

**UPPER SKAGIT WATERSHED  
NATIVE CHAR PROJECT**

***PROGRESS REPORT*  
2002**

***prepared for:***

**MINISTRY OF WATER, LAND AND AIR PROTECTION**

**BC Fisheries  
Lower Mainland Region  
10470 152<sup>nd</sup> Street  
Surrey, BC V3R 0Y3**

***and***

**BC Parks  
Lower Mainland District  
1610 Mount Seymour Road  
North Vancouver, BC V7G 2R9**

**March 2003**

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## *PROGRESS REPORT* **2002**

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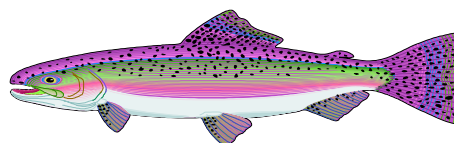
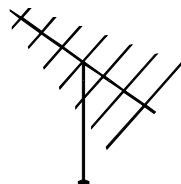
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Troy Nelson (LGL Limited) acted as project manager, and was also responsible for telemetry program design, data management, data analysis, and reporting. Jim Rissling, CEJ Mussell (LGL Limited) and Pier van Dishoeck (Aquatic Resources Limited) were responsible for telemetry station deployment, fish tagging and sampling, station downloading and maintenance, mobile telemetry surveys, data maintenance, and swim surveys. Eric Jeans (R2 Consultants, Redmond, WA) provided technical assistance and was responsible for all tagging and telemetry activities that occurred on the Washington side. Jack Mussell (LGL Limited) provided angling, downloading, tracking and logistical assistance throughout the project. Sarah Nelson provided telemetry assistance on a number of swim surveys.

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## INTRODUCTION

A biotelemetry study of resident char in the upper Skagit River, BC, commenced in 2001 and was expanded in 2002. This report presents the results and findings of the 2002 study of the Upper Skagit River Watershed Native Char Project. The intent of this project was to examine the potential of radio telemetry techniques in the watershed and to collect preliminary life-history information of native char. Telemetry project activities in 2002 were conducted in both the BC and Washington areas of the Skagit River watershed. The BC project component was administered by the Ministry of Water, Land and Air Protection (Surrey, BC). Project support and cooperative management of the study was provided by Seattle City Light (Seattle, Washington).

This report summarizes activities undertaken in 2002, and provides reference to individual radio-tagged and external-tagged-only char that were released in 2001 (Nelson et al. 2002). Previous studies of char and other resident fish species in the upper Skagit River watershed include: McPhail and Taylor 1995; Rissling 1997; and Harper and Scott 1998a, 1998b.

Note that this summary report emphasizes the results obtained during the field season in 2002, and does not extensively elaborate on these results. It is recommended that a comprehensive report is produced following the final field season of multi-year Upper Skagit Watershed Native Char Project.

## Goals and Objectives

Goals for the 3-year Upper Skagit Watershed Native Char Project are:

1. Identify bull trout (*Salvelinus confluentus*) and Dolly Varden (*S. malma*) char presence and distribution within the upper Skagit watershed;
2. Distinguish between adfluvial and fluvial stocks of bull trout and Dolly Varden char and describe life history strategies;
3. Provide estimates of bull trout and Dolly Varden population size;
4. Identify, describe, and photodocument critical habitats for bull trout and Dolly Varden char, including locations used for spawning, rearing, adult holding, and feeding;
5. Obtain individual fish information including species, sex, life stage, fork length, weight, age, and condition factor;
6. Continue to monitor water temperature by location and time in relation to habitat use and migration patterns;
7. Provide scientifically based resource management recommendations;
8. Promote international technical and data exchange;
9. Identify information gaps and develop an action plan to complete char conservation status evaluation; and
10. Maintain a watershed approach to char investigations in the upper Skagit River.





Objectives for the 2002 Skagit River Char Telemetry Project were:

1. Radio tag up to 40 char in the mainstem Skagit River (BC) near Ross Lake;
2. Implement and elaborate the tracking protocols established in 2001 for both stationary and mobile tracking;
3. Locate and document spawning sites (redds) and other important habitats;
4. Collect information for each fish caught during the capture/tag operations; and
5. Collect and submit tissue samples for genetic analysis to the University of British Columbia.

## **METHODS**

### **Study Area**

While the northern headwaters of the Skagit River watershed lie in the coastal mountains of southwestern BC, the mouth of the Skagit River empties into the marine waters of northern Puget Sound, Washington (Figure 1). The Skagit River crosses the international border between Canada and the US at the northern end of Ross Lake, a man-made reservoir in the Cascade Range of Washington. The study area for the BC component of the 2001 Skagit River Char Telemetry Project was limited to the upper Skagit River watershed (in BC), and included the northern end of Ross Lake (from the Canada-US border south approximately 2 km into the US; Figure 2). The BC study area is within Skagit Valley Provincial Park/Recreation Area, established in 1995. Major tributaries to the BC Skagit River include the Klesilkwa and Sumallo rivers and Snass Creek (Figure 2).

At the commencement of the project, a 1:50,000 map of the Skagit River within the BC study area was marked for river kilometer (rkm) reference points; these positions are referred to throughout this report (in addition, a GPS unit was used to collect UTM coordinates for key positions and habitat features, and these data are also presented). The point where the Skagit River empties into Ross Lake at full pool, was designated rkm 0.0. (This is also the fishing boundary). A gravel/dirt road provides access to the study area; this road leaves the Trans-Canada Highway (1) about 4 km west of Hope, BC, and follows Silverhope Creek and the Klesilkwa River into the core study area. The road crosses the Skagit River at "26-Mile Bridge", located at rkm 18.0 (Figure 2). The Sumallo River enters the upper Skagit River at rkm 32.6 near the Hope-Princeton Highway; the Sumallo River is accessible to upstream-migrating fish from its confluence with the Skagit River to the residential area near Sunshine Valley.



## Radio Telemetry

### Telemetry Receivers and Radio Tags

The telemetry receivers used for this study were the model SRX\_400 built by LOTEK Engineering Inc. of Newmarket, Ontario, with their CODE\_LOG version W31 and W32 data processing and storage program. The tags used for the study were the LOTEK model MCFT-3A and the MCFT-3L digitally coded radio tags. The MCFT-3A tags have a minimum 750-day battery life, are 16.2 mm in diameter, 46 mm long, weigh 16.0 g in air and 6.7 g in water; the burst rate of signal transmission was every 6 s. The MCFT-3L tags have a minimum 1517-day battery life, are 16.2 mm in diameter, 73 mm long, weigh 25.0 g in air and 11.1 g in water; the burst rate of signal transmission was every 5 s. The shorter (MCFT-3A) tags were to be implanted in char that were at least 450 mm FL, while the longer (MCFT-3L) tags were to be implanted in char that were at least 550 mm FL.

Radio tag frequencies used in Canada in 2002 were:

**MCFT-3A tags:** 149.440 MHz (Lotek "Channel 7"); and  
**MCFT-3L tags:** 149.400 MHz (Lotek "Channel 5").

Two-digit codes (unique for each frequency) were assigned to each radio tag by the manufacturer. Channel and code combinations were unique to all individual radio tags deployed during the program. During all tracking, the receiver was set to scan each frequency for 7 s, during which time one to two pulses will be transmitted by a tag (the pulses were 5 or 6 s apart); the receiver then searches the next frequency. If a signal is received, the receiver decodes the signal, reports the tag code and signal strength and stores the data in internal memory. As many as 12-15 different fish can be recorded on the same frequency during the same scan cycle (7 s) so that the probability of a fish not being detected is low if only a few fish are present on a single channel. The receivers, fitted with a single antenna, can scan over 13 frequencies and decode over 150 different radio-tagged fish within a 78-second period.

### Telemetry Stations

Two telemetry stations were established for this study (Figure 2). The first station (station 1) was located at rkm 1.4, approximately 100 m downstream of the "Swing Bridge" (suspension bridge) over the Skagit River. The second station (station 8) was located at rkm 18.1, approximately 100 m upstream from the road bridge ("26-Mile Bridge") over the Skagit River at rkm 18.0. The receivers at these sites were established to monitor and record the passage of radio-tagged char on a continuous basis, 24 h per day, during the entire study.



Telemetry station set up followed the procedures outlined in Nelson et al. (2001). Final positions of fixed-station receiver sites were determined based on the following criteria:

1. secure location with easy access;
2. adjacent to a section of confined river channel such that signals can be detected from all radio-tagged fish passing the location; and
3. access to a tall tree for antenna placement (antennae located 20-40 feet above the water have much greater detection ranges than those near water level).

Each receiver and antenna switcher was enclosed in a weather-proof container and powered by a 12-v, deep-cycle RV battery. During fall and winter, a 130 amp-h battery will operate the system for 10-12 days without changing or recharging depending on the strength of the battery. Field staff downloaded data and replaced RV batteries at both fixed-station sites every 7-10 days, well within the operable range of battery life. In an effort to quell public curiosity (and possible disruption of the telemetry station hardware) a printed notice regarding the project and the purpose of the equipment was posted on the outside of the container (Appendix A). In addition, a public notice regarding the telemetry project was posted at public campgrounds, information boards, and parking areas along the BC Skagit River downstream of the 26-mile Bridge (Photo Plate 1).

Each stationary receiver had two antennae coupled to it in order to determine the direction of movement of the fish and to maximize the probability of detecting each fish (two antennae cover almost twice the area of one). One antenna was pointed upstream, and the other pointed downstream; which allowed the determination of the direction of movement of each individual fish and ensured that even rapidly moving fish were recorded on at least one antenna. Differentiation of directionality was tested at the time each station was established. Following the installation of a basic telemetry station (antennas in tree, cables connected to receiver secured in waterproof enclosure), a technician would walk upstream and downstream (approximately 100-200 yards) from the station, and place an activated radio tag (of the type used in the study) in the water.

Using 2-way radios for communication, a technician at the receiver site would then check that the comparative power levels of tag detections for each antenna indicated the position/direction of the radio tag (upstream or downstream of the station).

#### *Data retrieval from fixed-station receivers*

Routine data downloading (typically on a weekly basis) was accomplished by connecting the receiver to a portable notebook computer and executing the LOTEK data downloading routines. All data was downloaded in hexadecimal (or .dmp) format and then converted to readable (text) format and browsed for data errors. Once the data was secure, the receiver memory was erased and scanning was continued.



### Mobile Surveys

Mobile telemetry surveys were conducted by vehicle, foot, and boat during the study. Mobile tracking surveys by vehicle and foot were scheduled to occur in conjunction with most download events. Boat surveys were scheduled to occur with swim surveys in order to establish observer error estimates for observed mark rates. Vehicle and foot surveys were conducted using a hand-held, 2-element, H-style antenna and boat surveys were conducted using a whip antenna. Vehicle surveys were conducted by driving along the river and scanning for radio tag signals, and stopping to confirm the channel and code of any detected signals and document the location of the tag. Foot surveys were conducted by walking with the receiver and antenna along the river (from the road or from a fishing site) and scanning for radio tags. Boat surveys were conducted with two technicians from an inflatable raft, with one technician monitoring the receiver and the other person manning the raft. In all three cases when radio tags were detected, an attempt was made to determine the location of the tag; and position data (river km and GPS coordinates) were recorded.

### Data Management and Security

Data collected by receivers were automatically stored in an internal memory in the receiver and then downloaded to a computer file whenever a fixed-station receiver site was visited. Downloaded data was copied to a computer, and backups of these data were copied onto diskette and sent (via e-mail) to the project manager. Verified data received by the project manager was backed up on diskette and loaded into a raw database for analysis.

The data stored for each signal received by the SRX 400 receiver include the following:

- a) date;
- b) time (h/min/s);
- c) channel or frequency;
- d) power level of signal;
- e) antenna (combined=0, #1, #2); and
- f) signal code.

The project manager and project fisheries technicians analysed data downloaded from fixed station receivers and summarized tag detections in an electronic database and on hardcopy summary sheets. In addition, a binder was maintained with copies of study area maps (one for each radio tag released). Following fixed-station downloads and mobile tracking surveys, detection data for individual tags (date and location) were entered on these maps; this system provided current knowledge of the most recent locations of individual radio-tagged char throughout the program.



## Fish Capture for Tagging

All adult char radio-tagged in the BC Skagit River in 2002 were captured using conventional angling techniques. Angling was conducted by personnel experienced with the proper handling and tagging techniques necessary to minimize stress on the captured fish. The standard procedure following capture and prior to tagging was to place the char into a cylindrical holding/recovery tube (constructed of heavy black fabric, with a zipper along the top and mesh at both ends). The holding tubes greatly assisted the process of hook removal and provided an excellent means of secure transport to the tagging location.

## Assessment, Handling, Sampling, and Tagging of Char

Once captured and secured in a zippered holding tube, all char were moved to a central location on the river bank for tag application and biosampling. Captured char were transferred from the holding tubes to a portable floating pen. Sex was determined by an external examination of the characteristics of the face, jaw, and adipose fin. Only char over 45 cm FL and in excellent condition (no open wounds, bleeding, or abnormal behaviour) were radio-tagged (Photo Plate 2). Char were anaesthetised with clove oil prior to radio tag insertion. For all radio-tagged fish, processing included noting the sex (field estimation), collection of scales (for ageing), collection of a pectoral fin ray for ageing and a piece of pectoral fin from the fin ray (for DNA analysis), taking a fork length and girth measurement, weighing the fish on a portable scale, noting the condition; and applying the radio tag (surgical procedure; Photo Plates 3 and 4) and a pink spaghetti tag (with unique 5-digit number; Photo Plate 5). For char that were not radio-tagged (surplus or smaller fish), the same data (above) was collected and a white spaghetti tag (with unique 5-digit number) was applied just under the dorsal fin (Photo Plate 6). Fin rays were collected and preserved in the manner described by Nelson and Caverhill (1999) for char sampled from Chilliwack Lake, BC (Photo Plate 7). Prior to tag applications, the channel and code of the radio tag, and/or the 5-digit number and color of the spaghetti tag, were recorded on the tag release data form. A complete description of the surgical tagging procedure can be found in the report provided by the US tag team in 2002 (Ed Connor, Seattle City Light, pers. comm.).

## RESULTS AND DISCUSSION

### Radio Telemetry

#### Telemetry Stations

Two fixed telemetry stations were established on the mainstem Skagit River to record the date, time, and direction of movement of any radio-tagged char that migrated past the station. Station 1, located at rkm 1.4, and station 8, located at rkm 18.1 were both installed and activated on 27 April 2002 prior to the tagging and release of any radio-



tagged char in 2002. Once activated, the stations were able to monitor any movements from the 15 radio-tagged char released in 2001 (10 on the Canadian side and 5 on the US side). Both stations functioned very well throughout the entire field program until their removal on 28-Novovember (Table 1). The only down time was at station 1 between July 18 and 27 when the receiver experienced a charging problem as a result of a poor electrical connection.

Telemetry receivers installed at the fixed stations were downloaded approximately every 7-10 days. Table 2 provides a summary of download history for the telemetry stations.

### Tag Applications

Summaries of all tag and release information for all char captured and sampled/tagged in Canada in 2001 and 2002 are presented in Tables 3 and 4, respectively. This summary includes all pertinent data collected at the time of capture and release, including date, time, location, and all biosampling data. Tables 3 and 4 also include a unique "Fish Number" for each individual char for reference in subsequent tables.

A total of 39 char were radio-tagged, biosampled, and released in Canada during the 2002 project (Table 4). An additional 26 char were biosampled but released without a radio tag; 19 of these fish were tagged with an external tag (spaghetti tag). Figure 3 illustrates the timing of tag application throughout the 2001 and 2002 field seasons; note that 2001 applications were predominantly fall, whereas 2002 applications were predominantly summer and early fall.

Appendices B and C provide summaries of tag release data for the US char activities in 2001 and 2002, respectively (data provided by E. Jeans, R2 Consultants, Redmond, WA). A total of 15 char were radio-tagged in the US in 2002 (Appendix C). The US char were tagged near the tributary-lake confluences of Beaver Creek and Ruby Creek (Figure 1).

### Movement and Fate of Radio-Tagged Char

Table 5 presents a summary of all detection information for each of the 39 radio-tagged char released in BC in 2002. In addition, a "fate" summary is provided that summarizes the known and likely movement/behaviour of individual radio-tagged char following release. Of the 39 fish that were radio-tagged, five fish were removed from the study. Reasons included tag removal by anglers, angling mortalities, and complications during the tagging procedure. All five of these radio tags were detected and recovered by the study team. Of the 34 radio-tagged char that survived during the 2002 field season, 23 (68%) were determined to have spawned in the Skagit River in the fall of 2002 between September and November (Table 5). Twenty-two spawners (98%) moved downstream following spawning (kelted), passing the lower telemetry station before crossing the US border and entering Ross Lake. Seven char were still in the Skagit River when the radio telemetry stations were removed. Some of these char likely spawned, but had not





passed by the lower telemetry station by the time of the station removal on 28 November 2002. Peak spawning appeared to occur during the week of 13 October when eight radio-tagged char were determined to have spawned (Figure 4).

Of the 10 radio tags released in BC in the fall of 2001, eight were detected in 2002. Of this group of eight radio-tagged char, six were determined to have spawned in the BC Skagit River in 2002 and all six kelted (after spawning) past station 1 (Table 5).

### Trans-boundary Movements

It appears that the majority of the char population in the Upper Skagit Watershed utilize both sides of the border (both US and Canadian waters) as part of their life history requirements. Of the 43 char that were radio-tagged in BC in 2001 and 2002 that were capable of crossing the Canadian /US border (live releases, not recaptured and killed, etc.), 35 (81.4%) crossed the border at least once. Some of these fish crossed the border a minimum of three times during 2001 and 2002 (Table 6).

Of the five radio-tagged char released on the US side in 2001, two were on the Canadian side with the likely intent of spawning in the BC Skagit River. Both these fish were still in the BC Skagit system when the stations were removed on November 28, 2002. Of the 15 char radio-tagged on the US side in 2002, only one was detected on the BC side of the border in 2002. However, these char were radio-tagged between 3 and 18 October 2002, and it is likely that the effect of handling/tagging may have altered the normal behaviour of this group for a period of time that extended beyond the end of the 2002 field season. A summary of detections and migratory behaviour for each radio-tagged char released in the US that migrated across the border and into Canada can be found in Appendix D.

### Recaptures

A total of 10 char released in BC in 2001 and 2002 were recaptured in 2002. A summary of these events, and the fates of individual char and/or radio tags, is provided in Table 7.

### **Biological Sampling**

Biological samples collected from char captured during the project included tissue (for DNA analysis), scales (for ageing), and pectoral fin rays (for ageing).

### Length Analysis

Fork lengths (mm) were taken from a total of 84 char captured in the BC Skagit in 2002. Figure 5 provides an illustration of the length-frequency of char that were tagged (both radio-tagged and external tagged) during the study. The length distribution appears to be normal for a sample of char captured with angling techniques (the smallest char was



300 mm, the largest was 718 mm fork length).

### Age (Fin Ray) Analysis

Pectoral fin rays from 67 char captured in the BC Skagit River in 2002 were shipped to North-South Consultants Inc. (Winnipeg, Manitoba) for age analysis. Of the 68 samples, five were determined to be unreadable. Ages derived from these fin rays ranged from age 3-11 and appeared to correlate with fish size (fork length; Figure 6).

### DNA Analysis

All tissue samples collected in BC for DNA analysis were secured for analysis at a later date. It is anticipated that the DNA analyses will provide information to assign bull trout, Dolly Varden, or hybrid classifications to respective individual fish.

### Scale Analysis

Scales taken from native char in BC in 2002 were secured for analysis at a later date.

## **Char Redd Surveys and Float Surveys**

### Char Redd Surveys

Char redds were observed during float surveys on the mainstem Skagit River between stations 1 and 8) on 12 and 13 October. A total of 24 redds were observed with all of them being between rkm 8.7 km (the "High Bank") and rkm 18.0 ("26-mile Bridge"). The majority of the redds were found between 14.5 and 16.5 km. A summary of these observations, with location (UTM) positions for individual groups of redds, is provided in Table 8.

### Swim Surveys

A number of swim count surveys were undertaken during the course of the 2002 study. A total of 11 days were spent floating a number of sections of the river in order to locate fish for tagging and to provide preliminary estimates of abundance. Raw data for these swim surveys is provided in Appendices E-H.

A population abundance survey conducted on two consecutive days on 12 and 13 October, from the "26-mile Bridge" to the border (rkm 18.0-0.0) was performed during the time of peak char spawning activity. During this float, 16 of 24 radio-tagged char present were observed (identified by external tag) by the swim crew (Photo Plate 8); this observer error rate provided an estimated observer efficiency of 0.667, which in turn provides an expansion factor of 1.50 for this survey. The observed number of char seen on this survey was 159; thus, the expanded estimate is 239 char (Appendix H). The floaters also observed 1155 rainbow trout during this float survey.





A summary of all char swim surveys conducted during the 2002 field season on the BC Skagit River is provided in Table 9.

### RECOMMENDATIONS

- 1) It is recommended that tag applications commence in mid- March of 2003. In order to meet this important objective, we propose a field project start-up date of 1 March; this should provide enough time to radio-tag several char in the BC Skagit River prior to reduced fishing opportunities during rising water levels (typically by late April or early May).
- 2) Fixed telemetry stations (in both Canada and the US) should be installed and operational in early to mid March, prior to spring tag applications. Important movement and behaviour information of radio-tagged char can be efficiently collected from fixed telemetry stations in early spring. For all subsequent years that the telemetry project is monitoring the sample of radio-tagged char in the upper Skagit watershed, is important that fixed telemetry stations in both Canada and the US are installed and operational by early to mid March.
- 3) Planning for spring tag application in 2003 should be a priority. The reason for this priority in 2003 is that now a representative number of other temporal groups of char (summer and fall) have been radio-tagged. It is possible that the spring group could migrate and/or behave differently than the summer and/or fall groups (i.e., comparatively, the spring group could move higher upstream into the watershed, spawn in different locations and/or at different times, move into or out of Ross Lake at different times). The radio tags being used will be available for tracking for 3-4 years, and the opportunity to collect inter- and intra-annual movement, behaviour, and habitat-preference data for individual char over this time is a realistic possibility. The spring group should be tagged as early in the project as possible in order to maximize amount of telemetry data for that group during ongoing telemetry program activities from 2002-2005. We recommend 15-20 radio tags should be deployed in the spring of 2003. In order to achieve the spring tagging objective, radio tags should be ordered and available for application by March 1, 2003.
- 4) A char population assessment should be considered as one of the main objectives of the telemetry and tagging project in 2003. This would follow up on the char population assessment work done by volunteers in 2002. Estimates of abundance could be derived from a combination of radio telemetry, external marking (colored tags), and swim surveys. Mark rates could be obtained during swim surveys, and observer efficiencies derived through verification of observation (during swim surveys) using a comparison of telemetry detections (collected during swim surveys) and external tag observations. Mark rates (the ratio of radio-tagged char to non-radio-tagged char in the population), adjusted for measured observer efficiency,



could be applied to the known number of radio tags in the system to produce a total estimate of char abundance. Key survey times will be the low-water/pre-spawning period in September of 2003 and 2004 (when sufficient numbers of tags are deployed in the population, sufficient mixing of both tagged and non-tagged char has occurred, and char are both present and visible in the BC Skagit mainstem). Estimates of char abundance in the upper Skagit watershed would provide fisheries managers with key stock status information that could be used as a benchmark for future assessments.

- 5) Tissue samples collected from char in 2001 and 2002 for the purpose of DNA analysis, from both Canada and the US, should be analyzed as soon as possible and the results provided to the principal investigators. Knowledge of the genetic background of individual radio-tagged char will provide additional levels of insight when analyzing observed movement, behaviour, and habitat-preference data for these fish over the course of the study.
- 6) Given the passage of radio-tagged fish upstream of the telemetry station at “26-Mile Bridge” (station 8), a third telemetry station should be considered for the Skagit River/Sumallo River confluence at Sumallo Grove. Another key station location would be at the High Bank (rkm 8.7) where movement upstream could be monitored and fish locations easier to identify.
- 7) Consideration should be given to directed radio tag applications in the upper sections of the BC Skagit River (near the Sumallo River confluence) and/or Sumallo River (upstream of the Skagit River confluence). A representative number of char (approximately 10-15 fish) could likely be radio-tagged during mid summer. The subsequent movements of these fish (to spawning locations and/or to downstream holding/wintering locations), and the timing of these movements, could be compared to the movements of char tagged in the lower BC Skagit and the US.
- 8) Solar panels should be obtained and installed at each telemetry site. A single 75-w solar panel should keep a deep-cycle RV battery fully charged throughout the duration of the annual field program. Solar-powered telemetry stations preclude weekly battery changes and provide security against data loss due to low battery power. The cost of the solar panels would be quickly recovered by a reduction in station visits to install fresh batteries during periods of reduced fish capture opportunities (such as during spring freshet). The solar panels would continue to provide cost efficiencies during subsequent years of telemetry monitoring.



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## **TABLES**

Table 1. Summary of operational dates for fixed-station telemetry receivers deployed on the Skagit River, 2002.  
See Figure 2 for an illustration of the locations of fixed-station receiver sites.

Receiver/ Station No.	Location (rkm)	UTM (GPS)		Setup		Removed		No. Days (Span)	Comments
				Date	Time	Date	Time		
1	1.3	5431249.18	641756.78	27-Apr	10:19	28-Nov	15:00		Station down from July 18-27 (reciever not charging)
8	18.1	5442245.04	633675.69	27-Apr	11:25	28-Nov	14:00		Station never down

Table 2. Summary of downloads for fixed-station receivers on the Skagit River, 2002.  
Data summary includes date, time, and data bank status (receiver memory).

Date	Fixed Station 1		Fixed Station 8	
	Time	Banks	Time	Banks
27-Apr-02	10:19	(installed)	16:25	(installed)
08-May-02	15:50	8.20160	8:31	0.3504
14-May-02	9:00	3.60784	8:25	0:5792
21-May-02	9:26	5.39632	8:40	0.2736
30-May-02	6:48	5.51872	6:00	0.6144
07-Jun-02	8:32	0.46704	7:20	0.3120
17-Jun-02	9:14	1.10272	8:39	0.4784
24-Jun-02	9:50	0.42480	8:45	0.2704
03-Jul-02	9:53	6.24272	9:01	0.3568
09-Jul-02	9:33	3.6464	8:53	0.2528
18-Jul-02	15:22	0.41888	16:41	0.3616
27-Jul-02	9:40	0.42000	8:44	0.7008
01-Aug-02	9:52	2.39986	8:41	0.2016
13-Aug-02	6:20	6.13728	5:40	0.4752
19-Aug-02	16:29	3.21256	17:05	0.2576
26-Aug-02	16:56	4.43792	17:37	0.8368
05-Sep-02	10:05	9.41072	7:25	0.9456
10-Sep-02	14:02	5.36000	14:51	0.2256
14-Sep-02	10:26	10.24432	17:00	0.25984
25-Sep-02	7:07	4.40048	15:54	0.20544
03-Oct-02	9:31	13:240	8:50	1:46064
12-Oct-02	16:04	7.17920	7:15	2.5344
20-Oct-02	11:05	3.54335	10:16	0.65264
30-Oct-02	15:53	8.53568	10:27	0.29824
08-Nov-02	9:29	6.13624	11:00	0.3440
17-Nov-02	10:28	7.40416	9:51	0.10656
28-Nov-02	15:00	6.24912	14:00	0.4416

Table 3. Pertinent data collected for each char captured and sampled during the Skagit River char telemetry program, 2001.

Fish No.	Sex	Radio Tagged? (Y/N)	Date	Time	Release			Radio Tag		Anchor Tag		Fork Length (mm)	Girth (mm)	Weight (g)	Scale		Fin Ray		DNA Analysis <sup>1</sup>			Angler Initials	Tagger Initials	Condition at Release	Comments
					rkm	Location		Ch	Code	No.	Color				No.	Age	No.	Age	DNA No.	DV HYB BT					
						UTM	UTM																		
Radio Tag Applied																									
1	M	Y	02-Oct	17:05	0.0	641584	5430294	7	72	-	-	485	225	1180	1	4	-	-	1		KL	EJ	Excellent	Fin ray not taken; no anchor tag	
2	M	Y	02-Oct	17:05	0.0	641584	5430294	5	52	-	-	577	260	1700	2	5	-	-	2		CM	EJ	Excellent	Fin ray not taken; no anchor tag	
3	M	Y	02-Oct	17:05	0.0	641584	5430294	7	70	-	-	535	220	1120	3	5	-	-	3		JR	EJ	Excellent	Fin ray not taken; no anchor tag	
4	M	Y	02-Oct	17:05	0.0	641584	5430294	7	71	-	-	525	215	1220	4	4	-	-	4		JR	EJ	Excellent	Fin ray not taken; no anchor tag	
5	M	Y	02-Oct	17:05	0.0	641584	5430294	7	73	-	-	498	210	1000	5	N/A	-	-	5		CM	EJ	Excellent	Fin ray not taken; no anchor tag	
6	M	Y	10-Oct	12:25	0.0	641584	5430294	5	51	-	-	560	250	1790	6	4	-	-	6		JR	EJ	Excellent	Fin ray not taken; no anchor tag	
7	F	Y	10-Oct	12:25	0.0	641584	5430294	5	50	-	-	539	245	1760	7	5	-	-	7		JR	EJ	Excellent	Fin ray not taken; no anchor tag	
8	M	Y	10-Oct	12:25	0.0	641584	5430294	7	74	-	-	505	233	1360	8	4	-	-	8		JR	EJ	Excellent	Fin ray not taken; no anchor tag	
9	M	Y	15-Oct	13:15	0.0	641584	5430294	5	56	-	-	550	250	1820	9	4	-	-	9		GG	EJ	Excellent	Fin ray not taken; no anchor tag	
10	M	Y	22-Oct	14:00	15.3	635638	5440987	7	79	-	-	518	230	1470	10	N/A	-	-	10		JR	EJ	Excellent	Fin ray not taken; no anchor tag	
No Radio Tag Applied																									
NT1	F	N	02-Oct	16:50	-0.3	641664	5430080	-	-	101	Br	494	205	900	NT1	4		NT1	8	NT1		JR	EJ	Excellent	
NT2	M	N	02-Oct	16:50	-0.3	641664	5430080	-	-	102	Br	434	198	780	NT2	4		NT2	5	NT2		CM	EJ	Excellent	
NT3	F	N	02-Oct	16:50	-0.3	641664	5430080	-	-	103	Br	451	185	740	NT3	5		NT3	7	NT3		JR	EJ	Excellent	
NT4	F	N	10-Oct	12:25	0.0	641584	5430294	-	-	104	Br	385	170	620	NT4	3		NT4	3	NT4		JR	EJ	Excellent	
NT5	F	N	10-Oct	13:00	0.0	641584	5430294	-	-	105	Br	408	19.3	756	NT5	4		NT5	4	NT5		JR	EJ	Excellent	
NT6	F	N	22-Oct	14:00	15.0	635768	5440646	-	-	106	Br	460	180	760	NT6	4		NT6	5	NT6		JR	EJ	Excellent	

<sup>1</sup> DV = Dolly Varden; HYB = Hybrid; BT = bull trout  
N/A = Not Available  
Note: DNA analyses not completed by August 2002

Table 4. Pertinent data collected for each char captured and sampled during the Skagit River char telemetry program, 2002.

Fish No.	Field Judge	Sex Confirm	Radio Tagged? (Y/N)	Date	Capture		Release		Radio Tag Ch	Radio Tag Code	Spaghetti Tag (Y/N)	Spaghetti Tag		Fork Length (mm)	Girth (mm)	Weight (g)	Scale		Fin Ray			DV or BT	Fluvial or Adfluvial	DNA Angler No.	Tagger Initials	Condition at Release	Comments	
					Time	Rkm	Time	Rkm				No.	Color <sup>3</sup>				No.	Age	No.	Age	Comment							
Radio Tag Applied																												
11	M		Y	8-May-02	12:30	0.3 km	14:40	-0.3	5	55	Y	516	white	640	295	2500	11		11	8		BT	adfluvial	11	CEJ	Pier	Excellent	First field surgery. Thick body walls; catheter bends slightly.
12	M		Y	27-Jul-02	11:20	0.5 km	16:25	-0.3	7	75	Y	BC 01117	pink	515	210	1180	12		12	4		BT		12	CEJ	JR	Good	Fish bled during surgery and slow to recover. Tag beeps but CODE_LOG not functioning so Code 75 NOT confirmed.
13	M	F	N	27-Jul-02	11:30	0.5 km	N/A	-	-	-	N	-	-	512	215	1200	13		13	7	Poor	BT		13	CEJ	JR	Dead	Surgery went well. However, could not recover fish after surgery. Fish originally thought to be male. Opened after it died and actually female.
14	M		Y	13-Aug-02	8:35	8.7 km	9:20	8.7 km	7	78	Y	BC 01114	pink	610	270	-	14		14	8		BT		14	JR	CEJ	Excellent	Size, age, DNA sampling conducted in recovery water. Shortened surgery procedure. Began use of ovadine rather than salt. Excellent recovery. DNA sample not in ethanol until 2100. Male b/c deep adipose, jaw slightly hooked.
15	F		Y	13-Aug-02	8:30	8.7 km	9:49	8.7 km	7	76	Y	BC 01123	pink	508	221	-	15		15	5		BT		15	CEJ	JR	Excellent	Sex based on blunt nose, small/narrow adipose. DNA sample not in ethanol until 2100.
16	M		Y	13-Aug-02	10:40	7.8 km	11:47	7.8 km	7	77	Y	BC 01115	pink	565	270	2150 *	16		16	6		BT		16	Pier	Pier	Excellent	Weight (after surgery) is <b>WITH TAG IN</b> . DNA sample not in ethanol until 2100.
17	M		Y	13-Aug-02	10:45	7.8 km	12:08	7.8 km	5	57	Y	BC 01122	pink	622	276	2500	17		17	10	Poor	BT		17	JR	JR	Excellent	Sex based on some hook to nose. DNA sample not in ethanol until 2100. Big radio tag.
18	M		Y	13-Aug-02	10:50	7.8 km	12:38	7.8 km	7	35	Y	BC 01119	pink	582	251	2000	18		18	10	Poor	BT		18	CEJ	CEJ	Excellent	DNA sample not in ethanol until 2100. Fish was later recaptured and found to have 2 radio tags. This fish is also fish # 6 channel 5 code 51.
19	F		Y	13-Aug-02	11:02	7.8 km	12:46	7.8 km	7	44	Y	BC 01124	pink	540	235	1400	19		19	9	Poor	BT		19	CEJ	Pier	Excellent	Smaller adipose, no hook, tight belly. Not dragged enough and squirmed during procedure. DNA sample not in ethanol until 2100.
20	M		Y	13-Aug-02	14:02		16:02	1.5 km ?	7	38	Y	BC 01129	pink	600	254	-	20		20	10		BT		20	JR	CEJ	Excellent	Big adipose, fins w/ distinct white line, some hook. Excellent surgery. DNA sample not in ethanol until 2100. <b>CHECK Rkm with UTM's.</b>
21	F		Y	13-Aug-02	17:45	1.0 km ?	18:30	1.0 km ?	7	37	Y	BC 01121	pink	485	230	1125	21		21	8		BT		21	JR	JR	Excellent	Small adipose, short lower jaw. Good recovery. DNA sample not in ethanol until 2100. <b>CHECK Rkm with UTM's.</b>
22	F		Y	14-Aug-02	9:50	9.5 km	11:33	8.8 km	7	36	Y	BC 01116	pink	540	206	-	22		22	5		BT		22	CEJ	Pier	Good	Appears that spots on females are brighter and more distinct.
23	F		Y	14-Aug-02	10:45	9.0 km	11:47	8.8 km	5	53	Y	BC 01111	pink	677	305	-	23		23	6		BT		23	JR	JR	Excellent	Season leader. Drew blood on fin clip.
24	M		Y	19-Aug-02	6:15	18.0 km	9:22	17.4 km	5	22	Y	BC 01132	pink	615	275	-	24		24	5		BT		24	JR	CEJ	Excellent	UTMs now in NAD 1927 Canada to match map.
25	F		Y	19-Aug-02	8:15	17.6 km	10:10	17.4 km	7	43	Y	BC 01135	pink	453	170	-	25		25	8		BT		25	JM	JR	Holding in position	Fish expected to be too small to radio tag. In drugs for an extra two minutes while tag prepared. This makes a big difference in the speed of recovery. Holding position in stream on release (rather than spooking away).
26	F		Y	19-Aug-02	11:00	16.8 km	12:30	16.6 km	5	24	Y	BC 01126	pink	585	252	-	26		26	7		BT		26	JR	Pier	Excellent	Fish bled a bit at incision. Strong at release. UTM for capture position may be incorrect due to poor reception.
27	M		Y	19-Aug-02	11:00	16.8 km	13:09	16.6 km	7	40	Y	BC 01118	pink	562	220	1600 w/ tag	27		27	7		BT		27	JR	CEJ	Excellent	This is also a <b>RECAPTURE</b> of yellow anchor tag 0903, released in Beaver Creek (US) on 18 Sept 2001. (x-ref on recapture sheet). Spaghetti tag applied to ensure sightability on snorkel floats. Weight is with radio tag in. Picture 14 is of gill parasite(?). UTM's for capture may not be accurate due to poor GPS coverage.
28	M		Y	19-Aug-02	11:00	16.8 km	13:30	16.6 km	5	21	Y	BC 01127	pink	585	246	-	28		28	5		BT		28	Pier	JR	Excellent	UTM for capture position may be incorrect due to poor reception.
29	M		Y	19-Aug-02	11:00	16.8 km	13:51	16.6 km	7	41	Y	BC 01112	pink	595	259	-	29		29	5		BT		29	Pier	Pier	Excellent	UTM for capture position may be incorrect due to poor reception.
30	F		Y	19-Aug-02	11:00	16.8 km	14:04	16.6 km	5	59	Y	BC 01134	pink	590	254	-	30		30	6		BT		30	JM	CEJ	Excellent	UTM for capture position may be incorrect due to poor reception.
31	M		Y	19-Aug-02	12:00	16.5 km	14:46	16.6 km	7	39	Y	BC 01138	pink	585	249	-	31		31	5		BT		31	JM	JR	Good	
32	M		Y	26-Aug-02	9:50	12.0 km	11:08	11.9 km	7	42	Y	BC 01148	pink	465	200	-	32		32	5		BT		32	JR	CEJ	Excellent	Slight hook to jaw, adipose is large for fish size
33	M		Y	26-Aug-02	9:30	12.1 km	11:50	11.9 km	7	30	Y	BC 01130	pink	562	249		33		33	6		BT		33	JR	JR	Excellent	
34	M		Y	26-Aug-02	13:35	9.2 km	15:20	9.0 km	5	19	Y	BC 01125	pink	581	245		34		34	6	Poor	BT		34	CEJ	CEJ	Excellent	This fish was hooked deeply and hook was cut off and left in fish. It was later removed and fish was released in excellent condition.



Table 4. Pertinent data collected for each char captured and sampled during the Skagit River char telemetry program, 2002.

Fish No.	Field Judge	Sex Confirm	Radio Tagged? (Y/N)	Date	Capture		Release		Radio Tag		Spaghetti Tag (Y/N)	Spaghetti Tag		Fork Length (mm)	Girth (mm)	Weight (g)	Scale		Fin Ray			DV or BT	Fluvial or Adfluvial	DNA No.	Angler Initials	Tagger Initials	Condition at Release	Comments	
					Time	Rkm	Time	Rkm	Ch	Code		No.	Color <sup>3</sup>				No.	Age	No.	Age	Comment								
35	M		Y	26-Aug-02	14:00	9.0 km	15:20	9.0 km	5	15	Y	BC 01136	pink	666	305		35		35	9		BT		35	CEJ	JR	Excellent	Fishing fly found and removed from chin.	
36	F		Y	27-Aug-02	8:28	6.7 km	9:51	5.5 km	7	34	Y	BC 01128	pink	485	200		36		36	8		BT		36	JR	Pier	Excellent	First LGL surgery anterior to pelvic fin. Needle still went near caudal.	
37	F		Y	27-Aug-02	8:29	6.7 km	9:56	5.5 km	7	33	Y	BC 01131	pink	485	203		37		37			BT		37	JM	CEJ	Excellent	This fish is a recapture (NT #6) that was now large enough to radio tag. Surgery also anterior to pelvic fin. Fin ray was sampled last year and regrowth was excellent. Anchor tag removed and replaced with spaghetti tag.	
38	F	Y	Y	10-Sep-02	9:30	0.1 km	10:23	0.1 km	5	55	Y	BC 01133	pink	604	298		38		38		Unageable	BT		38	CEJ	Pier	Good	Full of eggs and ready to spawn this year. Chunky fish. Incision Anterior to Pelvic	
39	F		Y	10-Sep-02	9:35	0.1 km	11:05	0.1 km	5	54	Y	BC 01139	pink	635	305		39		39		Unageable	BT		39	CEJ	JR	Excellent	Fat chunky fish ready to spawn this year. Fish was accidentally poked internally a few times when it flinched while being tagged. Slow to recover. Antenna came out of fish higher up than usual.	
40	F		Y	10-Sep-02	7:45	0.9 km	11:11	0.1 km	7	43	Y	BC 01120	pink	463	199		40		40	5		BT		40	JR	CEJ	Excellent	Fin ray 1/2 girth on one side. Scar on back where scale samples had possibly been taken from past sampling by Eric in 2001.	
41	M		Y	10-Sep-02	9:40	0.1 km	11:44	0.1 km	7	32	Y	BC 01146	pink	485	196		41		41	9	Very poor	BT		41	JR	Pier	Excellent	Male but small non typical adipose. Pier was happy with suture placement.	
42	F		Y	10-Sep-02	9:45	0.1 km	11:56	0.1 km	7	31	Y	BC 01150	pink	483	223		42		42	4		BT		42	JR	JR	Excellent	Good surgery but moderate recovery (sluggish) Energetic at release.	
43	F		Y	10-Sep-02	12:10	0.1 km	13:24	0.1 km	5	13	Y	BC 01154	pink	575	254		43		43	6		BT		43	JR	CEJ	Good	Female based on adipose, tight belly, no hook jaw. Bled a bit at incision. Possibly this years spawner.	
44	F		Y	14-Sep-02	12:05	17.2 km	14:43	16.7 km	5	58	Y	BC 01151	pink	551	248		44		44	11		BT		44	CEJ	Pier	Good	Bled a bit from the antenna exit. Orange stain on dorsal surface. Eggs inside are fairly loose. This years spawner.	
45	F	Y	Y	14-Sep-02	13:49	16.7 km	14:53	16.7 km	5	20	Y	BC 01152	pink	595	264		45		45		Unageable	BT		45	JR	CEJ	Excellent	Orange stain on dorsal surface. Eggs developed and seen at incision. This years spawner.	
46	F	Y	Y	14-Sep-02	14:02	16.7 km	15:11	16.7 km	5	14	Y	BC 01149	pink	584	246		46		46	6		BT		46	JR	JR	Excellent	No eggs seen at incision. Will probably not spawn this year.	
47	M		Y	14-Sep-02	16:00	15.6 km	17:10	15.2 km	5	10	Y	BC 01144	pink	635	282		47		47	10		BT		47	JR	Pier	Excellent	Big fish.	
48	F	Y	Y	14-Sep-02	16:10	15.6 km	17:26	15.2 km	5	16	Y	BC 01153	pink	534	243		48		48	7		BT		48	JR	CEJ	Good	This years spawner. Eggs visible.	
49	M	Y	Y	25-Sep-02	11:00	17.0 km	13:22	16.7 km	5	17	Y	BC 01147	pink	718	329		49		49	8	Poor	BT		49	CEJ	CEJ	Excellent	New Big Fish record for this year. Saw sperm at incision, this years spawner. Took awhile to recover.	
50	F	Y	Y	25-Sep-02	11:23	17.0 km	13:29	16.7 km	5	11	Y	BC 01143	pink	635	379		50		50	8		BT		50	CEJ	JR	Excellent	Fish bled a little bit at incision after she flinched during the sutures. Roe visible at incision, this years spawner.	
No Radio Tag Applied																													
NT7	M		N	8-May-02	11:30	0.6 km	14:40	-0.3			Y	545	pink	425	170	680	NT7		NT7	3		BT	adfluvial	NT7	JR	JR	Excellent		
NT8	F		N	27-Jul-02	11:20	0.5 km	16:25	-0.3			Y	1290	white	430	170	650	NT8		NT8	4		BT	?	NT8	CEJ	JR	Excellent	Photo's #8 and #9	
NT9	M		N	27-Jul-02	11:30	0.5 km	16:25	-0.3			N	-	-	300	120	230	NT9		NT9	3		DV	?	NT9	CEJ	JR	Excellent	Fish too small to spaghetti tag.	
NT10	F		N	1-Aug-02	11:40	0.7 km	12:50	0.5			N	-	-	380	150	-	NT10		NT10	4		?		NT10	JR	JR	Excellent	Fish too small to spaghetti tag.	
NT11	F		N	1-Aug-02	14:00	0.5 km	15:19	-0.3			Y	01287	white	405	160	-	NT11		NT11	4		?	fluvial	NT11	JR	JR	Excellent	Too small to radio tag. Caught at logs just d/s of the honey hole.	
NT12	M		N	1-Aug-02	13:45	0.5 km	15:20	-0.3			N	-	-	320	135	-	NT12		NT12	3		?	fluvial	NT12	Pier	JR	Excellent	Too small to spag. / radio tag. Caught at tailout of the honey hole.	
NT13	F		N	13-Aug-02	17:30	3.9 km ?	18:33	1.0 km ?			N	-	-	326	132	280	NT13		NT13	4		?		NT 13	Pier	JR	Excellent	Sex is based on short jaw, small adipose fin for size. Spots are orange / pink.	
NT14	M		N	13-Aug-02	14:00	?	16:04	5.5 km			N	-	-	317	140	-	NT 14		NT 14	4		DV		NT 14	JR	CEJ	Excellent	Sex is a guess based on heavily marked fins. Fish hooked near eye. Plot UTM's to confirm Rkm.	
NT15	M		N	19-Aug-02	8:15	17.6 km	9:47	17.4 km			Y	1275	white	376	163	520	NT15		NT15	5	Poor			NT 15	Pier	JR	Excellent	UTM's are now in NAD 1927 Canada to match the map.	
NT16	M		N	19-Aug-02	8:15	17.6 km	9:51	17.4 km			Y	1284	white	414	170	-	NT16		NT16	5				NT16	JM	JR	Good.		
NT17	M		N	19-Aug-02	8:15	17.6 km	10:04	17.4 km			Y	1276	white	396	170	570	NT17		NT17	4				NT17	JR	JR	Excellent		

Table 4. Pertinent data collected for each char captured and sampled during the Skagit River char telemetry program, 2002.

Fish No.	Sex Field	Radio Tagged? (Y/N)	Date	Capture Time Rkm	Release Time Rkm	Radio Tag Ch Code	Spaghetti Tag (Y/N)	Spaghetti Tag No. Color <sup>3</sup>	Fork Length (mm)	Girth (mm)	Weight (g)	Scale No. Age	Fin Ray No. Age Comment	DV or BT	Fluvial or Adfluvial	DNA Angler No. Initials	Tagger Initials	Condition at Release	Comments
NT18	M	N	19-Aug-02	8:15 17.6 km	10:10 17.4 km		Y	1280 white	440	180	800	NT18	NT18 7			NT18 JR	JR	Good.	
NT19	M	N	19-Aug-02	11:00 16.8 km	14:10 16.6 km		Y	1279 white	423	179	720	NT19	NT19 6			NT19 JM	JR	Excellent	Old wound on upper lip.
NT20	M	N	19-Aug-02	11:00 16.8 km	14:19 16.6 km		Y	1289 white	366	153	520	NT20	NT20 4			NT20 JM	JR	Excellent	Very small fish (this note to check on photo numbering).
NT21	M	N	26-Aug-02	7:45 14.5 km	11:28 11.9 km		Y	1283 white	352	148	340	NT 21	NT 21 5			NT 21 Pier	JR	Excellent	
NT22	F	N	26-Aug-02	8:00 14.5 km	11:34 11.9 km		N		340	119	200	NT 22	NT 22 3			NT 22 JM	JR	Excellent	
NT 23	M	N	26-Aug-02	9:53 12.0 km	11:41 11.9 km		N		339	128	340	NT 23	NT 23 Unageable			NT 23 Pier	JR	Excellent	Picture of pec. Fin
NT 24	M	N	26-Aug-02	10:00 11.9 km	11:49 11.9 km		Y	1273 white	362	144	480	NT 24	NT 24 4			NT 24 JR	JR	Good.	Fish slow to recover.
NT 25	M	N	26-Aug-02	10:17 11.9 km	11:59 11.9 km		Y	1288 white	357	137	440	NT 25	NT 25 3			NT 25 JM	JR	Good.	
NT 26	M	N	26-Aug-02	13:15 9.6 km			N		511	211	1030	NT 26	NT 26 7			NT 26 CEJ		Mortality	Fish was found dead in holding tube when we went to tag it. Fish was beat up and in very poor condition when it was caught. Scarring on abdomen that looked like a radio tag surgery (incision), well healed (from 2001 or earlier); internal damage on this scar area. Parts of fins missing, very thin. Fish was confirmed as male.
NT 27	F	N	26-Aug-02	14:01 9.0 km	15:20 9.0 km		Y	1285 white	533	206	1280	NT 27	NT 27 7			NT 27 JR	JR	Excellent	Left eye of this fish was badly damaged (likely blind in this eye). Because of this we did not apply radio tag (spag tag only). Fish was fairly thin possibly due to injury (poor feeding ability)
NT 28	F	N	27-Aug-02	12:00 4.0 km	13:09 3.5 km		Y	1215 white	410	190		NT 28	NT 28 6			NT 28 CEJ	CEJ	Excellent	Fish tagged in holding tube without anesthetic.
NT 29	M	N	27-Aug-02	12:45 3.5 km	13:15 3.5 km		Y	1221 white	392	175		NT 29	NT 29 Unageable			NT 29 JR	CEJ	Excellent	Fish tagged in holding tube without anesthetic. Measurements are in tube and fish was difficult to determine sex. Small adipose, long jaw for a small fish.
NT 30	F	N	27-Aug-02	15:25 0.5 km	15:25 0.5 km		N		485	209	1050	NT 30	NT 30 8			Mort 3 CEJ		Mortality	Fish was caught at transition into lake (2 other char captured also). Fish was moved slightly downstream to the next available tagging location; water temperature increased rapidly to 25 C so we quickly moved fish back upstream and attempted revival. This fish did not revive and died, the other 2 fish were fine (no sampling or tagging on the 2 releases). All 3 fish were large enough to radio tag. Fish was sampled following death.
NT 31	M	N	14-Sep-02	8:30 0.1 km	9:52 0.1 km		Y	1222 white	580	259		NT 31	NT 31 5			NT 31 CEJ	JR	Excellent	Fish had previous incision and antenna scar but no radio tag inside. Last years aborted procedure? Therefore we did not radio tag it and spaghetti tagged it. Fish had no sampling scars.
NT 32	M	N	14-Sep-02	12:10 17.2 km	15:19 16.7 km		Y	1224 white	438	176	730	NT 32	NT 32 8			NT 32 Pier	JR	Excellent	Called male because of hooked jaw.
NT 33	F	N	14-Sep-02	12:10 17.2 km	15:30 16.7 km		Y	1216 white	429	207	820	NT 33	NT 33 6			NT 33 JR	JR	Excellent	
NT 34	F	N	14-Sep-02	16:00 15.6 km	17:31 15.2 km		Y	1210 white	491	189	950	NT 34	NT 34 5			NT 34 JM	JR	Excellent	

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish		First detected		Last detected		Loc	
No.	Chan Code	Date	Time	Date	Time	(rkm)	Comments / Fate
<b>Fish Tagged in 2001</b>							
1	7	72	02-Oct-01	17:05		0.0	released at Boundary Hole <b>Fate (end of field season 2001):</b> Not detected after release.
				07-Jun-02	8:00	-5.0	Mobile tracked off lowest access point
				17-Jun-02	10:30	-4.0	Mobile tracked off of river mouth
		24-Jun-02		03-Jul-02	10:37	1.0	holding downstream
		04-Jul-02	17:06	04-Jul-02	18:03	1.0	passes station 1 upstream
		04-Sep-02	0:22	05-Sep-02	6:49	1.0	Passed station 1 downstream <b>KELT ?</b>
				05-Sep-02	9:34	0.0	Mobile Track
		05-Sep-02	11:50	09-Sep-02	23:38	1.0	still holding downstream
		10-Sep-02	9:20			0.0	Mobile track by boat
		11-Sep-02	5:56	14-Sep-02	6:04	1.0	still holding downstream
				14-Sep-02	9:40	-0.1	Boat track
		14-Sep-02	22:15	21-Sep-02	1:36	1.0	still holding downstream
				25-Sep-02	6:54	0.0	Mobile Track
		26-Sep-02	20:20	03-Oct-02	6:32	1.0	Detected downstream station 1
				03-Oct-02	11:00	0.0	Mobile Track
		03-Oct-02	21:14	12-Oct-02	6:38	1.0	Detected downstream station 1
		12-Oct-02	15:05	20-Oct-02	3:53	1.0	Detected downstream station 1
		20-Oct-02	19:19	30-Oct-02	9:44	1.0	Still holding downstream
				25-Oct-02	14:30	0.0	Eric boat track
				30-Oct-02	14:30	0.0	Eric boat track
				30-Oct-02	16:00	0.0	Mobile Track
		30-Oct-02	18:02	07-Nov-02	19:47	1.0	Detected downstream station 1
		08-Nov-02	12:20	14-Nov-02	1:42	1.0	Detected downstream station 1
				13-Nov-02	12:00	0.0	Eric boat track
		19-Nov-02	1:14	23-Nov-02	1:13	1.0	Detected downstream station 1
							<b>Fate (end of field season 2002):</b> <b>Fish held off of mouth and then moved up to spawn. After spawning it kelted on 5-Sept and went into a holding pattern in the lower river.</b>
2	5	52	02-Oct-01	17:05		0.0	released at Boundary Hole
				10-Oct-01	12:00	0.3	detected during mobile survey
				29-Oct-01		-2.0	detected during mobile survey from 2nd boat launch
							<b>Fate (end of field season 2001):</b> Unknown (moved into lake following short upstream migration following release)

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish		First detected		Last detected		Loc	
No.	Chan Code	Date	Time	Date	Time	(rkm)	Comments / Fate
		22-Aug-02	23:32	23-Aug-02	6:46	1.0	Passes station 1 upstream Very strong detection on Antenna 2 possibly because of scan time being same as tag pulse.
		13-Oct-02	1:33	13-Oct-02	1:47	18.1	Passes station 8 downstream ( Fish passed station 8 upstream sometime between 24-Aug and 15-Sept while it was still set to a scan time of 6.30 so the signal must have been missed)
		13-Oct-02	21:02	20-Oct-02	6:32	1.0	Passes station 1 downstream <b>KELT</b> Boat track by Eric
		18-Oct-02	14:30			0.0	
		20-Oct-02	19:11	30-Oct-02	7:09	1.0	Passes station 1 upstream and then drops back downstream again. Eric Mobile track Mobile track
				30-Oct-02	14:30	0.5	
				30-Oct-02	16:00	0.5	
		30-Oct-02	18:34	30-Oct-02	20:08	1.0	Detected passing station 1 upstream
		31-Oct-02	0:58	08-Nov-02	6:14	1.0	Detected passing station 1 downstream
		08-Nov-02	13:21	17-Nov-02	3:06	1.0	Detected downstream station 1
				13-Nov-02	12:07	0.5	Eric Mobile track
		17-Nov-02	17:32	23-Nov-02	20:38	1.0	Detected downstream station 1
				18-Dec-03	11:44		Hozomeen Boat Launch by Eric
							<b>Fate (end of field season 2002):</b> <b>Fish moved up and spawned in the upper river above 18 km and then kelted on the 20-Oct. It then held in the lower river up until 18-Dec when it was detected on the US side at the Hozomeen Boat Launch.</b>
3	7	70	02-Oct-01	17:05		0.0	released at Boundary Hole
							detected during mobile survey and on
				10-Oct-01	12:00	0.3	reciever
				15-Oct-01	8:00	0.3	"
				23-Oct-01	10:00	0.3	"
				29-Oct-01		0.3	"
				05-Nov-01		0.3	"
				12-Nov-01		0.3	"
				16-Nov-01		0.3	"
							<b>Fate (end of field season 2001)</b> Unknown (moved into lake after holding just below station 1 for over a month.

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish		First detected		Last detected		Loc					
No.	Chan	Code	Date	Time	Date	Time	(rkm) Comments / Fate				
4	7	71	02-Oct-01	17:05				Mobile tracked off of 2nd boat launch near river mouth			

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish		First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm) Comments / Fate
					12-Oct-01	14:08	1.5 Moved upstream of station 1
					15-Oct-01	5:08	18.0 Moved upstream of station 8
					29-Oct-01		the river was mobile tracked up to 20.5 km however the fish was not
							located up to this point
							<b>Fate (end of field season 2001):</b> Fish moved upstream to spawn and either perished on the spawning grounds or was still upstream of station 8 when it was finally removed
							<b>This fish could have been recaptured at this location again and the tag not working. Obvious incision and antenna hole. This fish was then sampled and called NT 31. This is one of two fish that we are missing from last year.</b>
					14-Sep-02	8:30	0.1 <b>Fate (end of field season 2002):</b> <b>Refer to note above on 14-Sept.</b>
6	5	51	10-Oct-01	12:25			0.0 released at Boundary Hole
					29-Oct-01		1.0 fish was detected by the station and mobile tracking
							fish was seen swimming by CEJ and Pier during a snorkle float. Fish was in good shape and antenna could be observed trailing behind fish.
					29-Oct-01		1.0 "
					05-Nov-01		1.0 "
					12-Nov-01		1.0 "
					01-Dec-01		1.0 fish was still at this location when the reciever was removed for the winter.
							<b>Fate (end of field season 2001):</b> Fish was in a holding pattern below station 1 when it was removed.
			28-Jun-02		02-Jul-02		1.0 passes station 1 upstream
					18-Jul-02		8.7 Mobile track at high bank
					27-Jul-02		8.7 Still at high bank
					01-Aug-02		7.3 Mobile track below high bank
							Recaptured and tag not noticed. Fish was radio tagged with 7-35 and became fish #18. However this was not noticed till next recapture.
					13-Aug-02	12:38	7.8

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish		First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm) Comments / Fate
					26-Aug-02	14:40	9.0 Recapture by Jack Mussell and found to have 2 radio tags in fish. This is also fish # 18 Channel/Code 7-35
			27-Sep-02	19:49	03-Oct-02	4:29	1.0 Passes station 1 downstream <b>KELT</b>
					03-Oct-02	11:00	0.0 Mobile Track
			04-Oct-02	2:22	12-Oct-02	4:20	1.0 Detected downstream station 1
			12-Oct-02	19:58	14-Oct-02	3:32	1.0 Detected downstream station 1
					18-Oct-02	14:30	0.0 Boat track by Eric
							Detected downstream station 1 and then moved upstream and then back downstream again.
			21-Oct-02	0:16	30-Oct-02	14:42	1.0
					25-Oct-02	14:30	0.0 Eric boat track
					30-Oct-02	14:30	0.5 Eric boat track
					30-Oct-02	16:00	0.5 Mobile track
			30-Oct-02	16:46	08-Nov-02	8:41	1.0 Detected downstream station 1
			08-Nov-02	10:34	17-Nov-02	6:57	1.0 Detected downstream station 1
					13-Nov-02	12:10	0.5 Eric boat track
			17-Nov-02	2:32	23-Nov-02	19:49	1.0 Detected downstream station 1
<b>Fate (end of field season 2002):</b>							
<b>Fish moved up and spawned around 9.0 km and kelted on the 3-Oct. It then held in the lower river and was last detected on 23-Nov.</b>							
7	5	50	10-Oct-01	12:25			0.0 released at Boundary Hole
					29-Oct-01		-2.0 fish detected by mobile tracking at 1st Boat Launch
<b>Fate (end of field season 2001):</b>							
Fish dropped back to the river mouth and was detected at that location							
			01-Sep-02	2:06	01-Sep-02	3:10	18.0 Passed station 8 upstream, possibly passed station 1 while it was down for a few days.
			13-Oct-02	5:29	13-Oct-02	5:37	18.1 Passed station 8 downstream
			13-Oct-02	21:48	16-Oct-02	23:18	1.0 Passed station 1 downstream <b>KELT</b>
					18-Oct-02	14:30	0.0 Boat track by Eric
					25-Oct-02	14:30	-1.0 Boat track by Eric
					30-Oct-02	14:30	-1.0 Boat track by Eric
					13-Nov-02	11:31	-1.0 Boat track by Eric
					22-Nov-02	14:04	North stumpfields west side by Eric

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish		First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm) Comments / Fate
							<b>Fate (end of field season 2002):</b> This fish moved up and spawned in the upper river above 18 km and then kelted on 16-Oct. It then held in the lower river and was last detected on 22-Nov on the US side at the river mouth.
8	7	74	10-Oct-01	12:25			0.0 released at Boundary Hold fish was not detected again after the initial release <b>Fate (end of field season 2001):</b> Unknown ( fish must have dropped back to lake)
					26-May-02	2:50	0.5 holding
					30-May-02	4:04	0.5 holding
					07-Jun-02	8:31	0.5 holding
					17-Jun-02		0.5 holding
					24-Jun-02		0.5 holding
			03-Jul-02	15:12	07-Jul-02	4:50	1.0 passes station 1 upstream
					09-Jul-02	5:03	1.0 passes back downstream station 1
					11-Jul-02	9:08	1.0 holding downstream station 1
					05-Sep-02	9:34	0.0 Mobile Track
					10-Sep-02	9:20	0.0 Mobile Track by boat
					14-Sep-02	8:38	0.1 Boat track
					25-Sep-02	6:54	0.0 Mobile track
					03-Oct-02	11:00	0.0 Mobile Track
					12-Oct-02	15:05	0.0 Boat track
					18-Oct-02	14:30	0.0 Boat track by Eric
					25-Oct-02	14:30	0.0 Boat track by Eric
					30-Oct-02	14:30	0.0 Boat track by Eric
					30-Oct-02	16:00	0.0 Mobile track
					13-Nov-02	12:11	0.0 Boat track by Eric
					02-Nov-02	14:06	North stumpfields west side by Eric
					18-Dec-03	11:49	Silver Crk Basin by Eric
							<b>Fate (end of field season 2002):</b> Fish held in lower river and then moved somewhere in the lake after 11-Jul. It returned around the 5-Sept and held in the lower river untill 18-Dec when it was detected on the US side at Silver Crk Basin.
9	5	56	15-Oct-01	13:15			0.0 released at Boundary Hole



Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	Comments / Fate
No.	Chan	Code	Date	Time	Date	Time	(rkm)	
					29-Oct-01		-2.0	fish was detected by mobile tracking at 2nd Boat Launch <b>Fate (end of field season 2001):</b> Unknown ( Fish was last detected holding at the river mouth
			29-Sep-02	3:04	03-Oct-02	6:09	1.0	Passes station 1 downstream (Fish must have been in river before stations were put in between 1.5 and 8.5 km or passed upstream station 1 while the station was down. <b>KELT</b>
					03-Oct-02	11:00	0.0	Mobile Track
			03-Oct-02	20:43	12-Oct-02	9:28	1.0	Detected d/s station 1
					12-Oct-02	15:00	0.3	Boat track
			12-Oct-02	6:32	20-Oct-02	7:26	1.0	Detected downstream station 1
					18-Oct-02	14:30	0.0	Boat track by Eric
			20-Oct-02	19:00	30-Oct-02	14:06	1.0	Detected downstream station 1
					25-Oct-02	14:30	0.5	Eric boat track
					30-Oct-02	14:30	0.5	Eric boat track
					30-Oct-02	16:00	0.5	Mobile Track
			30-Oct-02	17:32	08-Nov-02	6:53	1.0	Detected downstream station 1
			08-Nov-02	12:06	17-Nov-02	6:14	1.0	Detected downstream station 1
					13-Nov-02	12:07	0.5	Eric boat track
					22-Nov-02	14:09		North stumpfields east side by Eric
			17-Nov-02	16:56	24-Nov-02	11:31	1.0	Detected downstream station 1
					18-Dec-03	11:48		Silver Crk Basin by Eric
10	7	79	23-Oct-01	14:00			15.3	kelt tagged and released from upstream location at firsh pullout
					27-Oct-01	6:04	1.3	fish kelted and passed station 1 downstream
								<b>Fate (end of field season 2001):</b> Fish kelted passed station 1 and headed into the lake <b>This fish could have been recaptured at this location again and the tag not working. Obvious incision and antenna hole. This fish was then sampled and called NT 31. This is one of two fish that we are missing from last year.</b>
					14-Sep-02	8:30	0.1	<b>Fate (end of field season 2002):</b> Refer to comment above on 14-Sept.
<b>Fish tagged in 2002</b>								

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	Comments / Fate
No.	Chan	Code	Date	Time	Date	Time	(rkm)	
11	5	55			08-May-02	14:40	-0.3	release at campground
			30-Jun-02		03-Jul-02		1.0	Detected downstream station 1
			07-Jul-02	10:37	09-Jul-02	9:58	1.0	Still holding downstream
			27-Jul-02	9:45	01-Aug-02	9:48	1.0	Passes station 1 upstream
					13-Aug-02	6:34	1.0	station and mobile track
								recaptured; antenna clipped off and large scar where antenna exit was (see recaps sheet.)
			19-Aug-02	16:33	14-Aug-02	7:30	1.0	
					26-Aug-02		1.0	Holding downstream of station
					05-Sep-02		1.0	still holding downstream
					05-Sep-02	9:20	1.0	Mobile Track
								<b>Tag recovered by crew on beach. When tag was "recaptured" on 14 Aug, it could not have been in the fish. An angler likely pulled the antenna out of the fish and somehow it healed up and survived. Tag removed around the 1-Aug?</b>
					10-Sep-02	7:40	0.9	
								Visual by floaters. Could still see scar but healed well. Only radio tag size fish with white spaghetti tag.
					13-Oct-02	9:37	15.8	
								<b>Fate (end of field season 2002): Fish was recaptured on 14-Aug and it was noted that there was a large scar and no antenna leaving the fish. The tag was later recovered on 10-Sept on the beach at the same location. Fish was seen by floaters on the 13-Oct at 15.8 km. It was in good shape and the scar was healing nicely. White spaghetti tag was still intact.</b>
12	7	75	27-Jul-02	16:25			-0.3	released at campground
					18-Dec-03	11:49		Silver Crk Basin by Eric
								<b>Fate (end of field season 2002): Fish dropped back into lake after release and was not detected again until 18-Dec on the US side at Silver Crk Basin.</b>
13					27-Jul-02	11:30	0.5	<b>Fate (end of field season 2002): Mortality. Fish did not recover from surgery.</b>

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
14	7	78	13-Aug-02	9:20			8.7	Release
					05-Sep-02	8:52	8.7	Mobile Track
					10-Sep-02	14:20	8.7	Mobile Track by truck
					14-Sep-02	11:20	8.7	Mobile Track by truck
					25-Sep-02	10:06	8.7	Mobile Track
					03-Oct-02	11:50	15.5	Mobile Track
			06-Oct-02	1:04	06-Oct-02	3:03	18.1	Passes station 8 upstream
								<b>Fate (end of field season 2002):</b>
								<b>Fish held in the mid river untill 3-Oct and then it moved into the upper river above 18 km to spawn. The stations were removed on 28-Oct and at that time the fish had still not kelted.</b>
15	7	76	13-Aug-02	9:49			8.7	Release
			22-Aug-02	23:14	26-Aug-02	14:29	1.0	Passes station 1 downstream
					05-Sep-02	10:07	1.0	Still downstream station 1
					05-Sep-02	9:20	0.6	Mobile Track
			05-Sep-02	10:52	10-Sep-02	13:58	1.0	Still downstream station 1
			10-Sep-02	14:16	14-Sep-02	10:23	1.0	Still downstream station 1
					14-Sep-02	8:00	1.0	Boat track
			21-Sep-02	18:55	23-Sep-02	3:27	1.0	Detected downstream station 1
			25-Sep-02	7:28	03-Oct-02	9:32	1.0	Detected downstream station 1
					03-Oct-02	11:13	0.7	Mobile Track
			03-Oct-02	10:10	12-Oct-02	16:10	1.0	Detected downstream station 1
			12-Oct-02	16:33	20-Oct-02	11:08	1.0	Detected downstream station 1
			20-Oct-02	11:22	30-Oct-02	16:50	1.0	Detected downstream station 1
			30-Oct-02	16:16	08-Nov-02	9:35	1.0	Detected downstream station 1
			08-Nov-02	9:52	17-Nov-02	10:35	1.0	Detected downstream station 1
			17-Nov-02	10:56	28-Nov-02	14:55	1.0	Detected downstream station 1
								<b>Fate (end of field season 2002):</b>
								<b>Fish dropped back after tagging into the lower river and was last detected there on the 28-Nov when the stations were removed.</b>
16	7	77	13-Aug-02	11:47			7.8	Release
					05-Sep-02	8:51	9.0	Mobile
					10-Sep-02	14:20	8.7	Mobile Track by truck
								Detected by Eric at mouth of Big Beaver Crk ( fish somehow made it past lower station without being detected) <b>KELT</b>
					03-Oct-02	pm		

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
<b>Fate (end of field season 2002): Fish moved upstream to spawn after being tagged and then kelted and was last detected on the US side on 3-Oct at Big Beaver Crk.</b>								
17	5	57	13-Aug-02	12:08			7.8	Release
			15-Aug-02	3:01	15-Aug-02	3:21	1.0	Passes station 1 downstream
					22-Aug-02	?	?	Detected by Eric Jeans at Little Beaver Crk Arm during mobile track.
			24-Sep-02	21:39	24-Sep-02	23:37	1.0	Passes station 1 upstream
					13-Oct-02	13:00	10.0	<b>Tag recovered from riverbank on top of log. No fish remains. Possibly attacked by a predator or fisherman?</b> <b>Fate (end of field season 2002):</b> <b>Fish dropped back into lake after being tagged and was detected on the US side at Little Beaver Crk Arm on 22-Aug. It then moved back into the Skagit river on 24-Sept to spawn. The tag was found on the 13-Oct at 10 km but there was no sign of the fish. Refer to the comments above.</b>
18	7	35	13-Aug-02	12:38			7.8	Release
					26-Aug-02	14:40	9.0	Recapture by Jack Mussell. This fish is also Fish #6 Channel/Code 5-51
			27-Sep-02	19:44	02-Oct-02	23:27	1.0	Passes station 1 downstream <b>KELT?</b>
					03-Oct-02	11:00	0.0	Mobile Track
			04-Oct-02	2:33	12-Oct-02	4:25	1.0	Detected d/s station 1
			12-Oct-02	20:27	14-Oct-02	3:17	1.0	Detected d/s station 1
			21-Oct-02	0:22	30-Oct-02	14:43	1.0	Detected d/s station 1
					30-Oct-02	14:30	0.5	Eric mobile track
					30-Oct-02	16:00	0.5	Mobile Track
			30-Oct-02	18:52	08-Nov-02	7:08	1.0	Detected d/s station 1
			08-Nov-02	17:55	17-Nov-02	6:56	1.0	Detected d/s station 1
					13-Nov-02	12:10	0.5	Eric mobile track
			17-Nov-02	13:20	23-Nov-02	19:55	1	Detected d/s station 1

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	Comments / Fate
No.	Chan	Code	Date	Time	Date	Time	(rkm)	
								<b>Fate (end of field season 2002):</b> <b>This is also fish #6 (5-51) Fish was recaptured in the mid river on 13 and 26-Aug. It spawned around 9.0 km and kelted on 2-Oct. It then held in the lower river and was last detected on 23-Nov.</b>
19	7	44	13-Aug-02	12:46			7.8	Release
					03-Sep-02	12:00	15.1	RT Fish #19 RECAPTURED by angler on 03 Sept., 2.9 kms downstream of 26-mi bridge (7.3 kms upstream from release point on 13 Aug). Angler stated that he caught the fish on a lure, and that the hook badly damaged the eye, but that the fish did swim off (slowly) at release. The angler did see the radio tag antenna still in fish. This recapture was called in to Troy by angler (Robert Holland; 604-277-3943).
					25-Sep-02	14:41	15.4	Boat track
					03-Oct-02	11:50	15.5	Mobile Track
					13-Oct-02	9:50	15.0	Boat track
			15-Oct-02	0:33	15-Oct-02	0:44	1.0	Passes station 1 downstream <b>KELT</b>
								<b>Fate (end of field season 2002):</b> <b>Fish was recaptured after release on the 3-Sept. (See comment above) It spawned around 15.5 km and kelted on 15-Oct. That was the last time it was detected so it must have moved into the lake on the US side.</b>
20	7	38	13-Aug-02	16:02			5.5	Release
			20-Sep-02	1:39	20-Sep-02	1:44	1.0	Passes station 1 downstream <b>KELT</b>
					25-Sep-02	6:54	0.0	Mobile Track
			25-Sep-02	20:27	03-Oct-02	5:29	1.0	Detected downstream station 1
					03-Oct-02	11:00	0.0	Mobile Track
			03-Oct-02	19:49	12-Oct-02	5:30	1.0	Detected downstream station 1
					12-Oct-02	15:05	0.0	Boat track
			13-Oct-02	23:49	17-Oct-02	2:42	1.0	Detected downstream station 1
					18-Oct-02	14:30	0.0	Boat track by Eric
					25-Oct-02	14:30	-1.0	Boat track by Eric
					30-Oct-02	14:30	-1.0	Boat track by Eric
					13-Nov-02	11:32	-1.0	Boat track by Eric

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
					22-Nov-02	14:06		North stumpfields west side by Eric <b>Fate (end of field season 2002):</b> <b>After release, fish was first detected kelting on the 20-Sep. It then held in the lower river untill 22-Nov when it was detected on the US side off the river mouth.</b>
21	7	37	13-Aug-02	18:30			4.0	Release
			05-Sep-02	4:46	05-Sep-02	9:53	1.0	Passes station 1 downstream
					05-Sep-02	9:24	0.4	Mobile
			05-Sep-02	21:04	05-Sep-02	22:48	1.0	Detected downstream station 1
			22-Sep-02	20:55	22-Sep-02	23:43	1.0	Passes station 1 upstream
					03-Oct-02	11:50	15.5	Mobile Track
					13-Oct-02	9:50	15.0	Boat track
					20-Oct-02	10:54	15.0	Truck track
			21-Oct-02	0:20	21-Oct-02	0:45	1.0	Passes station 1 downstream <b>KELT</b>
								<b>Fate (end of field season 2002):</b> <b>After release, fish moved down to the lower river and headed up to spawn on the 22-Sep. It spawned around 15 km and kelted on the 21-Oct. This was the last time it was detected so it must have moved into the lake on the US side.</b>
22	7	36	14-Aug-02	11:33			8.8	Release
					25-Sep-02	10:06	9.0	Mobile Track
			13-Oct-02	6:27	13-Oct-02	6:36	1.0	Passes station 1 downstream <b>KELT</b>
								<b>Fate (end of field season 2002):</b> <b>This fish moved upstream after tagging and spawned somewhere upstream of 9 km. It kelted on the 13-Oct and that was the last time it was detected. It must have moved into the lake on the US side.</b>
23	5	53	14-Aug-02	11:47			8.8	Release
					05-Sep-02	8:51	9.0	Mobile
					10-Sep-02	14:20	8.7	Mobile track by truck
					14-Sep-02	11:20	8.7	Mobile
			18-Sep-02	3:41	18-Sep-02	5:55	18.1	Passes station 8 upstream
			08-Oct-02	19:42	08-Oct-02	20:04	18.1	Passes station 8 downstream

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
			09-Oct-02	19:50	09-Oct-02	20:09	1.0	Passes station 1 downstream <b>KELT</b>
					18-Oct-02	14:30	0.0	Boat track by Eric
					25-Oct-02	14:30	-0.5	Eric boat track
					30-Oct-02	14:30	-0.5	Eric boat track
					13-Nov-02	11:16	-0.5	Eric boat track
			19-Nov-02	2:03	19-Nov-02	2:06	1.0	Detected downstream station 1
					22-Nov-02	14:16		North stumpfields east side by Eric
					18-Dec-03	11:48		Silver Crk Basin by Eric
								<b>Fate (end of field season 2002):</b> <b>After release, this fish moved upstream to spawn above 18 km. It kelted on the 9-Oct and held in the lower river until 18-Dec when it was detected on the US side at Silver Crk Basin.</b>
24	5	22	19-Aug-02	9:22			17.4	Release
					05-Sep-02	8:08	16.5	Mobile
			11-Sep-02	21:56	11-Sep-02	22:48	18.1	Passes station 8 upstream
								<b>Fate (end of field season 2002):</b> <b>After release, this fish dropped back slightly and then moved up past 18 km to spawn. It had not kelted by the time we took the stations out on the 28-Nov.</b>
25	7	43	19-Aug-02	10:10			17.4	Release
					25-Aug-02		17.1	Reported dead on beach by angler and moved up on beach by angler <b>Tag recovered by Jack Mussell.</b>
								<b>Wound on anterior end at body cavity. Fish died a while ago and is partially decomposed. Fungus on side where antenna comes out and behind the gills. Ribs are separated from flesh at incision. Stomach is choked and swollen with contents. Tag lodged near rear of stomach cavity. Possibly pulled on by angler. Fish confirmed female. Photos roll 3 - 3,4,5</b>
					27-Aug-02	17:00	17.1	<b>Fate (end of field season 2002):</b> <b>Fish dropped back slightly after release and was found dead by a angler on the 25-Aug. See comments above on the 27-Aug.</b>

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	Comments / Fate
No.	Chan	Code	Date	Time	Date	Time	(rkm)	
26	5	24	19-Aug-02	12:30			16.6	Release
			21-Aug-02	3:34	23-Aug-02	0:44	1.0	Passes station 1 downstream
								<b>Fate (end of field season 2002):</b> <b>Fish dropped back downstream into lake after being tagged. It was not detected again in the Skagit River.</b>
27	7	40	19-Aug-02	13:09			16.6	Release
			13-Sep-02	0:52	13-Sep-02	22:28	1.0	Passes station 1 downstream
					12-Oct-02	15:08	0.0	Boat track and visual by floater (Yellow Floy)
			19-Oct-02	22:59	20-Oct-02	11:08	1.0	Detected downstream station 1
			20-Oct-02	11:22	20-Oct-02	22:07	1.0	Passes station 1 upstream
			09-Nov-02	1:16	12-Nov-02	22:46	18.1	Detected downstream station 8
			15-Nov-02	22:59	15-Nov-02	23:15	1.0	Passes station 1 downstream <b>KELT</b>
								<b>Fate (end of field season 2002):</b> <b>This fish was first floy tagged on the US side and then radio tagged on the Canadian side 16.6 km up the Skagit River. It then dropped back down and held in the lower river untill 20-Oct when it moved upstream to the upper river to spawn above 18 km. It kelted on the 15-Nov and travelled back out into the lake on the US side.</b>
28	5	21	19-Aug-02	13:30			16.6	Release
			07-Sep-02	3:17	09-Sep-02	22:48	1.0	Passes station 1 downstream
					10-Sep-02	22:48	0.1	Mobile track by boat
			12-Sep-02	0:47	12-Sep-02	21:54	1.0	Detected downstream station 1
					25-Sep-02	6:54	0.0	Mobile Track
			27-Sep-02	13:30	30-Sep-02	19:30	1.0	Detected downstream station 1
					03-Oct-02	11:11	0.5	Mobile Track
			07-Oct-02	0:21	08-Oct-02	22:39	1.0	Detected downstream station 1
					12-Oct-02	15:00	0.3	Boat track
			13-Oct-02	22:12	13-Oct-02	22:57	1.0	Detected downstream station 1
			21-Oct-02	23:53	23-Oct-02	23:21	1.0	Detected downstream station 1
					30-Oct-02	16:00	0.5	Mobile track
					30-Oct-02	14:30	0.5	Eric mobile track
			11-Nov-02	11:19	11-Nov-02	11:22	1.0	Detected downstream station 1
					13-Nov-02	11:59	0.5	Eric mobile track
								Detected downstream station
			18-Nov-02	2:32	23-Nov-02	22:17	1.0	1(Moving up and downstream)



Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
								<b>Fate (end of field season 2002):</b> <b>Fish dropped back downstream after being tagged at 16.6 km. It then held in the lower river and travelled around quite a bit but stayed within a 1 km stretch of the river.</b>
29	7	41	19-Aug-02	13:51			16.6	Release
			12-Sep-02	12:09	14-Sep-02	4:14	1.0	Passes station 1 downstream
					14-Sep-02	8:38	0.1	Boat track
					25-Sep-02	6:54	0.0	Mobile Track
			25-Sep-02	23:59	02-Oct-02	22:44	1.0	Detected downstream station 1
					03-Oct-02	11:00	0.0	Mobile Track
			05-Oct-02	7:09	07-Oct-02	19:39	1.0	Detected downstream station 1
					12-Oct-02	15:05	0.0	Boat track
					25-Oct-02	14:30	-1.0	Eric boat track
					30-Oct-02	14:30	-1.0	Eric boat track
					13-Nov-02	11:13	-1.0	Eric boat track
					22-Nov-02	14:06		North stumpfields west side by Eric
					18-Dec-03	11:50		Silver Crk Basin by Eric
								<b>Fate (end of field season 2002):</b> <b>This fish dropped back downstream after being tagged and held in the lower river until 18-Dec when it was detected at the Silver Crk Basin on the US side.</b>
30	5	59	19-Aug-02	14:04			16.6	Release
					03-Oct-02	11:52	15.4	Mobile Track
			11-Oct-02	21:12	11-Oct-02	21:20	1.0	Passed station 1 downstream <b>KELT</b>
					25-Oct-02	14:30	-1.0	Eric boat track
					13-Nov-02	10:08		Little Beaver Crk Basin
					22-Nov-02	13:40		Little Beaver Crk Basin
					18-Dec-03	11:44		Hozomeen Boat Launch
								<b>Fate (end of field season 2002):</b> <b>This fish spawned around 15.4 km and kelted on the 11-Oct. It held in the lower river for a while and then travelled to the Little Beaver Crk Basin on the US side on 13-Nov and then to the Hozomeen Boat Launch on the 18-Dec.</b>
31	7	39	19-Aug-02	14:46			16.6	Release

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Fish			First detected		Last detected		Loc	Comments / Fate
No.	Chan	Code	Date	Time	Date	Time	(rkm)	
			22-Aug-02	1:34	26-Aug-02	14:29	1.0	Passes station 1 downstream
			05-Sep-02	4:50	05-Sep-02	10:06	1.0	Passes station 1 upstream
					05-Sep-02	9:19	1.7	Mobile Track
			05-Sep-02	10:54	09-Sep-02	5:08	1.0	Passes station 1 downstream
					10-Sep-02	9:20	0.0	Mobile Track by boat
			10-Sep-02	20:45	14-Sep-02	7:53	1.0	Detected downstream station 1
					14-Sep-02	8:38	0.1	Boat track
					03-Oct-02	11:00	0.0	Mobile Track
					07-Oct-02	7:51	1.0	First detected downstream station 1
					12-Oct-02	15:00	0.3	Boat track
			13-Oct-02	7:32	15-Oct-02	8:27	1.0	Detected downstream station 1
								<b>Fate (end of field season 2002):</b>
								<b>Fish dropped back downstream to the lower river after release and held there until the 15-Oct when it moved out into the lake on the US side.</b>
32	7	42	26-Aug-02	11:08			11.9	Release
					05-Sep-02	8:43	12.0	Mobile Track
			10-Oct-02	3:27	10-Oct-02	19:51	18.1	Detected downstream station 8
			11-Oct-02	20:17	11-Oct-02	20:59	18.1	Detected downstream station 8
					13-Oct-02	12:15	11.7	Boat track
33	7	30	26-Aug-02	11:50			11.9	Release
			07-Sep-02	2:42	10-Sep-02	5:54	1.0	Passes station 1 downstream
					10-Sep-02	9:20	0.0	Mobile track by boat
			10-Sep-02	20:04	14-Sep-02	9:14	1.0	Detected downstream station 1
					14-Sep-02	8:38	0.1	Boat track
			14-Sep-02	20:12	25-Sep-02	6:00	1.0	Detected downstream station 1
					25-Sep-02	6:54	0.0	Mobile track
			25-Sep-02	19:45	03-Oct-02	7:49	1.0	Detected downstream station 1
					03-Oct-02	11:12	0.5	Mobile Track
			03-Oct-02	19:36	12-Oct-02	7:01	1.0	Detected downstream station 1
					12-Oct-02	15:00	0.3	Boat track
			12-Oct-02	19:38	17-Oct-02	0:43	1.0	Detected downstream station 1
					18-Oct-02	14:30	0.0	Boat track by Eric
					25-Oct-02	14:30	-1.0	Eric mobile track
					30-Oct-02	14:30	-1.0	Eric mobile track
					13-Nov-02	11:32	0.0	Eric mobile track
					22-Nov-02	14:06		North stumpfields west side by Eric

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
								<b>Fate (end of field season 2002):</b> <b>This fish dropped back after being tagged and hung out in the lower river. On the 22-Nov it was detected on the US side off the river mouth.</b>
34	5	19	26-Aug-02	15:20			9.0	Release
					05-Sep-02	8:53	9.2	Mobile track
			11-Sep-02	22:25	14-Sep-02	4:42	1.0	Passes station 1 downstream <b>KELT</b>
					14-Sep-02	8:38	1.0	Boat track
					03-Oct-02	14:20		Detected and recaptured at Mouth of Big Beaver Crk By Eric
					08-Oct-02	10:00		Detected and recaptured at Mouth of Big Beaver Crk By Eric
								<b>Fate (end of field season 2002):</b> <b>Fish moved upstream after being tagged and spawned above 9 km. It kelted on the 14-Sep and moved out into the lake on the US side. It was detected on the 3 and 8-Oct at the Mouth of Big Beaver Crk.</b>
35	5	15	26-Aug-02	15:20			9.0	Release
					05-Sep-02	8:52	8.7	Mobile Track
					10-Sep-02	14:20	8.7	Mobile Track
			21-Sep-02	3:18	21-Sep-02	4:37	18.1	Passes station 8 upstream
			23-Sep-02	2:29	23-Sep-02	2:47	18.1	Passes station 8 downstream
			24-Sep-02	21:57	24-Sep-02	23:33	18.1	Passes station 8 upstream
			12-Oct-02	4:01	12-Oct-02	4:16	18.1	Passes station 8 downstream
					13-Oct-02	12:40	10.9	Boat track
			15-Oct-02	21:36	15-Oct-02	21:41	1.0	Passes station 1 downstream <b>KELT</b>
					18-Oct-02	14:30	0.0	Boat track by Eric
					25-Oct-02	14:30	-1.0	Eric boat track
					30-Oct-02	14:30	-1.0	Eric boat track
					13-Nov-02	11:13	-2.0	Eric boat track near NPS Boat Launch
			23-Nov-02	4:16	23-Nov-02	23:08	1.0	Detected downstream station 1
								<b>Fate (end of field season 2002):</b> <b>This fish moved up and spawned above 18 km. It kelted on the 15-Oct and held in the lower river. It was detected on both the Canadian and US side.</b>
36	7	34	27-Aug-02	9:51			5.5	Release

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	Comments / Fate
No.	Chan	Code	Date	Time	Date	Time	(rkm)	
			29-Aug-02	22:30	05-Sep-02	5:52	1.0	Passes station 1 downstream
					05-Sep-02	9:30	0.0	Mobile Track
			05-Sep-02	22:02	10-Sep-02	5:52	1.0	Detected downstream station 1
					10-Sep-02	9:20	0.0	Boat track
			10-Sep-02	19:45	12-Sep-02	6:20	1.0	Detected downstream station 1
					14-Sep-02	9:40	-0.1	Boat track
			17-Sep-02	18:51	17-Sep-02	19:14	1.0	Detected downstream station 1
					18-Oct-02	14:30	0.0	Boat track by Eric
					18-Oct-02	?	0.0	<b>Tag recovered from dead and decomposed fish at US boundary by Greg Dixon, Seattle City Light.</b>
			23-Oct-02	8:21	29-Oct-02	14:24	1.0	Detected at station 1 (tag in Seattle City Light vehicle)
			22-Oct-02	16:28	29-Oct-02	14:49	18.1	Detected at station 8 (tag in Seattle City Light vehicle)
			13-Nov-02	11:25	13-Nov-02	16:00	18.1	Detected at station 8 (tag in Seattle City Light vehicle)
			13-Nov-02	11:39	13-Nov-02	15:28	1.0	Detected at station 1 (tag in Seattle City Light vehicle)
					13-Nov-02	12:10	0.0	Boat track by Eric
								<b>Fate (end of field season 2002): This fish dropped back after being tagged to the lower river. It was recovered dead on the 18-Oct at 0 km. Fish probably died as a result of angling because it was still alive on the 17-Sep (20 days after being radio tagged)</b>
37	7	33	27-Aug-02	9:56			5.5	Release
					25-Sep-02	14:43	15.3	Boat track and visual
					03-Oct-02	11:50	15.1	Mobile Track
			12-Oct-02	5:45	12-Oct-02	5:54	1.0	Passes station 1 downstream <b>KELT</b>
38	5	55	10-Sep-02	10:23			0.1	Release
			10-Sep-02	10:16	10-Sep-02	13:10	1.0	Detected downstream station 1
			10-Sep-02	14:17	14-Sep-02	10:30	1.0	Detected downstream station 1
					14-Sep-02	8:00	0.7	Boat track and visual by floater
			14-Sep-02	20:43	18-Sep-02	0:02	1.0	Passed station 1 upstream
					25-Sep-02	10:06	8.5	Mobile track
			10-Oct-02	23:38	10-Oct-02	23:59	1.0	Passed station 1 downstream <b>KELT</b>

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
<b>Fate (end of field season 2002):</b> <b>This fish held in the lower river after being tagged and then moved up to around 8.5 km to spawn. It kelted on the 10-Oct and moved out into the lake on the US side.</b>								
39	5	54	10-Sep-02	11:05			0.1	Release
			10-Sep-02	11:30	10-Sep-02	14:00	1.0	Detected downstream station 1
			10-Sep-02	14:16	10-Sep-02	20:36	1.0	Detected downstream station 1
			16-Sep-02	1:35	19-Sep-02	21:57	1.0	Passed station 1 upstream
					03-Oct-02	11:55	15.1	Mobile Track
			08-Oct-02	23:50	09-Oct-02	1:11	18.1	Passed station 8 upstream
			12-Oct-02	2:28	12-Oct-02	3:24	18.1	Passed station 8 downstream
					13-Oct-02	12:50	10.6	Boat track
			06-Nov-02	5:28	06-Nov-02	5:31	1.0	Passed station 1 downstream <b>KELT</b>
					13-Nov-02	13:10		Big Beaver Crk Mouth by Eric
					22-Nov-02	12:35		Big Beaver Crk Mouth by Eric
<b>Fate (end of field season 2002):</b> <b>This fish moved upstream and then dropped back downstream to possibly spawn around 10.6 km. It kelted on the 6-Nov and moved out in the lake on the US side and was detected on the 13 and 22-Nov at the Mouth of Big Beaver Crk.</b>								
40	7	43	10-Sep-02	11:11			0.1	Release
			10-Sep-02	20:05	14-Sep-02	6:02	1.0	Detected downstream station 1
					14-Sep-02	8:38	0.1	Boat track
								Recapture by Jim Rissling. Fish in good shape.
					14-Sep-02	8:45	0.1	
					25-Sep-02	6:54	0.0	Mobile Track
					03-Oct-02	11:00	0.0	Mobile Track
					25-Oct-02	14:30	-1.5	Eric boat track
					30-Oct-02	14:30	-1.5	Eric boat track
					13-Nov-02	11:13	-1.5	Eric boat track
					22-Nov-02	14:07		North stumpfields east side by Eric
<b>Fate (end of field season 2002):</b> <b>Fish held in the lower river after release and was recaptured once on the 14-Sep. On the 22-Nov it was detected on the US side off of the river mouth.</b>								
41	7	32	10-Sep-02	11:44			0.1	Release

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
			11-Sep-02	1:34	14-Sep-02	10:22	1.0	Detected downstream station 1
					14-Sep-02	8:38	0.1	Boat track
			14-Sep-02	22:38	15-Sep-02	20:54	1.0	Passed station 1 upstream
					03-Oct-02	11:50	15.0	Mobile Track
					13-Oct-02	8:40	16.9	Boat track
			13-Oct-02	21:00	14-Oct-02	22:18	18.1	Detected downstream station 8
					20-Oct-02	10:52	15.3	Truck track
			21-Oct-02	0:22	25-Oct-02	21:53	1.0	Passed station 1 downstream <b>KELT Fate (end of field season 2002): This fish moved upstream to spawn around 15 km. It kelted on the 25-Oct and moved out into the lake on the US side.</b>
42	7	31	10-Sep-02	11:56			0.1	Release
			10-Sep-02	20:29	13-Sep-02	1:09	1.0	Detected downstream station 1
					03-Oct-02	11:00	0.0	Mobile Track
								Detected at mouth of Big Beaver Crk by Eric. Just arrived today because it wasn't there on the 17-Oct.
					18-Oct-02	10:13		
					30-Oct-02	14:30	-1.0	Eric boat track
					13-Nov-02	10:29	-1.0	Eric boat track
					18-Dec-03	11:49		Silver Crk Basin by Eric
								<b>Fate (end of field season 2002): This fish held in the lower river after release and then moved to the US side and was detected at the mouth of Big Beaver Crk on the 18-Oct. It then moved back to the lower Skagit on the 30-Oct and then to the Silver Crk Basin on the 18-Dec.</b>
43	5	13	10-Sep-02	13:24			0.1	Release
			28-Sep-02	21:19	29-Sep-02	0:21	1.0	Passed station 1 upstream
					12-Oct-02	10:13	6.8	Boat track
			30-Oct-02	0:16	30-Oct-02	1:12	18.1	Detected downstream station 8
			05-Nov-02	1:00	05-Nov-02	1:12	1.0	Passed station 1 downstream <b>KELT Fate (end of field season 2002): This fish moved upstream after being tagged and spawned below 18 km. It kelted on the 5-Nov and moved out into the lake on the US side.</b>

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
44	5	58	14-Sep-02	14:43			16.7	Release
					14-Sep-02	15:41	16.5	Boat track
					25-Sep-02	14:11	16.1	Boat track
					03-Oct-02	12:06	15.7	Mobile Track
			06-Oct-02	22:03	07-Oct-02	0:24	18.1	Passed station 8 upstream
								<b>Fate (end of field season 2002):</b> <b>This fish held around 16 km after release and then moved up to spawn above 18 km on the 7-Oct. It still had not kelted by the 28-Nov when the stations were removed.</b>
45	5	20	14-Sep-02	14:53			16.7	Release
					14-Sep-02	15:41	16.5	Boat track
					25-Sep-02	10:06	8.5	Mobile track
					03-Oct-02	11:20	8.7	Mobile track
					12-Oct-02	9:00	8.8	Boat track
								Boat track (Not seen by floaters, keep an eye on this fish)
					13-Oct-02	14:00	8.8	
					20-Oct-02	11:03	8.8	Truck track
								Truck track (This tag may be on the beach somewhere)
					30-Oct-02	15:26	8.8	
								<b>Tag found in bushes above river. Located at a heavily fished area. Tag had to be thrown there by an angler or dragged there by a predator.</b>
					17-Nov-02	11:30	8.8	
								<b>Fate (end of field season 2002):</b> <b>This fish dropped back to 8.8 km after holding around 16 km. The tag was found in the bushes on the 17-Nov but I think that it died around the 12-Oct. See comment above on the 17-Nov.</b>
46	5	14	14-Sep-02	15:11			16.7	Release
					14-Sep-02	15:41	16.5	Boat track
					25-Sep-02	14:30	15.5	Boat track and visual by floater
					03-Oct-02	11:50	15.4	Mobile Track
					13-Oct-02	10:45	13.5	Boat track
					20-Oct-02	10:48	15.8	Truck track
			25-Oct-02	2:57	25-Oct-02	3:13	1.0	Passed station 1 downstream <b>KELT</b>
					25-Oct-02	14:30	0.0	Eric boat track
					30-Oct-02	14:30	0.0	Eric boat track
					13-Nov-02	11:12	0.0	Eric boat track
			15-Nov-02	1:51	15-Nov-02	16:44	1.0	Detected downstream station 1
					22-Nov-02	14:04		North stumpfields west side by Eric

Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
					18-Dec-03	11:44		Hozomeen Boat Launch by Eric <b>Fate (end of field season 2002):</b> Fish spawned around 15 km and kelted on the 25-Oct. It then held in the lower river until 22-Nov when it was detected on the US side off the river mouth. It then moved to the Hozomeen Boat Launch on the 18- Dec.
47	5	10	14-Sep-02	17:10			15.2	Release
			23-Sep-02	3:54	23-Sep-02	20:40	1.0	Detected u/s station 1
			25-Sep-02	19:25	30-Sep-02	22:27	1.0	Detected u/s station 1
			03-Oct-02	21:30	04-Oct-02	6:17	18.1	Detected downstream station 8
			07-Oct-02	1:14	07-Oct-02	3:30	18.1	Detected downstream station 8
			12-Oct-02	2:16	12-Oct-02	3:45	18.1	Detected downstream station 8
					13-Oct-02	9:12	16.0	Boat track
			15-Oct-02	4:20	15-Oct-02	5:31	18.1	Passed station 8 upstream
			15-Oct-02	11:29	15-Oct-02	19:31	18.1	Passed station 8 downstream
					20-Oct-02	10:49	15.5	Truck track
			25-Oct-02	23:54	26-Oct-02	0:06	1.0	Passed station 1 downstream <b>KELT</b>
								<b>Fate (end of field season 2002):</b> This fish dropped back downstream after release and then moved back up to spawn around 16 km after migrating up and downstream quite a bit. It kelted on the 26-Oct and moved back out into the lake on the US side.
48	5	16	14-Sep-02	17:26			15.2	Release
			19-Sep-02	23:58	20-Sep-02	8:08	1.0	Passed station 1 downstream
					25-Sep-02	6:54	0.0	Mobile track
			25-Sep-02	21:45	01-Oct-02	1:08	1.0	Detected downstream station 1
					03-Oct-02	11:00	0.0	Mobile track
			11-Oct-02	21:47	11-Oct-02	23:27	1.0	Passed station 1 upstream
					12-Oct-02	12:11	4.1	Boat track
					13-Oct-02	13:35	9.0	Boat track
			19-Oct-02	2:42	19-Oct-02	2:51	1.0	Passed station 1 downstream <b>KELT</b>
								<b>Fate (end of field season 2002):</b> This fish dropped back downstream after being tagged and then moved back up to spawn on the 11-Oct. It kelted on the 19-Oct and moved back out into the lake on the US side.



Table 5. Summary of detections and migratory behaviour for each radio-tagged char released in the BC Skagit River in 2001 and 2002.

Fish			First detected		Last detected		Loc	
No.	Chan	Code	Date	Time	Date	Time	(rkm)	Comments / Fate
49	5	17	25-Sep-02	13:22			16.7	Release
			25-Sep-02	22:14	25-Sep-02	23:50	18.1	Passed station 8 upstream
					03-Oct-02	12:14	20.2	Mobile Track
			04-Oct-02	0:06	04-Oct-02	0:32	18.1	Passed station 8 downstream
					13-Oct-02	9:02	16.2	Boat track
			14-Oct-02	0:22	14-Oct-02	4:22	18.1	Detected downstream station 8
			15-Oct-02	1:28	15-Oct-02	4:30	18.1	Passed station 8 upstream
			20-Oct-02	3:04	20-Oct-02	3:29	18.1	Passed station 8 downstream
			21-Oct-02	21:23	21-Oct-02	23:30	18.1	Passed station 8 upstream
			22-Oct-02	21:44	22-Oct-02	21:51	18.1	Detected upstream station 8
			23-Oct-02	2:59	24-Oct-02	0:21	18.1	Passed station 8 downstream
			24-Oct-02	23:06	25-Oct-02	2:07	18.1	Detected downstream station 8
			27-Oct-02	0:27	27-Oct-02	22:20	18.1	Passed station 8 upstream
			28-Oct-02	4:51	28-Oct-02	5:14	18.1	Passed station 8 downstream
			29-Oct-02	0:49	30-Oct-02	1:12	18.1	Detected downstream station 8
			02-Nov-02	5:26	02-Nov-02	5:33	1.0	Passed station 1 downstream <b>KELT Fate (end of field season 2002): Fish moved upstream after being tagged and travelled back and forth past 18 km numerous times between the 25-Sep and 30-Oct. It kelted on the 2-Nov and moved back out into the lake on the US side.</b>
50	5	11	25-Sep-02	13:29			16.7	Release
					13-Oct-02	9:02	16.2	Boat track
			26-Oct-02	23:21	26-Oct-02	23:30	1.0	Passed station 1 downstream <b>KELT</b>
			29-Oct-02	2:22	29-Oct-02	19:09	1.0	Detected downstream station 1 <b>Fate (end of field season 2002): This fish held around 16 km after release and spawned near that location. It kelted on the 26-Oct and was last detected on the 29-Oct downstream station 1. It must have moved out into the lake on the US side because it was not detected in any further mobile tracks.</b>

Table 6. Summary of cross-border movements of radio-tagged char in the upper Skagit River watershed in 2001 and 2002.

For fish Radio Tagged in BC						For fish RadioTagged in US				
Fish No.	Fall (F) or Summer (S) tag applicaion	Was fish able to cross border? 1=Yes	Did fish cross the border? (1 = Yes)	No. known unique trips to US	No. unique trips back to BC	Fish No.	Fall (F) or Summer (S) tag application	Did fish cross the border? (Y / N)	No. known unique trips to BC	No. unique trips back to US
1	F	1	1	1	1	US-10	F	N		
2	F	1	1	2	1	US-12	F	Y	1	
3	F	1	1	2	1	US-14	F	N		
4	F	1	1	1		US-17	F	N		
5	F		?			US-33	F	Y	1	
6	F	1	N			US-36	F	N		
7	F	1	1	2	1	US-41	F	N		
8	F	1	1	2	1	US-40	F	N		
9	F	1	1	2	1	US-43	F	Y	1	
10	F		?			US-45	F	N		
11	S		N			US-46	F	N		
12	S	1	1	1		US-47	F	N		
13	n/a		n/a			US-48	F	N		
14	S	1	N			US-49	F	N		
15	S	1	N			US-50	F	N		
16	S	1	1	1		US-51	F	N		
17	S	1	1	1	1	US-52	F	N		
18	S	1	N			US-53	F	N		
19	S	1	1	1		US-54	F	N		
20	S	1	1	1		US-55	F	N		
21	S	1	1	1						
22	S	1	1	1						
23	S	1	1	1						
24	S	1	N							
25	S		N							
26	S	1	1	1						
27	S	1	1	1						
28	S	1	N							
29	S	1	1	1						
30	S	1	1	1						
31	S	1	1	1						
32	S	1	N							
33	S	1	1	1						
34	S	1	1	1						
35	S	1	1	1	1					
36	S		N							
37	S	1	1	1						
38	F	1	1	1						
39	F	1	1	1						
40	F	1	1	1						
41	F	1	1	1						
42	F	1	1	2	1					
43	F	1	1	1						
44	F	1	N							
45	F		N							
46	F	1	1	1						
47	F	1	1	1						
48	F	1	1	1						
49	F	1	1	1						
50	F	1	1	1						

Minimum (percent) of BC radio-tagged char known to have crossed the border: 81.4%

\*Summer fish were tagged between May and Aug

\*Fall fish were tagged between Sept and Oct

In addition, 2 fish anchor tagged on the US side were seen by the

Shaded area indicates fish was tagged in 2001

In addition, 2 fish anchor tagged on the US side were seen by the swim crew on the Canadian side. One of these fish was recaptured by the crew.

Table 7. Pertinent data collected for each char RECAPTURED and sampled during the Skagit River char telemetry program, 2002.

Fish				Radio Tagged? (Y/N)						Released Alive? (Y/N)					Radio Tag		Spaghetti Tag	Spaghetti Tag		Fork Length (mm) Girth (mm) Weight (g)			Condition at Release		
RT Recap. No.	Original No.	Sex Field judgement	Confirmed		Recapture						Release														
					Date	Time	Rkm	UTM	UTM			Time	Rkm	UTM	UTM	Ch	Code	(Y/N)	No.	Color					
Radio Tagged Fish																									
1	11	F	see notes	Y	14-Aug-02	7:30	1.0 km	station 1		Y	7:35	1.0 km			5	55	Y	516	white					CEJ	poor
2	6	M		Y	13-Aug-02	10:50	7.8 km	638127	5435282	Y	12:38	7.8 km	638127	5435282	5	51	N	BC01119	pink	582	251	2000	CEJ	Excellent	
3	6 or 18	M			26-Aug-02	14:40	9.0 km	637901	5435957	Y	14:42	9.0 km	637901	5435957	7	35	Y	BC01119	pink					JM	Excellent
4	19			Y	03-Sep-02		15.1 km			Y		15.1 km			7	44	Y	BC01124	pink					RH	Poor
5	40	F		Y	14-Sep-02	8:45	0.1 km			Y	8:50	0 km			7	43	Y	BC 01120	pink					JR	Excellent
6	34	M		Y	03-Oct-02	pm	Mouth of Big Beaver Crk			Y	pm	Mouth of Big Beaver Crk			5	19	Y	BC 01125	pink	570		1875	EJ	Excellent	
No Radio Tag Applied																									
1	NT3	F	F	N	10-Oct-01	8:00	0.3 km			Y	8:05	0.3					anchor tag	103	brown					CEJ	Excellent
2	NT2	M	M	N	27-Jul-02	11:30	0.5 km	log run		N	not released						anchor tag	000102	brown	51.3	22.5	1200	JR	dead	
3	?	M	not checked	Y	19-Aug-02	11:00	16.8 km	634463	54413260	Y	13:09	16.6 km	0634610	5441166	7	40	anchor tag	903	yellow	562	220	1600 w/ tag	JR	Excellent	
4	NT 6	F	F	Y	27-Aug-02	8:29	6.7	638800	5434173	Y	9:56	5.5	639407	5433669	7	33	anchor tag	106	brown	485	203	1090 w/tag	JM	Excellent	

**Notes:**

<sup>1</sup> DV = Dolly Varden; BT = bull trout

Table 8. Summary of redd positions (UTM coordinates) observed during float surveys of the Skagit River, BC (downstream of rkm 18.0), on 12 and 13 October, 2002.

Snorkle Crew: CEJ Mussell, Pier van Dishoeck  
 Raft and Telemetry Crew: Jack Mussell, Sarah Nelson

Weather: Clear and Sunny with temperatures around freezing in the morning

The Upper Skagit River was floated and redds were counted between the 26 Mile Bridge (18 km) and the Fishing Boundary (0 km).

No Redds were observed in the section between the high bank (8.7 km) and the Fishing Boundary (0km). Most of the redds were between 14.5 km and 16.5 km.

Date	Time	umber of Redd	UTM1	UTM2
12-Oct-02	8:57	6	634978	5441151
12-Oct-02	9:08	2	635268	5441136
12-Oct-02	9:35	1	635476	5441053
12-Oct-02	9:52	5	635709	5440882
12-Oct-02	10:13	7	635882	5440170
12-Oct-02	11:01	2	636927	5438906
12-Oct-02	12:24	1	637801	5438092
TOTAL	TOTAL	24		

Table 9. Summary of swim survey observations (counts of char and rainbow trout) in the BC Skagit River, 2002. See Appendices for additional swim survey data.

Date	Section	rkm	Number of Char					No. Rainbow Trout
			Seen (no tag)	Seen (pink - radio tagged)	Seen (white - spaghetti i only)	Seen (anchor tag)	Seen (antenna only)	
27-Jul-02	Swing Bridge to Campsite	1.5-0.0	2	0	0			
13-Aug-02	High Bank to 5.5 km	8.7-5.5	26	1	1			
14-Aug-02	Swing Bridge to 0.5 km	1.5-0.5	1	1				
14-Aug-02	Above High Bank to High Bank	11-8.7	8					
19-Aug-02	26 Mile to Shawatum Day Use	18.0-15.3	25	0	0			
26-Aug-02	Shawatum Day Use to High Bank	15.3-8.7	33	2	1			
27-Aug-02	High Bank to Swing Bridge	8.7-1.5	44	1	2			
27-Aug-02	Swing Bridge to 0.5 km	1.5-0.5	9		1			
19-27 Aug	26 Mile to 0.5 km	18-0.5	111	3	4			n/a
10-Sep-02	Swing Bridge to Fishing Boundary	1.5-0	22	1	2			229
14-Sep-02	Swing Bridge to Below Boundary	1.5--0.1	19	7				250
14-Sep-02	26 Mile to 1st Road Access	18-15.2	23		1	1	1	n/a
25-Sep-02	Swing Bridge to Below Boundary	1.5--0.1	47	4	3	1		467
12-Oct-02	High Bank to Fishing Boundary	8.7-0	91	7	1		2	887
13-Oct-02	26 Mile to High Bank	18-8.7	49	6	2		1	268
12-13 Oct-02	26 Mile to 0 km	18-0	140	13	3	0	3	1155

## **FIGURES**

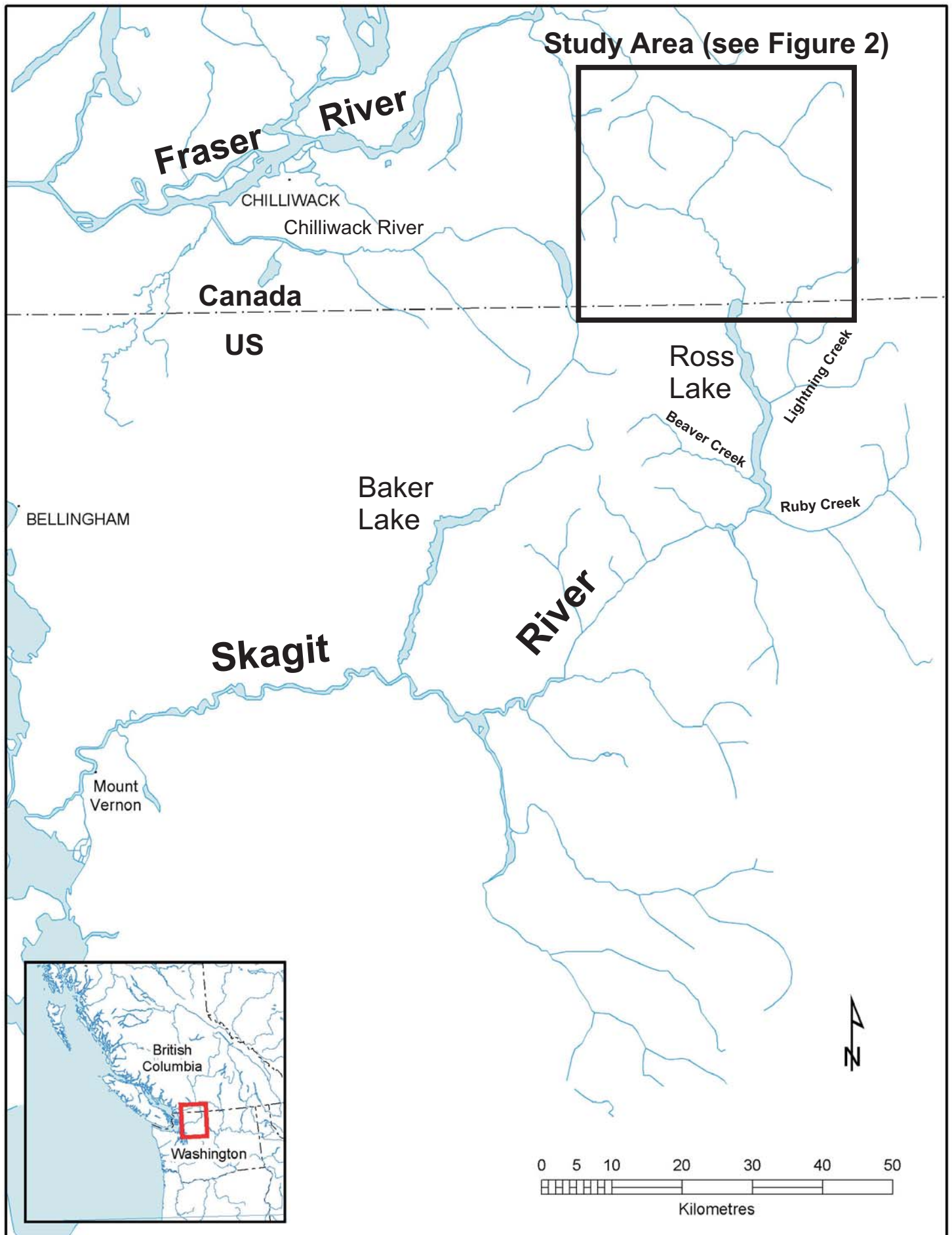


Figure 1. Location of the Skagit River watershed and its position in BC and Washington.

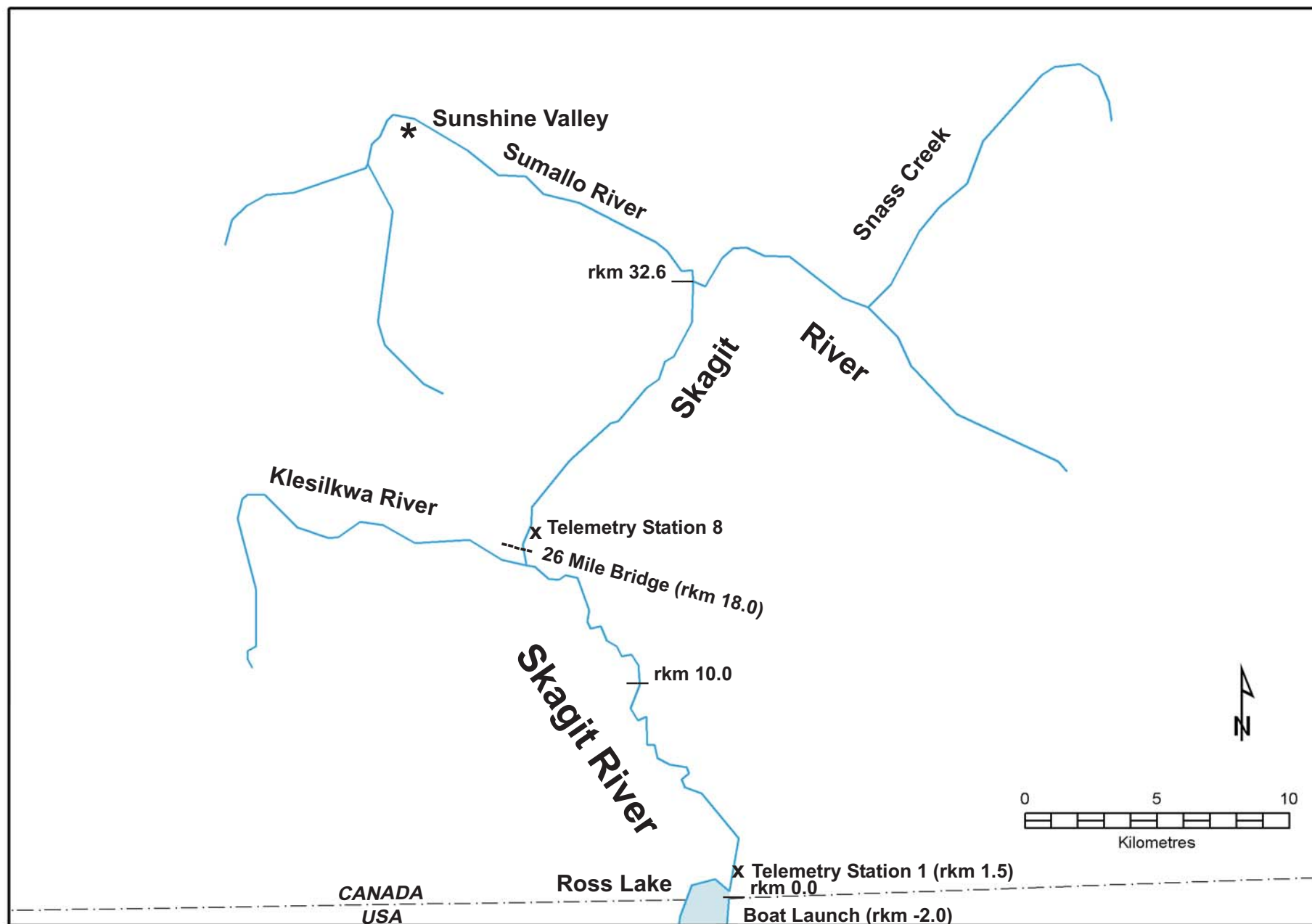


Figure 2. Study area and key reference points for the upper Skagit River (BC) char telemetry program 2001 and 2002.



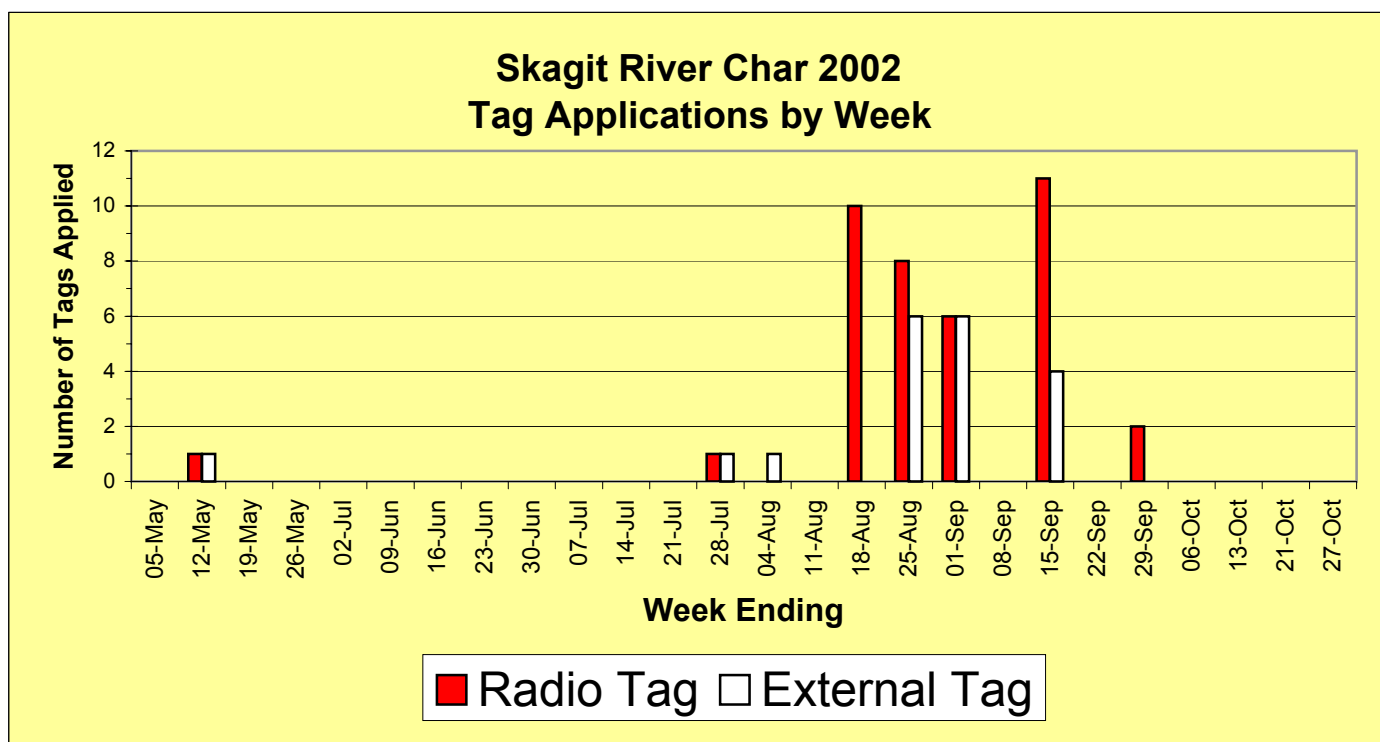
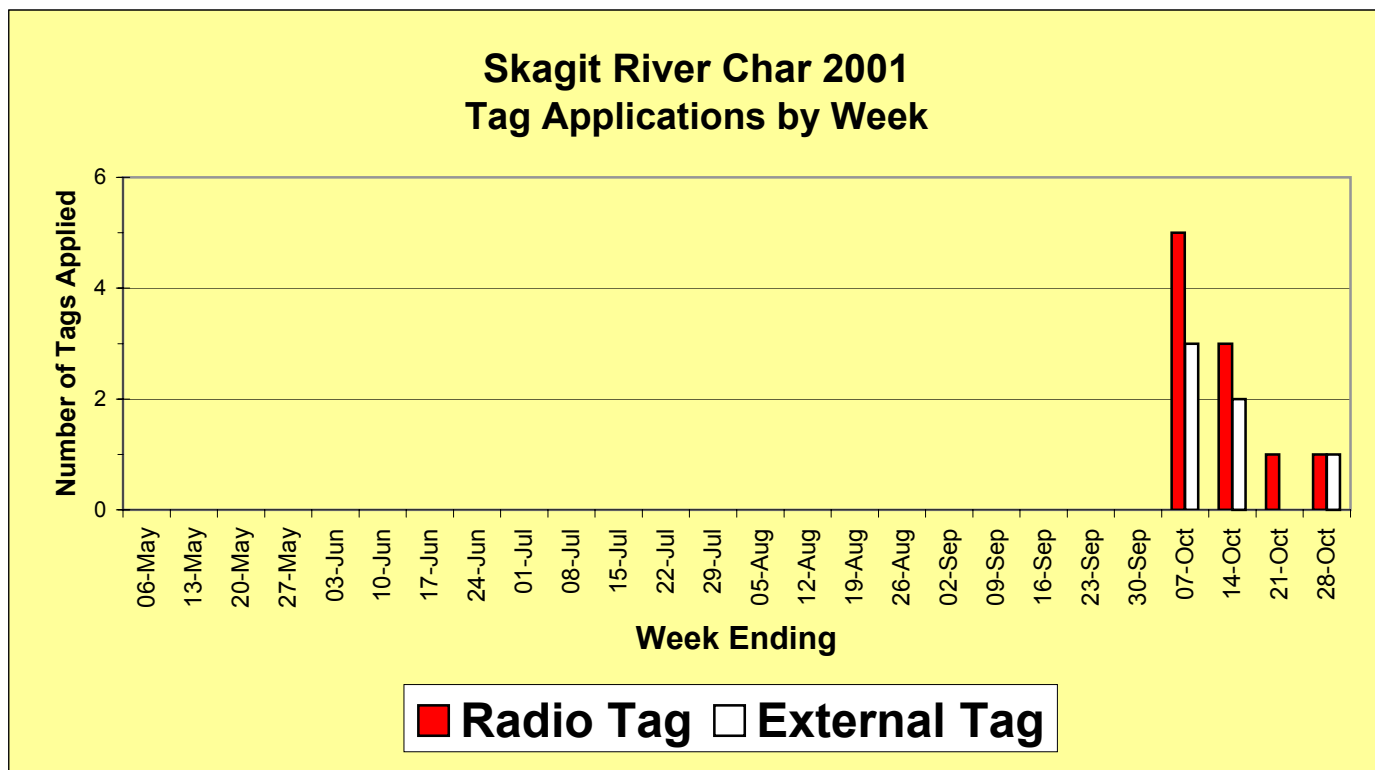


Figure 3. Illustrations of the timing of tag applications for radio-tagged and external-tagged char in the Skagit River, BC, in 2001 and 2002.

**Skagit River Char Telemetry 2002**  
**Estimated Spawning Week  
of Radio-Tagged Char**

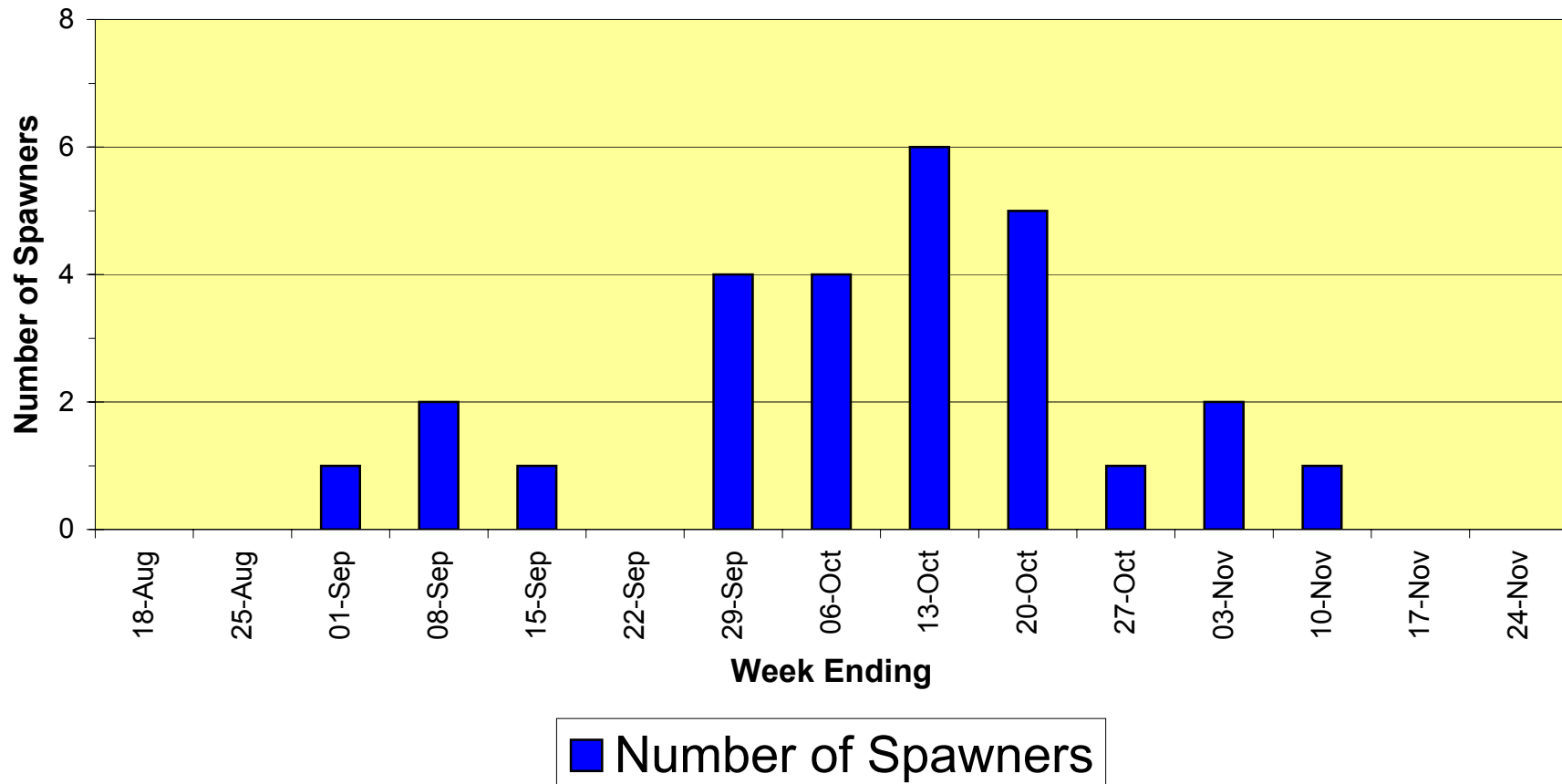


Figure 4. Illustration of the estimated timing of spawning events of radio-tagged char in the Skagit River watershed in 2002. Data presented are for all radio-tagged char that spawned in 2002, for which an estimated time of spawning (by week) could be positively assigned ( $n = 27$ ).

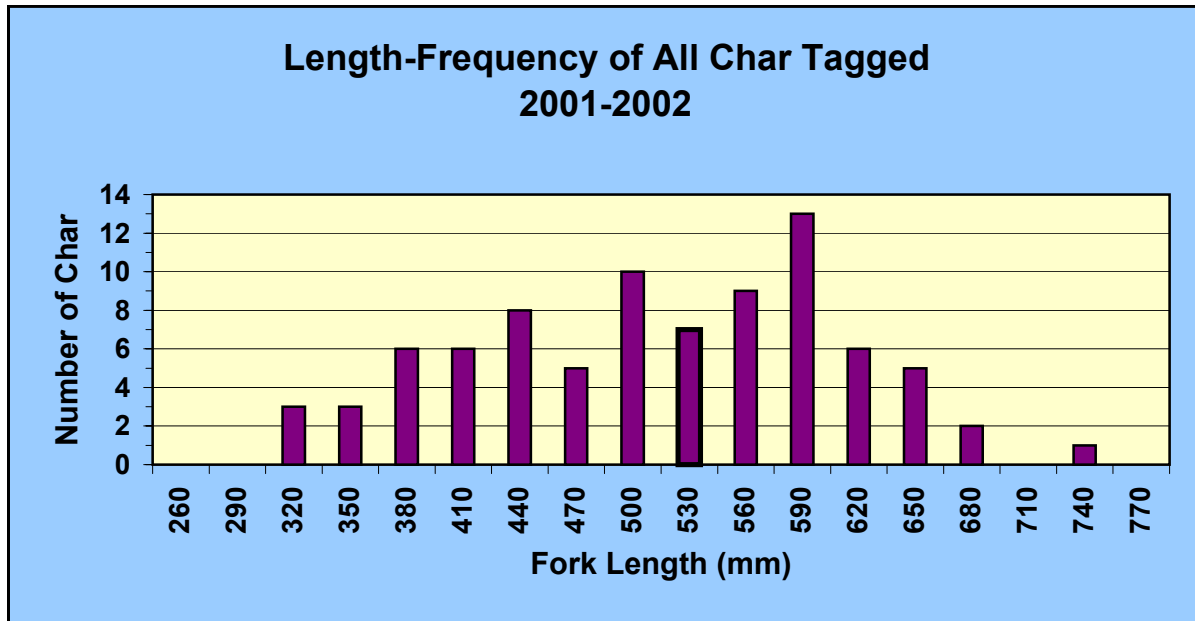
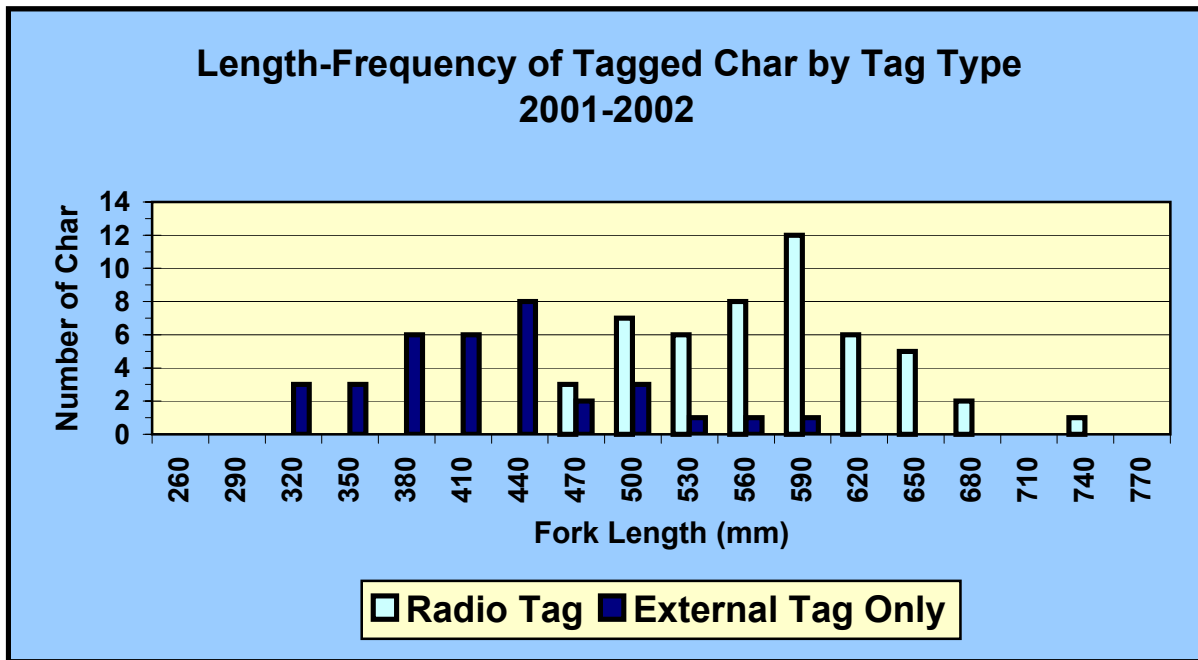


Figure 5. Length-frequency (fork length, mm) of char tagged with external-only and radio tags in the BC Skagit River during the 2001 and 2002 field programs. The top chart compares the distribution of tags, by length, for both external and radio tags. The bottom chart illustrates the tag distribution, by length, for all char tagged ( $n = 84$ ).

		NUMBER OF CHAR PER SIZE GROUP									
		AGE (Years)									
		3	4	5	6	7	8	9	10	11	All Ages
SIZE GROUP (Fork Length, mm)	Fork Length (mm)										
	740-769										
	710-739						1				1
	680-709										
	650-679				1			1			2
	620-649						2		2		4
	590-619			2			1		1		4
	560-589			3	6	2			1		12
	530-559			1		2		1		1	5
	500-529		1	1		2					4
	470-499		1	1			4	1			7
	440-469			3		1	1				5
	410-439	1	1	2	2	1	1				8
	380-409	1	3		1						5
	350-379	1	3	2							6
	320-349	1	1								2
	290-319	2	1								3
	260-289										
		3	4	5	6	7	8	9	10	11	All Ages
		AGE (Years)									

Figure 6. Length at age distribution for a sample size of 68 char captured in the Skagit River, BC, in 2001 and 2002. Age data (years) are from pectoral fin ray analysis. Lengths are fork lengths (mm).

## **APPENDICES**

**Appendix A**

**Public notice of Skagit River Char Telemetry Program 2002,  
posted at telemetry stations 1 and 8 on the Skagit River, 2002.**

**SKAGIT RIVER CHAR  
BIOTELEMETRY PROGRAM  
2002**

**THIS EQUIPMENT IS THE PROPERTY OF  
MINISTRY OF WATER, LAND AND AIR PROTECTION  
LOWER MAINLAND DISTRICT  
CULTUS LAKE, B.C.**

---

**ATTENTION**

The Ministry of Water, Land and Air Protection, in conjunction with the Fish and Wildlife Authority for Washington State, is conducting a study of the migration characteristics of Skagit River char (bull trout and Dolly Varden). As a part of this study, several char, captured in the Skagit River and Ross Lake, will be fitted with individually coded radio transmitters and released.

Telemetry stations, such as the one at this site, have been established at strategic locations along the Skagit River to record the presence and passage of radio-tagged char as they migrate upstream to their respective holding and spawning grounds, and again when these char pass downstream following spawning. This study will provide fisheries managers with critical information regarding the run timing, migration characteristics, spawning behaviour, and post-spawning survival of Skagit River char, and thus better management of the resource.

Please report any observed damage of this equipment to:

Tom Blackbird  
Ministry of Water, Land and Air Protection  
BC Parks  
Lower Mainland District  
Cultus Lake, BC V2R H6  
Phone: 604-824-2304

***THANK YOU FOR YOUR INTEREST***

## **Appendix B**

**Biological and tag data for char captured and released in Washington state from the US component of the Upper Skagit Watershed Native Char Project 2001.**



Appendix B. Biological and tag data for char captured and released in Washington state from the US component of the Upper Skagit Watershed Native Char Project 2001. Data Provided by Eric Jeans, R2 Consultants, Washington.

Species	Date	Sex	Fork Length (mm)	Weight (g)	Site	Floy Anchor Tag*	Scale Taken?	DNA Sample Taken?	CART Frequency	Tag Channel	Code	Acoustic Echo	Echo Delay	Recaptured?
NC	29-Aug-01	m	604	2,150	Big Beaver Cr	n/a	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	18-Sep-01	m	538	1,340	Big Beaver Cr	y-0903	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	18-Sep-01	f	627	2,860	Big Beaver Cr	y-0904	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	18-Sep-01	f	532	1,250	Big Beaver Cr	y-0905	Yes	Yes	n/a	n/a	n/a	n/a	n/a	Recaptured at mouth of Ruby Cr. (27 Sep 2001)
NC	18-Sep-01	m	461	1,000	Big Beaver Cr	y-0906	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	18-Sep-01	m	532	1,400	Big Beaver Cr	y-0907	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	18-Sep-01	m	655	2,870	Big Beaver Cr	y-0908	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	18-Sep-01	f	700	3,180	Big Beaver Cr	y-0909	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	18-Sep-01	m	487	990	Big Beaver Cr	y-0910	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	19-Sep-01	m	570	1,680	Ruby Cr	n/a	Yes	Yes	149.320	1	5	137	23	
NC	19-Sep-01	m	501	1,110	Ruby Cr	w-0951	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	27-Sep-01	m	683	2,850	Lightning Cr	n/a	Yes	Yes	149.320	1	3	137	23	
NC	28-Sep-01	m	470	960	Big Beaver Cr	y-0911	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	28-Sep-01	f	520	1,450	Big Beaver Cr	y-0912	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	28-Sep-01	f	675	3,350	Big Beaver Cr	y-0913	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	28-Sep-01	m	669	2,550	Big Beaver Cr	n/a	Yes	Yes	149.320	1	4	137	23	
NC	28-Sep-01	m	672	1,940	Big Beaver Cr	y-0915	Yes	Yes	n/a	n/a	n/a	n/a	n/a	
NC	28-Sep-01	m	645	2,400	Lightning Cr	n/a	Yes	Yes	149.320	1	7	137	23	
NC	16-Oct-01	m	687	2,750	Big Beaver Cr	n/a	Yes	Yes	149.320	1	6	137	23	

NC = native char; m = male; f = female

\* y = yellow; w = white; b = brown

**Appendix C**

**Biological and tag data for char captured and released in  
Washington state from the US component of the  
Upper Skagit Watershed Native Char Project 2002.**

Appendix C. Biological and tag data for char captured and released in Washington state from the US component of the Upper Skagit Watershed Native Char Project 2002. Data Provided by Eric Jeans, R2 Consultants, Washington.

Species	Date	Sex	Fork Length (mm)	Weight (g)	Site	Floy Tag	DNA Tissue	Channel	Code	Acoustic Echo	Echo delay	Temp Archive Tag	Condition
NC	03-Oct-02	f	535	1,610	Big Beaver Cr	y-0911	X	1	208	612	93	1745	1
NC	03-Oct-02	m	518	1,490	Big Beaver Cr	n/a	X	1	209	512	78	1574	1
NC	03-Oct-02	m	515	1,370	Big Beaver Cr	n/a	X	1	211	562	85	1380	1
NC	03-Oct-02	f	625	3,150	Big Beaver Cr	y-0919	X	1	212	212	34	n/a	1
NC	04-Oct-02	m	587	1,980	Big Beaver Cr	y-0921	X	5	72	n/a	n/a	n/a	1
NC	04-Oct-02	m	541	1,650	Big Beaver Cr	y-0922	X	1	210	162	27	n/a	1
NC	09-Oct-02	m	551	1,450	Ruby Cr	w-0952	X	5	71	n/a	n/a	n/a	1
NC	09-Oct-02	m	591	2,540	Ruby Cr	w-0953	X	5	73	n/a	n/a	n/a	1
NC	09-Oct-02	m	598	2,670	Ruby Cr	w-0954	X	5	79	n/a	n/a	n/a	1
NC	09-Oct-02	m	606	2,850	Big Beaver Cr	y-0925	X	5	74	n/a	n/a	n/a	1
NC	09-Oct-02	m	492	1,275	Big Beaver Cr	y-0924	X	5	75	n/a	n/a	n/a	1
NC	17-Oct-02	m	675	2,350	Big Beaver Cr	y-0923	X	5	78	n/a	n/a	n/a	1
NC	17-Oct-02	m	631	2,650	Ruby Cr	w-0956	X	5	76	n/a	n/a	n/a	1
NC	17-Oct-02	m	695	2,750	Ruby Cr	w-0954	X	5	77	n/a	n/a	n/a	1
NC	18-Oct-02	f	560	2,050	Big Beaver Cr	y-0926	X	5	70	n/a	n/a	n/a	1

## **Appendix D**

**Summary of detections and migratory behaviour for each radio-tagged char released in US Skagit River watershed in 2001 and 2002 that were detected in Canadian waters.**

Appendix D. Summary of detections and migratory behaviour for each radio-tagged char released in the US Skagit River watershed in 2001 and 2002 that were detected in Canadian waters. See Appendix A and B for a summary of release information for individual fish.

Fish No.	Channel Code	First detected		Last detected		Location (rkm)	Comments / Fate	
		Date	Time	Date	Time			
<b>Fish Tagged in 2001</b>								
US 10	1	5	19-Sep-01			0.0	Tagged and released at Ruby Crk (Washington)	
Fate: Fish not detected on the Canadian side of the border.								
US 12	1	3	27-Sep-01	?		0.0	Tagged and released at Lightning Crk (Washington)	
			18-Sep-02	22:30	19-Sep-02	20:36	1.0	Passed station 1 upstream
			26-Sep-02	3:20	03-Oct-02	6:41	1.0	Passed station 1 downstream
					03-Oct-02	11:00	0.0	Mobile track
			03-Oct-02	21:59	03-Oct-02	23:24	1.0	Passed station 1 upstream
								Boat track (no visual by floater because that part of channel split not floater, too many log jams)
					12-Oct-02	13:00	3.7	
Fate: Fish passed upstream to the spawning grounds on 3-Oct and was last detected on the 12-Oct at 3.7 km. Fish had not kelted by the time the stations were removed on the 28-Nov.								
US 14	1	4	28-Sep-01	?		0.0	Tagged and released at Big Beaver Crk (Washington)	
Fate: Fish not detected on the Canadian side of the border.								
US 17	1	7	28-Sep-01	?		0.0	Tagged and released at Lightning Crk (Washington)	
Fate: Fish not detected on the Canadian side of the border.								
US 33	1	6	16-Oct-01	?		0.0	released at Beaver Creek (Washington)	
			01-May-02		08-May-02	1.0	Detected at station 1 when channel 1 programmed into station	
			18-May-02	22:48	19-May-02	5:05	1.0	Passes station 1 heading upstream
					05-Sep-02	8:58	8.0	Mobile Track
			11-Sep-02	0:32	11-Sep-02	19:56	18.1	Passed station 8 upstream
			12-Sep-02	22:05	12-Sep-02	22:24	18.1	Passed station 8 downstream
					14-Sep-02	12:30	17.5	Boat track and visual from floater
			28-Sep-02	1:28	28-Sep-02	2:27	18.1	Passed station 8 upstream
			29-Sep-02	22:30	30-Sep-02	20:44	18.1	Detected upstream station 8
			01-Oct-02	6:33	01-Oct-02	19:31	18.1	Passed station 8 downstream
			03-Oct-02	20:28	03-Oct-02	21:34	18.1	Passed station 8 upstream
Fate: Fish passed upstream station 8 on the 3-Oct to spawn in the upper river. Fish had not kelted by the time the stations were removed on the 28-Nov.								
<b>Fish tagged in 2002</b>								
US 43	1	212	03-Oct-02				Tagged by Eric at Big Beaver Crk	
					18-Oct-02	14:30	0.0	Boat track by Eric
					25-Oct-02	14:30	0.0	Boat track by Eric
					30-Oct-02	14:30	-1.0	Boat track by Eric
					13-Nov-02	11:16	-1.0	Boat track by Eric
					22-Nov-02	14:04		North stumpfields west side by Eric
Fate: Fish was detected in Canadian waters during mobile tracks in late Oct and Nov.								

**Appendix E**

**Skagit char swim counts conducted in July and August 2002.**

Appendix E. Skagit char swim counts conducted in July and August 2002

Date	Section	rkm	Number of Char							
			Seen (not captured or tagged)	Seen (pink - radio tagged)	Seen (white - spaghetti only)	Captured (radio tagged, released)	Captured (spaghetti only, released)	Captured (not tagged, released)	Recaptured (pink - radio tagged)	Recaptured (anchor or spaghetti only)
27-Jul-02	Swing Bridge to Campsite	1.5-0.0	0	0	0	2				1
13-Aug-02	High Bank to 5.5 km	8.7-5.5	16	1	1	8	2		1	
14-Aug-02	Swing Bridge to 0.5 km	1.5-0.5	1	1					1	
14-Aug-02	Above High Bank to High Bank	11-8.7	6			2				
19-Aug-02	26 Mile to Shawatum Day Use	18.0-15.3	11	0	0	8	6			1
26-Aug-02	Shawatum Day Use to High Bank	15.3-8.7	22	2	1	4	7		1	
27-Aug-02	High Bank to Swing Bridge	8.7-1.5	40	1	2	2	2			1
27-Aug-02	Swing Bridge to 0.5 km	1.5-0.5	6		1			3		
19-27 Aug	26 Mile to 0.5 km	18-0.5	79	3	4	14	15	3	1	2
	*Estimated number of char (seen*1.5)		118.5	4.5	6					
	Total estimated number of char	129								
	Estimated number of radio tags	14								
	Estimated number of spaghetti tags	15								
	Estimated number of all tags	29								
	Estimated radio tag rate	10.9%								
	Estimated spaghetti only rate	11.6%								
	Estimated total mark rate	22.5%								

\* Expansion factor of 1.5 based on 12-13 October surveys

**Appendix F**

**Skagit char swim counts conducted on 10 and 14 September 2002.**



Appendix F. Skagit char swim counts conducted on 10 and 14 September 2002.

Date	Section	rkm	Number of Char								Number of Rainbow Trout	
			Seen (not captured or tagged)	Seen (pink - radio tagged)	Seen (white - spaghetti only)	Seen tag or antenna only)	Captured (radio tagged, released)	Captured (spaghetti only, released)	Captured (not tagged, released)	Recaptured (pink - radio tagged)		Recaptured (anchor or spaghetti only)
10-Sep-02	Swing Bridge to	1.5-0.8					1					9
	to Fishing Boundary	0.7	2									26
		0.2	7		1							114
		0.1-0	7	1	1		5					80
	TOTAL		16	1	2		6					229
14-Sep-02	Swing Bridge to Below Boundary	1.5--0.1	18	7					1	1		250+
	26 Mile to 1st Road Access	18-15.2	15		1	2	5	3				n/a
	TOTAL		33	7	1	2	5	3	1	1		250+

**Appendix G.**

**Float counts conducted on 25 September 2002.**

Appendix G. Skagit char swim counts conducted on 25 September 2002.

			Number of Char								Number of	
Date	Section	rkm	Seen (not captured or tagged)	Seen (pink - radio tagged)	Seen (white - spaghetti only)	Seen tag or antenna only)	Captured (radio tagged, released)	Captured (spaghetti only, released)	Captured (not tagged, released)	Recaptured (pink - radio tagged)	Recaptured (anchor or spaghetti only)	Rainbow Trout
25-Sep-02	Swing Bridge to Below Boundary	1.5--0.1										
		1.5										13
		1.1										23
		0.9	4									43
		0.5	2									60
		0.1	5	1	2							200+
		-0.1	7									80
TOTAL			18	1	2							419+
<hr/>												
25-Sep-02	26 Mile to 1st Road Access	18-15.2	29	3	1	1						48
	TOTAL		29	3	1	1						48

**Appendix H.**

**Skagit char population assessment 12-13 October 2002.**

Date: Oct 12-13 2002

Snorkle Crew: CEJ Mussell, Pier van Dishoeck

Raft and Telemetry Crew: Jack Mussell, Sarah Nelson

Weather: Clear and Sunny with temperatures around freezing in the morning

Survey No.	Date	Time	Location	River Km	UTM1	UTM2	Unique "Fish Group" No.	No. Rainbow Trout	No Non- tagged Char Observed (Swim Crew)	Number of Tagged Char Observed (Swim Crew)				Radio Tags Detected / Fish Data		Comments
										Pink	White	Floy	Antenna Only	Channel	Code	
1	12-Oct-02	9:09	High Bank	8.7			1	7								Fish (5-20) detected just upstream of 8.7 km in area not floated by floaters on this day.
1	12-Oct-02	9:15		8.5			2	2	6							
1	12-Oct-02	9:17					3		3							
1	12-Oct-02	9:25					4		2							Most Char Observed were seen in riffles in shallow water.
1	12-Oct-02	9:35					5	26								
1	12-Oct-02	9:45		638500	5434817											
1	12-Oct-02	9:46	Creek Mouth				6	4								
1	12-Oct-02	9:55					7	23	2							
1	12-Oct-02						8	33	2							
1	12-Oct-02	10:13		6.8	638796	5434164	9	26	4	1				5	13	
1	12-Oct-02	10:27					10	1								
1	12-Oct-02	10:34					11	4								
1	12-Oct-02			5.8	639457	5433677	12	2								Lunch Spot
1	12-Oct-02	11:10					13	3								
1	12-Oct-02						14	7								
1	12-Oct-02	11:16					15	5								
1	12-Oct-02	11:20					16	11	1							
1	12-Oct-02	11:25					17	7								
1	12-Oct-02						18	1								
1	12-Oct-02	11:27					19	5	1							
1	12-Oct-02	11:29		639357	5433388		20	2								
1	12-Oct-02	11:31					21	5								
1	12-Oct-02	11:36					22	5								
1	12-Oct-02	11:43		639664	5433215		23	26			1					
1	12-Oct-02	11:46					24	17	1							
1	12-Oct-02	11:58					25	3								
1	12-Oct-02	12:04					26	12								
1	12-Oct-02	12:05		640096	5432830											
1	12-Oct-02	12:10					27	5								
1	12-Oct-02	12:11		4.1	640222	5432709	28							5		16 Floaters missed fish in shallow water at tailout.
1	12-Oct-02						29	1								
1	12-Oct-02	12:48		4												
1	12-Oct-02	12:50					30	1								
1	12-Oct-02	13:10	Junction	3.7	640590	5432690										Fish (1-3) detected upstream of junction in channel not floated by floaters.
1	12-Oct-02	13:17					31	23								
1	12-Oct-02	13:27					32	7								
1	12-Oct-02	13:29					33	1								
1	12-Oct-02	14:01		641212	5433083		34	33	1							

## Appendix H. Skagit Char Population Assessment 12-13 October 2002. Swim Counts/Telemetry Survey Data Entry

Date: Oct 12-13 2002

Snorkle Crew: CEJ Mussell, Pier van Dishoeck

Raft and Telemetry Crew: Jack Mussell, Sarah Nelson

Weather: Clear and Sunny with temperatures around freezing in the morning

Survey No.	Date	Time	Location	River Km	UTM1	UTM2	Unique "Fish Group" No.	No. Rainbow Trout	No Non- tagged Char Observed (Swim Crew)	Number of Tagged Char Observed (Swim Crew)				Radio Tags Detected / Fish Data		Comments
										Pink	White	Floy	Antenna Only	Channel	Code	
1	12-Oct-02	14:05						35	3	1						
1	12-Oct-02	14:08						36	1							
1	12-Oct-02	14:10						37	3							
1	12-Oct-02	14:15						38	1							
1	12-Oct-02	14:17						39	9							
1	12-Oct-02	14:20			641749	5431689		40	8							
1	12-Oct-02	14:25						41	2							
1	12-Oct-02	14:29		1.8				42	120	8						Of these 8 char, only 2 were of spawning size.
1	12-Oct-02	14:31						43	29	1						Before this point, only 1 char not of spawning size
1	12-Oct-02	14:40	Suspension Bridge	1.5				44	8							Small char.
1	12-Oct-02	14:41						45	1							
1	12-Oct-02		Station 1		641491	5439197										
1	12-Oct-02			1				46	12							
1	12-Oct-02	14:48						47	1							
1	12-Oct-02	14:51						48	1							
1	12-Oct-02	14:54		0.7				49	18							
1	12-Oct-02	14:57						50	2							
1	12-Oct-02	15:00		0.3	641522	5430472		51	30	17	2		1	5	56	Blue means antenna only fish
1	12-Oct-02			0.3	641498	5430456		51						7	30	
1	12-Oct-02			0.3	641526	5430392		51						7	39	
1	12-Oct-02			0.25				52	10	2	1			5	21	
1	12-Oct-02							53	20	6						
1	12-Oct-02	3:32	Fishing Boundary	0	641523	5430183		54	300	33	3		1	7	41	One of the pink tagged fish had a yellow floy tag as well.
1	12-Oct-02			0				54						7	38	
1	12-Oct-02			0				54						7	72	Floater missed seeing one of either 7-72 or 7-74)
1	12-Oct-02			0	641627	5430224		54						7	74	Both are antenna only fish
1	12-Oct-02			0				54						7	40	
1	13-Oct-02	8:06	26 Mile Bridge	18				55	1							
1	13-Oct-02	8:13	Log Jam					56	1							
1	13-Oct-02							57	1							
1	13-Oct-02	8:26	Creek Mouth					58	1							
1	13-Oct-02	8:27			634236	5441485										
1	13-Oct-02	8:39		16.9	634485	5441200		59		1				7	32	Floater missed fish in shallow water.
1	13-Oct-02	8:47			634685	5441143		60				1				
1	13-Oct-02	8:57						61		1						
1	13-Oct-02	9:04		16.2	635129	5441164		62	14	10	1			5	17	Floater missed one of these fish. Fish seen in a pool below some redds.
1	13-Oct-02			16.2				62						5	11	

Date: Oct 12-13 2002

Snorkle Crew: CEJ Mussell, Pier van Dishoeck

Raft and Telemetry Crew: Jack Mussell, Sarah Nelson

Weather: Clear and Sunny with temperatures around freezing in the morning

Survey No.	Date	Time	Location	River Km	UTM1	UTM2	Unique "Fish Group" No.	No. Rainbow Trout	No Non- tagged Char Observed (Swim Crew)	Number of Tagged Char Observed (Swim Crew)				Radio Tags Detected / Fish Data		Comments
										Pink	White	Floy	Antenna Only	Channel	Code	
1	13-Oct-02	9:09					63			2						
1	13-Oct-02	9:12		16	635310	5441132	64							5		10 Floaters missed this fish.
																This was at one time fish 5-55 but somehow the tag was removed and the fish was seen swimming again with a large scar on the left side near the antenna exit location. Stitches looked great and are healed up nicely.
1	13-Oct-02	9:37			635476	5441053	65			1		1				
1	13-Oct-02	9:42					66	6		1						
1	13-Oct-02	9:46					67	12								
1	13-Oct-02	9:52					68			2						
1	13-Oct-02			15.6	635709	5440882	69			2	1			7		37 Floaters missed one of these fish.
1	13-Oct-02			15.6			69							7		44
1	13-Oct-02	10:00		15.2			70	10		2						
1	13-Oct-02	10:05					71			1						
1	13-Oct-02	10:06					72	9								
1	13-Oct-02	10:10					73			1						
1	13-Oct-02	10:12					74			3						
1	13-Oct-02	10:13					75	1								
1	13-Oct-02	10:20					76			3						
1	13-Oct-02	10:22					77	15								
1	13-Oct-02	10:27					78	2		1						
1	13-Oct-02	10:31					79	16								
1	13-Oct-02	10:37					80	2								
1	13-Oct-02	10:45		13.5			81	8		1	1			5		14
1	13-Oct-02	10:51					82	20		2						
1	13-Oct-02	11:03					83	53		6						
1	13-Oct-02	11:06					84	12		1						
1	13-Oct-02	11:14					85	1								
1	13-Oct-02	11:18					86	4								
1	13-Oct-02	11:26					87	14		3						
1	13-Oct-02	11:31					88	7								
1	13-Oct-02	11:40					89	27								
1	13-Oct-02	12:00	Log Jam Portage	11.8	637489	5438129										
1	13-Oct-02	12:15		11.7	637535	5438100	90				1			7		42 Fish in shallow fast water.
1	13-Oct-02	12:20					91	2								
1	13-Oct-02	12:27					92	3								
1	13-Oct-02	12:31		11.1	637897	5437936	93	5					1	5	50	Blue means antenna only fish.
1	13-Oct-02	12:40		10.9	637865	5437664	94				1			5		15
1	13-Oct-02	12:44					95	2		1						
1	13-Oct-02	12:48					96	1								
1	13-Oct-02	12:50		10.6	637878	5437301	97				1			5		54
1	13-Oct-02	12:52					98	1								

Date: Oct 12-13 2002

Snorkle Crew: CEJ Mussell, Pier van Dishoeck

Raft and Telemetry Crew: Jack Mussell, Sarah Nelson

Weather: Clear and Sunny with temperatures around freezing in the morning

Survey No.	Date	Time	Location	River Km	UTM1	UTM2	Unique "Fish Group" No.	No. Rainbow Trout	No Non- tagged Char Observed (Swim Crew)	Number of Tagged Char Observed (Swim Crew)				Radio Tags Detected / Fish Data		Comments
										Pink	White	Floy	Antenna Only	Channel	Code	
1	13-Oct-02	13:00		10	637785	54336905										Tag (5-57) was found on a log with no fish in sight. It is suspected that a angler or a predator got the fish. It passed upstream station 1 on Sept 24.
1	13-Oct-02	13:20					99	4								
1	13-Oct-02	13:25					100	1								
1	13-Oct-02	13:26					101		1							
1	13-Oct-02	13:32					102		1							
1	13-Oct-02	13:37					103	2	1							
1	13-Oct-02	13:40					104	2	1							
1	13-Oct-02	13:49	Pool above high bank	9	637822	5435969	105	2						5		16 Fish missed by floaters in wide section of river.
1	13-Oct-02	14:00	Just upstream high bank	8.8	638127	5436262	106	6						5		20 Fish missed by floaters in shallows at river edge.
Totals								1155	140	13	3	0	3	24		
										Total RT seen		16				
										Total RT detected		24				
										Observer Efficiency		0.667				
										Expansion Factor		1.500				
										Total Char Count		159				
										Expanded Char Estimate		239				
										Total Rainbow Count		1155				
										Expanded Rainbow Estimate		1733				



## **PHOTO PLATES**

## SKAGIT 2002 NATIVE CHAR STUDY & ANGLER SURVEY

### ATTENTION ANGLERS

The Ministry of Water, Land and Air Protection, in conjunction with Seattle City Light (Washington State) and LGL Limited, is conducting a study of the migration characteristics and behaviour of Skagit River native char (bull trout and Dolly Varden). As a part of this study, several char will be fitted with individually coded radio transmitters and coloured & numbered external (spaghetti) tags. Other char will be tagged with spaghetti tags only (no radio tag). The fish will then be released.

Telemetry stations are located at strategic locations along the Skagit River to record the passage of radio-tagged char as they migrate upstream to their respective holding and spawning grounds, and again when these char pass downstream following spawning. The study will provide fisheries managers with key information regarding the run timing, migration characteristics, spawning behaviour, and post-spawning survival of Skagit River char, and thus better management of the resource.

A Skagit River angler survey is also being conducted from July to October in order to determine angler effort and fishing success. Please cooperate with the surveyor and answer all questions to the best of your knowledge.

If you capture a tagged fish please record and report the following:

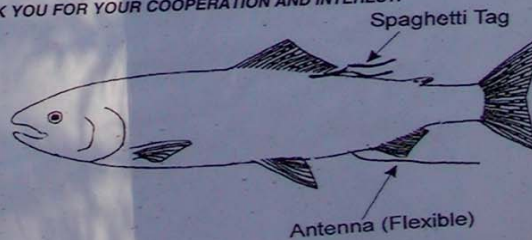
- Date and location of capture
- Spaghetti tag number and colour

Radio-tagged char have a flexible wire (antenna) protruding from the body near the tail. PLEASE DO NOT PULL, CUT OR REMOVE THIS WIRE. CAREFULLY REVIVE AND RELEASE ANGLED FISH.

Please report tag observations and telemetry equipment damage to:

Ministry of Water, Land and Air Protection  
Fish and Wildlife Science and Allocation  
10470 - 152 Street Surrey, B.C. V3R 0Y3  
Phone (Surrey Office): 604-582-5303 (toll free call Enquiry BC @ 1-800-663-7867 and ask to be connected to the Surrey Office number)

THANK YOU FOR YOUR COOPERATION AND INTEREST.



This project is funded by Skagit Environmental Endowment Commission, Seattle City Light and Province of BC.

Photo Plate 1. Picture of public notice regarding the Upper Skagit River Watershed Native Char Project 2002.





Photo Plate 2. Surgical tagging set up in the field, on the banks of the BC Skagit River, July 2002. Note inflatable raft in background.





Photo Plate 3. Insertion of radio tag into anaesthetised char capture by angling in the BC Skagit River, 2002. Note flexible antenna protruding from body (left).



Photo Plate 4. Stitching up the incision on a BC Skagit radio-tagged char, 2002.





Photo Plate 5. This 9-year-old char (Fish No. 35), released on 26 August 2002 at rkm 9.0 in the BC Skagit River, continued upstream following release, passing telemetry station 8 at the 26-mile Bridge (rkm 18.1) on 21 September. This fish likely spawned upstream of station 8. It migrated downstream past station 8 on 12 October, past station 1 (rkm 1.0) on 15 October, and moved across the international border into Ross Lake, where it was detected on 18, 25, and 30 October, and on 13 November, prior to moving back into the lower BC Skagit River on 23 November.



Photo Plate 6. White spaghetti tags were applied to char less than 450 mm fork length.



Photo Plate 7. Pelvic fin ray removal for age analysis.



Photo Plate 8. Picture of radio-tagged char (pink tag, foreground) and external-tag-only char (background) in the Skagit River, BC. Photo was taken during a swim survey to collect data for abundance estimates. Photo by P. van Dishoeck.