# Appendix F3

# Meadowbank Gold Project 2009 All Weather Private Access Road Fisheries Report, January 2010

# MEADOWBANK GOLD PROJECT

## 2009 ALL WEATHER PRIVATE ACCESS ROAD FISHERIES REPORT

JANUARY 2010

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# SECTION 1 • INTRODUCTION

## 1.1 BACKGROUND

The construction of the 105km All Weather Private Access Road (AWPAR) between the Hamlet of Baker Lake and Meadowbank Mine Camp was completed in the spring of 2008 under DFO authorization (NU-03-0190-2). Prior to AWPAR construction, baseline fisheries assessments found Arctic grayling (*Thymallus arcticus*) to be the predominant fish species. Other fish species opportunistically using the AWPAR streams included Lake trout, Arctic char, Round whitefish, slimy sculpin and ninespine stickleback. Many small ephemeral streams were defined as non-fish bearing; 6 of the proposed crossings were considered fish bearing and required follow-up monitoring. Follow-up monitoring in 2006 confirmed the predominance of Arctic grayling in crossings R02, R06, R09, R15 and R19. The decision to construct clear span bridges at these crossings was made to reduce the footprint on these streams and accommodate fish passage.

In 2007, monitoring was focused at R02 and R06, as bridge and culvert construction was not completed beyond approximately km 40 (i.e. R09, R15 and R19 clear span bridges were not constructed). In 2007, 294 fish were enumerated, dominated by Arctic grayling (n=279), with small numbers of lake trout and round whitefish captured (Azimuth, 2008). Results confirmed the ability of Arctic grayling to pass beneath the bridge at maximum velocities up to 1.7 m/s. Drift traps set throughout the proposed R02 habitat compensation area confirmed successful Arctic grayling spawning upstream of the R02 bridge crossing.

In 2008, fisheries monitoring was focused on evaluating the fish passage at R02, R06, R09 and R15 by identifying, enumerating, tagging and collecting biological data (AEM, 2009)(See Figure 1 for a map of the All Weather Private Access Road and the fisheries monitoring locations). Additionally, stream velocities and discharges were calculated at all fish bearing crossings and larval drift traps were set and fish larvae collected at crossing R02. The fisheries monitoring confirmed Arctic grayling were able to navigate past the bridge structures at R02, R06, R09 and R15. It was thought that much of the spawning migration occurred before the survey began as overall capture numbers were less than previous years. Notwithstanding, results from larval drift traps demonstrated that Arctic grayling are migrating and spawning below the ice and/or immediately at ice-off. As well, measured velocities were lower than prolonged or maximum Arctic grayling swim speeds confirming the ability of them to pass beyond bridge structures.

During the winter of 2009, habitat compensation features were constructed according to the design specifications that met biological criteria that were set to enhancing arctic grayling productivity at R02. The construction and engineering was focused on creating spawning and nursing habitat (high value habitat) which was to compensate for the loss of low/medium habitat. This loss of habitat was a result of bridge abutment construction that impeded on the foot-print of the streams, causing minor `harmful, alteration, disruption or destruction' (HADD) at crossings R02, R06, R09 and R15.

The goal of the 2009 field season was to evaluate the ability of arctic grayling movement beyond the bridge structures as part of the HADD fisheries monitoring and to evaluate the effectiveness of the

recently constructed R02 compensation habitat features constructed in 2009. This report documents and discusses the results of the fisheries monitoring along the AWPAR in 2009.

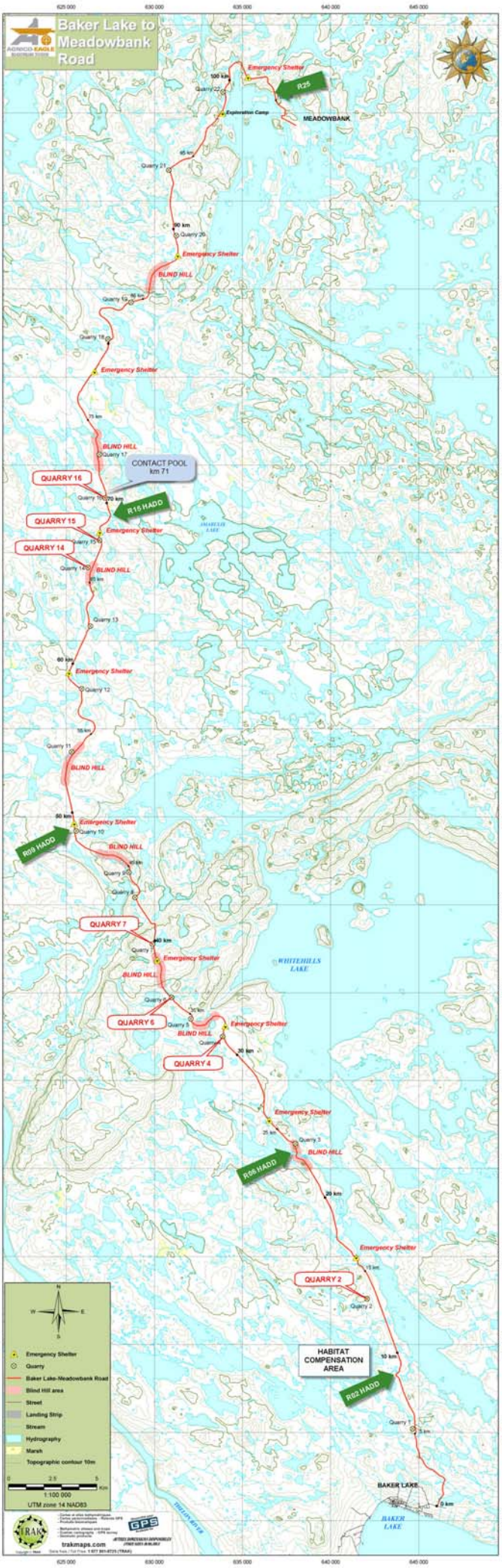
## 1.2 OBJECTIVE

Similar to previous years, the three main objectives of the 2009 AWPAR fisheries monitoring campaign were to complete:

- Assessment of the fish passage at R02, R06, R09 and R15 (HADD crossings) - The field program continued from previous years' monitoring of in-stream fish migrations. Much of the effort was focused on capturing fish moving upstream and downstream (upstream of the bridge crossings); identifying, enumerating, and collecting biological data of fish captured to evaluate the health of the population; and collecting velocity measurements both upstream and downstream of the crossings to measure the ability of fish to move beyond the bridge structures.

- R02 Habitat Compensation Evaluation - Habitat compensation structures were constructed during the winter of 2009. Similar to 2007 and 2008 data collection, larval drift traps were set upstream of the R02 compensation structures, at representative locations downstream and at a reference stream (R06). In combination with strategically located hoopnets, current year fish tagging provided data to determine the tendencies, patterns and movements of Arctic grayling near the R02 habitat compensation area.

- Creel Survey - Year 3 of a creel survey to obtain information on the fishing habits in the vicinity of the AWPAR and general fishing patterns of Baker Lake residents. The information was collected by Gebauer (See Appendix D) but will be summarized in this report.


Baker Lake to Meadowbank Road
AGRICO-EAGLE
Emergency Shelter
100 km
Quarry 22
R25
Exploration Camp
MEADOWBANK
95 km
Quarry 21
90 km
Quarry 20
Emergency Shelter
BLIND HILL
85 km
Quarry 19
Quarry 18
Emergency Shelter
75 km
BLIND HILL
Quarry 17
CONTACT POOL
km 71
QUARRY 16
Quarry 16
70 km
R15 HADD
QUARRY 15
Emergency Shelter
AMARUQ LAKE
Quarry 15
QUARRY 14
Quarry 14
BLIND HILL
65 km
Quarry 13
60 km
Emergency Shelter
Quarry 12
55 km
Quarry 11
BLIND HILL
50 km
Emergency Shelter
Quarry 10
R09 HADD
BLIND HILL
45 km
Quarry 9
Quarry 8
QUARRY 7
40 km
Quarry 7
Emergency Shelter
WHITEHILLS LAKE
BLIND HILL
Quarry 6
35 km
QUARRY 6
Quarry 5
Emergency Shelter
BLIND HILL
Quarry 4
30 km
QUARRY 4
Emergency Shelter
25 km
Quarry 3
BLIND HILL
R06 HADD
20 km
Emergency Shelter
15 km
QUARRY 2
Quarry 2
HABITAT COMPENSATION AREA
10 km
R02 HADD
Quarry 1
5 km
BAKER LAKE
0 km
BAKER LAKE
N
W
E
S
Emergency Shelter
Quarry
Baker Lake-Meadowbank Road
Blind Hill area
Street
Landing Strip
Stream
Hydrography
Marsh
Topographic contour 10m
0
2.5
5
Km
1:100 000
UTM zone 14 NAD83
TRAK
GPS
trakmaps.com
625 000
630 000
635 000
640 000
645 000

# SECTION 2 • METHODOLOGY AND APPROACH

Hoopnets, larval drift traps and minnow traps were set upstream of the bridge crossings to evaluate the passage of fish beyond the bridge structures at crossing R02, R06, R09 and R15. Hoopnets were visited nearly daily to determine the overall movements and patterns of Arctic grayling at respective crossings. Larval drift traps were placed to provide a comparison of historical Arctic grayling larval drift collection and provide evidence of fish spawning within the habitat compensation area. Additionally, minnow traps were set and observational data was collected to capture young-of-the-year (year 0) Arctic grayling to provide evidence of fish spawning and nursing.

## 2.1 LARVAL DRIFT TRAPS

In total 9, larval drift traps (DT) were set at R02 and 3 drift traps in R06 (as a reference) from June 23, 2009 until Aug 3, 2009. Three traps upstream (DT A1-3), three traps immediately downstream of the R02 habitat compensation (DT B1-3) and the three remaining traps (DT C1-3) were set downstream (See Figure 2.1). Nine (6 at R02 and 2 at R06) of the larval drift traps consisted of a square sided cone with a ridged frame that funnelled into a 0.5 mm nitex mesh bag. Attached at the back of the nitex bag was a nalgene container where the drift was collected. The remaining traps (3) consisted of a ~60cm x 30cm square frame which has a 0.5 mm nitex mesh bag, attached to which was a nalgene type container where the drift was collected The frame was submerged at least halfway under water and secured by poles on each side. The square cone drift traps were identical to those used in 2007 and 2008.

Larval drift traps were placed in representative, high to moderate flow sections of the stream. The upstream DT A1-3 were placed to target a *previously identified spawning area* (high value habitat) documented in 2006, 2007 and 2008. Drift traps were checked at least every other day. Larval drift was identified in the field and preserved in vials of diluted formalin. Fish larvae identification was confirmed at a University of Guelph laboratory by an AEM Environmental biologist using a suitable larval taxonomic key (Auer, 1982).

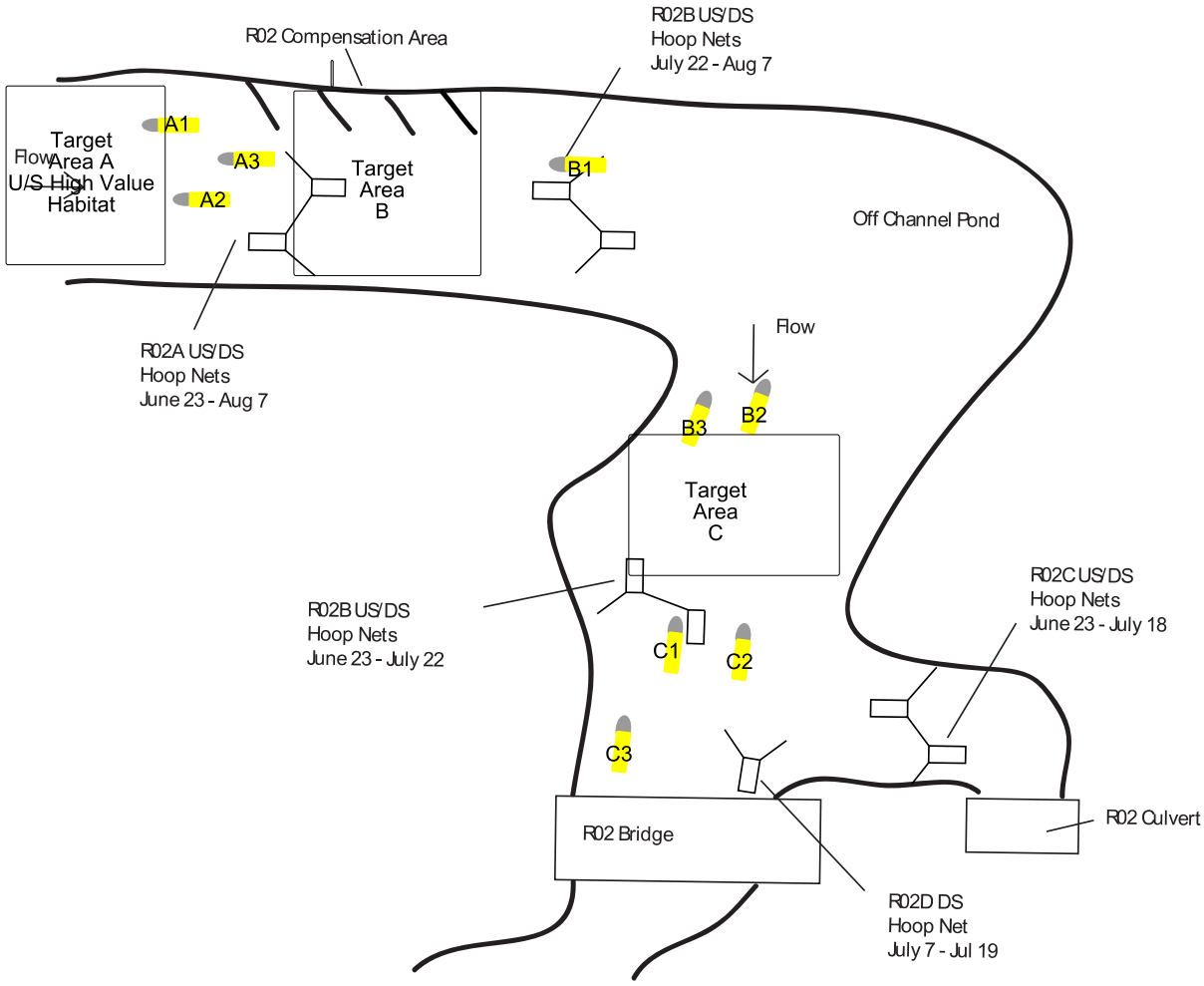
The exact UTM locations of the drift traps are presented in Table 2.1 and illustrated in Figure 2.1.

**Table 2.1: Larval Drift Trap Location by Date**

| Drift Trap ID | GPS Coordinates | Dates | GPS Coordinates | Dates |
|---|---|---|---|---|
| A1 | 14 W 0643438<br>UTM 7143415 | June 23 - Aug 2 | | |
| A2 | 14 W 0643451<br>UTM 7143424 | June 23 - Aug 2 | | |
| A3* | 14 W 0643445<br>UTM 7143435 | June 23 - Aug 2 | | |
| B1 | 14 W 0643682<br>UTM 7143550 | June 23 - July 20 | 14 W 0643595<br>UTM 7143542 | July 20 - Aug 2 |
| B2 | 14 W 0643699<br>UTM 7143505 | June 23 - July 20 | 14 W 0642592<br>UTM 7143553 | July 20 - Aug 2 |
| B3* | 14 W 0643707<br>UTM 7143485 | June 23 - July 20 | 14 W 0643587<br>UTM 7143555 | July 20 - Aug 2 |
| C1 | 14 W 0643762<br>UTM 7143399 | June 23 - July 25 | 14 W 0643783<br>UTM 7143392 | July 25 - Aug 2 |
| C2 | 14 W 0643773<br>UTM 7143409 | June 23 - July 25 | 14 W 0643788<br>UTM 7143397 | July 25 - Aug 2 |
| C3* | 14 W 0643784<br>UTM 7143407 | June 23 - July 25 | 14 W 0643767<br>UTM 7143382 | July 25 - Aug 2 |
| R1 | 14 W 0638400<br>UTM 7155731 | June 23 - July 20 | 14 W 0638286<br>UTM 7155765 | July 20 - Aug 2 |
| R2 | 14 W 0638396<br>UTM 7155690 | June 23 - July 20 | 14 W 0638350<br>UTM 7155705 | July 20 - Aug 2 |
| R3* | 14 W 0638396<br>UTM7155702 | June 23 - July 20 | 14 W 0638369<br>UTM 7155721 | July 20 - Aug 2 |

*60 x 30 cm square framed larval drift traps (not used in 2007 and 2008)

**Figure 2.1: Larval Drift Trap Locations at R02**



## 2.2 HOOPNETS

In total, 14 hoopnets were set at crossings R02, R06, R09 and R15. Hoopnets consist of either a 4ft (1.22m) or 3 ft (0.9)m) diameter front hoop. Hoopnets have interior hoops and traps that prevent fish from escaping but provide enough space in the *cod* end for fish to survive. Wings are attached to the front hoop to direct fish into the hoopnet. The fish are gently removed by field technicians from the nets using dip nets, placed in large tubs for enumeration, biological processing and then placed in a recovery tub. The fish are released up or downstream of the hoopnets (depending on the fish's migration direction) following handling. Hoopnets are an effective, non-invasive method of fisheries monitoring that causes few injuries or deaths to fish.

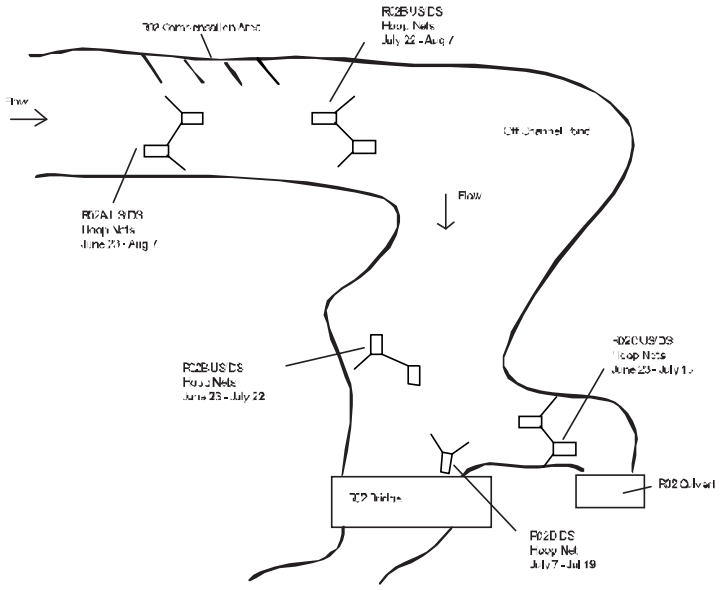
Biological processing included measuring the length of the fish, weighing the fish using Pesola field scale (+/-2 to 5 g) and classifying the maturity of the fish by gently palpitating the abdomen of the fish and visually identifying distinguishable male or female features (ie males have significantly larger dorsal fines with a greater number of rays). Relative water level measurements were taken using a staff gage (1.2m measuring stick with 1cm increments). Ambient temperature and water temperature measurements were recorded using a standard mercury thermometer.

The hoopnets were deployed on June 23rd, 2009 and pulled on August 3rd at R02 and slightly before that at R06, R09 and R15. Four x 4ft hoopnets and two x 2 ft hoopnets were set at R02. One x 4ft and two x 3ft hoopnets were used at R06 and R15. Two x 3ft hoopnets were used at R09. Table 2.2 outlines the locations of the hoopnets and the percent net coverage of the respective stream reaches. An attempt was made to cover the majority of the stream width. Furthermore, without jeopardizing the safety of the field personnel, the nets were placed in the thalweg of the streams depending on ice-flow conditions and stream velocities, to ensure the maximum effort to capture migrating fish.

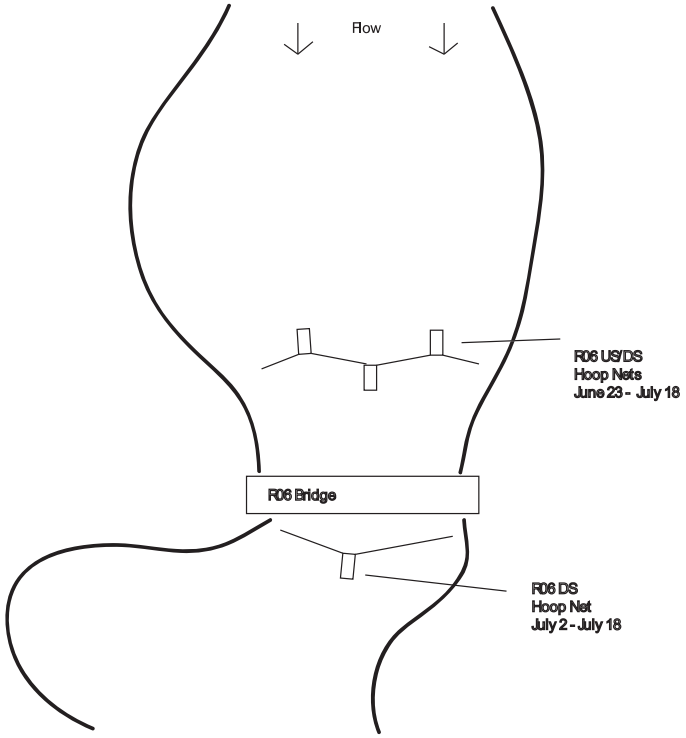
The locations of hoopnet placement were selected with the objective to provide evidence of the ability of the fish to move upstream past the bridge crossings as part of the HADD monitoring (i.e. hoopnets set to collect upstream moving fish, upstream of the bridge crossing). Hoopnets were also oriented to collect fish moving downstream to document the timing of the exodus or if the primary spawning run was missed. (ie. fish collected upstream of the bridge crossing, moving downstream may have passed prior to June 23, 2009). As well, hoopnets were placed adjacent to the habitat compensation area (Hoopnets R02 A); in a riffle/ side channel area upstream of the bridge and downstream of the compensation area (R02 B); immediately upstream of the bridge (R02 D); and immediately upstream of the culverts (See figure 2.2). These nets were set with the goal of capturing the maximum number of fish moving beyond the R02 bridge crossing, but also to assist in determining fish tendencies, patterns and movements near the R02 habitat compensation area.

**Figure 2.2: Location of Hoopnets at R02, R06, R09 and R15**

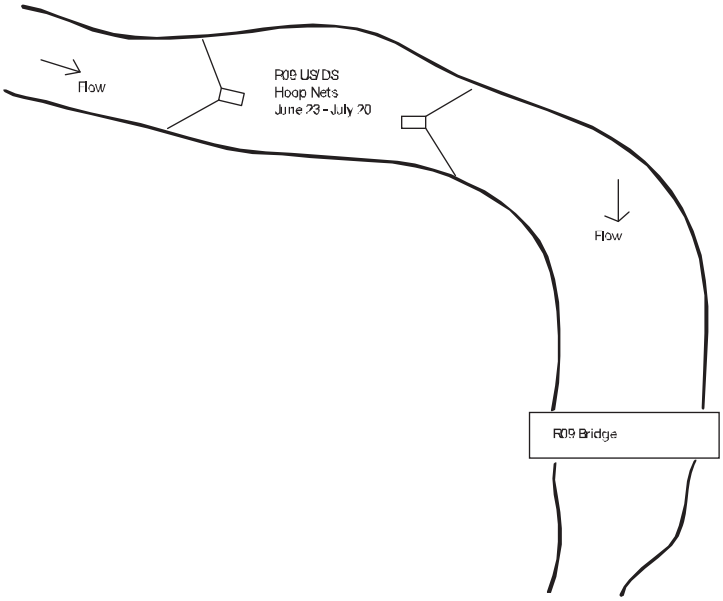
**R02**




**R06**



**R09**


Flow
R09 US/DS
Hoop Nets
June 23 - July 20
Flow
R09 Bridge

**R15**

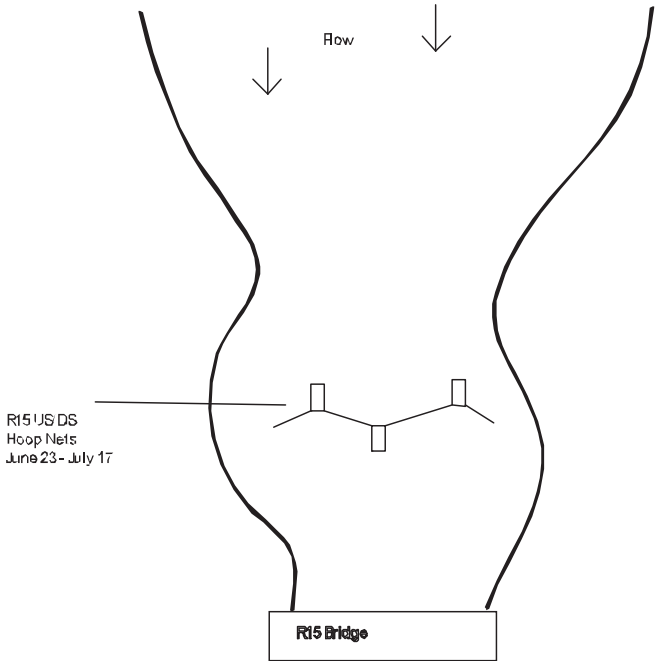

Flow
R15 US DS
Hoop Nets
June 23 - July 17
R15 Bridge

**Table 2.2: Hoopnet Locations, Net Orientation by Date and Approximate Stream Coverage**

| Location | GPS Coordinates | Net Orientation | Dates (2009) | Approximate Coverage |
|---|---|---|---|---|
| R02A | 14 W 0643513 UTM 7143452 | US | June 23 - Aug 7 | 75% |
| R02A | 14 W 0643502 UTM 7143457 | DS | June 23 - Aug 7 | |
| R02B | 14 W 0643746 UTM 7143430 | US | June 23 - July 9 | 25% |
| | | DS | July 10 - July 20 | |
| R02B | 14 W 0643753 UTM 7143436 | US | June 23 - July 9 | |
| | | DS | June 10 - July 20 | |
| R02 B | 14 W 0643603 UTM 7143575 | US | July 22 - Aug 7 | |
| R02 B | 14W 0643607 UTM 7143570 | DS | July 22 - Aug 7 | |
| R02C | 14 W 0643844 UTM 7143428 | US | June 23 - July 18 | 100% |
| R02C | 14 W 0643833 UTM 7143435 | DS | June 23 - July 18 | |
| R02D | 14 W 0643787 UTM 7143393 | DS | July 7 - July 19 | 33% |
| R06 | 14 W 0638045 UTM 7155850 | US | June 23 - June 30 | 80% |
| | | DS | July 1 - July 18 | |
| R06 | 14 W 0638053 UTM 7155858 | US | June 23 - July 18 | |
| R06 | 14 W 0638059 UTM 7155861 | US | June 23 - July 9 | |
| | | DS | July 10 - July 18 | |
| R06 | 14 W 0638098 UTM 7155831 | DS* | July 2 - July 18 | 100% |
| R09 | 14 W 0625523 UTM 7173745 | US | June 23 - July 19 | 100% |
| R09 | 14 W 0625519 UTM 7173740 | DS | June 23 - July 20 | |
| R15 | 14 W 0627474 UTM 7192083 | US | June 23 - July 2 | 75% |
| | | DS | July 3 - July 17 | |
| R15 | 14 W 0627429 UTM 7192102 | US | June 23 - July 17 | |
| R15 | 14 W 0627435 UTM 7192114 | US | June 23 - July 2 | |
| | | DS | July 3 - July 17 | |

* Set downstream of the R06 bridge crossing

## 2.3 MINNOW TRAPS AND OBSERVATIONAL DATA COLLECTION

Twelve minnow traps (standard wire mesh, gee minnow traps) were placed throughout the compensation area from July 20 until Aug 7, 2009. Three traps were deployed within each spawning and nursing areas between each berm. The uppermost berm area was identified as B1 and the traps set downstream of the last berm were identified as B4.

During minnow trap collection, field staff spent approximately 0.5 hrs per day collecting observational data in the vicinity of the R02 habitat compensation area between July 20 and Aug 7th. The data was collected to provide additional observational evidence of nursing and young-of-the-year fish utilization at R02.

## 2.4 VELOCITY

Velocity data was collected nearly weekly from June 21st until August 7, 2009 using a velocity meter (Swoffer Model 2100). Velocity and depth was collected upstream and downstream of the streams to determine the maximum and average water velocity to permit fish passage beyond bridge crossings.

## 2.5 DATA ANALYSIS

Data and statistical analysis was completed using Excel 2003.

# SECTION 3 • RESULTS AND DISCUSSION

## 3.1 STREAM VELOCITIES

Stream velocities were collected nearly weekly from June 21 to August 8 at HADD crossings R02, R06, R09 and R15. The average and maximum velocities at measurements taken upstream and downstream of the bridge crossings are presented in Table 3.1. Staff gage measurements discussed in this section are presented in Appendix A.

**Table 3.1 Average and Maximum Stream Velocities (Jun 21 to Aug 8, 2009)**

| | Stream Crossing ID (Upstream/ Downstream) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | R02 | | R06 | | R09 | | R15 | |
| | US | DS | US | DS | US | DS | US | DS |
| AVERAGE | 0.59 | 0.75 | 0.16 | 0.29 | 0.42 | 0.32 | 0.31 | 0.375 |
| MAXIMUM | 1.28 | 2.79 | 0.26 | 0.63 | 0.67 | 0.57 | 0.59 | 0.71 |

### 3.1.1 R02

Velocity measurements were taken at R02 as soon as possible following ice-off, which occurred on approximately June 14, 2009. On June 21, the maximum velocity (2.79 m/sec) was measured at R02 downstream of the bridge; the maximum velocity (1.28 m/sec.) upstream of the bridge was measured on July 3. Velocity measurements were taken at recorded peak freshet, as staff gage measurements on June 24$^{th}$ were at their highest (0.78m) and by June 26$^{th}$, the water level had decreased to 0.58m (a significant water level decrease of 20cm). On August 2, the water level had decreased by 52 cm.

Arctic grayling have a *sustained speed* of 0.8m/sec (maintained indefinitely), a *prolonged speed* of 0.8 - 2.1 m/s (can be maintained for up to 200 minutes) and a *burst speed* of 2.1 - 4.3 m/s (can be maintained for 15 seconds) (MOT, 2006). The field measurements indicate that the maximum velocities of the stream, at peak freshet, are within the lower range of the burst speed. The average speeds (0.59 US and 0.75 m/sec DS) were lower than cited Arctic grayling sustained speeds. These velocity data suggest that arctic grayling migrations are not obstructed by the bridge structures narrowing and increased currents at R02.

### 3.1.2 R06, R09 and R15

Average and maximum velocity measurements at R06, R09 and R15 are less than sustained speeds (MOT, 2006). Peak staff gage measurements were recorded on June 24$^{th}$ at all crossings. Staff gage measurements demonstrated that water levels decreased by 16 cm at R06, by 21cm at R09 and by 15 cm at R15. These data suggest that Arctic grayling migrations are not obstructed due to bridge structures and road activities at R06, R09 and R15.

## 3.2 LARVAL DRIFT

### 3.2.1 Overview

In total, 508 Arctic grayling larvae (young-of-the-year: YOY) were collected within a reach of the R02 stream which is approximately 450m in length (See Figure 2.1). Drift traps A1 to A3 were placed downstream of a previously identified high value habitat area (i.e. natural spawning and nursing habitat) and served as an internal reference. In total 179 Arctic grayling YOY were collected at DT A1 to 3). Three drift traps (B1 to B3) were placed immediately downstream of the compensation area; these traps collected the greatest number of YOY (234). Lastly, C1 to C3 were placed further downstream of the B traps; a total of 95 Arctic grayling YOY were collected in drift traps C1 to C3. These traps were placed in locations similar to 2007 and 2008 (Azimuth, 2008 and AEM, 2009).

Maximum collection occurred within the first two days (June 24th and 25th) of larval drift collection at R02 A to C. On a relative basis drift traps set immediately downstream collected the greatest amount of Arctic grayling larvae.

**Table 3.2.1a: Results of the Larval Drift Collection at R02**

| | R02 Habitat Compensation Drift Trap ID | | | | | | | | | | | R02 Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 | A Total | B1 | B2 | B3 | B Total | C1 | C2 | C3 | C Total | |
| **TOTAL** | 101 | 41 | 37 | **179** | 93 | 61 | 80 | **234** | 11 | 32 | 52 | **95** | **508** |
| **AVG*** | 3.26 | 1.32 | 1.19 | **5.77** | 3.00 | 1.97 | 2.58 | **7.55** | 0.35 | 1.03 | 1.68 | **3.06** | |
| **MAX** | 31 | 25 | 19 | **60** | 35 | 19 | 28 | **57** | 5 | 12 | 23 | **33** | |

* Average per day collection

An external reference was placed in a previously identified spawning area at R06 (Azimuth, 2005). The maximum larval drift collection was on July 22. Similarly 17 and 20 YOY were collected on July 19 and 20, respectively, at R06.

**Table 3.2.1b: Results of the Larval Drift Collection at R06**

| | Reference (R06) Drift Trap ID | | | |
|---|---|---|---|---|
| | R1 | R2 | R3 | R Total |
| **TOTAL** | 20 | 1 | 0 | **21** |
| **AVG*** | 0.58 | 0.03 | 0.00 | **0.61** |
| **MAX** | 17 | 1 | 0 | **17** |

* Average per day collection

### 3.2.2 Larval Timing and Temperature

Arctic grayling are spring spawners that migrate from lakes and large rivers to smaller streams to spawn over gravel or rocky bottoms (Evans et al. 2002). The literature suggests that spawning occurs between 7 and 10°C (Evans et al. 2002, McPhail and Lindsey, 1970, & Scott and Crossman, 1973). Young are thought to hatch within 16-18 days at water temperatures of 9°C or within 8 to 32 days of water temperature of 15.5°C (McPhail and Lindsey, 1970 and Krueger, 1981). Figure 3.2.2 illustrates the spatial (per drift trap target area; i.e. A, B and C) and temporal (by date) distribution of larval drift collected with respect to water temperature changes. Peak larval drift collection occurred between 5 and 10 °C. A second increase in collected larval drift was observed on July 19 with water temperatures stabilizing around 12°C. As was found in previous studies at R02, contrary to the literature cited, the primary arctic grayling spawning period may be occurring prior to setting drift traps at temperature less than 5°C and that peak migration is occurring below the ice or immediately at ice off.

The 2009 larval drift trap results demonstrate that arctic grayling are successfully spawning near or within the R02 habitat compensation area. It should be noted that larval drift collected could be drifting from locations upstream and may not be specifically linked to the targeted collection areas (as shown in Figure 2.1). However, the results provide evidence that arctic grayling larval drift collected in the vicinity of the habitat compensation area has increased in 2009 from historical data.

In 2007, seven traps were set throughout R02 compensation area (COB DT 1,2,3) and downstream (COA DT 1 to 4). In total 292 Arctic grayling larvae were collected in 2007 with peak drift around June 30, 2007. In 2008, 6 drift traps were set upstream and 2 downstream of the compensation area. In total 158 arctic grayling were collected with peak drift collected on June 23 to 29 at 6°C. As previously discussed, in total, 508 YOY were collected at R02 in 2009. As discussed in the methodology, it should be noted that traps A3, B3 and C3 were not used in 2007 and 2008. Although there was a greater *effort* in 2009 compared to previous studies, by subtracting the larvae collected in traps A3, B3 and C3 we can compare identical historical *catch per unit efforts.* If these data are subtracted there is a total of 339 YOY collected at R02, a 215% increase in larvae collected at R02 in 2009 from 2008, and 116% increase from 2007.

## 3.3 ADULT FISH COLLECTION

### 3.3.1 Overview

As in the past, the predominant fish species collected along the All Weather Private Access Road was Arctic grayling (*Thymallus arcticus*) followed by round whitefish (*Prosopium cylindraceum)* and in fewer quantity Lake Trout (*Salvelinus namaycush)*. Table 3.3.1 provides a summary of the results of the fish collected per crossing. These data are representative of *all* of the fish collected per crossing. Results evaluated in the subsequent text may have varying sample sizes (n), as the field data was not always complete (i.e. fish lost in transfer but were not measured, sexed or weighed: in such cases, these data could not be used for statistical purposes in subsequent sections but are included in the totals Table 3.3.1).

**Table 3.3.1: Overview of the Results by Fish Species Collected per Crossing.**

| | Crossing ID | | | | |
|---|---|---|---|---|---|
| | **R02** | **R06** | **R09** | **R15** | *Total* |
| Arctic Grayling | 387 | 74 | 69 | 26 | 556 |
| Lake Trout | 2 | 0 | 2 | 0 | 4 |
| Round Whitefish | 29 | 0 | 0 | 0 | 29 |
| *Total* | 418 | 74 | 71 | 26 | |

### 3.3.2 Arctic Grayling (Thymallus Arcticus) Size Distributions and Condition

The following section summarizes the size distribution at crossings R02, R06, R09 and R15; it does not review the round whitefish or lake trout data. The largest fish that was collected moving upstream at R02 was 405mm in length and 700g in weight. Many smaller fish were also collected in the hoopnets (minimum 150mm length and 68g weight). The condition factor, calculated as a function of length and weight demonstrate a very healthy population (K> 1.00).

At a population level, the condition factor of the Arctic grayling has slightly decreased in 2009 from 2007 and 2008 studies. At R02, the condition factor for Arctic grayling in 2007 was 1.17 (n=195) and 1.19 (n=34) in 2008. R06 condition factor in 2007 was 1.16 (n=85) and in 2008 was 1.19 (n=67). No data was collected in 2007 at R09 and R15. In 2008, R09 condition factor was 1.25 (n=59) and 1.23 (n=9) at R15.

Comparatively the condition factor differences are negligible at R02 and R06, and may simply be due to the fact that a greater number of fish were collected in 2009 than previous years and that immature fish (whose condition factor is generally lower than mature adults) are influencing the decrease in the overall population level condition factor. These results may be due to methodological differences in measuring weight. (In 2008 a digital scale was used to measure weight. Depending on which pesola scale is used for respective fish, the accuracy of the measurement decreases as the size of the fish decreases.)

**Table 3.3.2: Average, Maximum and Minimum Arctic Grayling Length, Weight and Condition Factor (K).**

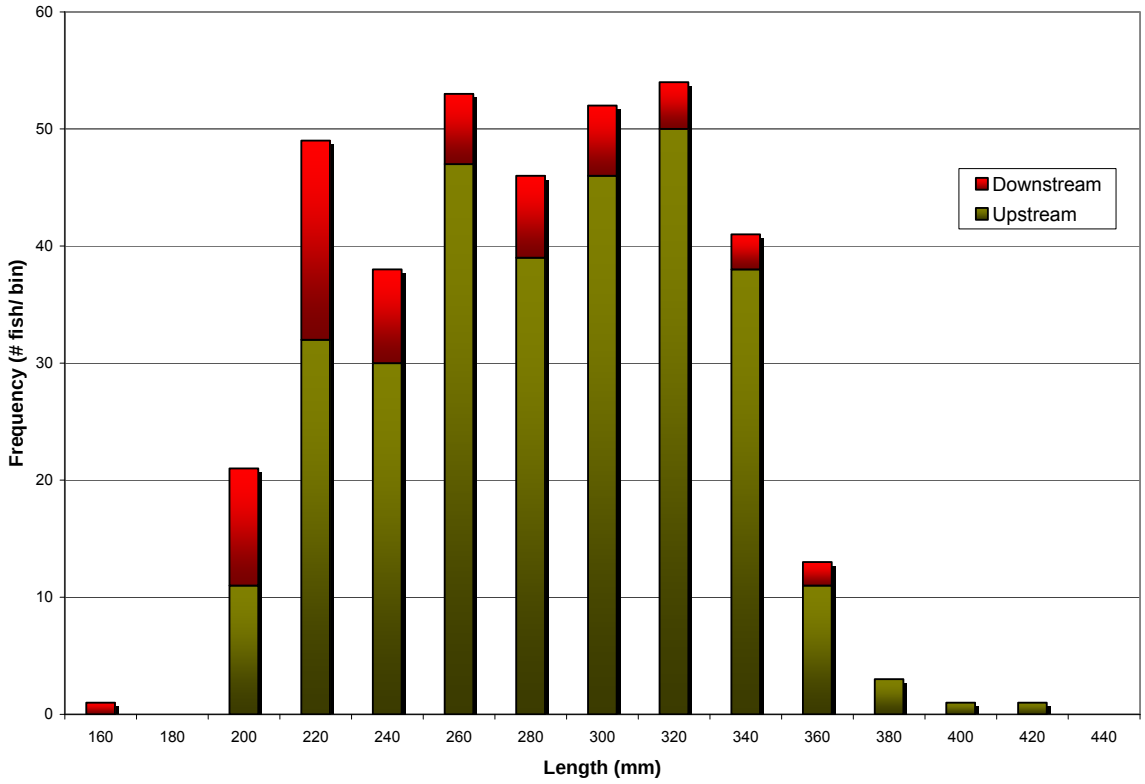
| | | Length (mm) | | | | Weight (g) | | | | K |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | AVG | MAX | MIN | SD | AVG | MAX | MIN | SD | AVG |
| R02 | 387 | 271.45 | 405 | 150 | 46.61 | 237.31 | 700 | 68 | 103.14 | 1.15 |
| R06 | 74 | 257.51 | 385 | 188 | 58.33 | 216.74 | 650 | 85 | 134.93 | 1.16 |
| R09 | 69 | 276.28 | 360 | 197 | 42.88 | 256.02 | 460 | 95 | 97.56 | 1.16 |
| R15 | 26 | 295.19 | 365 | 200 | 45.41 | 295.77 | 505 | 100 | 121.46 | 1.09 |

### *3.3.2.1 R02*

As in the past, the length-frequency distributions (see Figure 3.3.2.1) of fish collected at R02 are approximately normally distributed with the greatest number of fish collected between 300 and 320 mm (n=373). The data is clustered with nearly even distribution of lengths between the length-frequency of 200 to 340 mm. These data demonstrates that recruitment in all size classes is occurring and that the population is healthy. As represented in the length-frequency histogram, 309 of the arctic grayling were migrating upstream with 64 arctic grayling migrating downstream.

In 2007, the data showed similar trends with the greatest occurrence within a range (311-330mm) (Azimuth, 2008). Few fish were collected at R02 in 2008 (n=68) with the length frequency being the greatest between (220-240mm; immature) demonstrating that the peak upstream migration was likely missed (AEM, 2009).

**Figure 3.3.2.1: Length-Frequency Histogram of Arctic grayling at R02**

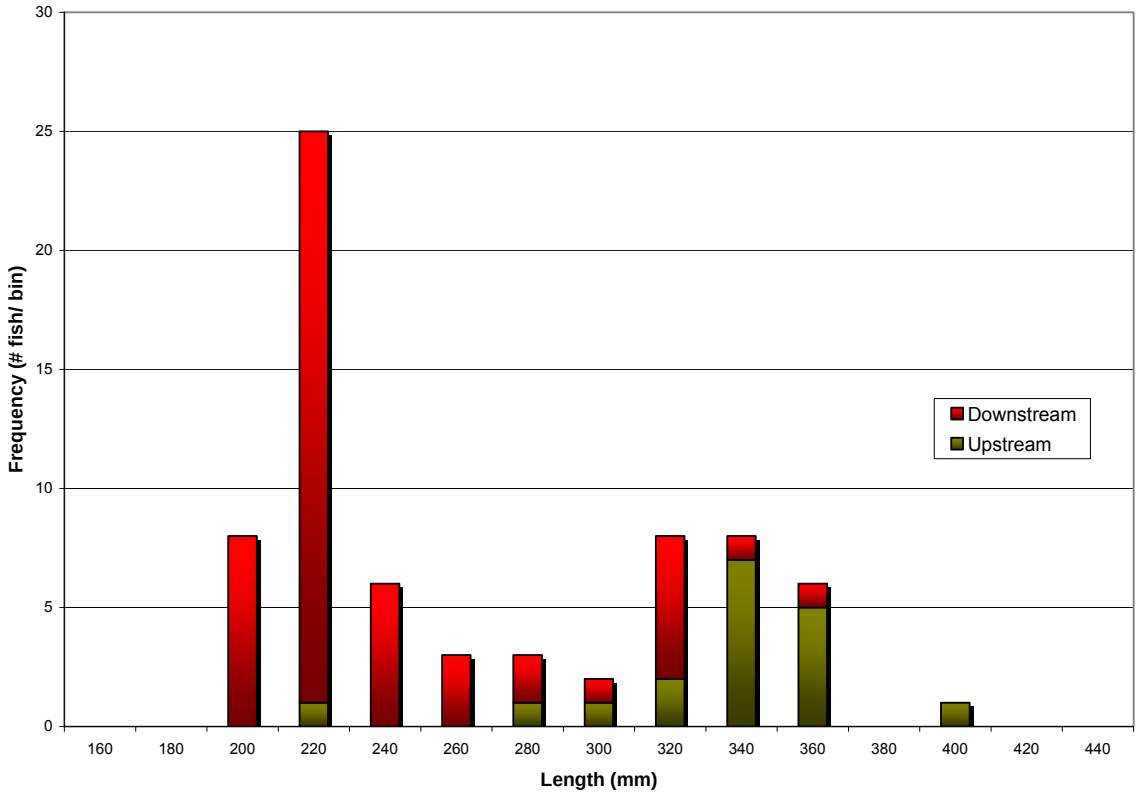


### *3.3.2.2 R06*

The length-frequency distributions (see Figure 3.3.2.2) of fish collected at R06 illustrates the fact that the primary upstream migration was likely missed in 2009. The greatest frequency of fish was between the length of 200 and 220 mm (immature arctic grayling). Although the numbers were few, the data of the upstream fish that were collected represent a bimodal distribution with the greatest frequency occurring at 200 and between 300 to 340mm (similar to R02), showing a healthy recruitment of immature fish with fewer mature fish collected moving upstream.

Although a greater number of fish were collected moving downstream (140 arctic grayling) in 2007 as compared to 2008 (74 arctic grayling), similar results were found in that no fish were collected moving upstream. Modal size in 2007 was 310-330mm. In 2008, 62 fish were captured moving upstream with a modal distribution of length frequency around 320 mm. Overall, the 2009 data is generally similar to historical data and most of all the data indicates that fish are able to pass by the bridge structures at R06.

**Figure 3.3.2.2: Length-Frequency Histogram of Arctic grayling at R06**

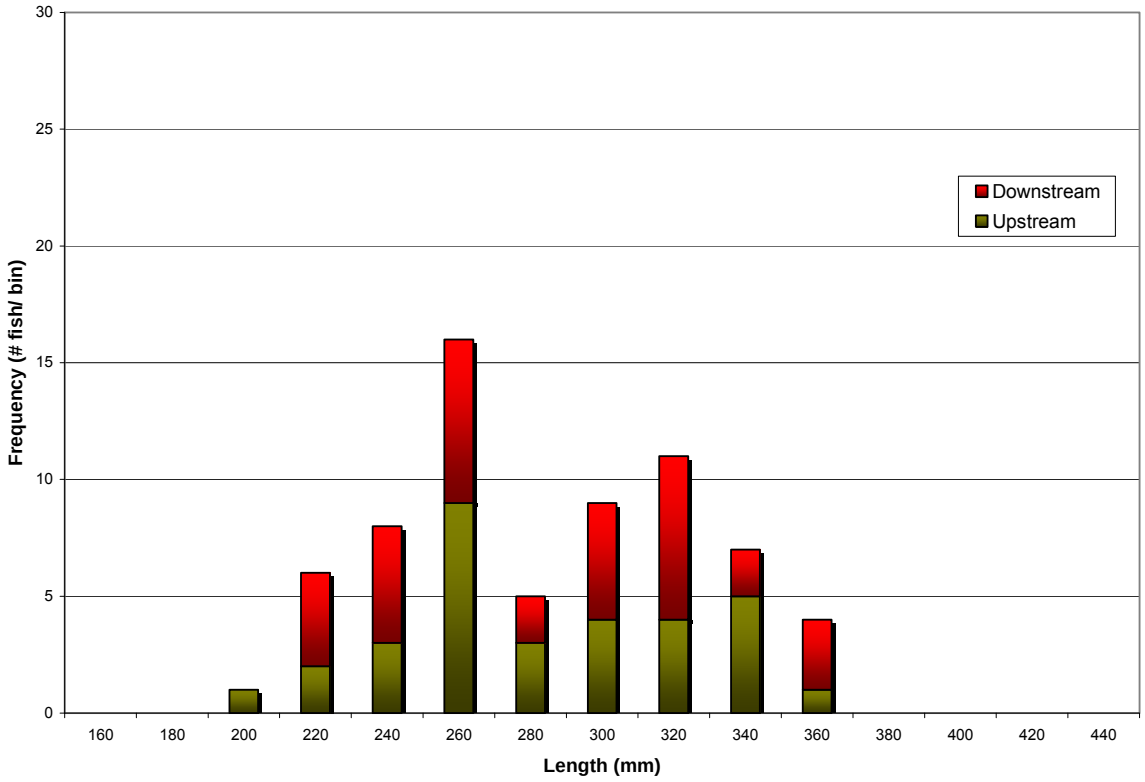


### *3.3.2.3 R09*

As in the past, the length-frequency (see Figure 3.3.2.3) of Arctic grayling collected at R09 are generally normally distributed with the greatest frequency of fish having a length between 240 and 260 mm (n=69). The data is clustered with nearly even distribution of lengths between the length-frequency of 240 to 340 mm. These data demonstrates that recruitment in all size classes is similar and that the population is healthy.

Fisheries data was not collected at R09 in 2007. The 2008 data showed similar trends with the greatest occurrence at 240mm and generally even distribution between lengths 200 and 330mm (Azimuth, 2008).

**Figure 3.3.2.3: Length-Frequency Histogram of Arctic grayling at R09**

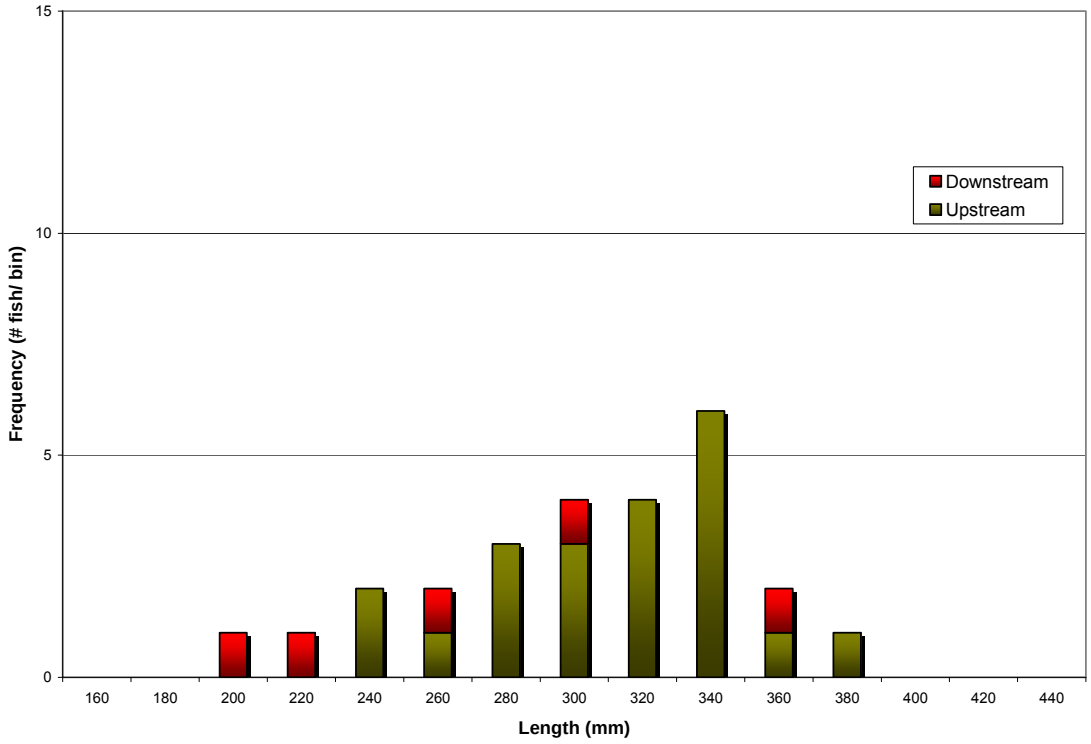


### *3.3.2.4 R15*

The length-frequency (see Figure 3.3.2.4) of Arctic grayling collected at R15 are generally normally distributed with the greatest frequency of fish having a length between 320 and 340 mm (n=26). These data demonstrates that recruitment in all size classes is similar and that the population is generally healthy. The majority of the fish collected were moving upstream and demonstrate that healthy mature Arctic grayling were able to pass by the bridge structures at R15.

Fisheries data was not collected at 2007 at R15. Few fish were collected at R15 in 2008 data showed similar trends with the greatest occurrence at 330 mm (Azimuth, 2008). The 2009 fisheries data set at R15 was the most successful field campaign and should serve as a reference for future studies.

**Figure 3.3.2.4: Length-Frequency Histogram of Arctic grayling at R15**



### 3.3.3 R02 Arctic Grayling Fish Movements

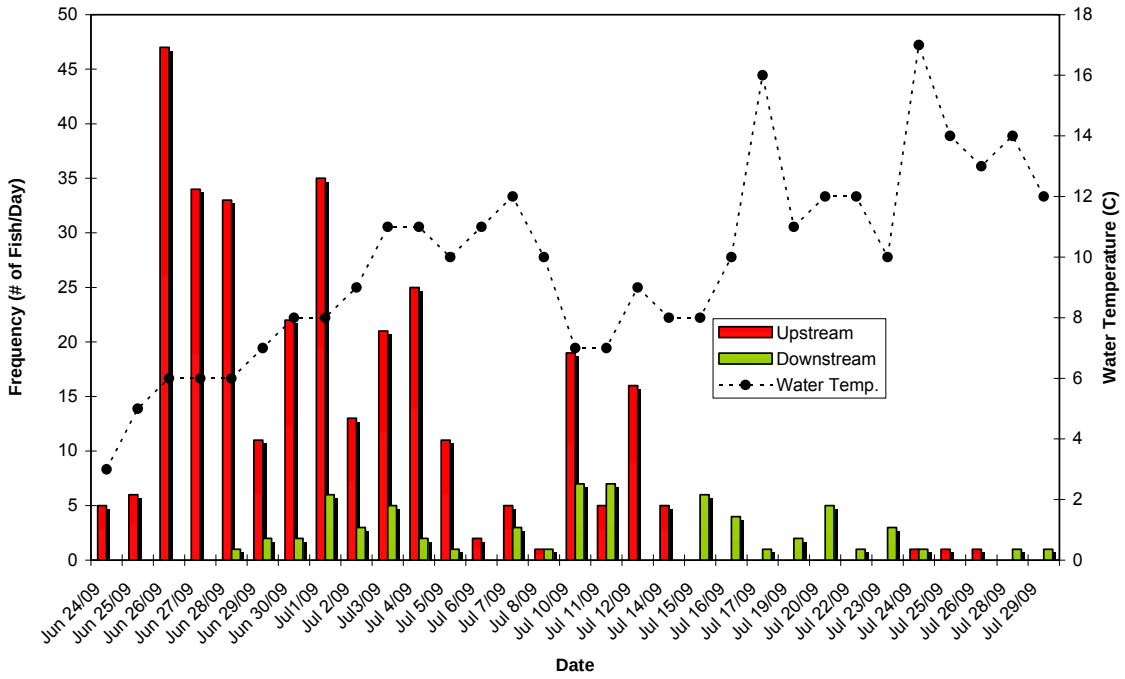
The following section evaluates the Arctic grayling movements at R02. This includes an evaluation of the upstream and downstream trends, the maturity and sex trends, and the results of the current year flow tagging program or recaptures.

#### *3.3.3.1 Arctic Grayling Upstream and Downstream Movements*

A total of 387 Arctic grayling were collected at R02. Three hundred and twenty three arctic grayling were collected moving upstream with a few collected in the first two days at water temperatures at or below 5 °C (See Figure 3.3.3.1). Peak upstream migration occurred on June 26th at 6°C and many Arctic grayling were collected between the days of June 27 and July 4th. Recorded downstream movements began shortly after the peak upstream migration on June 28th. Fewer fish (64) were collected moving downstream than were collected moving upstream, with peak downstream migration occurring on July 10 and 11. Water temperatures increased steadily from 3°C to July 8th with a considerable decrease due to poor weather conditions followed by an increase to a maximum of 17°C on July 24th.

Similar to previous year data, peak migration likely occurred just prior to the installation of hoopnets, based on the fact that many of the Arctic grayling were collected moving downstream within two days of the largest upstream collection. This is substantiated with the larval drift findings. It is evident that a small post-spawning run occurred at R02 either beginning on June 26th, a couple days after setting the nets, with a smaller peak on July 10th.

**Figure 3.3.3.1: R02 Arctic Grayling US/DS Migration Patterns**



Nets were set within a riffle-run/glide reach approximately 450m in length. The R02 nets were set in 2 stream segments: adjacent to the first berm of the habitat compensation area (R02 A) and in locations downstream within 100m of the bridge crossing, (R02 B, C and D). In total, R02B collected the largest number of fish (197) moving upstream. With fewer collected at R02A (113) (See table 3.3.3.1).

By comparing the number of fish captured at R02B to the number of fish collected at R02 A, it is likely that many fish are using the R02 habitat compensation area as refuge, foraging and/or for spawning as part of the post-spawning migration. This is deduced by comparing the respective net coverage and accounting. It would be expected that R02 A would collect nearly all of the fish migrating upstream (i.e. all of the fish collected at R02B, which covered 25% of the stream width). Given that fewer fish were collected at R02A than R02B, these results suggest that the unaccounted for Arctic grayling are using the area between the bridge crossing and the furthest upstream berm (R02 A), which includes the R02 habitat compensation area. Alternatively, these unaccounted for Arctic grayling may have avoided capture at hoopnets R02A, however this seems unlikely.

**Table 3.3.3.1: Arctic Grayling Movement per Hoopnet placed at R02**

| R02 Hoopnet ID | Fish Movement | # of Arctic Grayling |
|---|---|---|
| A | US | 113 |
| | DS | 20 |
| B | US | 197 |
| | DS | 16 |
| C | US | 13 |
| | DS | 19 |
| D | US | 0 |
| | DS | 9 |
| TOTALs | US | 323 |
| | DS | 64 |

### *3.3.3.2 Arctic Grayling Maturity and Sex Distributions at R02*

Maturity and sex distributions indicate an almost equal number of male (158) and female (151) moving upstream and equal male (32) and female (33) Arctic grayling moving downstream. Arctic grayling typically spawn between 7 and 10°C (Scott and Crossman, 1973). The males and females collected moving upstream were primarily immature or about to spawn from June 24$^{th}$ until June 30$^{th}$ at water temperatures below 10 °C. It was evident that most of the fish collected moving downstream were either spent or immature with a few that were still ripe (See Appendix A and current year recapture data). These data demonstrate that the arctic grayling collected are using this tributary as a migration corridor for spawning.

#### *3.3.3.3 Arctic Grayling Current Year Recaptures at R02*

Flow tags are commonly used to provide population density measurements, however they are also very useful in tracking (similar to telemetry) the activities of migrating fish. As previously discussed, the location of the hoopnets were placed to capture the greatest number of fish moving beyond the bridge crossings and conjointly provide information on the localized movements and tendencies of the fish by tagging and tracking their activities.

**Table 3.3.3.3 Current Year Recaptures at R02**

| Date | Time | Net ID | US or DS | Tagging # | Length | Weight | K | M or F | Maturity | Note | Eg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/24/2009 | 9:30:am | A | US | 90152 | 324 | 360 | 1.06 | M | 7 | | |
| 6/25/2009 | 8:20am | A | US | 90053 | 338 | 430 | 1.11 | M | 7 | | |
| 6/25/2009 | 8:20am | C | US | 90062 | 320 | 390 | 1.19 | F | 2 | | |
| 6/26/2009 | 3:52pm | B | US | 90093 | 310 | 320 | 1.07 | M | 7 | | a |
| 6/26/2009 | 3:52pm | B | US | 90096 | 300 | 285 | 1.06 | M | 7 | | b |
| 6/26/2009 | 3:52pm | B | US | 90097 | 291 | 265 | 1.08 | F | 2 | | c |
| 6/26/2009 | 3:52pm | B | US | 90137 | 321 | 330 | 1.00 | F | 2 | | d |
| 6/26/2009 | 3:52pm | B | US | 90139 | 320 | 345 | 1.05 | M | 7 | | |
| 6/26/2009 | 3:52pm | B | US | 90062 | 325 | 390 | 1.14 | F | 2 | CYRC | |
| 6/27/2009 | 5:00pm | A | US | 90030 | 304 | 315 | 1.12 | M | 7 | | e |
| 6/27/2009 | 5:00pm | A | US | 90033 | 335 | 390 | 1.04 | F | 2 | | |
| 6/27/2009 | 5:00pm | A | US | 90152 | 323 | 325 | 0.96 | M | 7 | CYRC | |
| 6/27/2009 | 4:45pm | B | US | 90097 | 290 | 360 | 1.48 | F | 4 | CYRC | c |
| 6/28/2009 | 3:30pm | B | US | 90955 | 267 | 220 | 1.16 | F | 1 | | h |
| 6/29/2009 | 10:30am | B | US | 90964 | 246 | 170 | 1.14 | M | 6 | | |
| 6/29/2009 | 10:30am | B | US | 90053 | 338 | 430 | 1.11 | M | 7 | CYRC | |
| 6/29/2009 | 10:30am | B | US | 90152 | 320 | 340 | 1.04 | M | 7 | CYRC | |
| 6/30/2009 | 9:54am | B | US | 90033 | 355 | 390 | 0.87 | F | 2 | CYRC | |
| 6/30/2009 | 9:54am | B | US | 90096 | 300 | 290 | 1.07 | M | 9 | CYRC | b |
| 6/30/2009 | 9:54am | B | US | 90139 | 313 | 330 | 1.08 | M | 9 | CYRC | |
| 7/1/2009 | 1:00pm | A | US | 90918 | 250 | 165 | 1.06 | M | 6 | | i |
| 7/1/2009 | 1:00pm | B | US | 90012 | 295 | 260 | 1.01 | F | 2 | CYRC | f |
| 7/1/2009 | 1:00pm | B | US | 90137 | 318 | 340 | 1.06 | F | 4 | CYRC | d |
| 7/3/2009 | 4:10pm | A | US | 90964 | 241 | 170 | 1.21 | M | 6 | CYRC | |
| 7/3/2009 | 4:10pm | B | US | 90030 | 300 | 295 | 1.09 | M | 7 | CYRC | e |
| 7/4/2009 | 8:25am | B | US | 90918 | 251 | 185 | 1.17 | F | 1 | CYRC | i |
| 7/7/2009 | 3:10PM | B | US | 90012 | 295 | 245 | 0.95 | F | 2 | CYRC | f |
| 7/10/2009 | 8:45am | A | US | 90955 | 230 | 270 | 2.22 | F | 1 | CYRC | h |
| 6/29/2009 | 10:30am | A | DS | 90959 | 300 | 255 | 0.94 | M | 9 | | g |
| 6/30/2009 | 9:54am | C | DS | 90093 | 310 | 290 | 0.97 | M | 9 | CYRC | a |
| 7/3/2009 | 4:10pm | C | DS | 90959 | 300 | 260 | 0.96 | M | 9 | CYRC | g |

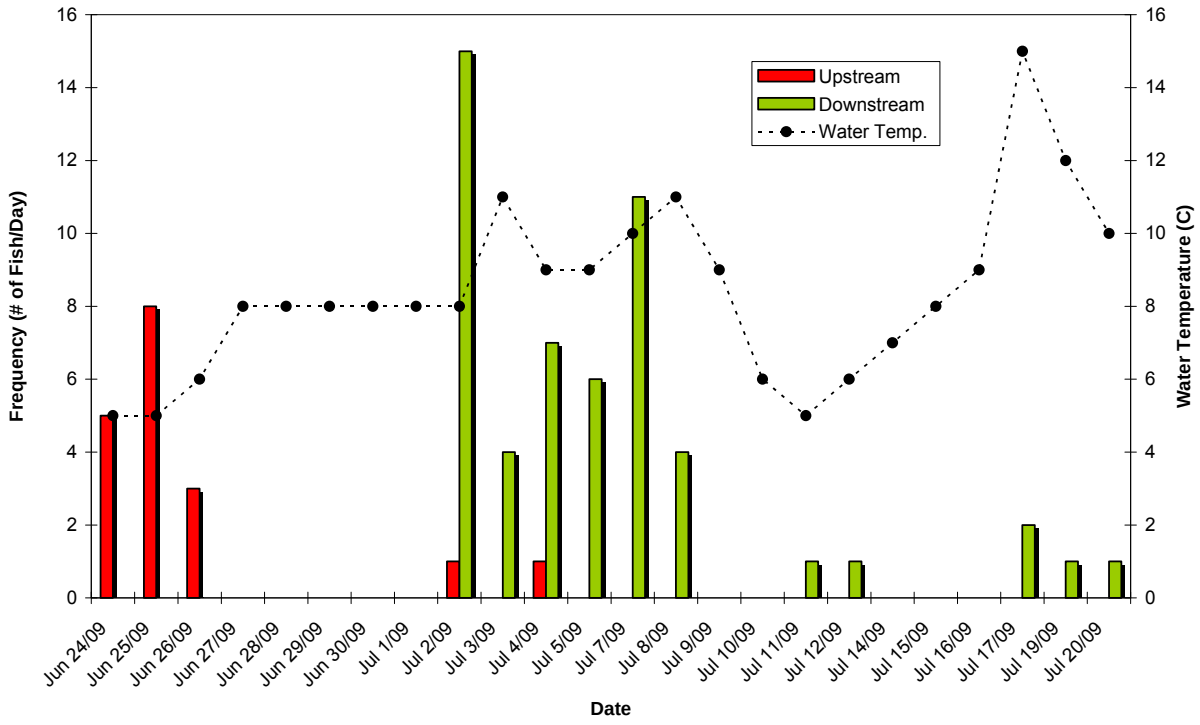
In total, 46 Arctic grayling were tagged and recaptured in 2009 (current year recaptures). Table 3.3.3.3 summarizes the current year recaptures and provides examples to capture what the broader Arctic grayling population movements and tendencies are at R02. There are numerous examples within the data of ripe/ ready to spawn grayling moving upstream. Example *a* shows a ready to spawn male grayling captured moving upstream in hoopnet R02B on June 26th. On June 30th he was recaptured in hoopnet R02C moving downstream having spawned nearby (i.e. M9 or spent). This is direct evidence of fish using the R02 compensation area, as he was not captured in R02 A, yet he spawned upstream of the R02C hoopnet. Similarly, other recaptures were determined to be ripe and then recaptured days later having spawned (examples *b, c, and d*). Others were recaptured but had not appeared to spawn over the span of a couple days and may have been courting or foraging in the vicinity (example *e* and *g*). Still other recaptures appeared to have been immature or seemingly just passing through (example *f* and *h*).

The current year recapture data provides a caption of what the broader population movements and behaviour are; these *observational* data suggest that fish are using the R02 compensation area as spawning habitat. This piece of evidence is supported by a comparison of the number of fish collected moving upstream and the larval drift data collected.

### 3.3.4 R06 Arctic Grayling Fish Movements

A total of 74 Arctic grayling were collected at R06. Six-teen arctic grayling were collected moving upstream within the first 3 days at water temperatures at or below 6 °C (See Figure 3.3.4). Peak upstream migration occurred on June 25th. Recorded downstream movements began on July 2nd. A greater number of fish were collected moving downstream than upstream which indicates that it is likely that the nets were set post spawning run. Nonetheless, the data indicates that Arctic Grayling are able to pass the bridge at R06.

**Figure 3.3.4: R06 Arctic Grayling US/DS Migration Patterns**




Two fish were recaptured at R06 following tagging (see Table 3.3.4). One female spawned in the vicinity of the hoopnets was recaptured in the same net, moving upstream. The other, a male was recaptured moving downstream nearly 10 days after spawning upstream.

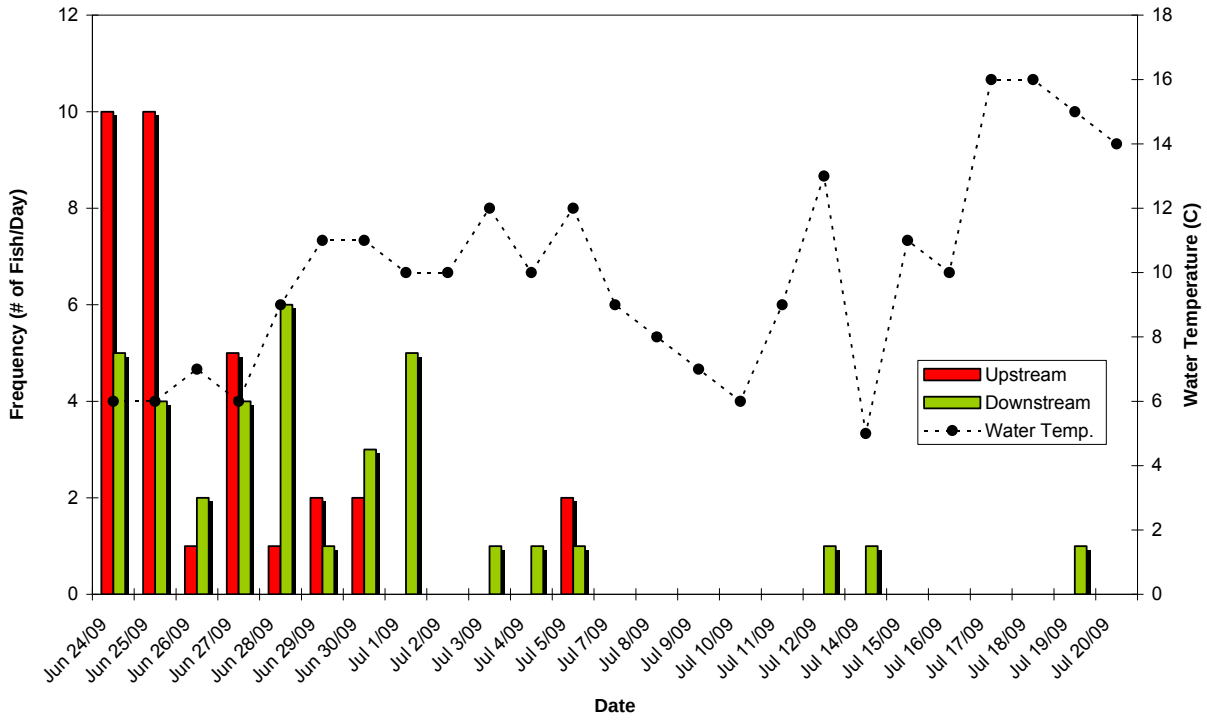
**Table 3.3.4: R06 Current Year Recaptures**

| Date | Time | US or DS | Fish ID | Tagging # | Length | Weight | K | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/24/2009 | 10:30am | US | 7 | 90155 | 335 | 320 | 0.85 | M | 9 | |
| 6/25/2009 | 9:30am | US | 39 | 90064 | 333 | 290 | 0.79 | F | 4 | |
| 6/25/2009 | 9:30am | US | 45 | 90155 | 335 | 350 | 0.93 | M | 7 | CYRC |
| 7/4/2009 | 10:50am | DS | 424 | 90064 | 335 | 405 | 1.08 | F | 4 | CYRC |

### 3.3.5 R09 Arctic Grayling Fish Movements

A total of 69 Arctic grayling were collected at R09. Twenty arctic grayling were collected moving upstream within the first 2 days at water temperatures at 6 °C, The peak upstream migration occurred on June 24th and 25th with peak downstream migration coinciding with the upstream run (See Figure 3.3.5). Given that a greater number of fish were collected moving downstream than upstream, it is likely that the nets were set post peak spawning run as 100% of the stream was covered. Nonetheless, the data indicates that Arctic Grayling are able to pass the bridge at R06.

**Figure 3.3.5: R09 Arctic Grayling US/DS Migration Patterns**




The current year recaptures and maturity data showed that many of the fish moving upstream were large mature grayling that had either spawned nearby (example a and b) or were immature fish. These results are supported by the fish movement data that it is likely that the peak migration was missed.

**Table 3.3.5: R09 Current Year Recapture**

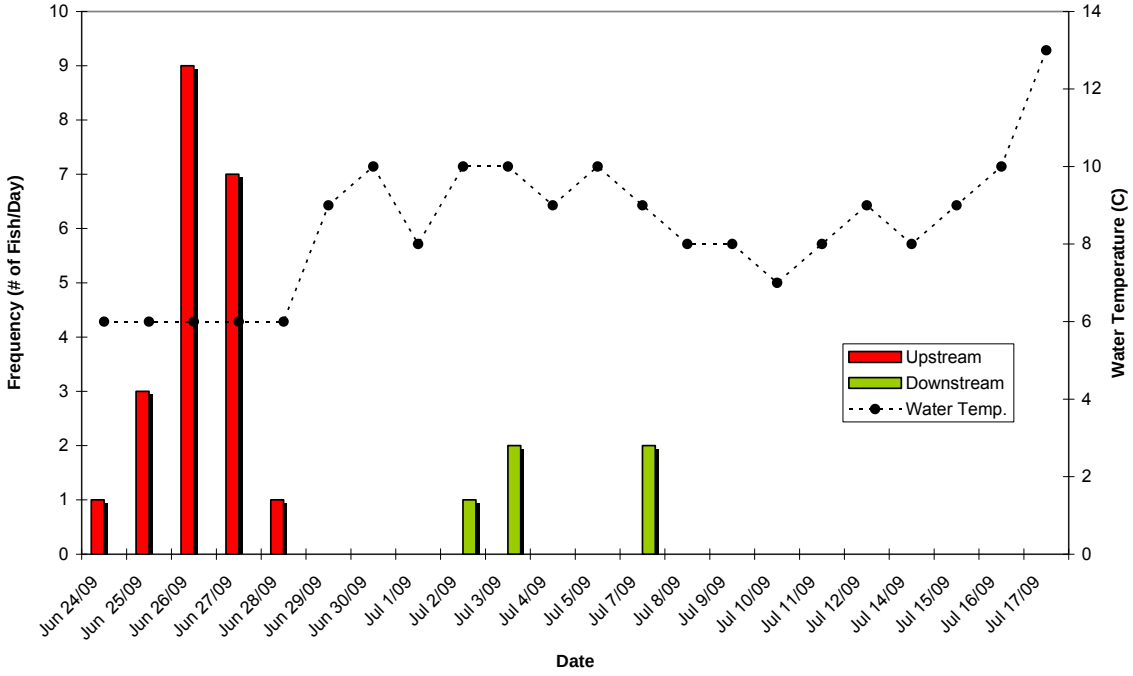
| Date | Time | US or DS | Fish ID | Tagging # | Length | Weight | K | M or F | Maturity | Note | Eg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/24/2009 | 12:30pm | US | 13 | 90159 | 325 | 390 | 1.14 | M | 9 | | a |
| 6/24/2009 | 12:30pm | US | 16 | 90163 | 300 | 300 | 1.11 | M | 7 | | |
| 6/24/2009 | 12:30pm | US | 17 | 90164 | 250 | 200 | 1.28 | F | 1 | | |
| 6/24/2009 | 12:30pm | US | 18 | 90165 | 265 | 375 | 2.02 | M | 6 | | |
| 6/24/2009 | 12:30pm | US | 19 | 90166 | 290 | 310 | 1.27 | F | 2 | | b |
| 6/25/2009 | 10:30am | DS | 57 | 90165 | 265 | 225 | 1.21 | M | 6 | CYRC | |
| 6/25/2009 | 10:30am | DS | 58 | 90163 | 320 | 290 | 0.89 | M | 7 | CYRC | |
| 6/25/2009 | 10:30am | US | 46 | 90070 | 314 | 320 | 1.03 | F | 4 | | |
| 6/25/2009 | 10:30am | US | 48 | 90072 | 345 | 415 | 1.01 | M | 7 | | |
| 6/27/2009 | 12:29pm | US | 129 | 90145 | 260 | 225 | 1.28 | M | 7 | | |
| 6/27/2009 | 12:29pm | US | 130 | 90146 | 245 | 190 | 1.29 | F | 1 | | |
| 6/27/2009 | 12:29pm | US | 131 | 90147 | 246 | 235 | 1.58 | F | 1 | | |
| 6/28/2009 | 1:00pm | DS | 186 | 90164 | 252 | 195 | 1.22 | F | 1 | CYRC | |
| 6/28/2009 | 1:00pm | DS | 187 | 90145 | 253 | 200 | 1.24 | M | 7 | CYRC | |
| 6/29/2009 | 1:33pm | DS | 235 | 90070 | 315 | 310 | 0.99 | M | 9 | CYRC | |
| 6/29/2009 | 1:33pm | US | 233 | 90973 | 225 | 155 | 1.36 | M | 6 | | |
| 6/30/2009 | 12:30pm | DS | 266 | 90146 | 260 | 195 | 1.11 | M | 6 | CYRC | |
| 6/30/2009 | 12:30pm | DS | 267 | 90159 | 325 | 355 | 1.03 | M | 9 | CYRC | a |
| 6/30/2009 | 12:30pm | DS | 268 | 90166 | 290 | 255 | 1.05 | F | 4 | CYRC | b |
| 7/1/2009 | 10:35am | DS | 269 | 90973 | 224 | 150 | 1.33 | F | 1 | CYRC | |
| 7/1/2009 | 10:35am | DS | 271 | 90072 | 341 | 420 | 1.06 | M | 7 | CYRC | |
| 7/12/2009 | 2:09pm | DS | 559 | 90147 | 245 | 170 | 1.16 | F | 3 | CYRC | |

### 3.3.6 R15 Arctic Grayling Fish Movements

In total 26 Arctic grayling were collected, 21 of them were collected moving upstream from June 24th to June 26th at R15. As in the past, it is evident that few fish use this tributary as nearly all of the stream width was covered at R15. Nevertheless, the data collected in 2009 was the most extensive data set collected to date at this crossing and demonstrates that a health representative population with a modal length-frequency distribution around 340 mm (mature arctic grayling).

Arctic grayling are not impeded by the bridge structures at R15. No current year tagged fish were captured.

**Figure 3.3.6: R15 Arctic Grayling US/DS Migration Patterns**



### 3.3.7 Previous Year Recaptures

#### *3.3.7.1 R02*

Six arctic grayling were recaptured having been tagged in previous years (2 were originally tagged in 2007, the remaining in 2008). All of the previous year recaptures were moving upstream either ripe or immature between the dates of June 26th and June 30th. The grayling collected on July 1st had migrated upstream of the bridge having spawned prior to it's' collection. The previous year recapture indicates that arctic grayling are annually passing upstream and generally returning to the same stream to spawn. Interestingly, one arctic grayling was collected having been tagged migrating at R06 in 2008. It is likely that he had returned into the Prince River system last year and altered his migratory pattern in 2009.

The recaptured arctic grayling were in good condition (K>1.0), however for most of the fish, the condition factor has decreased from their preceding data. This follows the same trends represented at a population level, previously discussed in section 3.3.2.

| Date | Location ID | US or DS | Fish ID | Tagging # | Length | Weight | K | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/26/2009 | R02 | US | 122 | 85118 | 320 | 330 | 1.01 | M | 7 | PYRC |
| 6/25/2007 | R02 | US | 18 | 85118 | 296 | 305 | 1.18 | M | 8 | |
| 6/26/2009 | R02 | US | 121 | 86469 | 319 | 330 | 1.02 | M | 7 | PYRC |
| 6/30/2008 | R06 | US | 107 | 86469 | 310 | 300 | 1.01 | | | |
| 6/26/2009 | R02 | US | 96 | 86471 | 222 | 110 | 1.01 | F | 5 | PYRC |
| 6/30/2008 | R02 | US | | 86471 | 200 | 100 | 1.25 | | | |
| 6/27/2009 | R02 | US | 179 | 85127 | 325 | 370 | 1.08 | F | 2 | PYRC |
| 6/26/2007 | R02 | US | 27 | 85127 | 311 | 335 | 1.11 | F | 4 | |
| 7/1/2009 | R02 | US | 309 | 85617 | 250 | 160 | 1.02 | F | 1 | PYRC |
| 7/8/2008 | R02 | DS | | 85617 | 242 | 175 | 1.23 | | | |
| 7/1/2009 | R02 | US | 312 | 86873 | 260 | 205 | 1.17 | M | 9 | PYRC |
| 6/29/2008 | R02 | US | | 86873 | 240 | 200 | 1.45 | | | |

### *3.3.7.2 R06*

Three arctic grayling were previous year recaptures moving upstream at R06. One fish was originally tagged in 2007, another in 2008. The male and 2 females were ripe and demonstrated that grayling are returning to the same tributaries and are not impeded by the bridge abutments. The recaptured arctic grayling were generally in good condition (K>1.0).

| Date | Location ID | US or DS | Fish ID | Tagging # | Length | Weight | K | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/24/2009 | R06 | US | 11 | 85594 | 325 | 380 | 1.11 | F | 4 | PYRC |
| 7/2/2007 | R06 | DS | | 85594 | 315 | 360 | 1.15 | F | 4 | |
| 6/26/2009 | R06 | US | 78 | 85028 | 320 | 365 | 1.11 | M | 7 | PYRC |
| | | | | | | | | Not found in historical data | | |
| 7/4/2009 | R06 | US | 417 | 86462 | 287 | 260 | 1.10 | F | 4 | PYRC |
| 6/30/2008 | R06 | DS | | | 270 | 250 | 1.27 | | | |

### *3.3.7.3 R09*

Eleven Arctic grayling were recaptured having been tagged in 2008 at R09. Six of the previous year recaptures moving upstream were ripe or immature migrating between the dates of June 26th and July 1st. Previous recaptures were also collected moving downstream. These data demonstrates that Arctic grayling are annually passing upstream of the bridge crossing and support the other findings that the peak migration was missed. The recaptured arctic grayling were generally in good condition (K>1.0).

| Date | Location ID | US or DS | Fish ID | Tagging # | Length | Weight | K | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/24/2009 | R09 | US | 21 | 85817 | 330 | 380 | 1.06 | M | 7 | PYRC |
| 6/22/2008 | R09 | US | | 85817 | 325 | 500 | 1.46 | | | |
| 6/25/2009 | R09 | US | 52 | 86875 | 265 | 185 | 0.99 | M | 8 | PYRC |
| 7/5/2008 | R09 | DS | 144 | | 240 | 175 | 1.27 | | | |
| 6/25/2009 | R09 | US | 53 | 86432 | 266 | 210 | 1.12 | M | 8 | PYRC |
| 7/5/2008 | R09 | DS | 140 | 86432 | 231 | 200 | 1.62 | | | |
| 6/26/2009 | R09 | DS | 73 | 86854 | 318 | 370 | 1.15 | M | 7 | PYRC |
| 6/24/2008 | R09 | US | 59 | 86854 | 315 | 350 | 1.12 | | | |
| 6/27/2009 | R09 | DS | 137 | 85802 | 298 | 315 | 1.19 | M | 7 | PYRC |
| 6/21/2008 | R09 | DS | 300 | 85802 | 300 | 375 | 1.39 | | | |
| 6/27/2009 | R09 | US | 133 | 85644 | 246 | 190 | 1.28 | F | 3 | PYRC |
| 7/13/2008 | R09 | DS | 202 | 85644 | 228 | 150 | 1.27 | | | |
| 6/28/2009 | R09 | DS | 185 | 85815 | 357 | 360 | 0.79 | F | 9 | PYRC |
| 6/21/2008 | R09 | US | 40 | 85815 | 309 | 375 | 1.27 | | | |
| 6/28/2009 | R09 | DS | 188 | 86867 | 320 | 390 | 1.19 | F | 4 | PYRC |
| 6/29/2008 | R09 | US | 73 | 86867 | 309 | 400 | 1.36 | F | 2 | |
| 6/29/2009 | R09 | US | 234 | 86860 | 320 | 355 | 1.08 | M | 7 | PYRC |
| 6/25/2008 | R09 | US | 65 | 86860 | 310 | 400 | 1.34 | M | 7 | |
| 6/30/2009 | R09 | US | 264 | 86867 | 320 | 355 | 1.08 | M | 9 | PYRC |
| 6/29/2008 | R09 | US | 73 | 86867 | 309 | 400 | 1.36 | | | |
| 7/1/2009 | R09 | DS | 270 | 86854 | 319 | 355 | 1.09 | M | 9 | PYRC |
| 6/24/2008 | R09 | US | 59 | 86854 | 315 | 350 | 1.12 | M | 7 | |

#### *3.3.7.4 R15*

One arctic grayling was a previous year recapture moving upstream at R15. The one fish was originally tagged in 2008. This demonstrates that grayling are returning to the same tributaries and are not impeded by the bridge abutments. The recaptured arctic grayling was generally in good condition (K>1.0), however its' condition factor has decreased from the 2008 collection data.

| Date | Location ID | US or DS | Fish ID | Tagging # | Length | Weight | K | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/26/2009 | R15 | US | 71 | 85865 | 269 | 215 | 1.10 | F | 5 | PYRC |
| 6/21/2008 | R15 | US | 14 | 85865 | 257 | 225 | 1.33 | | | |

## 3.4 MINNOW TRAP RESULTS

Minnow traps were set throughout the R02 habitat compensation area from July 20$^{th}$ to August 7$^{th}$ (post spawning run). During minnow trap retrieval observational data (approximately 0.5 hr) was also collected to document areas where young-of-the-year (YOY) Arctic grayling were nursing or foraging.

Zero Arctic grayling YOY were collected using minnow traps. Fourteen slimy sculpin and 8 nine-spine-sticklebacks were collected using minnow traps. During observational data collection, *minnows* were observed swimming inside the spawning beds between the berms. The swimming tendencies and size of minnows appeared to be that of Arctic grayling, however without having collected a specimen this could not be confirmed.

## SECTION 4 • CREEL SURVEY

In 2009, creel results were collected from twenty-two (22) of the thirty-three study participants. 2009 Creel results are summarized in **Table 1**. Results from previous years are also shown for comparative purposes.

**Table 1:** 2009 Creel Results and Historical Results to date.

| Fish Species | 2009 Counts | 2008 Counts | 2007 Counts |
|---|---|---|---|
| Arctic Char | 117 | 27 | 3 |
| Arctic Grayling | 1 | - | - |
| Lake Trout | 508 | 1035 | 210 |
| Lake Whitefish | 54 | 192 | - |
| **TOTALS** | **680** | **1254** | **213** |

As in previous years, creel data suggests the highest fishing rates occur during the spring and summer (April – August) with the peak period between May and June. The majority of fish continue to be caught away from the AWR, suggesting that fishing location preference continues to be uninfluenced by the presence of the road; however, an increased proportion of fishing was conducted at Whitehills Lake in 2009, which can be accessed via the AWR. It is unknown whether the increased fishing rates at Whitehills Lake are due to variation in study participation, the inclusion of new participants, or improved access due to the AWR. The key indicator species to determine effect, if any, will be Lake Trout, as densities of other fish currently occur in relatively low densities. Additional years of data will be required to identify potential trends..

# SECTION 5 • CONCLUSIONS

## 5.1 FISH PASSAGE AND MOVEMENTS

Similar to historical fisheries monitoring along the AWPAR, the 2009 results demonstrate that Arctic grayling (and a few other species) are able to pass by the bridge structures and complete their annual spawning migration. This is supported by the maximum and average stream velocities which are within the cited Arctic grayling *burst speed* and *sustained speed* (MOT, 2006). More-over, the high numbers of Arctic grayling captured moving upstream (especially at R02) indicate that they are not impacted by road activity and are able to pass by the bridge structures without constraints.

Similar to 2008, peak migration likely occurred just prior to the installation of hoopnets. This is based on the fact that many of the Arctic grayling were collected moving downstream within two days of the largest upstream collection. Furthermore, the larval drift findings at R02 suggest that there is an earlier spawning run (peak drift on June 24$^{th}$), followed by a post spawning run (smaller larval drift peak on July 19). According to Evans et al. (2002) Arctic grayling commonly have a post spawning run, therefore it would seem logical to assume that many of the fish collected moving upstream are part of a post spawning migration. Those collected moving downstream could be part of the peak upstream migration and/or the post spawning migration exodus.

In general, the Arctic grayling populations appear to be healthy at R02, R06, R09 and R15 crossings. The length-frequency, maturity data and condition factor indicate a robust Arctic grayling population with greater numbers of mature adult fish (300-360mm), and healthy population recruitment of immature fish in the size class of 200 to 240mm. There was evidence of a slight decrease in the condition factor of those fish captured in 2009 compared to 2008 and 2007 results. This may simply be due to altered methodologies between studies, or due to the fact that a greater number of immature fish (whose condition factor is generally lower than mature adults) are influencing the data to cause a decrease in the condition factor at the broader sample level. Where sample sizes are greatest (R02 and R06), the decrease in condition factor is negligible, however these findings need to be monitored in the future. Overall, the population of Arctic grayling appears to be healthy (K>1.00).

## 5.2 R02 HABITAT COMPENSATION

The combination of hoopnet collection, current year recapture, and young-of-the-year Arctic grayling larval drift collection at R02 suggests that Arctic grayling are utilizing the R02 habitat compensation area. Based on the 2009 and historical data, it is likely that Arctic grayling are beginning their spawning migration immediately at ice off (or possibly below ice). Given the high volume of water that flows at stream R02 and given the observed 50cm decrease in water level (which is only a portion of the total water level change), the berms are likely to offer refuge for Arctic grayling from the high currents. As per the habitat compensation design goals, the berms and spawning beds offer an ideal location for spawning during peak flows.

Although the effectiveness or success of the compensation area is difficult to quantify, the larval drift data provides evidence of Arctic grayling spawning utilization. By comparing *equal catch per unit efforts*, the data in 2009 shows an increase in Arctic grayling larvae collected throughout the R02

stream reach as compared to 2007 and 2008 data (116% and 215% increase, respectively). Overall, the number of larval data indicates that the spawning substrate and water depth at R02 compensation area is adequate for spawning and nursery.

Additionally, observational and quantitative data demonstrate that Arctic grayling are using the R02 habitat compensation area as refuge, foraging and/or spawning as part of the post-spawning migration as adults. As well, minnow observations suggest young-of-the-year area also using this area. The current year recapture data provides a caption of the broader population movements, migration patterns and behaviours. There were a number of examples of current year fish moving upstream that were ready to spawn and were later recaptured moving downstream having spawned. Some of these tagged fish were recaptured, having not passed by the farthest upstream R02 habitat compensation berm, where the R02A hoopnet was set. This suggests that this population is spawning near the R02 compensation area; or at the least the Arctic grayling are using this area as refugia post spawning.

Future monitoring will confirm the effectiveness of the habitat compensation area. Based on the number of fish collected moving upstream near the R02 compensation area, the larval drift data and these *observational* data collected, there is a weight of evidence suggesting that fish are using the R02 compensation area as spawning habitat and/or foraging and that young-of-the-year are nursing in it's vicinity.

### 5.3 CREEL SURVEY

As in previous years, creel data suggests the highest fishing rates occur during the spring and summer (April – August) with the peak period between May and June. The majority of fish continue to be caught away from the AWR, suggesting that fishing location preference continues to be uninfluenced by the presence of the road.

## SECTION 6 • REFERENCES

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# APPENDIX A: 2009 RAW FISHERIES DATA: ADULT FISHERIES DATA, LARVAL DRIFT TRAP DATA AND MINNOW TRAP DATA.

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/24/2009 | 9:30:am | 0.78 | R02A US | USA | 1 | Grayling | 90151 | 325 | 390 | F | 2 | |
| 6/24/2009 | 9:30:am | 0.78 | R02A US | USA | 2 | Grayling | 90152 | 324 | 360 | M | | |
| 6/24/2009 | 9:30:am | 0.78 | R02A US | USA | 3 | Grayling | 90153 | 300 | 305 | M | 9 | |
| 6/24/2009 | 9:30:am | 0.78 | R02A US | USA | 4 | Grayling | 90154 | 259 | 205 | F | 1 | |
| 6/24/2009 | 9:30:am | 0.78 | R02A US | USA | 5 | Grayling | | 205 | 100 | F | 2 | |
| 6/24/2009 | 9:30:am | 0.78 | R02A US | USA | 6 | Whitefish | | 315 | 345 | | | |
| 6/24/2009 | 10:30am | 0.36 | R06 US | US | 7 | Grayling | 90155 | 335 | 320 | M | 9 | |
| 6/24/2009 | 10:30am | 0.36 | R06 US | US | 8 | Grayling | 90156 | 350 | 460 | M | 9 | |
| 6/24/2009 | 10:30am | 0.36 | R06 US | US | 9 | Grayling | 90157 | 330 | 350 | M | 6 | |
| 6/24/2009 | 10:30am | 0.36 | R06 US | US | 10 | Grayling | | 220 | 130 | M | 7 | |
| 6/24/2009 | 10:30am | 0.36 | R06 US | US | 11 | Grayling | 85594 | 325 | 380 | F | 4 | PYRC |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 12 | Grayling | 90158 | 295 | 280 | M | 7 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 13 | Grayling | 90159 | 325 | 390 | F | 9 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 14 | Grayling | 90160 | 340 | 425 | M | 7 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 15 | Grayling | 90162 | 290 | 285 | M | 7 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 16 | Grayling | 90163 | 300 | 300 | M | 7 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 17 | Grayling | 90164 | 250 | 200 | F | 1 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 18 | Grayling | 90165 | 265 | 375 | M | 6 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 19 | Grayling | 90166 | 290 | 310 | F | 2 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 20 | Grayling | | 250 | 220 | M | 6 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 21 | Grayling | 85817 | 330 | 380 | M | 7 | PYRC |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | US | 22 | Lake Trout | | 480 | | | | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | DS | 23 | Grayling | 90167 | 310 | 345 | F | 7 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | DS | 24 | Grayling | 90168 | 320 | 350 | F | 4 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | DS | 25 | Grayling | | 235 | | F | 1 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | DS | 26 | Grayling | 90051 | 360 | 225 | F | 4 | |
| 6/24/2009 | 12:30pm | 0.37 | R09 US | DS | 27 | Grayling | | 213 | 120 | F | 1 | |
| 6/24/2009 | 2:30:pm | 0.49 | R15 US | US | 28 | Grayling | 90052 | 278 | 210 | F | 4 | |
| 6/25/2009 | 8:20am | 0.755 | R02A US | USA | 29 | Grayling | 90053 | 338 | 430 | M | 7 | |
| 6/25/2009 | 8:20am | 0.755 | R02A US | USA | 30 | Grayling | 90056 | 315 | 350 | M | 7 | |
| 6/25/2009 | 8:20am | 0.755 | R02A US | USA | 31 | Grayling | 90057 | 325 | 380 | M | 7 | |
| 6/25/2009 | 8:20am | 0.755 | R02A US | USA | 32 | Whitefish | | 325 | 340 | | | |
| 6/25/2009 | 8:20am | 0.755 | R02A US | USA | 33 | Whitefish | | 330 | 360 | | | |
| 6/25/2009 | 8:20am | 0.755 | R02C US | USC | 34 | Grayling | 90058 | 310 | 210 | M | 7 | |
| 6/25/2009 | 8:20am | 0.755 | R02C US | USC | 35 | Grayling | 90059 | 290 | 300 | M | 7 | |
| 6/25/2009 | 8:20am | 0.755 | R02C US | USC | 36 | Grayling | 90062 | 320 | 390 | F | 2 | |
| 6/25/2009 | 8:20am | 0.755 | R02C US | USC | 37 | Grayling | - | - | - | - | - | Lost in Transfer |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 38 | Grayling | 90063 | 345 | 300 | M | 7 | |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 39 | Grayling | 90064 | 333 | 290 | F | 4 | |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 40 | Grayling | 90065 | 345 | 350 | M | 7 | |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 41 | Grayling | 90066 | 360 | 300 | M | 7 | |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 42 | Grayling | 90067 | 350 | 505 | M | 7 | |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 43 | Grayling | 90068 | 385 | 650 | M | 7 | |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 44 | Grayling | 90069 | 320 | 410 | F | 4 | |
| 6/25/2009 | 9:30am | 0.35 | R06 US | US | 45 | Grayling | 90155 | 335 | 350 | M | 7 | CYRC |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 46 | Grayling | 90070 | 314 | 320 | F | 4 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 47 | Grayling | 90071 | 330 | 400 | F | 4 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 48 | Grayling | 90072 | 345 | 415 | M | 7 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 49 | Grayling | - | 217 | 115 | F | 5 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 50 | Grayling | - | 230 | 125 | F | 5 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 51 | Grayling | - | 197 | 95 | F | 5 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 52 | Grayling | 86875 | 265 | 185 | M | 8 | PYRC |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 53 | Grayling | 86432 | 266 | 210 | M | 8 | PYRC |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 54 | Grayling | 90073 | 325 | 460 | M | 9 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | US | 55 | Grayling | 90074 | 320 | 375 | F | 2 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | DS | 56 | Grayling | - | 235 | 145 | F | 5 | |
| 6/25/2009 | 10:30am | 0.36 | R09 US | DS | 57 | Grayling | 90165 | 265 | 225 | M | 6 | CYRC |
| 6/25/2009 | 10:30am | 0.36 | R09 US | DS | 58 | Grayling | 90163 | 320 | 290 | M | 7 | CYRC |
| 6/25/2009 | 10:30am | 0.36 | R09 US | DS | 59 | Grayling | 90158 | 295 | 280 | M | 7 | |
| 6/25/2009 | 11:30am | 0.48 | R15 US | US | 60 | Grayling | 90075 | 354 | 480 | M | 7 | |
| 6/25/2009 | 11:30am | 0.48 | R15 US | US | 61 | Grayling | 90100 | 318 | 290 | M | 7 | |
| 6/25/2009 | 11:30am | 0.48 | R15 US | US | 62 | Grayling | 90076 | 334 | 400 | F | 2 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 63 | Grayling | 90077 | 340 | 440 | M | 7 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 64 | Grayling | 90078 | 335 | 450 | F | 2 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 65 | Grayling | 90079 | 330 | 385 | M | 7 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 66 | Grayling | - | 286 | 210 | F | 5 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 67 | Grayling | - | 290 | 305 | F | 5 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 68 | Grayling | 90080 | 320 | 365 | M | 7 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 69 | Grayling | 90081 | 290 | 260 | F | 4 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 70 | Grayling | 90082 | 270 | 225 | F | 2 | |
| 6/26/2009 | 12:18pm | 0.475 | R15 US | US | 71 | Grayling | 85865 | 269 | 215 | F | 5 | PYRC |
| 6/26/2009 | 1:45pm | 0.35 | R09 US | US | 72 | Grayling | - | 251 | 190 | F | 5 | |
| 6/26/2009 | 1:45pm | 0.35 | R09 US | DS | 73 | Grayling | 86854 | 318 | 370 | M | 7 | PYRC |
| 6/26/2009 | 1:45pm | 0.35 | R09 US | DS | 74 | Grayling | - | - | - | - | - | Lost in Transfer |
| 6/26/2009 | 2:35pm | 0.35 | R06 US | US | 76 | Grayling | 90083 | 340 | 465 | M | 7 | |
| 6/26/2009 | 2:35pm | 0.35 | R06 US | US | 77 | Grayling | 90084 | 330 | 410 | F | 2 | |
| 6/26/2009 | 2:35pm | 0.35 | R06 US | US | 78 | Grayling | 85028 | 320 | 365 | M | 7 | PYRC |
| 6/26/2009 | 3:52pm | | R02C US | USC | 79 | Grayling | 90085 | 330 | 375 | F | 4 | |

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/26/2009 | 3:52pm | | R02C US | USC | 80 | Grayling | 90086 | 330 | 375 | F | 4 | |
| 6/26/2009 | 3:52pm | | R02C US | USC | 81 | Grayling | - | 285 | - | - | - | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 82 | Grayling | - | 289 | 250 | F | 5 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 83 | Grayling | - | 259 | 200 | F | 5 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 84 | Grayling | 90087 | 290 | 280 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 85 | Grayling | 90089 | 300 | 350 | F | 2 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 86 | Grayling | 90090 | 310 | 320 | F | 4 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 87 | Grayling | - | 390 | 380 | F | 3 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 88 | Grayling | 90091 | 308 | 310 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 89 | Grayling | 90093 | 310 | 320 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 90 | Grayling | - | 230 | 150 | F | 5 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 91 | Grayling | 90094 | 365 | 510 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 92 | Grayling | - | 197 | 110 | F | 5 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 93 | Grayling | 90095 | 298 | 270 | F | 2 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 94 | Grayling | - | 228 | 130 | F | 5 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 95 | Grayling | 90096 | 300 | 285 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 96 | Grayling | 86471 | 222 | 110 | F | 5 | PYRC |
| 6/26/2009 | 3:52pm | | R02B US | USB | 97 | Grayling | - | 280 | 245 | F | 5 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 98 | Grayling | 90097 | 291 | 265 | F | 2 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 99 | Grayling | - | 265 | 220 | M | 6 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 101 | Grayling | - | 276 | 225 | M | 6 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 102 | Grayling | 90129 | 316 | 385 | F | 2 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 103 | Grayling | - | 272 | 240 | F | 1 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 104 | Grayling | 90130 | 286 | 240 | F | 2 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 105 | Grayling | 90131 | 305 | 300 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 106 | Grayling | - | 203 | 100 | F | 1 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 107 | Grayling | - | 233 | 150 | F | 1 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 108 | Grayling | - | 233 | 145 | F | 1 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 109 | Grayling | - | 250 | 160 | F | 1 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 110 | Grayling | 90132 | 267 | 220 | F | 3 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 111 | Grayling | 90133 | 310 | 325 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 111 | Grayling | 90134 | 315 | 350 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 112 | Grayling | - | 297 | 315 | F | 1 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 113 | Grayling | 90135 | 320 | 350 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 114 | Grayling | 90136 | 295 | 295 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 115 | Grayling | 90137 | 321 | 330 | F | 2 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 116 | Grayling | 90138 | 326 | 405 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 117 | Grayling | 90139 | 320 | 345 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 118 | Grayling | 90140 | 339 | 415 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 119 | Grayling | - | 270 | 235 | F | 1 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 120 | Grayling | 90141 | 350 | 450 | M | 7 | |
| 6/26/2009 | 3:52pm | | R02B US | USB | 121 | Grayling | 86469 | 319 | 330 | M | 7 | PYRC |
| 6/26/2009 | 3:52pm | | R02B US | USB | 122 | Grayling | 85118 | 320 | 330 | M | 7 | PYRC |
| 6/26/2009 | 3:52pm | | R02B US | USB | 123 | Grayling | 90062 | 325 | 390 | F | 2 | CYRC |
| 6/26/2009 | 3:52pm | | R02B US | USB | 124 | Grayling | 90142 | 405 | 700 | M | 7 | |
| 6/26/2009 | 3:52pm | 0.735 | R02A US | USA | 125 | Grayling | 90143 | 295 | 285 | M | 7 | |
| 6/26/2009 | 3:52pm | 0.735 | R02A US | USA | 126 | Whitefish | - | 315 | 310 | - | - | |
| 6/26/2009 | 3:52pm | 0.735 | R02A US | USA | 127 | Grayling | 90144 | 310 | 330 | M | 7 | |
| 6/26/2009 | 3:52pm | 0.735 | R02A US | USA | 128 | Whitefish | - | 310 | 285 | - | - | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | US | 129 | Grayling | 90145 | 260 | 225 | M | 7 | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | US | 130 | Grayling | 90146 | 245 | 190 | F | 1 | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | US | 131 | Grayling | 90147 | 246 | 235 | F | 1 | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | US | 132 | Grayling | 90148 | 220 | 135 | F | 1 | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | US | 133 | Grayling | 85644 | 246 | 190 | F | 3 | PYRC |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | DS | 134 | Grayling | - | 251 | 200 | M | 10 | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | DS | 135 | Grayling | 90149 | 243 | 185 | F | 1 | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | DS | 136 | Grayling | 90150 | 212 | 145 | F | 1 | |
| 6/27/2009 | 12:29pm | 0.3 | R09 US | DS | 137 | Grayling | 85802 | 298 | 315 | M | 7 | PYRC |
| 6/27/2009 | 1:45pm | 0.475 | R15 US | US | 138 | Grayling | 90001 | 335 | 405 | M | 7 | |
| 6/27/2009 | 1:45pm | 0.475 | R15 US | US | 139 | Grayling | - | 233 | 142.5 | F | 1 | |
| 6/27/2009 | 1:45pm | 0.475 | R15 US | US | 140 | Grayling | 90002 | 311 | 317.5 | F | 2 | |
| 6/27/2009 | 1:45pm | 0.475 | R15 US | US | 141 | Grayling | 90003 | 248 | 195 | F | 1 | |
| 6/27/2009 | 1:45pm | 0.475 | R15 US | US | 142 | Grayling | 90004 | 307 | 250 | M | 7 | |
| 6/27/2009 | 1:45pm | 0.475 | R15 US | US | 144 | Grayling | 90005 | 335 | 435 | M | 7 | |
| 6/27/2009 | 1:45pm | 0.475 | R15 US | US | 145 | Grayling | 90006 | 365 | 505 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 146 | Grayling | 90007 | 313 | 315 | F | 3 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 147 | Grayling | 90008 | 308 | 320 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 148 | Grayling | 90009 | 300 | 280 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 149 | Grayling | 90010 | 340 | 440 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 150 | Grayling | 90011 | 342 | 435 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 151 | Grayling | 90012 | 291 | 255 | F | 4 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 152 | Grayling | 90013 | 314 | 325 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 153 | Grayling | 90014 | 330 | 240 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 154 | Grayling | 90015 | 272 | 215 | F | 1 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 155 | Grayling | 90016 | 324 | 365 | M | 7 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 156 | Grayling | - | 230 | 125 | F | 1 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 157 | Grayling | - | 224 | 110 | F | 1 | |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 158 | Grayling | - | 204 | 195 | F | 1 | |

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 159 | Grayling | 90097 | 290 | 360 | F | 4 | CYRC |
| 6/27/2009 | 4:45pm | 0.35 | R02B US | USB | 160 | Grayling | 90058 | 309 | 310 | M | 7 | CYRC |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 161 | Grayling | 90017 | 337 | 380 | M | 9 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 162 | Grayling | 90018 | 334 | 445 | F | 3 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 163 | Grayling | 90019 | 317 | 337 | F | 2 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 164 | Grayling | 90020 | 358 | 480 | M | 7 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 165 | Grayling | 90021 | 330 | 366 | F | 2 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 166 | Grayling | 90022 | 294 | 275 | F | 3 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 167 | Grayling | 90023 | 310 | 298 | F | 4 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 168 | Grayling | 90024 | 294 | 285 | F | 4 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 169 | Grayling | 90025 | 304 | 305 | F | 4 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 170 | Grayling | 90026 | 313 | 335 | F | 4 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 171 | Grayling | 90027 | 249 | 170 | F | 1 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 172 | Grayling | 90028 | 315 | 310 | M | 7 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 173 | Grayling | 90029 | 310 | 300 | M | 7 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 174 | Grayling | 90030 | 304 | 315 | M | 7 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 175 | Grayling | 90032 | 280 | 265 | F | 2 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 176 | Grayling | 90033 | 335 | 390 | F | 2 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 177 | Grayling | 90034 | 233 | 155 | F | 1 | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 178 | Grayling | 90152 | 323 | 325 | M | 6 | CYRC |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 179 | Grayling | 85127 | 325 | 370 | F | 2 | PYRC |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 180 | Whitefish | - | 325 | 355 | - | - | |
| 6/27/2009 | 5:00pm | 0.575 | R02A US | USA | 181 | Whitefish | - | 345 | 390 | - | - | |
| 6/28/2009 | 11:50am | 0.47 | R15 US | US | 182 | Grayling | - | 225 | 105 | M | 6 | |
| 6/28/2009 | 1:00pm | 0.28 | R09 US | US | 183 | Grayling | 90034 | 245 | 175 | M | 6 | |
| 6/28/2009 | 1:00pm | 0.28 | R09 US | DS | 184 | Grayling | 90035 | 282 | 255 | F | 9 | |
| 6/28/2009 | 1:00pm | 0.28 | R09 US | DS | 185 | Grayling | 85815 | 357 | 360 | F | 9 | PYRC |
| 6/28/2009 | 1:00pm | 0.28 | R09 US | DS | 186 | Grayling | 90164 | 252 | 195 | F | 1 | CYRC |
| 6/28/2009 | 1:00pm | 0.28 | R09 US | DS | 187 | Grayling | 90145 | 253 | 200 | M | 7 | CYRC |
| 6/28/2009 | 1:00pm | 0.28 | R09 US | DS | 188 | Grayling | 86867 | 320 | 390 | F | 4 | PYRC |
| 6/28/2009 | 1:00pm | 0.28 | R09 US | DS | 189 | Grayling | 90036 | 329 | 385 | F | 2 | |
| 6/28/2009 | 2:30pm | | R02C US | US | 190 | Grayling | - | - | - | - | - | Lost in Transfer |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | USA | 191 | Grayling | 90037 | 278 | 250 | M | 7 | |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | USA | 192 | Grayling | 90038 | 329 | 304 | M | 7 | |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | USA | 193 | Grayling | 90039 | 290 | 298 | F | 9 | |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | USA | 194 | Grayling | 90040 | 285 | 294 | M | 7 | |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | USA | 195 | Grayling | 90041 | 330 | 302 | F | 2 | |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | USA | 196 | Grayling | 90042 | 343 | 331 | F | 2 | |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | USA | 197 | Whitefish | - | 280 | 299 | - | - | |
| 6/28/2009 | 3:00pm | 0.535 | R02A US | DSA | 201 | Grayling | 90043 | 358 | 505 | M | 9 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 202 | Grayling | 90044 | 277 | 225 | F | 3 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 203 | Grayling | 90045 | 322 | 350 | M | 7 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 204 | Grayling | 90046 | 294 | 310 | F | 3 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 205 | Grayling | 90047 | 338 | 390 | M | 9 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 206 | Grayling | 90048 | 268 | 211 | M | 6 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 207 | Grayling | 90049 | 296 | 275 | M | 6 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 208 | Grayling | 90950 | 280 | 240 | F | 4 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 209 | Grayling | 90951 | 252 | 185 | M | 6 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 210 | Grayling | 90952 | 264 | 210 | M | 6 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 211 | Grayling | 90953 | 313 | 329 | F | 4 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 212 | Grayling | 90954 | 231 | 130 | F | 1 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 213 | Grayling | 90955 | 267 | 220 | F | 1 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 214 | Grayling | 90956 | 247 | 170 | F | 1 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 215 | Grayling | 90957 | 258 | 190 | M | 6 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 216 | Grayling | 90958 | 251 | 170 | F | 1 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 217 | Grayling | - | 208 | 105 | M | 6 | |
| 6/28/2009 | 3:30pm | | R02B US | USB | 218 | Grayling | 90010 | 343 | 440 | M | 7 | CYRC |
| 6/28/2009 | 3:30pm | | R02B US | USB | 219 | Grayling | - | 215 | 121 | - | - | Dead |
| 6/29/2009 | 10:30am | 0.53 | R02A US | DSA | 220 | Grayling | 90959 | 300 | 255 | M | 9 | |
| 6/29/2009 | 10:30am | 0.53 | R02A US | DSA | 221 | Grayling | 90960 | 305 | 300 | M | 9 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 222 | Grayling | 90962 | 301 | 279 | M | 9 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 223 | Grayling | 90963 | 277 | 230 | F | 4 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 224 | Grayling | 90964 | 246 | 170 | M | 6 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 225 | Grayling | 90965 | 274 | 220 | M | 9 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 226 | Grayling | 90968 | 253 | 180 | M | 6 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 227 | Grayling | 90970 | 287 | 220 | M | 9 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 228 | Grayling | 90971 | 301 | 270 | M | 7 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 229 | Grayling | 90972 | 330 | 390 | F | 3 | |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 230 | Grayling | 90152 | 320 | 340 | M | 7 | CYRC |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 231 | Grayling | 90053 | 338 | 430 | M | 7 | CYRC |
| 6/29/2009 | 10:30am | 0.53 | R02B US | USB | 232 | Grayling | 90094 | 363 | 500 | M | 7 | CYRC |
| 6/29/2009 | 1:33pm | 0.27 | R09 US | US | 233 | Grayling | 90973 | 225 | 155 | M | 6 | |
| 6/29/2009 | 1:33pm | 0.27 | R09 US | US | 234 | Grayling | 86860 | 320 | 355 | M | 7 | PYRC |
| 6/29/2009 | 1:33pm | 0.27 | R09 US | DS | 235 | Grayling | 90070 | 315 | 310 | M | 9 | CYRC |
| 6/30/2009 | 9:54am | 0.53 | R02A US | DSA | 236 | Grayling | 90975 | 220 | 130 | F | 1 | |
| 6/30/2009 | 9:54am | 0.53 | R02A US | USA | 237 | Whitefish | - | 295 | 290 | - | - | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 238 | Grayling | 90976 | 249 | 120 | M | 6 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 239 | Grayling | 90977 | 292 | 270 | M | 9 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 240 | Grayling | 90978 | 277 | 250 | M | 9 | |

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 241 | Grayling | 90979 | 289 | 240 | M | 9 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 242 | Grayling | 90980 | 321 | 315 | M | 7 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 243 | Grayling | 90981 | 290 | 255 | F | 2 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 244 | Grayling | 90982 | 301 | 310 | F | 4 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 245 | Grayling | 90983 | 269 | 215 | M | 6 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 246 | Grayling | 90984 | 313 | 285 | M | 9 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 247 | Grayling | 90985 | 308 | 330 | M | 7 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 248 | Grayling | 90986 | 296 | 310 | M | 7 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 249 | Grayling | - | 208 | 110 | F | 1 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 250 | Grayling | 90987 | 332 | 370 | M | 7 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 251 | Grayling | 90988 | 335 | 390 | F | 2 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 252 | Grayling | 90989 | 358 | 430 | M | 9 | |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 253 | Grayling | 90141 | 346 | 430 | M | 7 | CYRC |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 254 | Grayling | 90050 | 280 | 240 | F | 1 | CYRC |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 255 | Grayling | 90096 | 300 | 290 | M | 9 | CYRC |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 256 | Grayling | 90139 | 313 | 330 | M | 9 | CYRC |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 257 | Grayling | 90033 | 355 | 390 | F | 2 | CYRC |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 258 | Grayling | 90018 | 335 | 410 | F | 2 | CYRC |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 259 | Grayling | - | - | - | - | - | Lost in Transfer |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 260 | Grayling | - | - | - | - | - | Lost in Transfer |
| 6/30/2009 | 9:54am | 0.53 | R02B US | USB | 261 | Grayling | - | - | - | - | - | Lost in Transfer |
| 6/30/2009 | 9:54am | 0.53 | R02C US | USC | 262 | Grayling | 90954 | 235 | 150 | F | 1 | CYRC - Dead |
| 6/30/2009 | 9:54am | 0.53 | R02C US | DSC | 263 | Grayling | 90093 | 310 | 290 | M | 9 | CYRC |
| 6/30/2009 | 12:30pm | 0.275 | R09 US | US | 264 | Grayling | 86867 | 320 | 355 | M | 9 | PYRC |
| 6/30/2009 | 12:30pm | 0.275 | R09 US | US | 265 | Grayling | 90990 | 260 | 195 | M | 6 | |
| 6/30/2009 | 12:30pm | 0.275 | R09 US | DS | 266 | Grayling | 90146 | 260 | 195 | M | 6 | CYRC |
| 6/30/2009 | 12:30pm | 0.275 | R09 US | DS | 267 | Grayling | 90159 | 325 | 355 | M | 9 | CYRC |
| 6/30/2009 | 12:30pm | 0.275 | R09 US | DS | 268 | Grayling | 90166 | 290 | 255 | F | 4 | CYRC |
| 7/1/2009 | 10:35am | 0.265 | R09 US | DS | 269 | Grayling | 90973 | 224 | 150 | F | 1 | CYRC |
| 7/1/2009 | 10:35am | 0.265 | R09 US | DS | 270 | Grayling | 86854 | 319 | 355 | M | 9 | PYRC |
| 7/1/2009 | 10:35am | 0.265 | R09 US | DS | 271 | Grayling | 90072 | 341 | 420 | M | 7 | CYRC |
| 7/1/2009 | 10:35am | 0.265 | R09 US | DS | 272 | Grayling | 90991 | 253 | 200 | F | 1 | |
| 7/1/2009 | 10:35am | 0.265 | R09 US | DS | 273 | Grayling | 90992 | 293 | 295 | F | 4 | |
| 7/1/2009 | 1:00pm | 0.51 | R02C US | DSC | 275 | Grayling | 90993 | 260 | 195 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02C US | DSC | 276 | Grayling | 90994 | 255 | 160 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02C US | USC | 278 | Grayling | - | 220 | 110 | F | 1 | Dead |
| 7/1/2009 | 1:00pm | 0.51 | R02C US | USC | 279 | Grayling | - | 195 | 100 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02D US | DSD | 280 | Grayling | 90907 | 292 | 260 | M | 9 | CYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02D US | DSD | 281 | Grayling | 90958 | 253 | 195 | F | 9 | CYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02D US | DSD | 282 | Grayling | 90139 | 313 | 305 | M | 9 | CYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02D US | DSD | 283 | Grayling | 90995 | 300 | 300 | M | 9 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 284 | Grayling | 90996 | 244 | 170 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 285 | Grayling | 90997 | 275 | 220 | M | 9 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 286 | Grayling | 90998 | 260 | 185 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 287 | Grayling | - | 200 | 105 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 288 | Grayling | - | 206 | 100 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 289 | Grayling | 90999 | 232 | 135 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 290 | Grayling | - | 211 | 125 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 291 | Grayling | 91000 | 319 | 295 | M | 7 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 292 | Grayling | 90901 | 281 | 235 | F | 4 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 293 | Grayling | 90902 | 278 | 240 | M | 9 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 294 | Grayling | 90903 | 243 | 145 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 295 | Grayling | 90904 | 231 | 135 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 296 | Grayling | 90905 | 228 | 145 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 297 | Grayling | 90906 | 238 | 155 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 298 | Grayling | 90907 | 269 | 220 | F | 3 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 299 | Grayling | 90908 | 280 | 250 | M | 9 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 300 | Grayling | - | 203 | 110 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 301 | Grayling | 90909 | 257 | 170 | F | 1 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 302 | Grayling | 90910 | 267 | 200 | M | 9 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 303 | Grayling | 90911 | 283 | 230 | M | 7 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 304 | Grayling | 90912 | 276 | 225 | F | 4 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 305 | Grayling | 90913 | 327 | 355 | M | 7 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 306 | Grayling | 90914 | 316 | 340 | F | 4 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 307 | Grayling | 90915 | 295 | 300 | F | 3 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 308 | Grayling | 90916 | 340 | 430 | M | 7 | |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 309 | Grayling | 85617 | 250 | 160 | F | 1 | PYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 310 | Grayling | 90012 | 295 | 260 | F | 2 | CYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 311 | Grayling | 90929 | 319 | 340 | F | 2 | CYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 312 | Grayling | 86873 | 260 | 205 | M | 9 | PYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 313 | Grayling | 90137 | 318 | 340 | F | 4 | CYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02B US | USB | 314 | Grayling | 90988 | 337 | 400 | F | 4 | CYRC |
| 7/1/2009 | 1:00pm | 0.51 | R02A US | USA | 315 | Grayling | 90917 | 267 | 240 | F | 3 | |
| 7/1/2009 | 1:00pm | 0.51 | R02A US | USA | 316 | Grayling | 90918 | 250 | 165 | M | 6 | |
| 7/1/2009 | 1:00pm | 0.51 | R02A US | USA | 317 | Whitefish | - | 320 | 320 | - | - | |
| 7/1/2009 | 1:00pm | 0.51 | R02A US | USA | 318 | Whitefish | - | 345 | 425 | - | - | |
| 7/2/2009 | 8:30am | 0.5075 | R02A US | USA | 319 | Grayling | 90919 | 252 | 150 | M | 6 | |
| 7/2/2009 | 8:30am | 0.5075 | R02A US | USA | 320 | Grayling | 90920 | 267 | 205 | M | 6 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 321 | Grayling | - | 198 | 98 | F | 1 | |

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 322 | Grayling | 90921 | 251 | 200 | F | 1 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 323 | Grayling | - | 196 | 68 | F | 1 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 324 | Grayling | - | 212 | 105 | F | 1 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 325 | Grayling | - | 202 | 95 | F | 1 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 326 | Grayling | 90923 | 251 | 190 | F | 1 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 327 | Grayling | 90924 | 258 | 200 | F | 4 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 328 | Grayling | 90925 | 294 | 300 | F | 4 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 329 | Grayling | 90926 | 309 | 310 | M | 8 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 330 | Grayling | - | - | - | - | - | Lost |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 331 | Grayling | 90927 | 293 | 290 | F | 4 | |
| 7/2/2009 | 8:30am | 0.5075 | R02B US | USB | 332 | Grayling | 90928 | 343 | 420 | M | 7 | |
| 7/2/2009 | 8:30am | 0.5075 | R02C US | DSC | 333 | Grayling | 90062 | 325 | 310 | M | 9 | |
| 7/2/2009 | 8:30am | 0.5075 | R02C US | DSC | 334 | Grayling | 90930 | 230 | 120 | M | 6 | |
| 7/2/2009 | 8:30am | 0.5075 | R02D DS | DSD | 335 | Grayling | 90931 | 330 | 390 | M | 7 | |
| 7/2/2009 | 10:20am | 0.3 | R06 US | US | 336 | Grayling | 90932 | 265 | 200 | M | 6 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 337 | Grayling | 90933 | 260 | 210 | F | 1 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 338 | Grayling | 90934 | 315 | 340 | F | 4 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 339 | Grayling | 90935 | 310 | 360 | M | 9 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 340 | Grayling | 85862 | 320 | 360 | M | 9 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 341 | Grayling | 86456 | 305 | 310 | F | 4 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 342 | Grayling | 90936 | 350 | 470 | M | 9 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 343 | Grayling | 90937 | 300 | 390 | F | 4 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 344 | Grayling | 90938 | 315 | 330 | M | 9 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 345 | Grayling | 90939 | 255 | 300 | M | 6 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 346 | Grayling | 90940 | 250 | 175 | F | 1 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 347 | Grayling | 90941 | 230 | 135 | F | 1 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 348 | Grayling | - | 190 | 100 | M | 6 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 349 | Grayling | - | 210 | 110 | M | 6 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 350 | Grayling | - | 215 | 105 | M | 6 | |
| 7/2/2009 | 10:20am | 0.3 | R06 DS | DS | 351 | Grayling | - | 191 | 95 | F | 1 | |
| 7/2/2009 | 12:40pm | 0.4475 | R15 US | DS | 352 | Grayling | - | 200 | 100 | F | 1 | |
| 7/3/2009 | 1:40pm | 0.4475 | R15 US | DS | 353 | Grayling | 90942 | 287 | 250 | M | 9 | |
| 7/3/2009 | 1:40pm | 0.4475 | R15 US | DS | 354 | Grayling | 90943 | 252 | 190 | F | 1 | |
| 7/3/2009 | 2:30pm | 0.26 | R09 US | DS | 355 | Grayling | 90944 | 275 | 250 | M | 9 | |
| 7/3/2009 | 3:15pm | 0.27 | R06 US | DS | 356 | Grayling | - | - | - | - | - | Lost in Transfer |
| 7/3/2009 | 3:15pm | 0.27 | R06 DS | DS | 357 | Grayling | - | 212 | 105 | F | 1 | |
| 7/3/2009 | 3:15pm | 0.27 | R06 DS | DS | 358 | Grayling | - | 188 | 98 | F | 1 | |
| 7/3/2009 | 3:15pm | 0.27 | R06 DS | DS | 359 | Grayling | 90945 | 278 | 215 | F | 4 | |
| 7/3/2009 | 3:15pm | 0.27 | R06 DS | DS | 360 | Grayling | 90946 | 221 | 110 | F | 1 | |
| 7/3/2009 | 4:10pm | 0.48 | R02C US | USC | 361 | Grayling | 90947 | 345 | 430 | M | 9 | |
| 7/3/2009 | 4:10pm | 0.48 | R02C US | DSC | 362 | Grayling | 90959 | 300 | 260 | M | 9 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02C US | DSC | 363 | Grayling | - | 198 | 105 | F | 1 | |
| 7/3/2009 | 4:10pm | 0.48 | R02D US | DSD | 364 | Grayling | 90948 | 252 | 165 | F | 2 | |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 365 | Grayling | - | 203 | 105 | F | 1 | |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 366 | Grayling | 90949 | 243 | 160 | F | 1 | |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 367 | Grayling | 90950 | 256 | 175 | M | 6 | |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 368 | Grayling | 90601 | 306 | 295 | M | 7 | |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 369 | Grayling | 90602 | 244 | 175 | M | 6 | |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 370 | Grayling | 90963 | 279 | 225 | F | 4 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 371 | Grayling | 90603 | 281 | 220 | M | 9 | |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 372 | Grayling | 90988 | 337 | 385 | F | 4 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 373 | Grayling | 90030 | 300 | 295 | M | 7 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02B US | USB | 374 | Grayling | 90915 | 296 | 285 | F | 4 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | DSA | 375 | Grayling | - | 209 | 115 | M | 6 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | DSA | 376 | Whitefish | - | 300 | 295 | - | - | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 377 | Grayling | 90604 | 226 | 135 | F | 1 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 378 | Grayling | - | 198 | 105 | F | 1 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 379 | Grayling | 90605 | 264 | 200 | M | 7 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 380 | Grayling | 90606 | 250 | 205 | F | 4 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 381 | Grayling | 90607 | 310 | 315 | M | 7 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 382 | Grayling | 90608 | 235 | 135 | M | 6 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 383 | Grayling | 90981 | 290 | 240 | F | 2 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 384 | Grayling | 90609 | 252 | 115 | M | 9 | |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 385 | Grayling | 90964 | 241 | 170 | M | 6 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 386 | Grayling | 90135 | 327 | 330 | M | 7 | CYRC |
| 7/3/2009 | 4:10pm | 0.48 | R02A US | USA | 389 | Grayling | 90610 | 314 | 320 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02A US | USA | 390 | Grayling | 90611 | 240 | 155 | M | 6 | |
| 7/4/2009 | 8:25am | 0.47 | R02A US | USA | 391 | Grayling | 90612 | 211 | 120 | F | 1 | |
| 7/4/2009 | 8:25am | 0.47 | R02A US | USA | 392 | Grayling | 90613 | 258 | 195 | F | 1 | |
| 7/4/2009 | 8:25am | 0.47 | R02A US | USA | 393 | Grayling | 90614 | 280 | 255 | F | 4 | |
| 7/4/2009 | 8:25am | 0.47 | R02A US | USA | 394 | Grayling | 90615 | 290 | 270 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02A US | USA | 395 | Grayling | 90616 | 269 | 235 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02A US | USA | 396 | Grayling | 90928 | 340 | 416 | M | 7 | CYRC |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 397 | Grayling | 90617 | 265 | 215 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 398 | Grayling | 90618 | 258 | 190 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 399 | Grayling | 90619 | 304 | 285 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 400 | Grayling | 90620 | 226 | 140 | F | 1 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 401 | Grayling | 90621 | 249 | 180 | F | 1 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 402 | Grayling | - | 211 | 110 | F | 1 | |

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 403 | Grayling | 90622 | 228 | 140 | F | 1 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 404 | Grayling | 90623 | 254 | 195 | M | 6 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 405 | Grayling | 90624 | 258 | 190 | M | 6 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 406 | Grayling | 90625 | 272 | 240 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 407 | Grayling | 90651 | 303 | 300 | M | 9 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 408 | Grayling | 90652 | 319 | 350 | M | 7 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 409 | Grayling | 90653 | 340 | 400 | M | 7 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 410 | Grayling | 90654 | 353 | 420 | M | 7 | |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 411 | Grayling | 90918 | 251 | 185 | F | 1 | CYRC |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 412 | Grayling | 90984 | 312 | 290 | F | 1 | CYRC |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 413 | Grayling | 90014 | 286 | 245 | M | 7 | CYRC |
| 7/4/2009 | 8:25am | 0.47 | R02B US | USB | 414 | Grayling | 90091 | 305 | 330 | M | 9 | CYRC |
| 7/4/2009 | 8:25am | 0.47 | R02C US | DSC | 415 | Grayling | 90947 | 345 | 430 | M | 9 | Dead |
| 7/4/2009 | 8:25am | 0.47 | R02C US | DSC | 416 | Grayling | 90655 | 225 | 140 | F | 1 | |
| 7/4/2009 | 10:50am | 0.36 | R06 US | US | 417 | Grayling | 86462 | 287 | 260 | F | 4 | PYRC |
| 7/4/2009 | 10:50am | 0.36 | R06 US | DS | 418 | Grayling | - | 211 | 120 | M | 6 | Dead |
| 7/4/2009 | 10:50am | 0.36 | R06 US | DS | 419 | Grayling | - | 205 | 110 | F | 1 | |
| 7/4/2009 | 10:50am | 0.36 | R06 US | DS | 420 | Grayling | - | 205 | 110 | F | 1 | |
| 7/4/2009 | 10:50am | 0.36 | R06 US | DS | 421 | Grayling | - | 211 | 120 | F | 1 | |
| 7/4/2009 | 10:50am | 0.36 | R06 US | DS | 422 | Grayling | 90656 | 274 | 230 | F | 4 | |
| 7/4/2009 | 10:50am | 0.36 | R06 US | DS | 423 | Grayling | 90657 | 305 | 290 | F | 4 | |
| 7/4/2009 | 10:50am | 0.36 | R06 US | DS | 424 | Grayling | 90064 | 335 | 405 | F | 4 | CYRC |
| 7/4/2009 | 12:00pm | 0.26 | R09 US | DS | 425 | Grayling | 90658 | 224 | 152 | F | 1 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 426 | Grayling | 90659 | 291 | 275 | M | 9 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 427 | Grayling | 90660 | 237 | 140 | F | 1 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 428 | Grayling | 90661 | 273 | 225 | F | 4 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 429 | Grayling | 90662 | 285 | 270 | M | 7 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 430 | Grayling | 90663 | 256 | 210 | F | 4 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 431 | Grayling | 90664 | 264 | 220 | M | 9 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 432 | Grayling | 90665 | 242 | 180 | M | 9 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 433 | Grayling | 90666 | 329 | 385 | M | 7 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 434 | Grayling | 90667 | 335 | 390 | F | 4 | |
| 7/5/2009 | 8:00am | 0.46 | R02B US | USB | 435 | Grayling | 90668 | 294 | 275 | F | 4 | |
| 7/5/2009 | 8:00am | 0.46 | R02D US | DSD | 436 | Grayling | 90617 | 265 | 215 | M | 9 | CYRC - Dead |
| 7/5/2009 | 8:00am | 0.46 | R02C US | USC | 437 | Grayling | 90655 | 236 | 150 | F | 1 | CYRC |
| 7/5/2009 | 10:00am | 0.3 | R06 DS | DS | 438 | Grayling | - | 200 | 95 | F | 1 | |
| 7/5/2009 | 10:00am | 0.3 | R06 DS | DS | 439 | Grayling | 90669 | 238 | 160 | F | 1 | |
| 7/5/2009 | 10:00am | 0.3 | R06 DS | DS | 440 | Grayling | - | 193 | 95 | F | 1 | |
| 7/5/2009 | 10:00am | 0.3 | R06 DS | DS | 441 | Grayling | - | 212 | 110 | F | 1 | |
| 7/5/2009 | 10:00am | 0.3 | R06 DS | DS | 442 | Grayling | - | 210 | 115 | M | 6 | |
| 7/5/2009 | 10:00am | 0.3 | R06 DS | DS | 443 | Grayling | 90670 | 238 | 140 | M | 6 | |
| 7/5/2009 | 11:15am | 0.16 | R09 US | US | 444 | Grayling | 90671 | 240 | 160 | F | 1 | |
| 7/5/2009 | 11:15am | 0.16 | R09 US | US | 445 | Grayling | - | - | - | - | - | Lost in Transfer |
| 7/5/2009 | 11:15am | 0.16 | R09 US | DS | 446 | Grayling | 90672 | 220 | 135 | F | 1 | |
| 7/6/2009 | 9:39am | 0.455 | R02A US | USA | 447 | Grayling | - | - | - | - | - | Dead |
| 7/6/2009 | 9:39am | 0.455 | R02A US | DSA | 448 | - | - | - | - | - | - | Lost in Transfer |
| 7/6/2009 | 9:39am | 0.455 | R02A US | DSA | 449 | Whitefish | | 310 | 300 | - | - | |
| 7/6/2009 | 3:55pm | 0.455 | R02C US | US | 453 | Grayling | 90659 | 291 | 275 | M | 9 | CYRC |
| 7/7/2009 | 10:25 | 0.419 | R15 US | DS | 454 | Grayling | 90673 | 345 | 420 | M | 7 | |
| 7/7/2009 | 10:25 | 0.419 | R15 US | DS | 456 | Grayling | - | 218 | 140 | F | 1 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 457 | Grayling | - | 200 | 105 | F | 1 | Dead |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 458 | Grayling | - | 210 | 100 | F | 1 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 459 | Grayling | - | 210 | 100 | M | 6 | Dead |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 460 | Grayling | - | 200 | 102 | M | 6 | Dead |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 461 | Grayling | - | 205 | 100 | M | 6 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 462 | Grayling | - | 211 | 105 | M | 6 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 463 | Grayling | - | 207 | 110 | M | 6 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 464 | Grayling | 90675 | 213 | 105 | M | 6 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 465 | Grayling | 90626 | 225 | 115 | M | 6 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 466 | Grayling | 90627 | 215 | 107 | F | 1 | |
| 7/7/2009 | 1:50PM | 0.26 | RO6 DS | DS | 467 | Grayling | - | 210 | 95 | F | 1 | |
| 7/7/2009 | 3:10PM | 0.26 | R02D US | DSD | 468 | Grayling | 90666 | 335 | 370 | M | 7 | CYRC |
| 7/7/2009 | 3:10PM | 0.26 | R02D US | DSD | 469 | Grayling | - | 270 | 245 | F | 4 | CYRC |
| 7/7/2009 | 3:10PM | 0.26 | R02B US | USB | 470 | Grayling | 90012 | 295 | 245 | F | | CYRC |
| 7/7/2009 | 3:10PM | 0.26 | R02B US | USB | 471 | Grayling | - | 213 | 125 | F | 1 | |
| 7/7/2009 | 3:10PM | 0.26 | R02B US | USB | 472 | Grayling | 90628 | 230 | 130 | M | 6 | |
| 7/7/2009 | 3:10PM | 0.26 | R02B US | USB | 473 | Grayling | - | - | - | - | | |
| 7/7/2009 | 3:10PM | 0.26 | R02B US | USB | 474 | Grayling | 90629 | 225 | 125 | F | 1 | |
| 7/7/2009 | 3:10PM | 0.438 | RO2A US | DSA | 475 | Grayling | - | 214 | 295 | - | - | |
| 7/8/2009 | 8:45am | 0.438 | R02A US | USC | 476 | Grayling | 90630 | 270 | 200 | M | 6 | |
| 7/8/2009 | 8:45am | 0.438 | R02A US | DSC | 477 | Grayling | 90631 | 230 | 140 | F | 1 | |
| 7/8/2009 | 8:45am | 0.26 | R06 DS | DS | 478 | Grayling | - | 213 | 110 | M | 6 | |
| 7/8/2009 | 8:45am | 0.26 | R06 DS | DS | 479 | Grayling | - | 201 | 105 | F | 1 | |
| 7/8/2009 | 8:45am | 0.26 | R06 DS | DS | 480 | Grayling | - | 203 | 110 | F | 1 | |
| 7/8/2009 | 8:45am | 0.26 | R06 DS | DS | 481 | - | - | - | - | - | - | Lost in Transfer |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 484 | Grayling | - | 210 | 100 | M | 6 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 485 | Grayling | - | 200 | 90 | M | 6 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 486 | Grayling | - | 222 | 110 | M | 6 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 487 | Whitefish | - | 290 | 360 | - | - | |

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 488 | Whitefish | - | 395 | 280 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 489 | Whitefish | - | 319 | 315 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 490 | Whitefish | - | 320 | 350 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 491 | Whitefish | - | 330 | 315 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 492 | Whitefish | - | 380 | 210 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 493 | Whitefish | - | 330 | 350 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 494 | Whitefish | - | 380 | 300 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 495 | Whitefish | - | 210 | 130 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 496 | Whitefish | - | 250 | 180 | - | - | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 497 | Grayling | 90634 | 380 | 250 | M | 7 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 498 | Grayling | 90639 | 314 | 310 | M | 7 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 499 | Grayling | 90640 | 245 | 198 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 500 | Grayling | - | 210 | 110 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 501 | Grayling | 90641 | 260 | 101 | M | 6 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 502 | Grayling | 90642 | 275 | 204 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 503 | Grayling | - | 245 | 160 | M | 6 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 504 | Grayling | - | 228 | 150 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 505 | Grayling | - | 210 | 129 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 506 | Grayling | - | 235 | 150 | M | 6 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 507 | Grayling | - | 215 | 102 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 508 | Grayling | - | 274 | 250 | M | 9 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 509 | Grayling | 90645 | 255 | 282 | F | 2 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 510 | Grayling | - | 230 | 150 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 511 | Grayling | 90646 | 260 | 230 | M | 6 | |
| 7/10/2009 | 8:45am | 0.425 | R02A US | USA | 512 | Grayling | 90955 | 230 | 270 | F | 1 | CYRC |
| 7/10/2009 | 8:45am | 0.425 | R02B US | DSB | 513 | Grayling | - | 219 | 120 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02B US | DSB | 514 | Grayling | - | 210 | 110 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02B US | DSB | 515 | Lake Trout | 85843 | 570 | 8lbs | - | - | CYRC |
| 7/10/2009 | 8:45am | 0.425 | R02C US | DSB | 516 | Grayling | - | 210 | 110 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02C US | DSB | 517 | Grayling | - | 215 | 250 | F | 1 | |
| 7/10/2009 | 8:45am | 0.425 | R02C US | DSB | 518 | Grayling | 90647 | 234 | 210 | M | 9 | |
| 7/10/2009 | 8:45am | 0.425 | R02C US | DSB | 519 | Grayling | 90648 | 266 | 160 | F | 4 | |
| 7/10/2009 | 8:45am | 0.425 | R02C US | DSB | 520 | Grayling | 90649 | 272 | 210 | F | 4 | |
| 7/11/2009 | 8:25am | 0.387 | R02A US | USA | 522 | Grayling | 90650 | 240 | 152 | F | 1 | |
| 7/11/2009 | 8:25am | 0.387 | R02A US | USA | 523 | Grayling | - | 220 | 120 | F | 1 | |
| 7/11/2009 | 8:25am | 0.387 | R02A US | USA | 524 | Grayling | 90701 | 260 | 200 | M | 9 | |
| 7/11/2009 | 8:25am | 0.387 | R02A US | USA | 525 | Grayling | 90702 | 260 | 200 | F | 2 | |
| 7/11/2009 | 8:25am | 0.387 | R02A US | USA | 526 | Whitefish | - | 350 | 490 | - | - | |
| 7/11/2009 | 8:25am | 0.387 | R02A US | USA | 527 | Grayling | 90996 | 245 | 180 | F | 1 | CYRC |
| 7/11/2009 | 8:25am | 0.387 | R02A US | USA | 528 | Grayling | - | - | - | - | - | Dead |
| 7/11/2009 | 8:25am | 0.387 | R02B US | DSB | 529 | Grayling | - | 210 | 110 | F | 1 | |
| 7/11/2009 | 8:25am | 0.387 | R02B US | DSB | 530 | Grayling | 90703 | 220 | 240 | F | 1 | |
| 7/11/2009 | 8:25am | 0.387 | R02B US | DSB | 531 | Grayling | 90704 | 250 | 200 | F | 3 | |
| 7/11/2009 | 8:25am | 0.387 | R02B US | DSB | 532 | Grayling | 90705 | 234 | 150 | F | 3 | |
| 7/11/2009 | 8:25am | 0.387 | R02B US | DSB | 533 | Grayling | 90706 | 300 | 240 | M | 7 | |
| 7/11/2009 | 8:25am | 0.387 | R02B US | DSB | 534 | Grayling | - | 218 | 110 | F | 1 | Dead |
| 7/11/2009 | 8:25am | 0.387 | R02B US | DSB | 535 | Grayling | - | 225 | 100 | M | 6 | Dead |
| 7/11/2009 | | 0.25 | R06 DS | DS | 536 | Grayling | - | 225 | 120 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 537 | Grayling | - | 220 | 240 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 538 | Grayling | - | 205 | 110 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 539 | Grayling | - | 218 | 120 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 540 | Grayling | - | 211 | 100 | M | 6 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 541 | Grayling | - | 210 | 110 | M | 6 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 542 | Grayling | - | 191 | 198 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 543 | Grayling | 90707 | 268 | 230 | F | 4 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 544 | Grayling | - | 204 | 110 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 545 | Grayling | 90708 | 230 | 170 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 546 | Grayling | 90709 | 208 | 120 | F | 1 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 547 | Grayling | - | 205 | 110 | M | 6 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 548 | Grayling | 90710 | 290 | 160 | M | 9 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 549 | Grayling | 90711 | 185 | 260 | M | 7 | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 550 | Grayling | 90701 | 258 | 240 | M | 9 | CYRC |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 551 | Grayling | 90038 | 310 | 330 | M | 7 | CYRC |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 552 | Grayling | 90624 | 250 | 160 | M | 7 | CYRC |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 553 | Whitefish | | 278 | 220 | - | - | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 554 | Whitefish | | 290 | 270 | - | - | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 555 | Whitefish | | 236 | 140 | - | - | |
| 7/12/2009 | 8:15am | 0.4 | R02A US | USA | 556 | Whitefish | | 325 | 350 | - | | |
| 7/12/2009 | | 0.25 | R06 DS | DS | 557 | Grayling | - | 218 | 210 | F | 1 | |
| 7/12/2009 | 2:09pm | 0.2 | R09 US | DS | 558 | Lake Trout | - | 374 | 440 | - | - | |
| 7/12/2009 | 2:09pm | 0.2 | R09 US | DS | 559 | Grayling | 90147 | 245 | 170 | F | 3 | CYRC |
| 7/14/2009 | 8:20am | 0.38 | R02A US | USA | 560 | Grayling | - | 250 | 170 | M | 9 | |
| 7/14/2009 | 8:20am | 0.38 | R02A US | USA | 561 | Grayling | - | 211 | 120 | F | 1 | |
| 7/14/2009 | 8:20am | 0.38 | R02A US | USA | 562 | Grayling | - | 183 | 100 | F | 1 | |
| 7/14/2009 | 8:20am | 0.38 | R02A US | USA | 563 | Grayling | - | 200 | 105 | M | 6 | |
| 7/14/2009 | 8:20am | 0.38 | R02A US | USA | 564 | Grayling | - | 211 | 120 | F | 1 | |
| 7/14/2009 | 9:50am | 0.22 | R09 US | DS | 565 | Grayling | - | 212 | 105 | - | - | Dead |
| 7/15/2009 | 8:15am | 0.4 | R02A US | DSA | 567 | Grayling | 90713 | 294 | 300 | F | 4 | |
| 7/15/2009 | 8:15am | 0.4 | R02B US | DSB | 568 | Grayling | - | 150 | 110 | F | 1 | Dead |

**Appendix A: Raw Fisheries Field Data**

| Date | Time | Staff Gage | Bridge Location ID | Fish Movement US or DS | Fish ID | Species | Tagging # | Length | Weight | M or F | Maturity | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/15/2009 | 8:15am | 0.4 | R02B US | DSB | 569 | Grayling | - | 213 | 100 | M | 6 | |
| 7/15/2009 | 8:15am | 0.4 | R02B US | DSB | 570 | Grayling | - | 204 | 110 | F | 1 | |
| 7/15/2009 | 8:15am | 0.4 | R02B US | DSB | 571 | Grayling | 90714 | 272 | 230 | F | 4 | |
| 7/15/2009 | 8:15am | 0.4 | R02B US | DSB | 572 | Grayling | 90903 | 245 | 160 | M | 9 | CYRC |
| 7/16/2009 | 8:20am | 0.363 | R02C US | DSC | 573 | Grayling | - | 270 | 220 | M | 6 | |
| 7/16/2009 | 8:20am | 0.363 | R02C US | DSC | 574 | Grayling | - | 200 | 100 | F | 1 | Dead |
| 7/16/2009 | 8:20am | 0.363 | R02C US | DSC | 575 | Grayling | - | 195 | 95 | M | 6 | Dead |
| 7/16/2009 | 8:20am | 0.363 | R02C US | DSC | 576 | Grayling | - | 210 | 105 | M | 6 | |
| 7/17/2009 | 2:15pm | 0.34 | R15 US | - | - | - | - | - | - | - | - | Pulled Nets |
| 7/17/2009 | 3:30pm | 0.21 | R06 DS | DS | 577 | Grayling | 90716 | 220 | 140 | M | 6 | |
| 7/17/2009 | 3:30pm | 0.21 | R06 DS | DS | 578 | Grayling | - | 208 | 115 | F | 1 | |
| 7/17/2009 | 4:00pm | | R02B US | DSB | 579 | Grayling | 90717 | 310 | 320 | F | 4 | |
| 7/18/2009 | 10:56am | 0.2 | R06 DS | DS | 580 | Grayling | - | - | - | - | - | Dead |
| 7/18/2009 | 10:56am | 0.2 | R06 DS | DS | 581 | Grayling | - | - | - | - | - | Lost in Transfer |
| 7/19/2009 | 8:20am | 0.34 | R02A US | DSA | 582 | Grayling | - | 195 | 110 | M | 1 | |
| 7/19/2009 | 8:20am | 0.34 | R02A US | DSA | 583 | Whitefish | - | 200 | 266 | - | - | |
| 7/19/2009 | 8:20am | 0.34 | R02A US | DSA | 584 | Grayling | - | - | - | - | - | Lost in Transfer |
| 7/19/2009 | 8:20am | 0.34 | R02C US | DSC | 585 | Grayling | - | 200 | 120 | M | 6 | |
| 7/19/2009 | 8:20am | 0.34 | R02C US | DSC | 586 | Lake Trout | - | 382 | 540 | - | - | |
| 7/19/2009 | 11:00am | 0.2 | R06 US | DS | 587 | Grayling | 90718 | 210 | 120 | M | 6 | |
| 7/19/2009 | 11:50am | 0.16 | R09 US | DS | 588 | Grayling | 90719 | 225 | 145 | F | 4 | |
| 7/20/2009 | 9:00am | 0.36 | R02A US | DS | 589 | Grayling | - | 192 | 80 | M | 6 | |
| 7/20/2009 | 9:00am | 0.36 | R02A US | DS | 590 | Grayling | - | 226 | 145 | M | 6 | |
| 7/20/2009 | 9:00am | 0.36 | R02A US | DS | 591 | Grayling | - | 200 | 100 | M | 6 | |
| 7/20/2009 | 9:00am | 0.36 | R02A US | DS | 592 | Grayling | - | 193 | 110 | F | 1 | |
| 7/20/2009 | 9:00am | 0.36 | R02A US | DS | 593 | Grayling | - | 203 | 110 | F | 1 | |
| 7/20/2009 | 11:45am | 0.2 | R06 DS | DS | 594 | Grayling | - | 195 | 85 | M | 6 | |
| 7/20/2009 | | | R06 | | | | | | | | | Nets Pulled |
| 7/20/2009 | | | R09 | | | | | | | | | Nets Pulled |
| 7/22/2009 | 10:30am | 0.3175 | R02A US | DSA | 595 | Grayling | 90720 | 210 | 115 | M | 6 | |
| 7/22/2009 | 10:30am | 0.3175 | R02A US | DSA | 596 | Grayling | - | - | - | - | - | Lost in Transfer |
| 7/23/2009 | 8:30am | 0.315 | R02A US | DSA | 597 | Grayling | - | 225 | 130 | F | 1 | |
| 7/23/2009 | 8:30am | 0.315 | R02A US | DSA | 598 | Grayling | - | 219 | 110 | F | 1 | |
| 7/23/2009 | 8:30am | 0.315 | R02A US | DSA | 599 | Grayling | - | 215 | 120 | M | 6 | |
| 7/23/2009 | 8:30am | 0.315 | R02A US | DSA | 600 | Grayling | - | - | - | - | - | Lost in Transfer |
| 7/24/2009 | 4:45pm | 0.305 | R02A US | DSA | 601 | Grayling | - | 190 | 90 | F | 1 | |
| 7/24/2009 | 4:45pm | 0.305 | R02A US | USA | 602 | Grayling | - | 210 | 110 | F | 1 | |
| 7/25/2009 | 11:15am | 0.31 | R02A US | USA | 603 | Grayling | - | - | - | - | - | Lost in Transfer |
| 7/26/2009 | 8:30am | 0.31 | R02B US | USB | 604 | Grayling | 90721 | 310 | 315 | F | 4 | |
| 7/28/2009 | 9:30am | 0.302 | R02A US | DSA | 605 | Grayling | - | 190 | 100 | M | 6 | |
| 7/29/2009 | 9:30am | 0.292 | R02A US | DSA | 606 | Grayling | 90722 | 274 | 200 | M | 9 | |
| 8/2/2009 | 9:30am | 0.263 | R02 | - | - | - | - | - | - | - | - | Nets Pulled |

Notes:

| | | | |
|---|---|---|---|
| F 1 | Immature (too young to spawn) | M 6 | Immature (too young to spawn) |
| F 2 | Ripe (eggs observed) | M 7 | Ripe (milk observed) |
| F 3 | Waiting to spawn | M 8 | Waiting to spawn |
| F 4 | Spent (no eggs) | M 9 | Spent (no milk) |
| F 5 | Unknown | M 10 | Unknown |

PYRC Previous Year Recapture
CYRC Current Year Recapture

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| June 24/09 | 9:30am | A1 | 31 | | | | | |
| | | A2 | 25 | | | | | |
| | | A3 | 4 | | | | | |
| | | B1 | 34 | | | | | |
| | | B2 | 19 | | | | | |
| | | B3 | 3 | | | | | |
| | | C1 | 3 | | | | | |
| | | C2 | 8 | | | | | |
| | | C3 | 9 | | | | | |
| | | | | | | | | |
| June 25/09 | 9:00am | A1 | 11 | | | | | |
| | | A2 | 3 | | | | | |
| | | A3 | 19 | | | | | |
| | | B1 | 13 | | | | | |
| | | B2 | 15 | | | | | |
| | | B3 | 13 | | | | | |
| | | C1 | 5 | | | | | |
| | | C2 | 5 | | | | | |
| | | C3 | 23 | | | | | |
| | 9:45am | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| June 26/09 | 9:00am | A1 | 4 | | | | | |
| | | A2 | 1 | | | | | |
| | | A3 | 1 | | | | | |
| | | B1 | 8 | | | | | |
| | | B2 | 3 | | | | | |
| | | B3 | 15 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 2 | | | | | |
| | | C3 | 4 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| June 27/09 | 4:15pm | A1 | 4 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 5 | | | | | |
| | | B2 | 1 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 4 | | | | | |
| | | C3 | 2 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| June 28/09 | 3:00pm | A1 | 5 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 13 | | | | | |
| | | B2 | 8 | | | | | |
| | | B3 | 28 | | | | | |
| | | C1 | 3 | | | | | |
| | | C2 | 12 | | | | | |
| | | C3 | 6 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| June 29/09 | 4:30pm | A1 | 1 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 3 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 1 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| June 30/09 | 5:30pm | A1 | 2 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 6 | | | | | |
| | | B1 | 7 | | | | | |
| | | B2 | 6 | | | | | |
| | | B3 | 6 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 3 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| July 1/09 | 4:10pm | A1 | 2 | | | | | |
| | | A2 | 8 | | | | | |
| | | A3 | 4 | | | | | |
| | | B1 | 4 | | | | | |
| | | B2 | 6 | | | | | |
| | | B3 | 7 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 3 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 2/09 | 3:30pm | A1 | 1 | | | | | |
| | | A2 | 3 | | | | | |
| | | A3 | 2 | | | | | |
| | | B1 | 3 | | | | | |
| | | B2 | 2 | | | | | |
| | | B3 | 7 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 1 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 3/09 | 4:30pm | A1 | 0 | | | | | |
| | | A2 | 1 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| July 4/09 | 5:30pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 2 | | | | | |
| | | B2 | 1 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 5/09 | 3:30pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 1 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 1 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 6/09 | 4:30pm | A1 | 0 | | | | | 1 |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 7/09 | 4:45pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 8/09 | 3:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | 1 |
| | | B2 | 0 | | | | | 3 |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| July 9/09 | 6:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 10/09 | 6:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 11/09 | 4:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 12/09 | 4:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 13/09 | 4:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| July 14/09 | 4:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 15/09 | 4:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 16/09 | 5:20pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | 0 |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 17/09 | 5:35pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 18/09 | 4:28pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 1 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| July 19/09 | 5:00pm | A1 | 17 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 20/09 | 5:30pm | A1 | 20 | | | | | 2 |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 22/09 | 3:00pm | A1 | 1 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 17 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 23/09 | 4:00pm | A1 | 1 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 1 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 1 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 24/09 | 6:00pm | A1 | 1 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 1 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| July 25/09 | 3:30pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 26/09 | 5:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 2 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| July 27/09 | 6:00pm | A1 | 0 | | 1 | | | |
| | | A2 | 0 | | 1 | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 28/09 | 5:30pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 29/09 | 4:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | 4 | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | 1 | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| July 30/09 | 3:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | 5 | | | |
| | | B2 | 0 | | 1 | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | 7 | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| July 31/09 | 6:00pm | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | 1 | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | 7 | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| Aug 1/09 | 5:50pm | A1 | 0 | | 2 | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | 3 | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | 1 | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| Aug 2/09 | | A1 | 0 | | | | | |
| | | A2 | 0 | | 1 | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | 1 | | | |
| | | B2 | 0 | | 1 | | | |
| | | B3 | 0 | | 1 | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | 11 | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | 1 | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| Aug 3/09 | | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |

**Appendix A: Raw Drift Trap Collection**

**Laboratory Confirmation Larval Drift Collection**

| Date | Time | DT ID | ARGR | NSST | SLSC | Burbot | LKTR | Other |
|---|---|---|---|---|---|---|---|---|
| Aug 4/09 | | A1 | 0 | | 1 | | | |
| | | A2 | 0 | | 0 | | | |
| | | A3 | 0 | | 0 | | | |
| | | B1 | 0 | | 0 | | | |
| | | B2 | 0 | | 0 | | | |
| | | B3 | 0 | | 0 | | | |
| | | C1 | 0 | | 1 | | | |
| | | C2 | 0 | | 3 | | | |
| | | C3 | 0 | | 0 | | | |
| | | R1 | 0 | | 1 | | | |
| | | R2 | 0 | | 0 | | | |
| | | R3 | 0 | | 0 | | | |
| | | | | | | | | |
| Aug 5/09 | | A1 | 0 | | 11 | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | 1 | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | 1 | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| Aug 6/09 | | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | | | | | | | |
| Aug 7/09 | | A1 | 0 | | | | | |
| | | A2 | 0 | | | | | |
| | | A3 | 0 | | | | | |
| | | B1 | 0 | | | | | |
| | | B2 | 0 | | | | | |
| | | B3 | 0 | | | | | |
| | | C1 | 0 | | | | | |
| | | C2 | 0 | | | | | |
| | | C3 | 0 | | | | | |
| | | R1 | 0 | | | | | |
| | | R2 | 0 | | | | | |
| | | R3 | 0 | | | | | |
| | | **Total** | **529** | **0** | **69** | **0** | **0** | **7** |

**Appendix A: AWR Minnow Trap Data Collection**

**Field Crew: TT, TM, MD, PM**

| Date | Time | Water Temp | Location | Berm # | Species | Qty. | Notes |
|---|---|---|---|---|---|---|---|
| 7/20/2009 | 10:00am | | R02 | B1 - B4 | | | Minnow Traps Set |
| 7/22/2009 | 11:00am | 11 | R02 | B1 - B4 | - | - | Observed NSST, ARGR YOY, & Minnows Reset @ 11:30am |
| 7/22/2009 | 12:00pm | 13 | R06 | B1, 2, 3 | - | - | Observed YOY & Minnows. Traps Reset @ 1:00pm |
| 7/23/2009 | 9:00am | 10 | R02 | B1 - B4 | - | - | Traps Reset @ 9:35am |
| 7/23/2009 | 11:00am | 13 | R06 | 1,2,3 | - | - | Traps Reset @ 11:35am |
| 7/24/2009 | 4:04pm | 15 | R06 | 1,2,3 | - | - | Traps Reset @ 4:30pm |
| 7/24/2009 | 4:45pm | 17 | R02 | B1 - B4 | - | - | Traps Reset @ 5:30pm |
| | | | | B3 | NSST | 1 | Observed YOY & Minnows |
| 7/25/2009 | 10:00am | 14 | R06 | 1,2,3 | - | - | Traps Reset @ 10:30am |
| 7/25/2009 | 11:00am | 14 | R02 | 1 | - | - | Traps Reset @ 12:00pm |
| | | | | 2 | - | - | |
| | | | | 3 | - | - | |
| | | | | 4 | SLSC | 1 | |
| 7/26/2009 | 9:00am | 12 | R02 | 1 | - | - | Traps Reset @ 9:30am |
| | | | | 2 | - | - | |
| | | | | 3 | NSST | 1 | |
| | | | | 4 | SLSC | 1 | |
| 7/26/2009 | 10:35am | 13 | R06 | 1,2,3 | - | - | Traps Reset @ 11:15am, Minnows observed at R1 DT |
| 7/28/2009 | 9:30am | 14 | R02 | B1 | - | - | Traps Reset @ 11:00am |
| | | | | B2 | | | |
| | | | | B3 | SLSC | 1 | |
| | | | | B4 | SLSC | 1 | |
| 7/28/2009 | 11:30am | 14 | R06 | 1,2,3 | SLSC | 1 | Traps Reset @ 12:15pm |
| 7/29/2009 | 9:40am | 11 | R02 | B1 | - | - | Traps Reset @ 10:00am |
| | | | | B2 | - | - | |
| | | | | B3 | - | - | |
| | | | | B4 | SLSC | 2 | |
| 7/29/2009 | 11:00am | 11 | R06 | 1,2,3 | SLSC | 1 | Traps Reset @ 12:00pm |
| 7/30/2009 | 10:00am | 13 | R02 | B1 | - | - | Traps Reset @ 10:45am |
| | | | | B2 | - | - | |
| | | | | B3 | - | - | |
| | | | | B4 | SLSC | 1 | |
| 7/30/2009 | 12:45pm | 14 | R06 | 1,2,3 | NSST | 1 | Traps Reset @ 1:30pm |
| 8/1/2009 | 9:30am | 10 | R02 | B1 | - | - | Traps Reset @ 10:15am |
| | | | | B2 | - | - | |
| | | | | B3 | NSST | 1 | |
| | | | | B4 | SLSC | 1 | |
| 8/1/2009 | 12:30pm | 14 | R06 | 1,2,3 | NSST | 1 | Traps Reset @ 1:00pm |
| 8/2/2009 | 9:30am | 13 | R02 | B1 - B4 | - | - | Traps Reset @ 11:00am |
| 8/2/2009 | 12:30pm | 14 | R06 | 1,2,3 | NSST | 1 | Traps Reset @ 1:30pm |
| 8/4/2009 | 11:30am | 12 | R02 | 1 | - | - | Traps Reset @ 12:00pm |
| | | | | 2 | - | - | |
| | | | | 3 | NSST/SLSC | 1 | |
| | | | | 4 | SLSC | 2 | |
| 8/4/2009 | 10:30am | 12 | R06 | 1,2,3 | - | - | Traps Reset @ 11:00am |
| 8/5/2009 | 9:30am | 12 | R02 | 1 | SLSC | 2 | Traps Reset @ 10:00am |
| | | | | 2 | - | - | |
| | | | | 3 | SLSC | 1 | |
| | | | | 4 | - | - | |
| 8/5/2009 | 1:00pm | 12 | R06 | 1,2,3 | - | - | Traps Reset @ 1:30pm |
| 8/6/2009 | 9:00am | 10 | R02 | 1 | - | - | Traps Reset @ 10:00am |
| | | | | 2 | NSST | 1 | |
| | | | | 3 | - | - | |
| | | | | 4 | NSST | 1 | |
| 8/6/2009 | 3:00pm | 10 | R06 | 1,2,3 | - | - | Traps Reset @ 4:00pm |
| 8/7/2009 | 1:00pm | 11 | R02 | 1 | - | - | Traps Pulled |
| | | | | 2 | - | - | |
| | | | | 3 | - | - | |
| | | | | 4 | - | - | |
| 8/7/2009 | 3:00pm | 12 | R06 | 1,2,3, | - | - | Traps Pulled |
| **Total** | **SLSC** | **14** | | | | | |
| | **NSST** | **8** | | | | | |

# APPENDIX B: 2009 FISHERIES PHOTO DOCUMENTATION

Photo No 1 : Upstream hoopnets identified as R02A adjacent to the upstream berm and R02 Habitat Compensation Area spawning pad. Hoopnets area oriented to collect upstream and downstream moving fish.

Photo No 2 : Hoopnets R02B set upstream of bridge crossing and downstream of the Habitat Compensation area. Hoopnets in the photo are oriented to collect upstream moving fish.

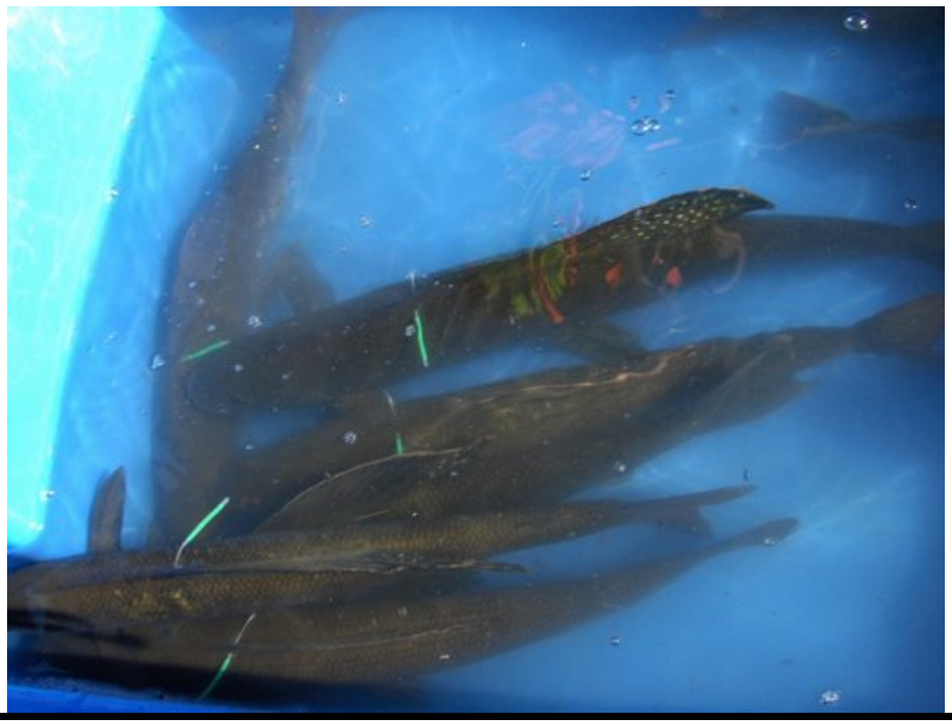


Photo No 3:  Arctic grayling tagged and placed in the recovery tub prior to release.

Photo No 4: Mature male Arctic grayling collected at R02B moving upstream

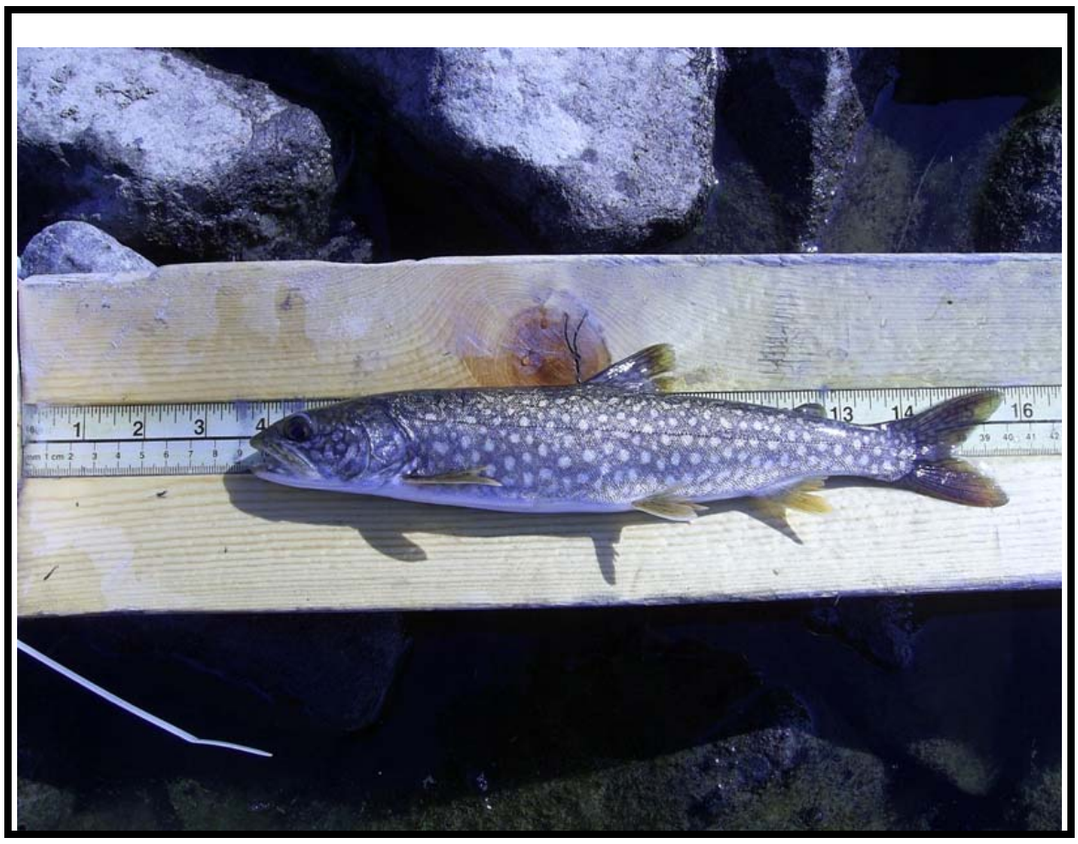


Photo No 5 :Lake Trout collected at R02. When possible length and weight data collected and recorded for all fish captured.

Photo No 6: Removing ice at R06 on June 25th, 2009. Ice removed from nets at R02, R06 and R15; tubs and fish processing gear in the foreground.

Photo No 7 : Drift Trap collection in mid July at R02 Drift Trap Area C.

Photo No 8 : Drift Traps set upstream of Habitat Compensation Area in a previously identified High Value Habitat Zone (Drift Trap Area A).

Photo No 9 : Berms within the R02 Habitat Compensation Area. Berms 3 and 4 featured in this photo.

Photo No 10 : Spawning pads between Berm 2 and 3. Note that the water level has decreased exposing the perimeter of the spawning pads.

# APPENDIX C: DFO AUTHORIZATIONS

Licence #: S-09/10-1027-NU

Ryan VanEngen
Agnico-Eagle Mines Ltd. P.O. Box 540
Baker Lake, NU, CA X0C 0A0

Dear Ryan VanEngen,

Enclosed is your Licence to Fish for Scientific Purposes issued pursuant to Section 52 of the Fishery (General) Regulations.

Please be advised that this licence only permits those activities stated on your licence. Any other activity may require approval under the Fisheries Act or other legislation. It is the Project Authority's responsibility to obtain any other approvals.

Failure to comply with any of the conditions specified on the attached licence may result in a contravention of the Fishery (General) Regulations.

Please ensure that you include the licence number and project title in any future correspondence and that you complete the Summary Harvest Report upon completion of activities under this licence.

Yours truly,

Chris Lewis

June 24/09
Date

Chris Lewis
Fisheries Management Biologist
Eastern Arctic Area
Central and Arctic Region
Fisheries and Oceans Canada

Enclosure

# LICENCE TO FISH FOR SCIENTIFIC PURPOSES

## S-09/10-1027-NU

Pursuant to Section 52 of the Fishery (General) Regulations, the Minister of Fisheries and Oceans hereby authorizes the individual(s) listed below to fish for scientific purposes, subject to the conditions specified.

**Project Authority:** Ryan VanEngen
Agnico-Eagle Mines Ltd. P.O. Box 540
Baker Lake, NU, CA X0C 0A0

**Other Personnel:** Gary Mann
Randy Baker
Ryan Hill
Ryan VanEngen

**Objectives:** Project Title: Meadowbank Gold Project: Aquatic Effects Monitoring and All-Weather Private Access Road HADD Crossing Monitoring
Project Objectives:

Agnico-Eagle Mines Ltd. has received a NIRB Project Certificate for its Meadowbank gold project, located 70km north of Baker Lake, Nunavut. Environmental monitoring has been ongoing at this site since 1999, and has included aquatic, terrestrial and cultural resources; similar monitoring work will continue through construction, operation and closure (an estimated 12-year or more horizon). The purpose of the monitoring program is to avoid or mitigate negative impacts from mine activities, and to meet the conditions and commitments of the NIRB Project Certificate and DFO Authorization (NU-03-0109) for the all-weather road. Specific objectives of the aquatic sampling program are to: - conduct annual water, sediment, plankton, periphyton and benthic sampling of lakes immediately surrounding the mine site to provide baseline and operational data to inform the mine environmental management program, - monitor bridge and culvert installations along the all-weather road to avoid increased sedimentation that may directly or indirectly affect fish or fish habitat, and - evaluate fisheries status of crossings along the all-weather road to avoid accidental occurrence of barriers to fish migration - evaluate spawning productivity in recently constructed habitat compensation area.

### CONDITIONS

**Waters:**

**Water Body: Baker Lake Area (64° 19' N, 96° 02' W)**

Species: Phytoplankton — Gear: Water Pump

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 3 | | |

Species: Benthos — Gear: Ponar dredge

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 15 | | |

**Water Body: Meadowbank All-Weather Private Access Road (64° 18' 42" N, 66° 00' 04" W)**

**Water Body: Meadowbank All-Weather Private Access Road (64° 18' 42" N, 66° 00' 04" W)**

Species: Arctic Charr (SR OR LL)
Arctic Grayling
Sculpin, Slimy
Trout, Lake
Whitefish, Round

Gear: Hoop Net

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled |
|---|---|---|---|---|---|
| | | | | 300 | 20 |

Species: Larval Freshwater Fish

Gear: Driftnet
Minnow Trap

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled |
|---|---|---|---|---|---|
| | | | | | 500 |

**Water Body: Tehek Lake (64° 55' N, 95° 38' W)**

Species: Benthos

Gear: Ponar dredge

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 5 | | |

Species: Phytoplankton

Gear: Water Pump

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 1 | | |

**Water Body: Unnamed Lake & System (Portage Lake system) (65° 00' 51" N, 96° 05' 33" W)**

Species: Benthos

Gear: Ponar dredge

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 20 | | |

Species: Phytoplankton

Gear: Water Pump

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 4 | | |

Species: Arctic Charr (SR OR LL)
Burbot
Sculpin, Slimy
Trout, Lake
Whitefish, Round

Gear: Electroshocker
Fine mesh tooth gill net
Minnow Trap
Rod and Reel

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled |
|---|---|---|---|---|---|
| | | | | 100 | 25 |

**Water Body: Unnamed Lake (Inuggugayualik Lake) (65° 01' 43" N, 96° 23' 18" W)**

Species: Phytoplankton — Gear: Water Pump

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 1 | | |

Species: Benthos — Gear: Ponar dredge

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 5 | | |

**Water Body: Unnamed Lake (Pipedream Lake) (65° 01' 43" N, 96° 23' 18" W)**

Species: Benthos — Gear: Ponar dredge

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 5 | | |

Species: Phytoplankton — Gear: Water Pump

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 1 | | |

**Water Body: Unnamed Lake (Wally Lake) (65° 06' 05" N, 95° 57' 19" W)**

Species: Benthos — Gear: Ponar dredge

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 5 | | |

Species: Phytoplankton — Gear: Water Pump

| Total Weight Sampled (Kg) | Weight Live Sampled (Kg) | Weight Dead Sampled (Kg) | Total Number Sampled | Number Live Sampled | Number Dead Sampled | Number Tows/Sets | Hours per | Minutes per |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 / 1 | | |

**Fishing Period:** June 24, 2009 to September 30, 2009

**A copy of this licence must be available at the study site and produced at the request of a fishery officer.**

**Live fish may not be retained unless specified in the conditions of this licence.**

**The licence holder shall immediately cease fishing when the total fish killed or live sampled reaches any of the maximums set for any of the species listed.**

**Transportation:**

Other approvals/permits may be necessary to collect or transport certain species, such as Marine Mammal Transportation Permits. For marine mammal parts, products and derivatives a Marine Mammal Transportation Licence is required for domestic transport and, for international transport a Canadian CITES Export Permit is also required.

**Disposal of Fish Caught:**

Fish not required for the purpose of dead sampling and/or retention MUST be returned to the water at the site of capture. Retained fish may be made available to the nearest settlement for domestic consumption or sold commercially within the Territory. Any dead fish for commercial sale beyond the Territory in which it was caught requires authorization under the Fish Inspection Regulations. Disposal of any fish remains must be in accordance with local land use regulations.

**Retention & Disposal of Fish Caught:**

Fish not required for the purpose of dead sampling and/or retention MUST be returned to the water at the site of capture. Retained fish may be made available to the nearest settlement for domestic consumption or sold commercially within the Territory. Any dead fish for commercial sale beyond the Territory in which it was caught requires authorization under the Fish Inspection Regulations. Disposal of any fish remains must be in accordance with local land use regulations.

**Report on Activities:**

The Project Authority will provide the Scientific Licence Coordinator, Resource Management, Department of Fisheries and Oceans, within one month of the expiry date, with a report stating:

i) whether the field work was conducted; and
ii) waterbody location, the number or amount of fish harvested (collected) or marked and the date or period of harvest.

The Project Authority also will provide a copy of any published or public access documents which result from the project. Information supplied will be used for population management purposes by the Department of Fisheries and Oceans and becomes part of the public record.

**Notification of Commencement:**

Prior to the commencement of fishing the Project Authority will contact:

Fisheries Management Biologist
Fisheries and Oceans Canada
Box 358
Iqaluit, NU X0A 0H0
email: XCA-NUpermit@dfo-mpo.gc.ca

Jan 24 2009
Date

Carla Baker
for Eric Kan
Area Director, Eastern Arctic Area
Central and Arctic Region
Fisheries and Oceans Canada

For the Minister of Fisheries and Oceans.

Pursuant to Section 52 of the Fishery (General) Regulations.

Date: June 4, 2009

To: Ryan VanEngen (Environmental Biologist)
Agnico-Eagle Mines Ltd.
Baker Lake, Nunavut, X0C 0A0
E-mail: rvanengen@agnico-eagle.com

**Subject: Animal Use Protocol - Letter of Approval**

Dear Ryan VanEngen,

Your 2009 Animal Use Protocol (AUP), number FWI-ACC-2009-027 entitled "**Meadowbank Gold Project: Aquatic Ecosystem Monitoring Plan (AEMP) and All-Weather Private Access Road (AWPAR) HADD Crossing Monitoring"**, has been reviewed and approved by the Freshwater Institute Animal Care Committee. This AUP will expire on December 31, 2009.

The committee has approved your AUP but asks that you consider the following:

**Section 9** - Category of invasiveness should be a C as you will be capturing, handling, and tagging fish.

**Section 15**:
- Please ensure that gloves are wet when handling fish to minimize impacts to mucosal layer.
-Please consider using anesthetic because floy tag implantation can be deemed painful to fish. A ph buffered MS-222 bath (25-100g/L) is recommended. When doing so, please ensure all water baths are well aerated and water is at appropriate temperatures (e.g for recovery baths).
-Please ensure floy tag implanting tools are sterilized between fish implants.
-Please ensure the fish have fully recovered (including anesthetic based recovery, if necessary) prior to release.

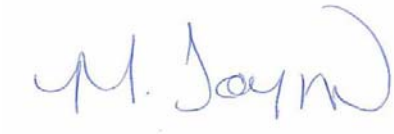
**Section 17** - Please have a contingency plan in place for unexpected injuries. Should injuries occur and the fish will not be used for consumption, CCAC recommends the use of a lethal dose of buffered MS222 for euthanasia.

Keep this signed letter of approval as well as the signed AUP for your records. Please be advised that should there be a need to revise the protocol you are requested to contact the Freshwater Institute Animal Care Committee and obtain approval prior to proceeding.

In addition, you are required to submit a brief report within 30 days of completion of the project outlining the unexpected changes to the protocol, the number of animals used and any unanticipated results or mortalities.

Feel free to contact me if you have any questions or concerns.

Sincerely,



_____

*Melanie VanGerwen-Toyne FWISL-ACC Chairperson*

*Freshwater Institute Science Laboratories Animal Care Committee*
*Arctic Aquatic Research*
*Central & Arctic / Région du Centre et de l'Arctique*
*Fisheries and Oceans Canada / Pêches et Océans Canada*
*501 University Crescent*
*Winnipeg, Manitoba R3T 2N6*
*Phone:204 983-5137*
*Fax:204 984-2403*

Enclosure

Bcc: Members, FWISL-ACC

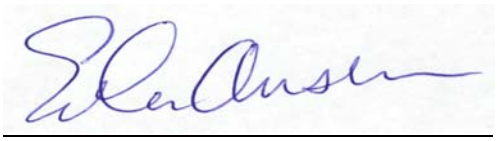
## APPROVAL BY ANIMAL CARE COMMITTEE MEMBERS

AUP#: FWISL-ACC-2009-XXX Date: ___

### Signatures of ACC Members

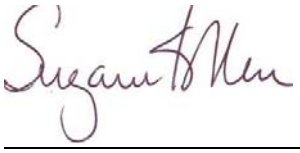
Melanie VanGerwen-Toyne, Acting Chair

Brad Park



Dr. Ericka Anseeuw D.V.M.

Danielle Godard



Suzanne Kollar

Bob Artes

Magaly Chambellant

**Interim Approval** ☐ **Final Approval** ☒

**APPROVAL BY THE FWI ANIMAL CARE COMMITTEE IS FOR THE PERIOD STATED ON YOUR ANIMAL USE PROTOCOL.**

Canada

# APPENDIX D: GEBAUER AND ASSOCIATES: 2009 CREEL SURVEY MEMORANDUM

# MEMORANDUM

Gebauer & Associates
ENVIRONMENTAL CONSULTANTS

**TO:** Ryan Vanengen – Agnico-Eagle
Stéphane Robert – Agnico-Eagle
Rachel Gould – Agnico-Eagle

**DATE:** 28 March 2010

**FROM:** Chris Lee and Martin Gebauer

**Subject: 2009 Hamlet of Baker Lake Harvest Study – Creel Results**

Gebauer & Associates Ltd. (Gebauer & Associates) is pleased to provide Agnico-Eagle Mines Ltd. (Agnico-Eagle) with this brief memorandum summarizing the 2009 creel results from the annual harvest study conducted in the Hamlet of Baker Lake.

## Background

In March 2007, a harvest study was initiated by Agnico-Eagle in association with the Hamlet of Baker Lake Hunters and Trappers Organization (HTO) in order to monitor and document the spatial distribution, seasonal patterns, and harvest rates of hunter kills both before and after construction of the Meadowbank All-Weather Road (AWR). The harvest study is conducted annually and is open to both Inuit and non-Inuit residents of Baker Lake who are at least 16 years of age. The harvest study focuses primarily on terrestrial wildlife harvests; however, creel results are also recorded by the harvest study administrator in support of on-going creel surveys. In previous years, the creel results were included in the annual Meadowbank Wildlife Monitoring Summary Report; however, in 2009 and subsequent years, results will be provided in a separate memorandum.

In late 2009, AREVA Resources Canada Inc. (AREVA) entered into a data and cost-sharing agreement with Agnico-Eagle; however, the implementation of the harvest study has remained the same. Both Agnico-Eagle and AREVA recognize that communication with participants is of utmost importance to ensure study success through adequate participation rates and accurate reporting.

## Fish Species

The four species included in the harvest study are Arctic Char (*Salvelinus alpinus*), Arctic Grayling (*Thymallus arcticus*), Lake Trout (*Salvelinus namaycush*), and Lake Whitefish (*Coregonus clupeaformis*).

## 2009 Results

*Participation*

In 2009, creel results were collected from twenty-two (22) of the thirty-three study participants. The number of participants has increased steadily since study inception. Each year, new participants sign up for the study as a result of word-of-mouth, marketing, radio-addresses and prize draws. The rate of increase in study participation is off-set slightly by the attrition of a small number of participants each year.

*Fish Counts*

2009 Creel results are summarized in **Table 1**. Results from previous years are also shown for comparative purposes.

**Table 1:** 2009 Creel Results and Historical Results to date.

| Fish Species | 2009 Counts | 2008 Counts | 2007 Counts |
|---|---|---|---|
| Arctic Char | 117 | 27 | 3 |
| Arctic Grayling | 1 | - | - |
| Lake Trout | 508 | 1035 | 210 |
| Lake Whitefish | 54 | 192 | - |
| **TOTALS** | **680** | **1254** | **213** |

As in previous years, creel data suggests the highest fishing rates occur during the spring and summer (April – August) with the peak period between May and June (**Figure 1**). Data was standardized through the simple division of fish harvested by the number of participants (**Figure 2**). Standardized results also indicated that the majority of fishing occurred in the spring and summer months. The elevated standardized values in September and November in 2009 were the result of a single participant using nets over an extended period near the Hamlet of Baker Lake.

**Figure 1:** Fish Harvests per Month in 2009 (and 2008).

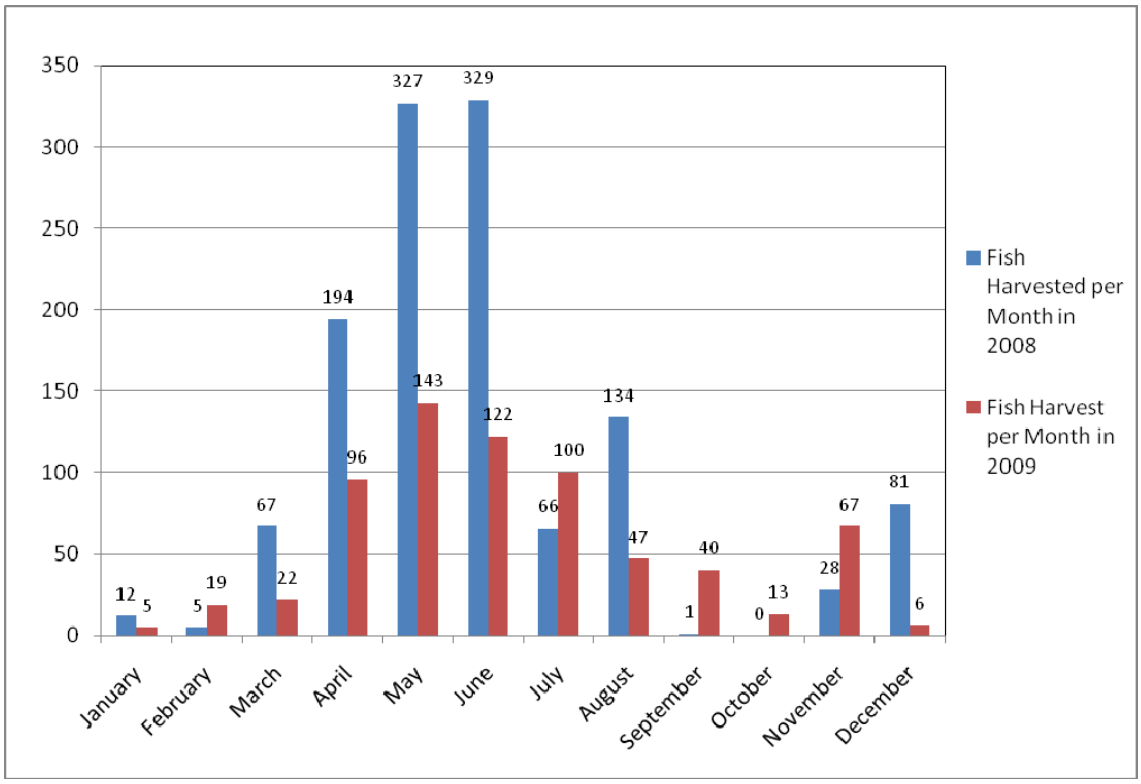
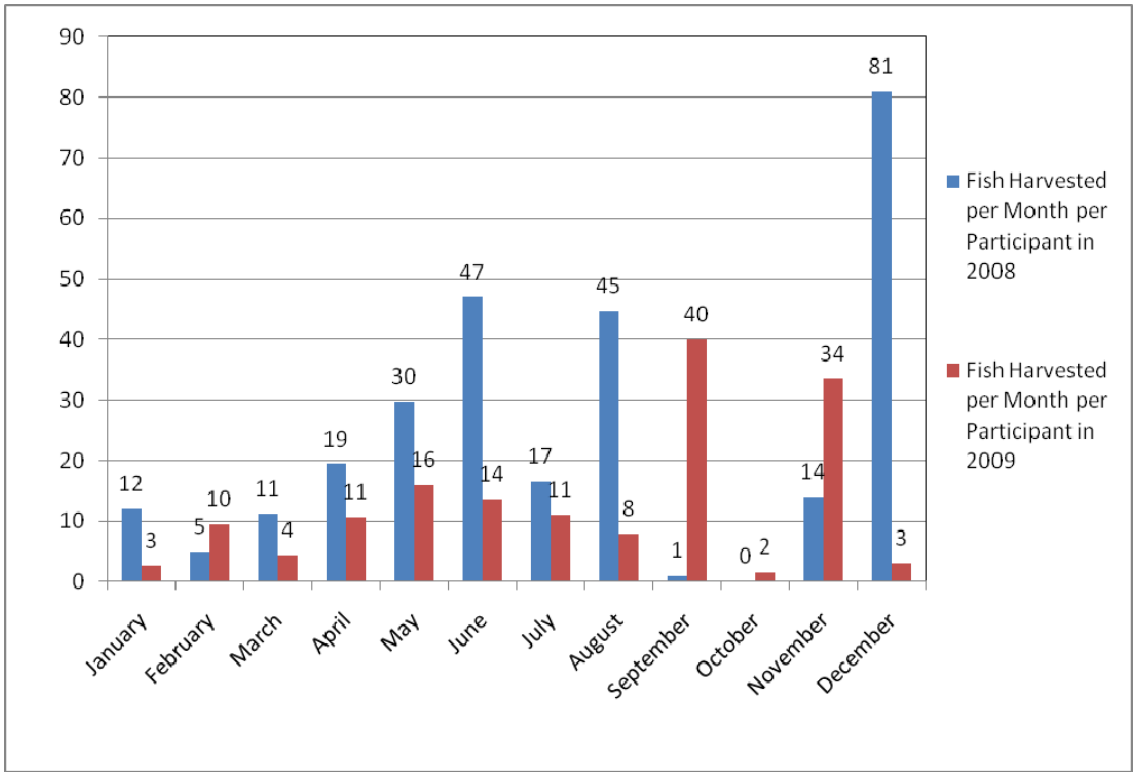



**Figure 2:** Fish Harvests per Month per Participant in 2009 (and 2008).



*Fish Harvest Distribution*

Arctic Char

In 2009, Arctic Char captures were widely distributed, encompassing both the eastern (Schultz Lake) and western (Baker Lake – eastern edge) boundaries of the study area (**Figure 3**). A higher proportion of captures were also observed at Whitehills Lake relative to 2008. Specifically, 2008 Arctic Char captures were limited primarily to Baker Lake with the exception of two captures at Whitehills Lake and four captures north of Schultz Lake.

Arctic Grayling

Only one (1) Arctic Grayling was reported in 2009, which was caught from the shores of Baker Lake by net. In previous years, no Arctic Grayling captures have been reported.

Lake Trout

As in 2008, Lake Trout capture densities were highest immediately south of the Hamlet of Baker Lake and at Whitehills Lake (**Figure 4**). Despite a lower number of Lake Trout captures in 2009, capture location was more heterogeneous relative to 2008 with a higher proportion of captures occurring at Whitehills Lake (constituting 48.6% of all captures in 2009 relative to 34.7% of all captures in 2008) (refer to 2008 Meadowbank Wildlife Monitoring Summary Report for additional details).

Lake Whitefish

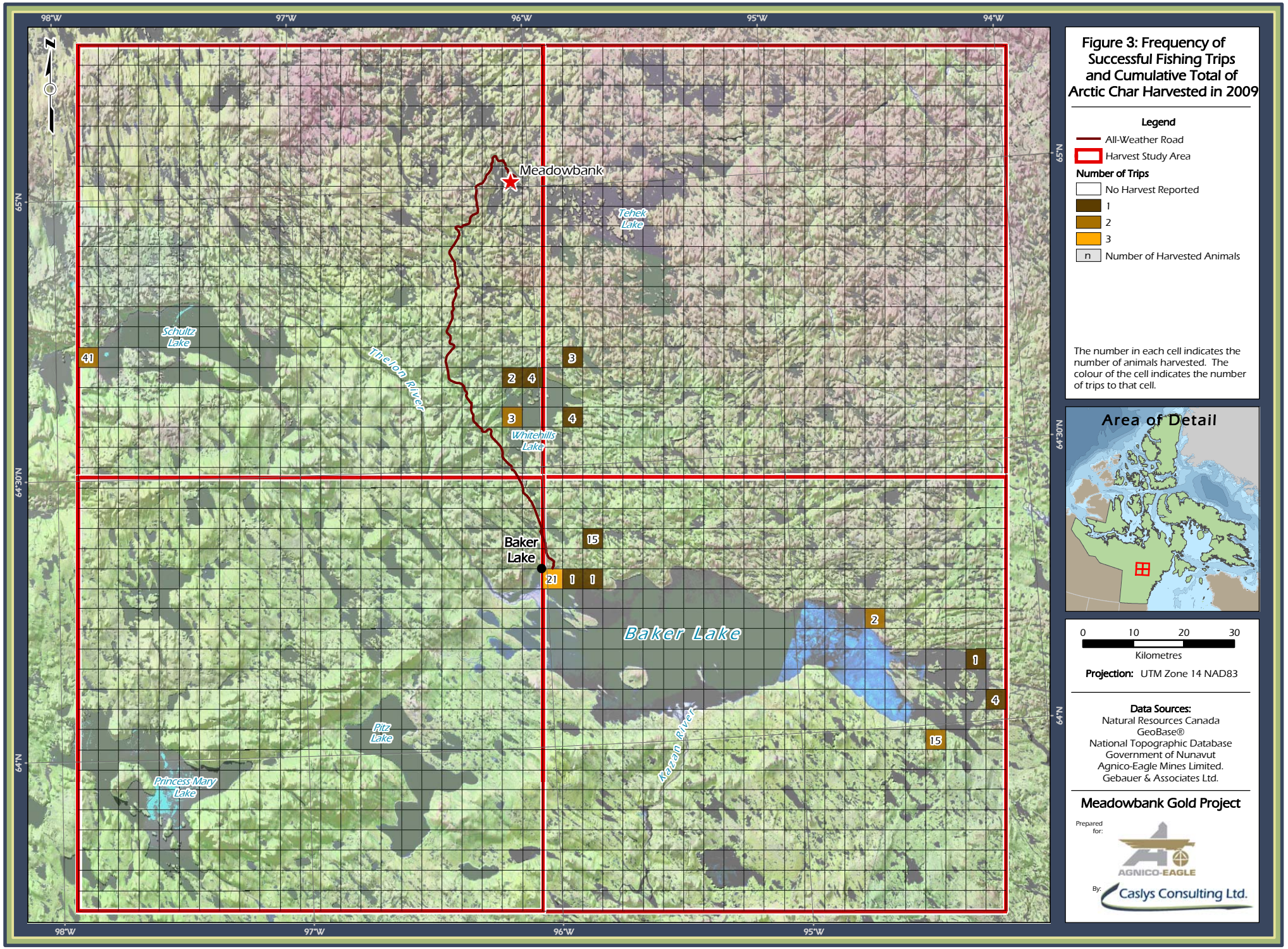
Lake Whitefish captures continued to occur in relatively low densities, being limited to Baker Lake and the Kazan River in 2009 (**Figure 5**). Similarly, in 2008, the majority of Lake Whitefish were caught on the shores of Baker Lake immediately south of the Hamlet. A large group of whitefish were also caught with nets in a small lake to the northwest of the Hamlet.

All Fish

Creel results between 2007 and 2009 are presented in **Figure 6**. The highest densities of fish captures continue to be Whitehills Lake and the shores of Baker Lake, which is driven primarily by the proportion of Lake Trout captures at these locations relative to other fish included in the study.

## Discussion

Relative to 2008, reported fish captures were approximately half in 2009 despite an increase in study participation. The decrease in fish reports may be the result of the emphasis on reporting terrestrial harvest results. Similarly, changes in study participation each year can influence the creel results. In addition, certain participants noted that they hadn't had as much time to fish in 2009 because of increasing job-related demands.




# Figure 3: Frequency of Successful Fishing Trips and Cumulative Total of Arctic Char Harvested in 2009

**Legend**

- All-Weather Road
- Harvest Study Area

**Number of Trips**

- No Harvest Reported
- 1
- 2
- 3
- n — Number of Harvested Animals

The number in each cell indicates the number of animals harvested. The colour of the cell indicates the number of trips to that cell.




0 10 20 30
Kilometres

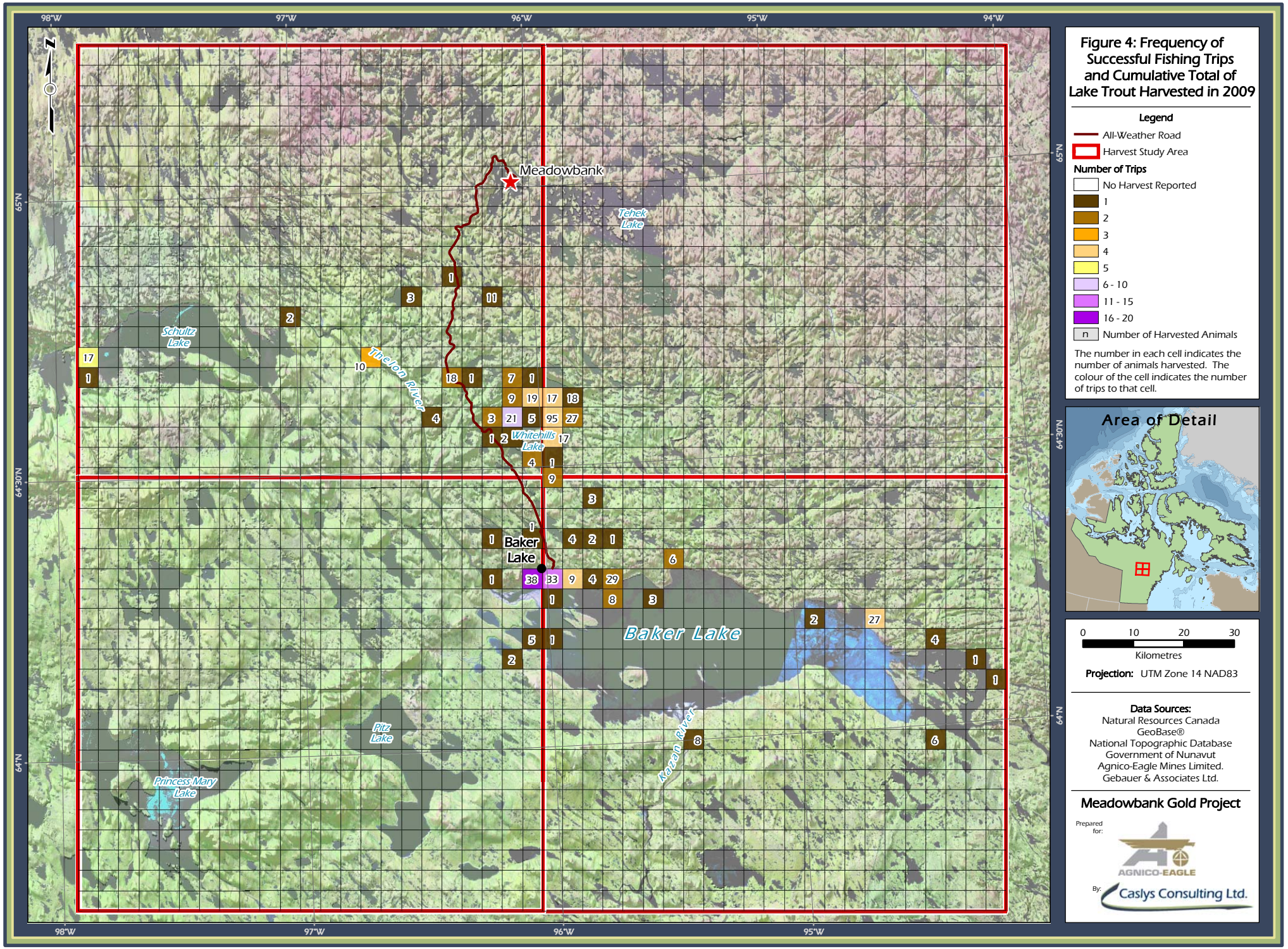
**Projection:** UTM Zone 14 NAD83

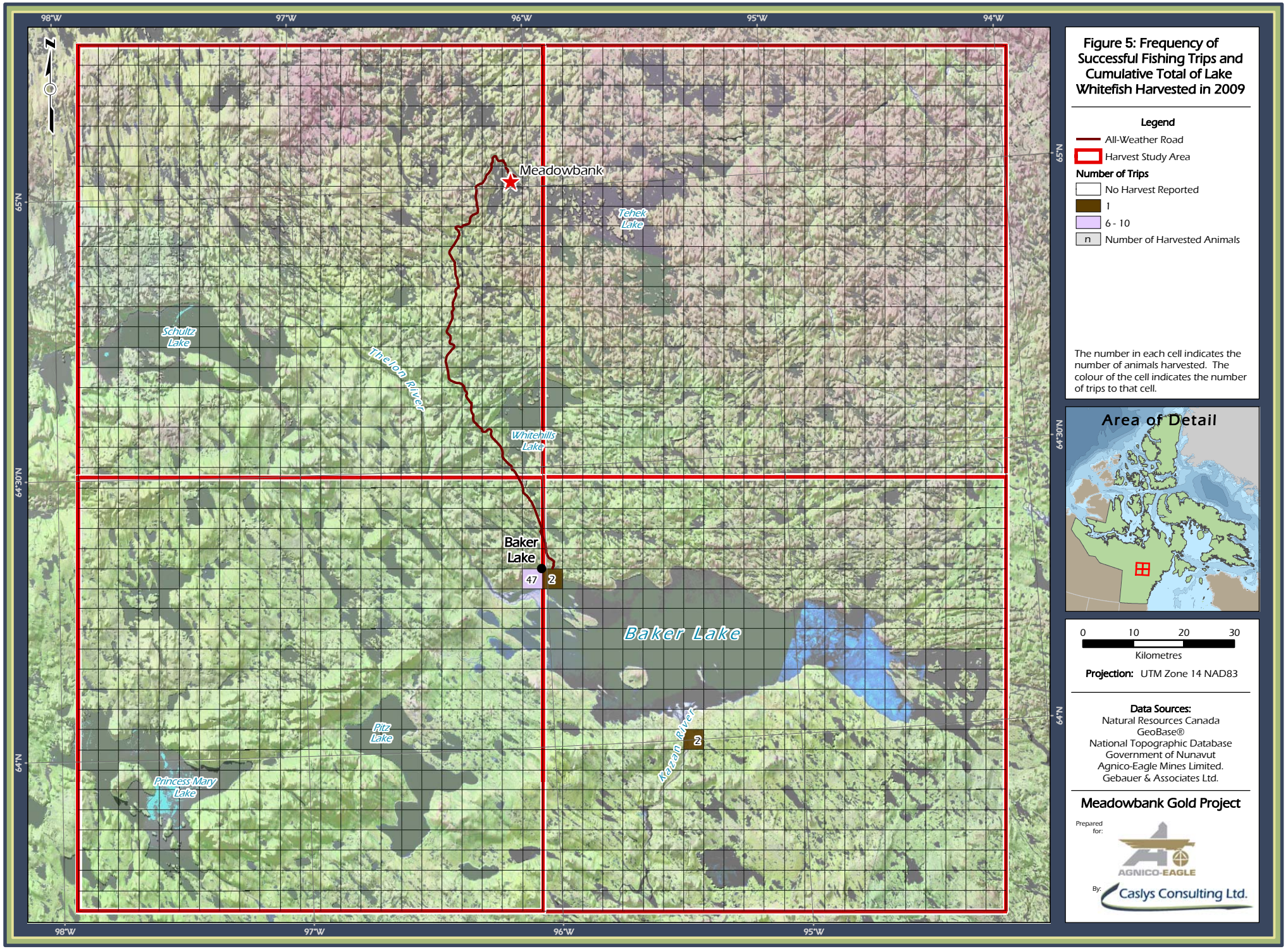
**Data Sources:**
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Limited.
Gebauer & Associates Ltd.

## Meadowbank Gold Project

Prepared for: AGNICO-EAGLE

By: Caslys Consulting Ltd.


98°W
97°W
96°W
95°W
94°W
65°N
64°30'N
64°N
N
Meadowbank
Tehek Lake
Schultz Lake
Thelon River
Whitehills Lake
Baker Lake
Baker Lake
Pitz Lake
Princess Mary Lake
Kazan River
Figure 4: Frequency of Successful Fishing Trips and Cumulative Total of Lake Trout Harvested in 2009
Legend
All-Weather Road
Harvest Study Area
Number of Trips
No Harvest Reported
1
2
3
4
5
6 - 10
11 - 15
16 - 20
n Number of Harvested Animals
The number in each cell indicates the number of animals harvested. The colour of the cell indicates the number of trips to that cell.
Area of Detail
0 10 20 30
Kilometres
Projection: UTM Zone 14 NAD83
Data Sources:
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Limited.
Gebauer & Associates Ltd.
Meadowbank Gold Project
Prepared for:
AGNICO-EAGLE
By:
Caslys Consulting Ltd.




# Figure 5: Frequency of Successful Fishing Trips and Cumulative Total of Lake Whitefish Harvested in 2009

**Legend**

- All-Weather Road
- Harvest Study Area

**Number of Trips**

- No Harvest Reported
- 1
- 6 - 10
- n — Number of Harvested Animals

The number in each cell indicates the number of animals harvested. The colour of the cell indicates the number of trips to that cell.




0 10 20 30

Kilometres

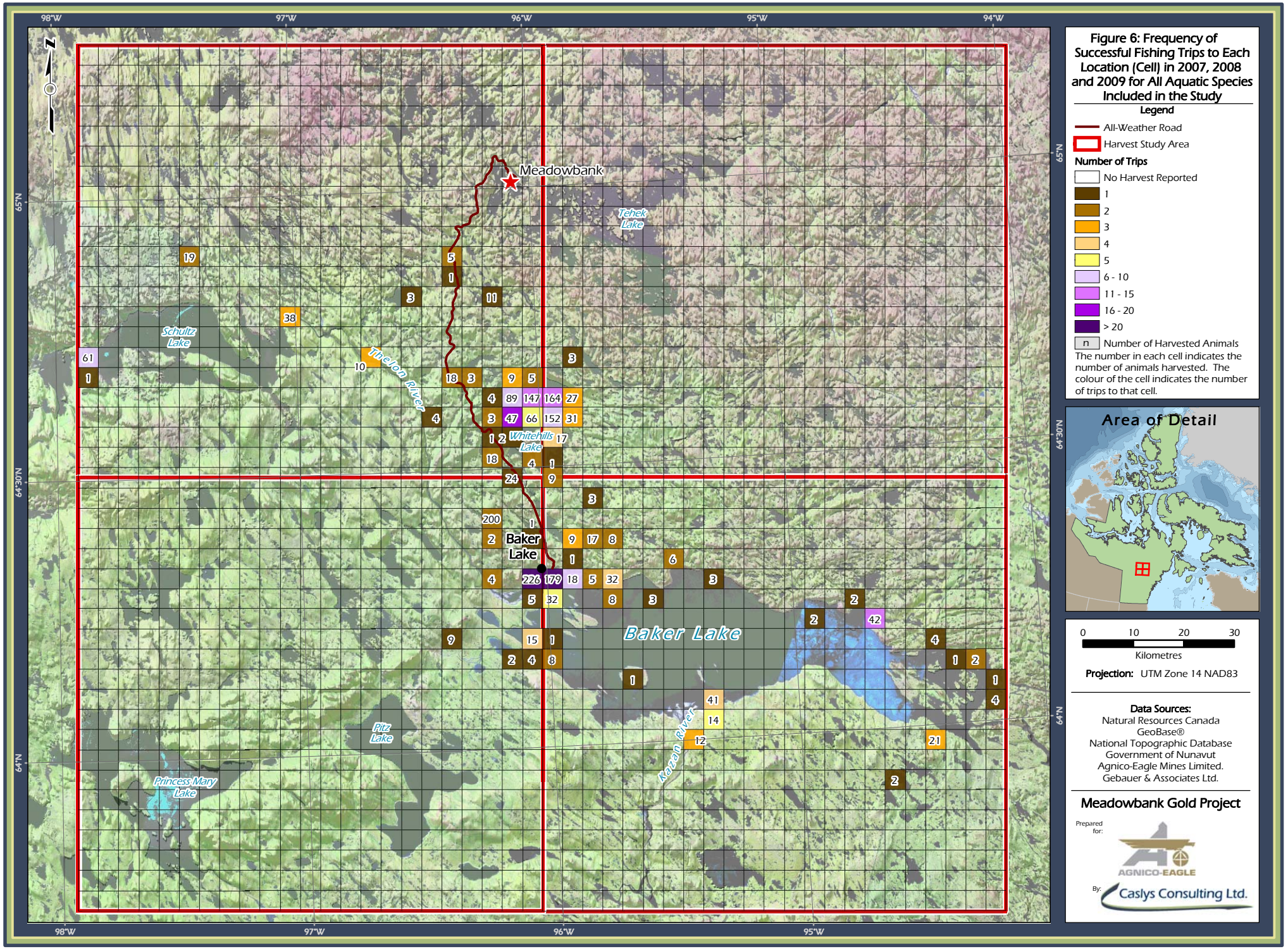
**Projection:** UTM Zone 14 NAD83

**Data Sources:**
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Limited.
Gebauer & Associates Ltd.

## Meadowbank Gold Project

Prepared for: AGNICO-EAGLE

By: Caslys Consulting Ltd.


98°W
97°W
96°W
95°W
94°W
65°N
64°30'N
64°N
Meadowbank
Tehek Lake
Schultz Lake
The Ion River
Whitehills Lake
Baker Lake
Pitz Lake
Princess Mary Lake
Kazan River
Baker Lake
Figure 6: Frequency of Successful Fishing Trips to Each Location (Cell) in 2007, 2008 and 2009 for All Aquatic Species Included in the Study
Legend
All-Weather Road
Harvest Study Area
Number of Trips
No Harvest Reported
1
2
3
4
5
6 - 10
11 - 15
16 - 20
> 20
n Number of Harvested Animals
The number in each cell indicates the number of animals harvested. The colour of the cell indicates the number of trips to that cell.
Area of Detail
0 10 20 30
Kilometres
Projection: UTM Zone 14 NAD83
Data Sources:
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Limited.
Gebauer & Associates Ltd.
Meadowbank Gold Project
Prepared for:
AGNICO-EAGLE
By:
Caslys Consulting Ltd.

*Project-related Effects*

The majority of fish continue to be caught away from the AWR, suggesting that fishing location preference continues to be uninfluenced by the presence of the road; however, an increased proportion of fishing was conducted at Whitehills Lake in 2009, which can be accessed via the AWR. It is unknown whether the increased fishing rates at Whitehills Lake are due to variation in study participation, the inclusion of new participants, or improved access due to the AWR. The key indicator species to determine effect, if any, will be Lake Trout, as densities of other fish currently occur in relatively low densities. Additional years of data will be required to identify potential trends, if any, associated with AWR construction.

We trust this provides the information you currently require. Should you have any questions, please do not hesitate to contact the undersigned at 604-765-2993.

Respectfully submitted,

**Chris Lee, MSc, R.P.Bio, QEP**
Project Biologist
Gebauer & Associates Ltd.