | 1 | 71 | N | | S6 | No | Dry channel - steep (28%) |
| Lower Gosnell tribs | 50800-00500-1890 | 2 | 74 | Y | EF | S6 | No | Poor access past Reach 1 and suspect reach dewaters |
| Lower Gosnell tribs | ILP 1429 | 1 | 75 | Y | EF | (S4) and S6 | Yes | No fish caught - still classed 700 m as (S4) |
| Lower Gosnell tribs | ILP 1429 | 2 | 76 | N | | S6 | Yes | Very low flows - should re-sample if plans in vicinity |
| Lower Gosnell tribs | 50800-00500-2000 | 2 | 78 | Y | EF | S6 | No | No access to this reach due to steep section at top of R1 |
| Lower Gosnell tribs | 50800-00500-2000 | 2 | 79 | N | | S6 | Yes | Flows too low to sample- appears to be very low potential |

## Appendix 9 Table 1. Re-Sampling Recommendations and Rationale for Non Fish-Bearing Reaches of the Gosnell Watershed, 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Fish Sample | Method | Classification ( ) = suspected | Recommend Re-sampling | Rationale |
|---|---|---|---|---|---|---|---|---|
| Lower Gosnell tribs | ILP 1441 | 1 | 88 | Y | MT | (S6) &S6 | No | NVC in lower section - stagnant pond |
| Lower Gosnell tribs | 50800-00500-2520-3700 | 1 | 89 | N | | S6 | No | Dry channel and steep bench at mouth - snowmelt only |
| Lower Gosnell tribs | ILP 1444 | 1 | 90 | N | | S6 | No | Dry channel and steep 15% gradient |
| Lower Gosnell tribs | ILP 1319 | 1 | 94 | Y | EF | (S4) and S6 | Yes | Only re-sample if lower 400 m in question |
| Lower Gosnell tribs | ILP 1704 | 2 | 98 | Y | MT | S6 | No | Pond with poor water quality and access restriction below |
| Lower Gosnell tribs | ILP 1321 | 1 | 99 | N | | S6 | No | Steep with very low flows - only potential in lower 20 m |
| Shea | 500-2830-2623 | 1 | 105 | N | | S4 | Yes | Only to downgrade R1 classification |
| Shea | ILP 1731 | 3 | 107 | Y | MT | S6 | No | Poor water quality and no potential |
| Shea | 500-2830-2715 | 1 | 109 | N | | S3 and S6 | No | Classed as S3 to 1.5 m falls |
| Shea | ILP 1605 | 3 | 112 | Y | EF | S3 & S6 | No | Ended fish aceess at 20% slope in R3 |
| Shea | ILP 1729 | 4 | 113 | Y | MT | | No | Also no fish caught at site d/s |
| Shea | ILP 1603 | 1 | 114 | Y | EF | (S3) & S6 | Yes | Only to downgrade (S3) classification |
| Shea | 500-2830-2798 | 1 | 115 | N | | S3 amd S5 | | Dry channel - classed as fish to falls |
| Shea | 500-2830-2798 | 2 | 116 | Y | EF | S6 | No | 15 m falls d/s - fish below falls but not above |
| Shea | 500-2830-2895 | 1 | 117 | Y | EF | (S6) and S6 | No | Suspect no access due to such low flows |
| Shea | ILP 1477 | 2 | 120 | N | | (S3) and S6 | Yes | Only to downgrade R1 (S3) - steep (17%) and dry |
| Shea | 500-2830-2968-268 | 1 | 127 | N | MT | S6 | No | Steep rises sharply 20 m from mouth 15% plus slope |
| Shea | 500-2830-2968-268 | 2 | 128 | Y | MT | | No | No outlet to the pond |
| Shea | 500-2830-2968-422 | 3 | 129 | Y | MT | | No | No outlet to the lake |
| Shea | 500-2830-2968-433-086 | 1 | 131 | N | | (S3) & (S4) | Yes | Channel dry - sample to re-classify |
| Shea | 500-2830-2968-433-086 | 1 | 132 | Y | EF | (S4) | Yes | Only to downgrade classification |
| Shea | 500-2830-2968-433-086 | 2 | 133 | Y | MT | | Yes | To confirm that lake and outlet are barren |
| Shea | ILP 1602 | 1 | 137 | N | | S6 | Yes | Examined from air - NVC but close to fish stream |
| Shea | ILP 1600 | 1 | 138 | N | | (S4) and S6 | No | Gradient increases to >20% at 110 m. |
| Shea | 500-2830-2968-477 | 5 | 142 | Y | | suspected fish | No | Only to downgrade classification |
| Shea | 500-2830-2968-507 | 3 | 144 | Y | EF | S6 | No | Steep section present in d/s reach |
| Shea | ILP 1597 | 1 | 145 | N | | FSZ and S6 | Yes | May be some use in lower 100 m. |
| Shea | 500-2830-3266 | 2 | 149 | Y | EF | S6 | No | Steep cliff barrier d/s |
| Shea | 500-2830-2798 | 4 | 150 | Y | EF | S6 | No | Fish barrier d/s in Reach 2 |
| Shea | 500-2830-3322 | 2 | 151 | Y | EF | (S6) & NVC | Yes | To confirm (S6) status d/s from site. |
| Shea | ILP 1483 | 1 | 152 | N | | S4 & (S6) & S6 | Yes | Channel dry Re-sample suspected section during wetter season. |
| Shea | ILP 1483 | 2 | 153 | Y | EF | (S6) &S6 | Yes | Sample lower section of creek to confirm S6 status |
| Shea | 500-2830-3452 | 1 | 154 | N | | (S6) | Yes | Based on air obser - site dry and access restriction at mouth |
| Shea | 500-2830-3452 | 2 | 155 | Y | EF | S6 | No | Based on d/s obser and no fish at site |
| Mid Gosnell Tribs | ILP 1730 | 2 | 157 | Y | MT | S4 | Yes | Only to downgrade classification |

## Appendix 9 Table 1. Re-Sampling Recommendations and Rationale for Non Fish-Bearing Reaches of the Gosnell Watershed, 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Fish Sample | Method | Classification ( ) = suspected | Recommend Re-sampling | Rationale |
|---|---|---|---|---|---|---|---|---|
| Mid Gosnell Tribs | 500-3080 | 3 | 158 | Y | EF | S4 | Yes | Only to downgrade classification |
| Mid Gosnell Tribs | ILP 1609 | 1 | 159 | N | | S6 | No | Channel dry - steepends - then NVC |
| Mid Gosnell Tribs | 500-3080 | 4 | 160 | N | | S6 | No | Channel dry - no potential above road due to steep bench |
| Mid Gosnell Tribs | ILP 1467 | 2 | 166 | N | | S6 | No | Channel dry & NVC above 150 m |
| Mid Gosnell Tribs | 500-3650 | 1 | 169 | N | | FSZ & S6 | Yes | Only to downgrade FSZ classification |
| Mid Gosnell Tribs | 500-3650 | 2 | 170 | N | | S6 | No | Channel dry and steep (19% plus slope) |
| Mid Gosnell Tribs | 500-3650 | 3 | 171 | Y | EF | S6 | No | Steep inaccessible section d/s |
| Mid Gosnell Tribs | 500-3770 | 4 | 177 | Y | MT | S6 | Yes | 1 m beaver dam may change over time |
| Mid Gosnell Tribs | 500-3770 | 4 | 178 | Y | EF | S6 | Yes | 1 m beaver dam may change over time |
| Mid Gosnell Tribs | 500-3770-3470 | 2 | 182 | Y | EF | S6 | No | Very steep section d/s - no fish d/s |
| Mid Gosnell Tribs | ILP 1706 | 1 | 183 | N | | S3 | Yes | Only to downgrade classification |
| Mid Gosnell Tribs | ILP 1706 | 2 | 184 | N | | S3 & (S6) & S6 | No | Channel dry and steep (>16%) after 320 m |
| Mid Gosnell Tribs | ILP 1311 | 1 | 189 | N | | S6 | No | Channel dry and steep (>15%) |
| Mid Gosnell Tribs | 500-3770-5510 | 1 | 190 | Y | MT | (S4) | Yes | Pond - Assumed fish present- sample to downgrade class. |
| Mid Gosnell Tribs | ILP 1323 | 1 | 191 | Y | EF | (S4) and S6 | Yes | Only 75 m of channel wetted - only to downgrade class. |
| Mid Gosnell Tribs | ILP 1323 | 2 | 192 | N | | S6 | No | Channel too steep (15-20% plus) |
| Mid Gosnell Tribs | 500-3770-7220 | 1 | 194 | Y | EF | S6 | Yes | 1 m high beaver dam may change with time |
| Mid Gosnell Tribs | 500-3770-7220 | 2 | 195 | Y | EF | S6 | Yes | 1 m high beaver dam may change with time |
| Mid Gosnell Tribs | 500-3900 | 2 | 197 | N | | S4 & (S4) & S6 | No | Re- sample to downgrade classification |
| Mid Gosnell Tribs | 500-3900 | 2 | 198 | Y | EF | S4 & (S4) & S6 | No | This section above Site 197 |
| Mid Gosnell Tribs | 500-3900 | 3 | 199 | Y | EF | S6 | No | Thoroughly sampled - marginal habitat |
| Mid Gosnell Tribs | ILP 1454 | 2 | 204 | Y | EF | S6 | No | Steep (18% plus) small creek |
| Mid Gosnell Tribs | 500-4290 | 4 | 209 | Y | EF | (S4) | Yes | BD's in R3 may restrict access - incorrectly mapped as S6 |
| Mid Gosnell Tribs | 500-4290-2871 | 3 | 213 | N | | S5 &S6 | No | Dry and steep channel (15% plus) |
| Mid Gosnell Tribs | 500-4290-2871 | 1 | 214 | N | | S5 & S6 | No | Mainly no channel through this section |
| Mid Gosnell Tribs | 500-4290-2871 | 2 | 215 | Y | EF | S5 & S6 | No | Considered no potential |
| Mid Gosnell Tribs | ILP 1293 | 1 | 216 | N | | S6 | No | Small dry channel - no fish in main channel d/s |
| Mid Gosnell Tribs | 500-5380 | 2 | 225 | Y | EF | FSZ & S6 | No | NVC above floodplain |
| Mid Gosnell Tribs | 500-5470 | 2 | 226 | Y | EF | S3 & (S3) & S6 | No | Slope >24% above (S3) section |
| Mid Gosnell Tribs | 500-5610-2790 | 2 | 235 | Y | EF | S6 | No | Sampled only habitat available - mostly dry |
| Mid Gosnell Tribs | 500-5610-3720 | 2 | 237 | Y | EF | S5 & S6 | No | Impassable 6.5 m falls in lower reach |
| Mid Gosnell Tribs | ILP 1152 | 1 | 238 | Y | MT | | No | Wetland pond -NVC and BD at outlet |
| Mid Gosnell Tribs | ILP 1707 | 2 | 239 | Y | EF | S4 & S6 | Yes | Re-sample at higher flows in S4 section |
| Mid Gosnell Tribs | 500-5730 | 2 | 244 | N | | S2 | Yes | Channel dry - re-sample to downgrade class. |
| Mid Gosnell Tribs | 500-5730-0690 | 2 | 247 | Y | EF | S3 & S6 | Yes | S3 on floodplain |

## Appendix 9 Table 1. Re-Sampling Recommendations and Rationale for Non Fish-Bearing Reaches of the Gosnell Watershed, 1998.

| Stream Name | Watershed Code or ILP | Reach | Site | Fish Sample | Method | Classification ( ) = suspected | Recommend Re-sampling | Rationale |
|---|---|---|---|---|---|---|---|---|
| Mid Gosnell Tribs | 500-5730-2280 | 2 | 248 | N | | S3 | Yes | Dry channel - but accessible at higher flows. |
| Mid Gosnell Tribs | 500-5730-2280 | 2 | 249 | Y | EF | S3 & (S3) & S6 | Yes | Re-sample to downgrade and due to BD |
| Mid Gosnell Tribs | ILP 1709 | 2 | 253 | Y | EF | S5 & S6 | No | Inaccessible due to d/s steep canyon |
| Mid Gosnell Tribs | 500-5730-5210 | 1 | 254 | N | | S5 & S6 | Yes | Channel too small or not visible |
| Mid Gosnell Tribs | 500-5730-5210 | 1 | 255 | Y | MT | S4 & S6 | Yes | Wetland - 2 m BD may change over time |
| Mid Gosnell Tribs | ILP 1710 | 1 | 257 | Y | EF | S4 & S6 | Yes | Thoroughly sampled small seepage section |
| Mid Gosnell Tribs | 500-5730-5370-6240 | 1 | 259 | Y | EF | S3 | No | Assume fish use due to good access |
| Mid Gosnell Tribs | 500-5730-5370-7320 | 1 | 260 | N | | S3 & S5 & S6 | No | Dry channel - re-sample to downgrade lower class. |
| Mid Gosnell Tribs | ILP 1176 | 1 | 261 | N | | S4 | Yes | Dry channel - assume fish use due to good access |
| Mid Gosnell Tribs | 500-5730-5370-8930 | 2 | 262 | Y | EF | S4 & S6 | Yes | Classified by aerial examination |
| Mid Gosnell Tribs | 500-6580 | 2 | 264 | Y | EF | S5 & S6 | No | Impassable chute d/s |
| Mid Gosnell Tribs | ILP 1711 | 1 | 265 | Y | EF | S6 | No | Impassable chute d/s |
| Mid Gosnell Tribs | 500-6830 | 1 | 266 | N | | S6 | No | Drops over 65% bench into the mainstem |
| Mid Gosnell Tribs | 500-7110 | 1 | 267 | Y | EF | S2 & S5 &S6 | No | Impassable chutes located at 200 m |
| Mid Gosnell Tribs | ILP 1712 | 1 | 268 | Y | EF | S6 | No | Too steep - 16% plus |
| Upper Gosnell Tribs | 500-7520 | 2 | 273 | Y | EF | (S5) & S5 & S6 | No | Bedrock canyon in lower end - steep with impassable chute |
| Upper Gosnell Tribs | ILP 1720 | 3 | 284 | Y | EF | S2 & S5 &S6 | Yes | To downgrade S2 class in lower sections |
| Upper Gosnell Tribs | ILP 1724 | 1 | 285 | Y | EF | S4 &S6 | No | NVC u/s from 100 m |
| Upper Gosnell Tribs | 500-8460 | 2 | 286 | Y | EF | S2 & (S5) &S6 | Yes | Impassable chutes u/s from S2 section |
| Upper Gosnell Tribs | 500-8840 | 1 | 287 | N | | S5 & S6 | No | Steep (18% plus) and dry |
| Upper Gosnell Tribs | ILP 1104 | 2 | 289 | Y | EF | (S3) & S6 | Yes | Only to downgrade classification |
| Upper Gosnell Tribs | ILP 1714 | 1 | 292 | Y | EF | S6 | No | Impassable falls d/s |
| Upper Gosnell Tribs | 500-9430 | 2 | 296 | Y | EF | S2 & S5 & S6 | No | 5m high impassable falls d/s |
| Upper Gosnell Tribs | 500-9640 | 2 | 301 | Y | EF | S3 & (S3) & S5 | No | Only available habitat was sampled |
| Crystal Creek | 50800-00500-1730-5750 | 1 | 61 | N | | S3 & S6 | No | Steepens u/s from mouth 18% plus @ 180 m. |
| Lower Gosnell tribs | 50800-00500-2400 | 3 | 82 | N | | | No | No visible channel |

**Appendix 10. Photo Survey Form 1 and Photo Documentation Report.**

## PHOTO SURVEY FORM 1 - Equipment Details

**Survey start date** (yyyy/mm/dd): 1998/08/01 **Agency:** C087
**Survey end date:** 1998/10/01 **Crew:** DB/RD/CP/GM/IB/DA

**CAMERA A:**

| | | | |
|---|---|---|---|
| **Make and model:** | Pentax Zoom 90-WR Multi-AF | **Lens:** | 38-90 mm zoom |
| **Format:** | 35 mm film | | (focal length, mm) |
| **Resolution (for digital and video cameras):** | n/a | | |
| **Output file type (for digital and video cameras):** | n/a | | |

**CAMERA B:**

| | | | |
|---|---|---|---|
| **Make and model:** | Pentax Zoom 90-WR Multi-AF | **Lens:** | 38-90 mm zoom |
| **Format:** | 35 mm film | | (focal length, mm) |
| **Resolution (for digital and video cameras):** | n/a | | |
| **Output file type (for digital and video cameras):** | n/a | | |

**CAMERA EX:**

| | | | |
|---|---|---|---|
| **Make and model:** | kodak disposible | **Lens:** | 35 mm |
| **Format:** | 35 mm film | | (focal length, mm) |
| **Resolution (for digital and video cameras):** | n/a | | |
| **Output file type (for digital and video cameras):** | n/a | | |

**ROLL DETAILS:**

| Roll #'s | Camera # | Output Medium | For film cameras: | |
|---|---|---|---|---|
| | | | Film Type | ISO |
| 1-10 | A | negative | color | 200 |
| 11-18 | B | | color | 200 |
| 19 | EX | negative | color | 100 |

# Photo Documentation Report

*1999/03/29*

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-6980-000-000-000- | 2.0- | 91 | | | Sample site. |
| 1 | 2 | 2 | 1 | 2 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-6980-000-000-000- | 2.0- | | | | Twin culverts. NID # 8062. |
| 1 | 3 | 3 | 1 | 3 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-6980-000-000-000- | 2.0- | | | | |
| 1 | 4 | 4 | 1 | 4 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-6980-000-000-000- | 2.0- | | | | |
| 1 | 5 | 5 | 1 | 5 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-0000-000-000-000- | 4.0- | 86 | | | Sample site. |
| 1 | 6 | 6 | 1 | 6 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-0000-000-000-000- | 4.0- | | | | |
| 1 | 7 | 7 | 1 | 7 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-0000-000-000-000- | 4.0- | | | | |
| 1 | 8 | 8 | 1 | 8 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-0000-000-000-000- | 2.0- | 173 | | | Sample site. |
| 1 | 9 | 9 | 1 | 9 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-0000-000-000-000- | 2.0- | | | | |
| 1 | 10 | 10 | 1 | 10 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-0000-000-000-000- | 2.0- | | | | |
| 1 | 11 | 11 | 1 | 11 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-0000-000-000-000- | 2.0- | | | | |
| 1 | 12 | 12 | 1 | 12 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3080-0000-000-000-000- | 4.0- | 160 | | | |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 13 | 1 | 13 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 159 | 093L.023 | 1609 | |
| 1 | 14 | 14 | 1 | 14 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 4.0- | 21 | 093L.024 | 1406 | Stream channel. |
| 1 | 15 | 15 | 1 | 15 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1060-0000-000-000-000- | 2.0- | 24 | | | Stream channel in R2. |
| 1 | 16 | 16 | 1 | 16 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1060-0000-000-000-000- | 3.0- | 25 | | | Dry swamp channel. |
| 1 | 17 | 17 | 1 | 17 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 35 | 093L.023 | 1248 | Dry channel. |
| 1 | 18 | 18 | 1 | 18 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 2.0- | 30 | | | Sample site. |
| 1 | 19 | 19 | 1 | 19 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 2.0- | | | | |
| 1 | 20 | 20 | 1 | 20 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 2.0- | | | | |
| 1 | 21 | 21 | 1 | 21 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 40 | 093L.013 | 1800 | Site location in the lower 100 m. |
| 1 | 22 | 22 | 1 | 22 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-2300-000-000-000- | 1.0- | 36 | | | Steep section in the lower 20 m of R1. |
| 1 | 23 | 23 | 1 | 23 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-2300-000-000-000- | 1.0- | | | | |
| 1 | 24 | 24 | 1 | 24 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 2.0- | | | | Slump. NID # 8025 |
| 2 | 1 | 1 | 1 | 26 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-0000-000-000-000- | 2.0- | 173 | | | R2 pond of trib. 00500-3770-1930 - Site 180. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 2 | 1 | 27 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-1930-000-000-000- | 2.0- | | | | |
| 2 | 2 | 2 | 1 | 27 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-1930-000-000-000- | 2.0- | | | | |
| 2 | 3, 4 | | 1 | 28 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-1930-000-000-000- | 2.0- | | | | |
| 2 | 3, 4 | | 1 | 28 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-1930-000-000-000- | 2.0- | | | | |
| 2 | 5 | 5 | 1 | 30 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3080-0000-000-000-000- | 3.0- | 158 | | | R2 lake of trib. ILP 1608 - Site 157. |
| 2 | 6 | 6 | 1 | 31 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3080-0000-000-000-000- | 3.0- | 158 | | | R1 lake outlet with NVC of trib. ILP 1608. |
| 2 | 7 | 7 | 1 | 32 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 19 | 093L.024 | 1406 | Reach 1. |
| 2 | 8 | 8 | 1 | 33 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 20 | 093L.024 | 1406 | Reach 2. |
| 2 | 9 | 9 | 1 | 34 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 22 | 093L.024 | 1407 | Dry channel. |
| 2 | 10 | 10 | 1 | 35 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 39 | 093L.013 | 1282 | No visible channel. |
| 2 | 11 | 11 | 1 | 36 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-2300-000-000-000- | 3.0- | 38 | | | Alder swale creek. |
| 2 | 12 | 12 | 1 | 37 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-2300-000-000-000- | 3.0- | 38 | | | Pond above the 2 m high BD. |
| 2 | 13 | 13 | 1 | 38 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 98 | 093L.013 | 1704 | R2 trapping pond. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 14 | 14 | 1 | 39 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | | 093L.013 | 1704 | Culvert. NID # 8063 |
| 2 | 15 | 15 | 1 | 40 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 97 | 093L.013 | 1704 | R1 above the road culvert. |
| 2 | 16 | 16 | 1 | 41 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2520-6980-000-000-000- | 3.0- | 92 | | | R3 sample site. |
| 2 | 17 | 17 | 1 | 42 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2040-0000-000-000-000- | 3.0- | 82 | | | |
| 2 | 18 | 18 | 1 | 43 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-2300-000-000-000- | 2.0- | 37 | | | Trapping pond. |
| 2 | 19 | 19 | 1 | 44 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2520-6980-000-000-000- | 4.0- | 93 | | | R4 sample site. |
| 2 | 20 | 20 | 1 | 45 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 99 | 093L.013 | 1321 | R1 site. |
| 2 | 21 | 21 | 1 | 46 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 95 | 093L.013 | 1320 | R1 sample site. |
| 2 | 22 | 22 | 1 | 47 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-3470-000-000-000- | 1.0- | 181 | | | Sample site below the road. |
| 2 | 23 | 23 | 1 | 48 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-3470-000-000-000- | 1.0- | 181 | | | Abandoned channel u/s in R2 now crosses road 50 m away from old bridge crossing. |
| 3 | 1 | 1 | 1 | 53 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 90 | 093L.023 | 1444 | Reach 1. |
| 3 | 2 | 2 | 1 | 54 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2520-3700-000-000-000- | 1.0- | 89 | | | Steep section on bench in R1. Site location. |
| 3 | 3 | 3 | 1 | 55 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3080-0000-000-000-000- | 2.0- | 156 | | | Reach 2 sample site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 4 | 4 | 1 | 56 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3080-0000-000-000-000- | 3.0- | 158 | | | Reach 3. |
| 3 | 5 | 5 | 1 | 57 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3080-0000-000-000-000- | 3.0- | 158 | | | Wetland area (dry grassy fen). |
| 3 | 6 | 6 | 1 | 58 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-0000-000-000-000- | 3.0- | 174 | | | Sample site. |
| 3 | 7 | 7 | 1 | 59 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2520-0000-000-000-000- | 4.0- | 86 | | | R8 lake wetland - Site 87. |
| 3 | 8 | 8 | 1 | 60 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 34 | 093L.023 | 1248 | R1 site location. |
| 3 | 9 | 9 | 1 | 61 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 94 | 093L.013 | 1319 | R1 sample site. |
| 3 | 10 | 10 | 1 | 62 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 187 | 093L.013 | 1314 | Sample site, 60 m d/s from road culvert. |
| 3 | 11 | 11 | 1 | 63 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | | 093L.013 | 1314 | Culvert. NID # 8107 |
| 3 | 12 | 12 | 1 | 64 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-3470-241-000-000- | 2.0- | 185 | | | Sample site above culvert at road. |
| 3 | 13 | 13 | 1 | 65 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-3470-241-000-000- | 2.0- | 185 | | | Road culvert: 2 m diameter x 18 m long; well installed; easy fish passage. |
| 3 | 14 | 14 | 1 | 66 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-3470-241-000-000- | 2.0- | 186 | | | Sample site. |
| 3 | 15 | 15 | 1 | 67 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-3470-241-000-000- | 3.0- | 188 | | | Lower 100 m of R3. |
| 3 | 16 | 16 | 1 | 68 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3650-0000-000-000-000- | 3.0- | 171 | | | Sample site in R2. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 17 | 17 | 1 | 69 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 210 | 093L.013 | 1299 | Reach 1 spawning area. |
| 3 | 18 | 18 | 1 | 70 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4290-0000-000-000-000- | 1.0- | 206 | | | Sample site in R1; prime CO habitat. |
| 3 | 19 | 19 | 1 | 71 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4290-2871-000-000-000- | 2.0- | 212 | | | Reach 2 sample site. |
| 3 | 20 | 20 | 1 | 72 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4290-2871-000-000-000- | 2.0- | 212 | | | Abandoned channel on fan. |
| 3 | 21 | 21 | 1 | 73 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4290-2871-000-000-000- | 3.0- | 213 | | | Reach 3 u/s of old bridge crossing. |
| 4 | 1 | 1 | 1 | 74 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 189 | 093L.013 | 1311 | Reach 1. |
| 4 | 2 | 2 | 1 | 75 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-3470-000-000-000- | 2.0- | 182 | | | Sample site in lower gradient section of R2. |
| 4 | 3 | 3 | 1 | 76 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 215 | 093L.012 | 1295 | Reach 2 sample site. |
| 4 | 4 | 4 | 1 | 77 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-0000-000-000-000- | 1.0- | 172 | | | Sample site at the top of R1. |
| 4 | 5 | 5 | 1 | 78 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-0000-000-000-000- | 1.0- | 172 | | | Aerial view of lower R1. |
| 4 | 6 | 6 | 1 | 79 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2040-0000-000-000-000- | 1.0- | 81 | | | Sample site. |
| 4 | 7 | 7 | 1 | 80 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2520-0000-000-000-000- | 3.0- | 85 | | | R3 sample site. |
| 4 | 8 | 8 | 1 | 81 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2520-0000-000-000-000- | 2.0- | 84 | | | |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 9 | 9 | 1 | 82 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 214 | 093L.012 | 1295 | R1 sample site. |
| 4 | 10 | 10 | 1 | 83 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4290-0000-000-000-000- | 4.0- | 209 | | | R4 at Site 209 location. |
| 4 | 11 | 11 | 1 | 84 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 216 | 093L.012 | 1293 | Dry channel at R1 site. |
| 4 | 12 | 12 | 1 | 85 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-0000-000-000-000- | 4.0- | 230 | | | First bridge crossing. |
| 4 | 13 | 13 | 1 | 86 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-0000-000-000-000- | 4.0- | 230 | | | Sample site, 100 m u/s from bridge. |
| 4 | 14 | 14 | 1 | 87 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-3720-000-000-000- | 2.0- | 237 | | | R2 above road bridge. |
| 4 | 15 | 15 | 1 | 88 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-0000-000-000-000- | 4.0- | 175 | | | Trapping site in marsh in R4. |
| 4 | 16 | 16 | 1 | 89 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4290-0000-000-000-000- | 2.0- | 207 | | | R2 sample area. |
| 4 | 17 | 17 | 1 | 90 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-2790-000-000-000- | 2.0- | 235 | | | R2 above the road crossing. |
| 4 | 18 | 18 | 1 | 91 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-3720-000-000-000- | 1.0- | | | | 6.5 m high falls. NID # 8142 |
| 4 | 19 | 19 | 1 | 92 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-3720-000-000-000- | 1.0- | 236 | | | R1 below falls. |
| 4 | 20 | 20 | 1 | 93 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-0000-000-000-000- | 5.0- | 231 | | | R5 - blown out section, 600 m u/s from road |
| 4 | 21 | 21 | 1 | 94 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-0000-000-000-000- | 5.0- | 231 | | | R5 - site location, 700 m u/s from road |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 22 | 22 | 1 | 95 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 184 | 093L.013 | 1706 | R2 above the road. |
| 4 | 23 | 23 | 1 | 96 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 183 | 093L.013 | 1706 | R1 with gravel spread across the forest floor. |
| 4 | 24 | 24 | 1 | 97 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-2790-000-000-000- | 1.0- | 234 | | | Sample site just above swamp (base of hillside). |
| 4 | 25 | 25 | 1 | 98 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5610-2790-000-000-000- | 1.0- | 234 | | | R1 wetland complex. |
| 5 | 1 | 1 | 2 | 1 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 179 | 093L.023 | 1307 | Lower end of R1. |
| 5 | 2 | 2 | 2 | 2 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3150-000-000-000- | 2.0- | 43 | | | Sample site at road in R3. |
| 5 | 3 | 3 | 2 | 3 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-0000-000-000-000- | 4.0- | 177 | | | Pond area where traps were set. |
| 5 | 4 | 4 | 2 | 4 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-0000-000-000-000- | 4.0- | 177 | | | Outlet channel showing 35 cm high drop over mud. |
| 5 | 5 | 5 | 2 | 5 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-7220-000-000-000- | 1.0- | 194 | | | Sample site. |
| 5 | 6 | 6 | 2 | 6 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-7220-000-000-000- | 2.0- | 195 | | | Lower R2, below road crossing. |
| 5 | 7 | 7 | 2 | 7 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3770-7220-000-000-000- | 2.0- | 195 | | | Road culvert in R2. |
| 5 | 8 | 8 | 2 | 8 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 88 | 093L.023 | 1441 | R1 trapping pond. |
| 5 | 9 | 9 | 2 | 9 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4290-0000-000-000-000- | 3.0- | 208 | | | R3 lower trap site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 10 | 10 | 2 | 10 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4290-0000-000-000-000- | 3.0- | 208 | | | R3 upper trap site. |
| 5 | 11 | 11 | 2 | 11 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5610-0000-000-000-000- | 1.0- | 227 | | | Sample site immediately d/s from proposed road crossing in R1. |
| 5 | 14 | 14 | 2 | 14 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5610-0000-000-000-000- | 3.0- | 228 | | | Reach 3 trap site. |
| 5 | 15 | 15 | 2 | 15 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5610-0000-000-000-000- | 3.0- | 229 | | | R3 above swamp in semi-forested meadow. |
| 5 | 16 | 16 | 2 | 16 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 2.0- | 123 | | | Site 123 in R2. |
| 5 | 17 | 17 | 2 | 17 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-0000-000-000-000- | 4.0- | 178 | | | Sample site above pond in R4. |
| 5 | 18 | 18 | 2 | 18 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-0000-000-000-000- | 4.0- | 176 | | | Main channel in this section of R4. |
| 5 | 19 | 19 | 2 | 19 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3770-5510-000-000-000- | 1.0- | 190 | | | Wetland. |
| 5 | 20 | 20 | 2 | 20 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 191 | 093L.013 | 1323 | Upper R1. |
| 5 | 21 | 21 | 2 | 21 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 193 | 093L.013 | 1803 | R1 at sample site, 135 m u/s from mouth. |
| 6 | 1 | 1 | 2 | 25 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-0000-000-000-000- | 4.0- | 66 | | | R4 sample site. |
| 6 | 2 | 2 | 2 | 26 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-6790-000-000-000- | 1.0- | 65 | | | R1 sample site. |
| 6 | 3 | 3 | 2 | 27 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-6790-000-000-000- | 1.0- | 65 | | | Debris jam ~100 m u/s from mouth. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 4 | 4 | 2 | 28 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-6550-000-000-000- | 1.0- | 63 | | | R1 site. |
| 6 | 5 | 5 | 2 | 29 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-6460-000-000-000- | 1.0- | 62 | | | Lower 50 m in R1 with ~28% gradient. |
| 6 | 6 | 6 | 2 | 30 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-6460-000-000-000- | 1.0- | 62 | | | Above 100 m in R1 with ~6% gradient. |
| 6 | 7 | 7 | 2 | 31 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 5.0- | 33 | | | Site location in the lower 300 m of R5. |
| 6 | 8 | 8 | 2 | 32 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-8850-000-000-000- | 1.0- | 72 | | | R1 sample site 200 m u/s from the mouth. |
| 6 | 9 | 9 | 2 | 33 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-8850-000-000-000- | 1.0- | | | | |
| 6 | 10 | 10 | 2 | 34 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-8630-000-000-000- | 1.0- | 71 | | | R1 site. |
| 6 | 11 | 11 | 2 | 35 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 70 | 093L.013 | 1221 | R1 sample site. |
| 6 | 12 | 12 | 2 | 36 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-8220-000-000-000- | 1.0- | 69 | | | R1 sample site. |
| 6 | 13 | 13 | 2 | 37 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-7540-000-000-000- | 1.0- | 67 | | | R1 at 130 m. |
| 6 | 14 | 14 | 2 | 38 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 64 | 093L.013 | 1231 | R2 wetland on top of bench. |
| 6 | 15 | 15 | 2 | 39 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 64 | 093L.013 | 1231 | R1 steep bench. |
| 6 | 16 | 16 | 2 | 40 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-6360-000-000-000- | 1.0- | 61 | | | Site in lower R1. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 17 | 17 | 2 | 41 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 60 | 093L.013 | 1270 | R1 site. |
| 6 | 18 | 18 | 2 | 42 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 3.0- | 32 | | | Site location in R3. |
| 6 | 19 | 19 | 2 | 43 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 3.0- | | | | Unstable bank, NID # 8040. |
| 6 | 20 | 20 | 2 | 44 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-5750-000-000-000- | 1.0- | 59 | | | R1 site. |
| 6 | 21 | 21 | 2 | 45 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-5460-000-000-000- | 1.0- | 58 | | | R1 site. |
| 6 | 22 | 22 | 2 | 46 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-5460-000-000-000- | 1.0- | 58 | | | R1 site. |
| 6 | 23 | 23 | 2 | 47 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 57 | 093L.013 | 1277 | R1 site. |
| 6 | 24 | 24 | 2 | 48 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 56 | 093L.013 | 1278 | R1 site. |
| 7 | 1 | 1 | 2 | 50 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-5210-000-000-000- | 1.0- | 55 | | | R1 site at 100 m. |
| 7 | 2 | 2 | 2 | 51 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-4680-000-000-000- | 1.0- | 54 | | | R1 site. |
| 7 | 3 | 3 | 2 | 52 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 53 | 093L.013 | 1240 | R1 site. |
| 7 | 4 | 4 | 2 | 53 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2968-477-000-000- | 1.0- | 139 | | | Reach 1, 100 m d/s from lower lake. |
| 7 | 5 | 5 | 2 | 54 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2968-477-000-000- | 4.0- | 141 | | | R3 showing 2 m high BD near top of R3. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 6 | 6 | 2 | 55 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-477-000-000- | 4.0- | 141 | | | R4. |
| 7 | 7 | 7 | 2 | 56 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-566-000-000- | 1.0- | 147 | | | Sample site. |
| 7 | 8 | 8 | 2 | 57 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-0000-000-000-000- | 1.0- | 102 | | | Index site. |
| 7 | 9 | 9 | 2 | 58 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-0000-000-000-000- | 1.0- | 102 | | | Index site. |
| 7 | 10 | 10 | 2 | 59 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-433-086-000- | 1.0- | 132 | | | R2 lake - Site 133. |
| 7 | 11 | 11 | 2 | 60 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5610-0640-000-000-000- | 1.0- | 232 | | | R2 lake - Site 233. |
| 7 | 12 | 12 | 2 | 61 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5610-0640-000-000-000- | 1.0- | 232 | | | R1 lake outlet. |
| 7 | 13 | 13 | 2 | 62 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5610-0640-000-000-000- | 1.0- | 232 | | | R1 300 m u/s from mouth. |
| 7 | 14 | 14 | 2 | 63 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 238 | 093L.012 | 1152 | Wetland pond in R1. Trap site. |
| 7 | 15 | 15 | 2 | 64 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-6260-0000-000-000-000- | 2.0- | 263 | | | Upper pond. |
| 7 | 16 | 16 | 2 | 65 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-6260-0000-000-000-000- | 2.0- | 263 | | | Lower pond. |
| 7 | 17 | 17 | 2 | 66 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-6260-0000-000-000-000- | 2.0- | 263 | | | Outlet of lower pond. |
| 7 | 18 | 18 | 2 | 67 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-2280-000-000-000- | 2.0- | 249 | | | Upper R2, sample site immediately d/s from R3 swamp. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 19 | 19 | 2 | 68 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-2280-000-000-000- | 2.0- | 249 | | | R2 ~200 m d/s from swamp. |
| 7 | 20 | 20 | 2 | 69 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-6580-0000-000-000-000- | 2.0- | 264 | | | R2 sample site. |
| 7 | 21 | 21 | 2 | 70 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 265 | 093L.012 | 1711 | R1 sample site. |
| 7 | 22 | 22 | 2 | 71 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | | 093L.024 | 1199 | Aerial view of m/s Gosnell C. |
| 7 | 23 | 23 | 2 | 72 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | | 093L.024 | 1199 | Aerial view of m/s Gosnell C. |
| 7 | 24 | 24 | 2 | 73 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | | 093L.024 | 1199 | Aerial view of m/s Gosnell C. |
| 7 | 25 | 25 | 2 | 74 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | | 093L.024 | 1199 | Aerial view of m/s Gosnell C. |
| 8 | 1 | 1 | 2 | 75 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 2.0- | 244 | | | R3 lake - Site 245. |
| 8 | 2 | 2 | 2 | 76 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 2.0- | 244 | | | Upper R2. |
| 8 | 3 | 3 | 2 | 77 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 261 | 093L.012 | 1176 | R1 site location. |
| 8 | 4 | 4 | 2 | 78 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-8930-000-000-000- | 2.0- | 262 | | | Lake outlet; location of sample site. |
| 8 | 5 | 5 | 2 | 79 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-7260-0000-000-000-000- | 2.0- | 269 | | | R2 sample site. |
| 8 | 6 | 6 | 2 | 80 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-7260-0000-000-000-000- | 3.0- | 270 | | | R3 sample site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 7 | 7 | 2 | 81 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7260-4815-000-000-000- | 1.0- | 271 | | | R1 sample site. |
| 8 | 8 | 8 | 2 | 82 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 2.0- | 29 | | | Index site enclosed with stopnets. |
| 8 | 9 | 9 | 2 | 83 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-0000-000-000-000- | 2.0- | 29 | | | Index site. |
| 8 | 10 | 10 | 2 | 84 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 6.0- | | 093L.024 | 1199 | 1.0 m high chute. NID # 8171. |
| 8 | 11 | 11 | 2 | 85 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 6.0- | | 093L.024 | 1199 | 1.9 m high falls. NID # 8004. |
| 8 | 12 | 12 | 2 | 86 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 6.0- | | 093L.024 | 1199 | Second photo of 1.9 m high falls. NID # 8004. |
| 8 | 13 | 13 | 2 | 87 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-6830-0000-000-000-000- | 1.0- | 266 | | | R1 site. |
| 8 | 14 | 14 | 2 | 88 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 6.0- | | 093L.024 | 1199 | 1.0 m high chute. NID # 8170. |
| 8 | 15 | 15 | 2 | 89 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5730-5210-000-000-000- | 1.0- | 255 | | | Trapping pond. |
| 8 | 16 | 16 | 2 | 90 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 253 | 093L.012 | 1709 | Sample site. |
| 8 | 17 | 17 | 2 | 91 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7690-0000-000-000-000- | 2.0- | 274 | | | R2 sample site. |
| 8 | 18 | 18 | 2 | 92 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7790-0000-000-000-000- | 2.0- | 275 | | | Sample site. |
| 8 | 19 | 19 | 2 | 93 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-8460-0000-000-000-000- | 1.0- | 283 | | | ~200 m u/s from mouth; note the large amounts of debris and the unstable banks. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 20 | 20 | 2 | 94 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-0000-000-000-000- | 2.0- | 104 | | | Index site, upper net. |
| 8 | 21 | 21 | 2 | 95 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-0000-000-000-000- | 2.0- | 104 | | | Index site, lower net. |
| 8 | 22 | 22 | 2 | 96 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 3.0- | 3 | 093L.024 | 1199 | margin site. |
| 8 | 23 | 23 | 2 | 97 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 3.0- | 3 | 093L.024 | 1199 | |
| 8 | 24 | 24 | 2 | 98 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | 6 | 093L.024 | 1199 | Sample site with top net. |
| 8 | 25 | 25 | 2 | 99 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | 6 | 093L.024 | 1199 | Sample site with bottom net. |
| 8 | 26 | 26 | 2 | 100 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 7.0- | 9 | 093L.024 | 1199 | Sample site with top net. |
| 8 | 27 | 27 | 3 | 1 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 7.0- | 9 | 093L.024 | 1199 | Sample site with bottom net. |
| 9 | 1 | 1 | 4 | 51 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 8.0- | 11 | 093L.024 | 1199 | Top net of sample site with eroding bank u/s in the background. |
| 9 | 2 | 2 | 4 | 52 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 8.0- | 11 | 093L.024 | 1199 | Bottom net. |
| 9 | 3 | 3 | 4 | 53 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 9.0- | 13 | 093L.024 | 1199 | |
| 9 | 4 | 4 | 4 | 54 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 9.0- | 13 | 093L.024 | 1199 | |
| 9 | 5 | 5 | 4 | 55 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 50 | 093L.013 | 1701 | R2 site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 6 | 6 | 4 | 56 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 49 | 093L.013 | 1701 | R1 site. |
| 9 | 7 | 7 | 4 | 57 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3150-000-000-000- | 4.0- | 44 | | | Sample site in R4. |
| 9 | 8 | 8 | 4 | 58 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-8850-0000-000-000-000- | 1.0- | 288 | | | Sample site; note the LWD drops. |
| 9 | 9 | 9 | 4 | 59 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 289 | 093L.002 | 1104 | Sample site; note the steep, stepped habitat with large cobble bed material. |
| 9 | 10 | 10 | 4 | 60 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-8840-0000-000-000-000- | 1.0- | 287 | | | Site location. |
| 9 | 11 | 11 | 4 | 61 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-9170-0000-000-000-000- | 2.0- | 290 | | | Top of sample site. |
| 9 | 12 | 12 | 4 | 62 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 292 | 093L.002 | 1714 | Top of sample site. Note the LWD pools. |
| 9 | 13 | 13 | 4 | 63 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-9310-0000-000-000-000- | 1.0- | 291 | | | Top of sample site. |
| 9 | 14 | 14 | 4 | 64 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 9.0- | | 093L.024 | 1199 | Aerial shot towards Atna Peak. |
| 9 | 15 | 15 | 4 | 65 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-8850-0000-000-000-000- | 1.0- | | | | Aerial view of beaver ponded section in lower end of trib. 00500-8850. |
| 9 | 16 | 16 | 4 | 66 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-9490-0000-000-000-000- | 2.0- | 297 | | | Top of sample site. |
| 9 | 17, 18 | | 4 | 67 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-9490-0000-000-000-000- | 2.0- | | | | |
| 9 | 19 | 19 | 4 | 69 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 251 | 093L.012 | 1708 | R1 at sample site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 20 | 20 | 4 | 70 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-7540-000-000-000- | 3.0- | 68 | | | R3 sample site. |
| 9 | 21 | 21 | 4 | 71 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-9430-0000-000-000-000- | 1.0- | 294 | | | Sample site. |
| 9 | 22 | 22 | 4 | 72 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-9430-0000-000-000-000- | 2.0- | | | | 4 m and 5 m high falls. NID #'s 8217 and 8218 |
| 9 | 23 | 23 | 4 | 73 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-9430-0000-000-000-000- | 2.0- | 296 | | | Sample site. |
| 9 | 24 | 24 | 4 | 74 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-9430-0000-000-000-000- | 1.0- | 295 | | | Sample site at the top of R1. |
| 10 | 1 | 1 | 4 | 75 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 9.0- | 14 | 093L.024 | 1199 | Reach 9 sample site. |
| 10 | 2 | 2 | 4 | 76 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-9640-0000-000-000-000- | 2.0- | 301 | | | Sample site. |
| 10 | 3 | 3 | 4 | 77 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-9640-0000-000-000-000- | 2.0- | 300 | | | Lower site in forest in R2. |
| 10 | 4 | 4 | 4 | 78 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | 7 | 093L.024 | 1199 | Coho spawning section in Reach 5 ~1000 m u/s river left side channel. |
| 10 | 5 | 5 | 4 | 79 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 1.0- | 240 | | | R1 on the edge of the swamp. |
| 10 | 6 | 6 | 4 | 80 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | | 093L.024 | 1199 | Slump. NID # 8128 |
| 10 | 7 | 7 | 4 | 81 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 96 | 093L.013 | 1320 | R2 sample site. |
| 10 | 8 | 8 | 4 | 82 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-2280-000-000-000- | 2.0- | 248 | | | R2 at 100 m. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 1 | 1 | 4 | 1 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 15 | 093L.024 | 1717 | |
| 11 | 2 | 2 | 4 | 2 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 16 | 093L.024 | 1717 | |
| 11 | 3 | 3 | 4 | 3 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 26 | 093L.023 | 1424 | |
| 11 | 4 | 4 | 4 | 4 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 27 | 093L.023 | 1425 | No visible channel. |
| 11 | 5 | 5 | 4 | 5 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1890-0000-000-000-000- | 2.0- | 74 | | | |
| 11 | 6 | 6 | 4 | 6 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 76 | 093L.023 | 1429 | |
| 11 | 7 | 7 | 4 | 7 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | | 093L.024 | 1717 | |
| 11 | 8 | 8 | 4 | 8 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 18 | 093L.023 | 1423 | |
| 11 | 9 | 9 | 4 | 9 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | | 093L.023 | 1423 | 2 m high BD; NID 8001 |
| 11 | 10 | 10 | 4 | 10 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 3.0- | 17 | 093L.024 | 1717 | |
| 11 | 11 | 11 | 4 | 11 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1890-0000-000-000-000- | 1.0- | 73 | | | |
| 11 | 12 | 12 | 4 | 12 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1890-0000-000-000-000- | 1.0- | | | | |
| 11 | 13 | 13 | 4 | 13 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2000-0000-000-000-000- | 2.0- | 79 | | | |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 14 | 14 | 4 | 14 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2440-0000-000-000-000- | 2.0- | 83 | | | |
| 11 | 15 | 15 | 4 | 15 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2440-0000-000-000-000- | 2.0- | | | | Culvert with large fill over top; NID # 8005. |
| 11 | 16 | 16 | 4 | 16 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2715-000-000-000- | 1.0- | 109 | | | Dry channel. |
| 11 | 17 | 17 | 4 | 17 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 168 | 093L.023 | 1466 | |
| 11 | 18 | 18 | 4 | 18 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3140-0000-000-000-000- | 3.0- | 162 | | | |
| 11 | 19 | 19 | 4 | 19 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3650-0000-000-000-000- | 3.0- | 171 | | | |
| 11 | 20 | 20 | 4 | 20 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3900-0000-000-000-000- | 3.0- | 199 | | | |
| 11 | 21 | 21 | 4 | 21 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4490-0000-000-000-000- | 1.0- | 201 | | | Note the functional LWD causing pool formation. |
| 11 | 22 | 22 | 4 | 22 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4730-0000-000-000-000- | 3.0- | 217 | | | R3 sample site; note the LWD piled up and the extensive bars. |
| 11 | 23, 24 | | 4 | 23 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4730-0000-000-000-000- | 3.0- | | | | |
| 11 | 25 | 25 | 4 | 25 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 222 | 093L.022 | 1194 | Note the logged riparian zone. |
| 12 | 1 | 1 | 4 | 26 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4730-1870-000-000-000- | 1.0- | 221 | | | |
| 12 | 2 | 2 | 4 | 27 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4490-0000-000-000-000- | 2.0- | 202 | | | Reach 2 site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 3 | 3 | 4 | 28 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 203 | 093L.023 | 1454 | |
| 12 | 4 | 4 | 4 | 29 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 204 | 093L.023 | 1454 | |
| 12 | 5 | 5 | 4 | 30 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4490-4260-000-000-000- | 1.0- | 205 | | | |
| 12 | 6 | 6 | 4 | 31 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3900-0000-000-000-000- | 2.0- | 198 | | | |
| 12 | 7 | 7 | 4 | 32 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2798-000-000-000- | 2.0- | | | | 15 m high falls. NID # 8072 |
| 12 | 8 | 8 | 4 | 33 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2798-000-000-000- | 2.0- | 116 | | | |
| 12 | 9 | 9 | 4 | 34 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 220 | 093L.022 | 1197 | Sample site; water is turbid and is due to the disturbance of the channel during sampling. |
| 12 | 10 | 10 | 4 | 35 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-4730-0990-000-000-000- | 2.0- | 219 | | | |
| 12 | 11 | 11 | 4 | 36 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5200-0000-000-000-000- | 2.0- | 224 | | | |
| 12 | 12 | 12 | 4 | 37 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5200-0000-000-000-000- | 1.0- | 223 | | | View of creek ~450 m d/s from road. |
| 12 | 13 | 13 | 4 | 38 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5200-0000-000-000-000- | 1.0- | 223 | | | View of cobble strewn forest floor on immediate river left bank. |
| 12 | 15 | 15 | 4 | 40 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 110 | 093L.023 | 1605 | Note the abundance of instream algae. |
| 12 | 16 | 16 | 4 | 41 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5200-0000-000-000-000- | 1.0 | | | | |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 17 | 17 | 4 | 42 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5200-0000-000-000-000- | 1.0- | | | | |
| 12 | 18 | 18 | 4 | 43 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5200-0000-000-000-000- | 1.0- | 223 | | | Sample site; note the instream balsam, spruce and cottonwood. |
| 12 | 20 | 20 | 4 | 45 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 5.0- | 125 | | | |
| 12 | 21 | 21 | 4 | 46 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5200-0000-000-000-000- | 2.0- | | | | Debris jam. NID # 8132 |
| 12 | 22 | 22 | 4 | 47 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5200-0000-000-000-000- | 2.0- | | | | 1.6 m high chute. NID # 8133 |
| 12 | 24 | 24 | 4 | 49 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4730-0990-000-000-000- | 3.0- | | | | 2.2 m high falls. NID # 8126 |
| 12 | 25 | 25 | 4 | 50 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | | 093L.023 | 1605 | |
| 13 | 1 | 1 | 5 | 1 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2623-000-000-000- | 2.0- | 106 | | | R3 eutrophic pond - Site 107. |
| 13 | 2 | 2 | 5 | 2 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2623-000-000-000- | 2.0- | 106 | | | |
| 13 | 3 | 3 | 5 | 3 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4730-1870-000-000-000- | 1.0- | | | | 1.1 m high falls. NID # 8123 |
| 13 | 4 | 4 | 5 | 4 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 168 | 093L.023 | 1466 | |
| 13 | 5 | 5 | 5 | 5 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3140-0000-000-000-000- | 3.0- | 162 | | | |
| 13 | 6 | 6 | 5 | 6 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2798-000-000-000- | 4.0- | | | | |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 7 | 7 | 5 | 7 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3900-0000-000-000-000- | 2.0- | 197 | | | Site 150 m u/s from lake. |
| 13 | 8 | 8 | 5 | 8 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3650-0000-000-000-000- | 2.0- | 170 | | | Dry channel. |
| 13 | 9 | 9 | 5 | 9 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3650-0000-000-000-000- | 1.0- | 169 | | | Alder swale lowland with no visible channel. |
| 13 | 10 | 10 | 5 | 10 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-3650-0000-000-000-000- | 1.0- | 169 | | | Tributary 00500-3650-1308 wetland slough. |
| 13 | 11 | 11 | 5 | 11 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | | 093L.023 | 1467 | |
| 13 | 12 | 12 | 5 | 12 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 165 | 093L.023 | 1467 | |
| 13 | 13 | 13 | 5 | 13 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 166 | 093L.023 | 1467 | |
| 13 | 14 | 14 | 5 | 14 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 167 | 093L.023 | 1466 | |
| 13 | 15 | 15 | 5 | 15 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2895-000-000-000- | 1.0- | 117 | | | |
| 13 | 17 | 17 | 5 | 17 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 114 | 093L.023 | 1603 | |
| 13 | 18 | 18 | 5 | 18 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 3.0- | 112 | 093L.023 | 1605 | |
| 13 | 19 | 19 | 5 | 19 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 3.0- | 112 | 093L.023 | 1605 | R4 lakes - Site 113. |
| 13 | 20 | 20 | 5 | 20 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2968-507-000-000- | 3.0- | 144 | | | |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 21 | 21 | 5 | 21 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-566-000-000- | 1.0- | 146 | | | Note the nice spawning gravels and the abundance of functional LWD. |
| 13 | 22 | 22 | 5 | 22 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 145 | 093L.023 | 1597 | |
| 13 | 23 | 23 | 5 | 23 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 6.0- | 126 | | | Slough with grassy riparian. |
| 13 | 24 | 24 | 5 | 24 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2798-000-000-000- | 1.0- | 115 | | | |
| 14 | 1 | 1 | 5 | 25 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3140-3350-000-000-000- | 1.0- | 163 | | | Large wetland glide. |
| 14 | 2 | 2 | 5 | 26 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3140-3350-000-000-000- | 2.0- | 164 | | | Note the residual pool. |
| 14 | 3 | 3 | 5 | 27 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3900-0000-000-000-000- | 2.0- | 197 | | | View of channel 250 m u/s from lake. |
| 14 | 4 | 4 | 5 | 28 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3900-0000-000-000-000- | 2.0- | 197 | | | Aerial view of R1 lake - Site 196. |
| 14 | 5 | 5 | 5 | 29 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4490-0000-000-000-000- | 1.0- | 200 | | | Site 200 location. |
| 14 | 6 | 6 | 5 | 30 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4490-0000-000-000-000- | 1.0- | 200 | | | Aerial view of back channel 00500-3980. |
| 14 | 7 | 7 | 5 | 31 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4490-0000-000-000-000- | 1.0- | 200 | | | Aerial view of back channel 00500-3980. |
| 14 | 8 | 8 | 5 | 32 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-4730-0990-000-000-000- | 1.0- | 218 | | | |
| 14 | 9 | 9 | 5 | 33 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2715-000-000-000- | 1.0- | 108 | | | Water in pool is turbid due to sampling; most of the fish were caught in this one pool. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | 10 | 10 | 5 | 34 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2715-000-000-000- | 1.0- | | | | Culvert. NID # 8068 |
| 14 | 11 | 11 | 5 | 35 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2715-000-000-000- | 1.0- | | | | 1.5 m high falls. NID # 8069 |
| 14 | 14 | 14 | 5 | 38 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3900-0000-000-000-000- | 2.0- | 197 | | | R1 lake - Site 196. |
| 14 | 15 | 15 | 5 | 39 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3900-0000-000-000-000- | 1.0- | | | | |
| 14 | 15 | 15 | 5 | 39 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-3900-0000-000-000-000- | 1.0- | | | | |
| 14 | 16 | 16 | 5 | 40 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 153 | 093L.023 | 1483 | |
| 14 | 17 | 17 | 5 | 41 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-3266-000-000-000- | 2.0- | 149 | | | |
| 14 | 18 | 18 | 5 | 42 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2798-000-000-000- | 4.0- | 150 | | | Bottom of site with gravel/pool/LWD. |
| 14 | 19 | 19 | 5 | 43 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-3452-000-000-000- | 2.0- | 155 | | | |
| 14 | 20 | 20 | 5 | 44 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-3322-000-000-000- | 2.0- | 151 | | | |
| 14 | 21 | 21 | 5 | 45 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 2.0- | 123 | | | East Julian Holland Lake - Site 130. |
| 14 | 22 | 22 | 5 | 46 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-0000-000-000-000- | 1.0- | 101 | | | Index site with top net present. |
| 14 | 23 | 23 | 5 | 47 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-268-000-000- | 1.0- | 127 | | | R2 lake - Site 128. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | 24 | 24 | 5 | 48 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-268-000-000- | 1.0- | 127 | | | ~50 m d/s from lake outlet. |
| 15 | 1 | 1 | 5 | 49 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 2.0- | 122 | | | Ponded glide with grass riparian. |
| 15 | 2 | 2 | 5 | 50 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 2.0- | 123 | | | R3 lake of trib. 2830-2968-422 - Site 129. |
| 15 | 3 | 3 | 5 | 51 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 2.0- | 123 | | | R1 pond of trib. 2830-2968-433-179 - Site 135. |
| 15 | 4, 5 | | 5 | 52 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-433-179-000- | 1.0- | | | | |
| 15 | 4, 5 | | 5 | 52 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-433-179-000- | 1.0- | | | | |
| 15 | 6 | 6 | 5 | 54 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 137 | 093L.023 | 1602 | No visible channel. |
| 15 | 7 | 7 | 5 | 55 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 2.0- | 123 | | | R3 lake of trib. 2830-2968-433-179 - Site 136. |
| 15 | 8 | 8 | 5 | 56 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 2.0- | 123 | | | R2 lake outlet channel of trib. 2830-2968-433-179 - Site 136. |
| 15 | 9 | 9 | 5 | 57 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-433-086-000- | 1.0- | 132 | | | |
| 15 | 10 | 10 | 5 | 58 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 134 | 093L.023 | 1594 | No visible channel with willow shrub riparian surrounded by mature coniferous forest. |
| 15 | 11 | 11 | 5 | 59 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-433-086-000- | 1.0- | 131 | | | Site; note the moss-covered cobble/boulder bed material and alder swale lining the channel. |
| 15 | 12 | 12 | 5 | 60 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-477-000-000- | 1.0- | 139 | | | R2 lake - Site 140. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 13 | 13 | 5 | 61 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-3920-000-000-000- | 1.0- | 51 | | | Lower site. |
| 15 | 14 | 14 | 5 | 62 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-3920-000-000-000- | 1.0- | | | | Bedrock chute. NID # 8034 |
| 15 | 15 | 15 | 5 | 63 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-3150-000-000-000- | 1.0- | 41 | | | Slow moving run section of site. |
| 15 | 16 | 16 | 5 | 64 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-3150-000-000-000- | 1.0- | 41 | | | Section of site more representative of this reach. |
| 15 | 17 | 17 | 5 | 65 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 4.0- | | | | |
| 15 | 18 | 18 | 5 | 66 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-000-000-000- | 4.0- | 124 | | | Site u/s of old beaver dam in ponded section. |
| 15 | 19 | 19 | 5 | 67 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-507-000-000- | 1.0- | 143 | | | Reach 1 ~50 m u/s from mouth. |
| 15 | 20 | 20 | 5 | 68 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2830-2968-477-000-000- | 4.0- | 141 | | | R5 lake - Site 142. |
| 15 | 21 | 21 | 5 | 69 | FISH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-0000-000-000-000- | 1.0- | | | | |
| 15 | 22 | 22 | 5 | 70 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-0000-000-000-000- | 1.0- | 28 | | | Sample site side channel. |
| 15 | 23 | 23 | 5 | 71 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-0000-000-000-000- | 1.0- | 28 | | | Representative photo of R1. |
| 15 | 24 | 24 | 5 | 72 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-0000-000-000-000- | 2.0- | 31 | | | Index site with upper and lower stopnets. |
| 15 | 25 | 25 | 5 | 73 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 75 | 093L.023 | 1429 | |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 1 | 1 | 5 | 74 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-2000-0000-000-000-000- | 1.0- | 77 | | | Abundant moss and woody debris within channel of sample site. |
| 16 | 2 | 2 | 5 | 75 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 80 | 093L.023 | 1431 | An abundance of overhanging vegetation in sample site. |
| 16 | 3 | 3 | 5 | 76 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 1.0- | 241 | | | Trap site. |
| 16 | 4 | 4 | 5 | 77 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-3200-000-000-000- | 2.0- | 250 | | | Sample site. |
| 16 | 5 | 5 | 5 | 78 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 257 | 093L.012 | 1710 | Sample site. |
| 16 | 6 | 6 | 5 | 79 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 2.0- | 242 | | | |
| 16 | 7 | 7 | 5 | 80 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-5830-000-000-000- | 1.0- | 258 | | | Sample site. |
| 16 | 8 | 8 | 5 | 81 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-6240-000-000-000- | 1.0- | 259 | | | Sample site. |
| 16 | 10 | 10 | 5 | 83 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 252 | 093L.012 | 1709 | Sample site. |
| 16 | 11 | 11 | 5 | 84 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-5370-000-000-000- | 1.0- | 256 | | | Sample site. |
| 16 | 12 | 12 | 5 | 85 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-7110-0000-000-000-000- | 1.0- | 267 | | | Sample site. |
| 16 | 13 | 13 | 5 | 86 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 268 | 093L.012 | 1712 | Sample site. |
| 16 | 14 | 14 | 5 | 87 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-1730-3150-000-000-000- | 2.0- | 42 | | | Sample site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 15 | 15 | 5 | 88 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3150-408-000-000- | 1.0- | 47 | | | Sample site; note the step-pool habitat. |
| 16 | 16 | 16 | 5 | 89 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3150-408-000-000- | 2.0- | 48 | | | NVC with stagnant water. |
| 16 | 17 | 17 | 5 | 90 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3150-166-000-000- | 1.0- | 46 | | | Sample site; water turbidity is due to site disturbance during sampling. |
| 16 | 18 | 18 | 5 | 91 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3150-166-000-000- | 1.0- | | | | 6.0 m high falls. NID # 8029 |
| 16 | 19 | 19 | 5 | 92 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3150-166-000-000- | 1.0- | 45 | | | Sample site; note the step-pool habitat. |
| 16 | 20 | 20 | 5 | 93 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-1730-3920-000-000-000- | 1.0- | 52 | | | Pool at top of sample site followed by a steep 20% stepped section. |
| 16 | 21 | 21 | 5 | 94 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7520-0000-000-000-000- | 1.0- | 272 | | | R1 sample site. |
| 16 | 22 | 22 | 5 | 95 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7520-0000-000-000-000- | 2.0- | 273 | | | Sample site. |
| 16 | 23 | 23 | 5 | 96 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7520-0000-000-000-000- | 2.0- | 273 | | | Proposed bridge crossing site 1050 m u/s from the mouth. |
| 16 | 24 | 24 | 5 | 97 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 278 | 093L.012 | 1713 | Sample site. |
| 17 | 1 | 1 | 6 | 18 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7930-0000-000-000-000- | 1.0- | 276 | | | Sample site. |
| 17 | 3 | 3 | 6 | 19 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7930-0000-000-000-000- | 2.0- | 277 | | | Sample site. |
| 17 | 4 | 4 | 6 | 20 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 1 | 093L.024 | 1199 | |

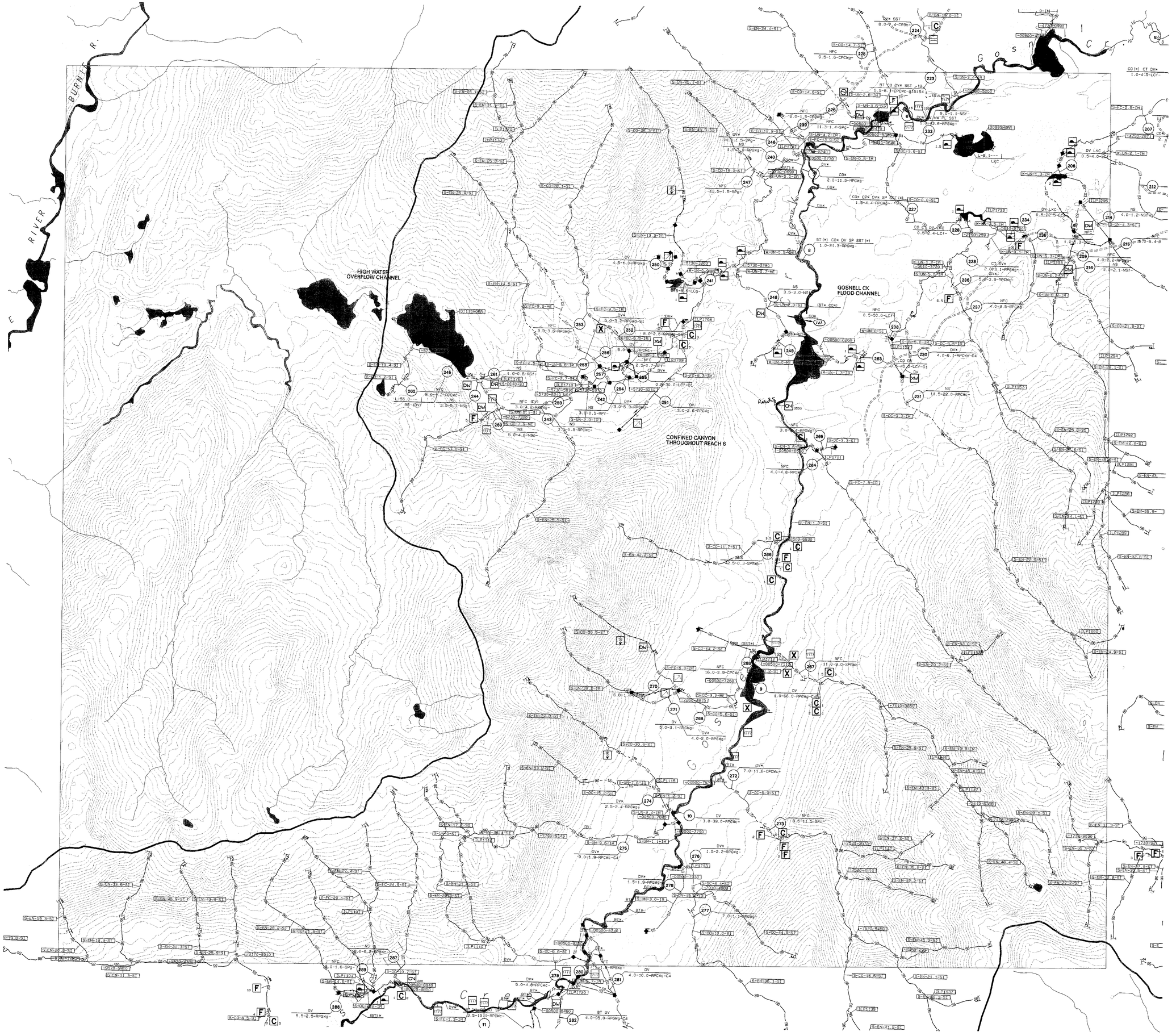
| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 5 | 5 | 6 | 21 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 1 | 093L.024 | 1199 | |
| 17 | 6 | 6 | 6 | 22 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 2 | 093L.024 | 1199 | |
| 17 | 7 | 7 | 6 | 23 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 2 | 093L.024 | 1199 | |
| 17 | 8 | 8 | 6 | 24 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 23 | 093L.024 | 1199 | Looking u/s into ponded section. |
| 17 | 9 | 9 | 6 | 25 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 3.0- | 4 | 093L.024 | 1199 | Index site looking u/s from bottom net. |
| 17 | 10 | 10 | 6 | 26 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 4.0- | 5 | 093L.024 | 1199 | |
| 17 | 11 | 11 | 6 | 27 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 4.0- | 5 | 093L.024 | 1199 | |
| 17 | 12 | 12 | 6 | 28 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | 8 | 093L.024 | 1199 | |
| 17 | 13 | 13 | 6 | 29 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 5.0- | 8 | 093L.024 | 1199 | |
| 17 | 14 | 14 | 6 | 30 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 7.0- | 10 | 093L.024 | 1199 | |
| 17 | 15 | 15 | 6 | 31 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 7.0- | 10 | 093L.024 | 1199 | |
| 17 | 16 | 16 | 6 | 32 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2000-0000-000-000-000- | 2.0- | 78 | | | Pool section of sample site with abundant instream woody debris. |
| 17 | 17 | 17 | 6 | 33 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5380-0000-000-000-000- | 2.0- | 225 | | | Sample site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 18 | 18 | 6 | 34 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 9.0- | 12 | 093L.024 | 1199 | |
| 17 | 19 | 19 | 6 | 35 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 9.0- | 12 | 093L.024 | 1199 | |
| 17 | 20 | 20 | 6 | 36 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-8250-0000-000-000-000- | 1.0- | 281 | | | Sample site on fan; note the standing trees within the channel. |
| 17 | 21 | 21 | 6 | 37 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-8240-0000-000-000-000- | 1.0- | 279 | | | Sample site showing LWD pools that are typical in R1. |
| 17 | 22 | 22 | 6 | 38 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5730-0690-000-000-000- | 2.0- | 247 | | | Sample site; note the abundance of instream LWD. |
| 17 | 23 | 23 | 6 | 39 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-5730-0240-000-000-000- | 1.0- | 246 | | | Top of sample site. |
| 17 | 24 | 24 | 6 | 40 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 239 | 093L.012 | 1707 | Sample site, note the abundant LWD. |
| 18 | 1 | 1 | 6 | 41 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 285 | 093L.002 | 1724 | Base of sample site; note the stagnant pools. |
| 18 | 3 | 3 | 6 | 42 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 3.0- | 284 | 093L.002 | 1720 | Sample site; cascade-pool habitat. |
| 18 | 4 | 4 | 6 | 43 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 293 | 093L.002 | 1086 | Sample site. |
| 18 | 5 | 5 | 6 | 44 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 298 | 093L.002 | 1094 | Sample site; note the gravel channel with LWD pools. |
| 18 | 6 | 6 | 6 | 45 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 299 | 093L.002 | 1094 | Sample site; note the high banks, LWD and large bed material. |
| 18 | 8 | 8 | 6 | 46 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-9170-0000-000-000-000- | 2.0- | | | | Chute. NID # 8206 |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 9 | 9 | 6 | 47 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 138 | 093L.023 | 1600 | Dry channel with LOD stepping and devil's club riparian. |
| 18 | 10 | 10 | 6 | 48 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 192 | 093L.013 | 1323 | |
| 18 | 11 | 11 | 6 | 49 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-7110-0000-000-000-000- | 2.0- | | | | Series of chutes. NID # 8178 |
| 19 | 1 | 1 | 6 | 1 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-3452-000-000-000- | 1.0- | 154 | | | R1 above grassland. |
| 19 | 2 | 2 | 6 | 2 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 1.0- | 152 | 093L.023 | 1483 | R1 at 50 m. |
| 19 | 3 | 3 | 6 | 3 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-0000-000-000-000- | 2.0- | 103 | | | Reach 2 at tributary 00500-2830-3266 mouth. |
| 19 | 4 | 4 | 6 | 4 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-3266-000-000-000- | 1.0- | 148 | | | Reach 1 at 400 m. |
| 19 | 5 | 5 | 6 | 5 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2968-000-000-000- | 1.0- | 121 | | | Reach 1. |
| 19 | 6 | 6 | 6 | 6 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-000-000000-00000-00000-0000-0000-000-000-000- | 2.0- | 120 | 093L.023 | 1477 | Reach 2. |
| 19 | 7 | 7 | 6 | 7 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-3013-000-000-000- | 1.0- | 119 | | | Reach 1. |
| 19 | 8 | 8 | 6 | 8 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-0000-000-000-000- | 1.0- | 100 | | | R1 at 1900 m. |
| 19 | 9 | 9 | 6 | 9 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-2830-2623-000-000-000- | 1.0- | 105 | | | Reach 1 at 150 m. |
| 19 | 10 | 10 | 6 | 10 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-460-600600-50800-00500-8250-0000-000-000-000- | 1.0- | 280 | | | Sample site. |

| Roll | Frame | Neg | CD # | Image # | Owner | Project WS Code / WS Code | Reach | Site | ILP MAP # | ILP # | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 11 | 11 | 6 | 11 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-8250-0000-000-000-000- | 1.0- | 280 | | | Sample site. |
| 19 | 12 | 12 | 6 | 12 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-7320-000-000-000- | 1.0- | 260 | | | Site located 150 m u/s in R1. |
| 19 | 13 | 13 | 6 | 13 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-7320-000-000-000- | 2.0- | | | | 5 m high falls. NID # 8163 |
| 19 | 14 | 14 | 6 | 14 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 2.0- | 243 | | | R2 480 m d/s from 00500-5730-7320 mouth. |
| 19 | 15 | 15 | 6 | 15 | SITE | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-5210-000-000-000- | 1.0- | 254 | | | R1 of seepage below ponds. |
| 19 | 16 | 16 | 6 | 16 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 2.0- | | | | 4 m high falls. NID # 8153 |
| 19 | 17 | 17 | 6 | 17 | REACH | 460-600600-50800-00500-0000-0000-000-000-000-<br>460-600600-50800-00500-5730-0000-000-000-000- | 2.0- | | | | 4 m high falls. NID # 8153 |

**END OF REPORT**




# 093L012

## 1:20,000 Intensive Fish Inventory Gosnell Watershed Project

5 of 6

Morice River WSG
Mid & Upper Gosnell Creek
(460-600600-50800-00500)

Northwood Inc.
Morice Forest District
Gosnell Operating Area
1998

NAD 83 TRIM 1994

SCALE 1 : 20000
1 cm = 200 metres

0 200 400 600 800 1000

N

Collected By: Dave Bustard & Associates Ltd.
Date Drawn: 1999/07/06 (yyyy/mm/dd)
Drawn By: Western Geographic Information Systems Inc.

### Stream Information Summary

- Watershed code / Waterbody Identifier: 123-123456-12345-123..
- Reach break
- Sample site location: 1
- Stream anomaly
- Fishbearing streams
  - S1 > 20m (channel width): S1 - S1
  - S2 5-20m: S2 - S2
  - S3 1.5-5m: S3 - S3
  - S4 < 1.5m: S4 - S4
- Non-fishbearing streams
  - S5 > 3m: S5 - S5
  - S6 <= 3m: S6 - S6
- Suspected riparian class: S4 - - - S4
- No visible channel (NVC)
- Physical Characteristics
  - bridge
  - fisheries sensitive zone
  - slumping bank
  - slide
  - falls
  - chute
  - persistent debris accumulation
  - culvert
  - beaver dam
  - sediment wedge
  - dewatered
  - canyon
  - groundwater flow
  - rapids

### Feature Summary Symbol

Feature symbol

Height — 10.0 C 75.0 — Length

*(Note: Not all features are associated with height and/or length measurements)*

### Reach Summary Symbol

S-FC-3-IR

Stream (S) or Wetland (W) | Confinement | Gradient | Pattern

### Stream Summary Symbol

Fish code(s)

CO DV RB

2-12-RPg-C3C4S3

Site Gradient | Width | Morphology | Dominant Substrate | Disturbance

*(Note: Historic sample sites do not have stream summary symbols. Contact MELP for the associated historic data.)*

### Lake Summary Symbol

Lake (L) or Wetland (W) | Surface Area | pH | Littoral Area | TDS | Conductivity

L-175-6.8-29 | 20-15

CAS CO DV PCC RB SK TSB

Fish code(s)

### Other Features

- Lake
- Wetland
- Watershed boundary
- Sub-watershed boundary
- River or stream
- Contour
- Roads

| Code | Common Name | Code | Common Name |
|---|---|---|---|
| NFC | No fish captured | * | Spawning species |
| NS | Not sampled | () | Suspected species |
| BT | Bull Trout | LNC | Longnose Dace |
| CAS | Prickly Sculpin | LSU | Longnose Sucker |
| CH | Chinook Salmon | MW | Mountain Whitefish |
| CO | Coho Salmon | PK | Pink Salmon |
| CSU | Largescale Sucker | PL | Pacific Lamprey |
| CT | Cutthroat Trout | RB | Rainbow Trout |
| DV | Dolly Varden | SST | Steelhead (Summer-run) |
| LKC | Lake Chub | SP | Unknown species |

BASIE: TR STR SYM: INV
LOC: EDE, APE LK SYM: OTH
HAB: INV, AP
FISH: INVD
DATE INV: 1998/09/30 INV MGNT: OTH