Appendix 40

Meadowbank 2019 Habitat Compensation Monitoring Report

MEADOWBANK GOLD MINE

2019 Habitat Compensation Monitoring Report

In Accordance with

DFO Fisheries Authorizations NU-0191.2, NU-03-0191.3, NU-03-0191.4 and 14-HCAA-01046

Prepared by:
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March, 2020

EXECUTIVE SUMMARY

According to Fisheries and Oceans Canada (DFO) Authorizations NU-0191.2, NU-03-0191.3, NU-03-0191.4 and 14-HCAA-01046, Agnico Eagle maintains a Habitat Compensation Monitoring Plan (HCMP; February, 2017) to ensure that fish habitat compensation features at the Meadowbank site are constructed and functioning as intended. Based on the schedule described in the HCMP, monitoring of compensation features generally occurs every 2 years until at least 2021. After that time, final determinations regarding success of the features will begin to be presented.

In 2019, monitoring was conducted for the constructed spawning pad, located at stream crossing R02 along the all-weather access road (AWAR) to Baker Lake, as well as for the onsite habitat compensation features constructed to date (East Dike exterior, Bay-Goose Dike exterior, Dogleg Ponds). As described in the HCMP, the AWAR study included a visual assessment of stability, as well biological monitoring to confirm use by Arctic grayling. The onsite monitoring included an assessment of periphyton growth and fish use for dike faces, and surface area for the Dogleg Ponds. Interstitial water quality is normally included for dike faces, but was not assessed in 2019 (next assessment will be 2021).

The constructed spawning pads at stream crossing R02 along the AWAR were visually confirmed to be stable as designed. Generally, condition factors of adult fish, population size distributions and timing of migration were within the range of values seen in previous years, confirming continued use of this area by Arctic grayling without significant changes in population structure. Larval drift rates of collection continue to exceed those observed prior to construction of the spawning pad. While these traps are useful to assess spawning rates upstream of the R02 reach generally, Agnico anticipates reviewing HCMP methods prior to the 2021 monitoring event to better assess successful utilization of the spawning pads specifically. Any updated plans will be provided to DFO for review prior to implementation.

Onsite, angling and underwater motion camera monitoring demonstrated continued fish use of the dikes as habitat. A total of 20 fish were caught through angling in 15 hr of effort, and a single fish sighting was captured on camera during the underwater motion camera program (3 hr of footage). Bathymetric surveys were completed for the Dogleg ponds, but air photo interpretation combined with bathymetric surveys will be used in the next monitoring event to confirm total surface area in comparison to baseline measurements.

Once the minimum monitoring period as described in the HCMP (2017) is reached for each compensation feature (2021+), a weight-of-evidence approach incorporating all data collected to date will be used to determine whether specific criteria for success have been met.

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SECTION 1 • INTRODUCTION

1.1 BACKGROUND

In accordance with Fisheries and Oceans Canada (DFO) Authorizations NU-0191.2, NU-03-0191.3, NU-03-0191.4, and 14-HCAA-01046, Agnico Eagle maintains a Habitat Compensation Monitoring Plan (HCMP; February, 2017) to ensure that fish habitat compensation described in Meadowbank's No Net Loss or Fish Habitat Offsetting Plans is constructed and functioning as intended. This program is carried out as a targeted monitoring plan under the Meadowbank Aquatic Effects Monitoring Program (AEMP).

1.2 SUMMARY OF COMPENSATION FEATURES

Under the 2017 HCMP, habitat compensation features have been implemented or are planned to be constructed in three general areas: along the All Weather Access Road to Baker Lake (NU-0191.2), in the Portage (main mine site) area (NU-03-0191.3), and in the Vault area (NU-03-0191.4, 14-HCAA-01046). A brief description of habitat compensation features in each area is provided below. Further details are available in the most recent Habitat Compensation Monitoring Plan (Version 4, February, 2017).

1.2.1 AWAR Compensation (NU-03-0190.2)

Construction of the 110 km All Weather Access Road (AWAR) between the Hamlet of Baker Lake and the Meadowbank Mine was completed in the spring of 2008, under DFO Authorization NU-03-0190.2. Four AWAR crossings were found to impact fish-bearing streams, so habitat compensation was required by DFO to account for any potential reductions in productivity.

In 2009, a habitat compensation project consisting of four gravel spawning pads was constructed at crossing R02 according to design specifications that met biological criteria aimed at enhancing Arctic grayling productivity. The construction focused on creating high value spawning and nursery habitat to compensate for the loss of the low and medium value habitat affected by bridge abutment construction at the four crossings.

Per Condition 5 of Fisheries Act Authorization NU-03-0190.2, monitoring studies have been conducted to evaluate fish migrations at the four AWAR crossings where "harmful alteration, disruption or destruction" (HADD) of fish habitat occurred (R02, R06, R09, and R15), and where compensation was implemented (R02). The details of this program are described in the original HCMP (Azimuth, 2007). In 2013, Agnico Eagle and DFO reviewed the information collected to date, and determined that conditions of the Authorization pertaining to monitoring of HADD sites were fulfilled, and that further monitoring would focus on the habitat compensation features. Updates to the scheduled monitoring activities at R02 were made in 2013 (AEM, 2014).

1.2.2 Portage Area Compensation (NU-03-0191.3)

Fish habitat losses in the Portage area are largely due to the dewatering of the northwest arm of Second Portage Lake for the mine's tailings storage facility (TSF) and Portage Pit, and the Bay-Goose Basin of Third Portage Lake for construction of the Portage and Goose Island pits. These areas were impounded from the rest of their lakes using dewatering dikes constructed from material quarried onsite. Compensation was mainly planned to be achieved through re-flooding of the de-watered basins, although changes to that offsetting plan are now being considered since in-pit deposition of tailings material was permitted in the Portage area in 2019. Minor habitat gains are also achieved through surface water diversion channels which increase the flooded area of the nearby Dogleg Ponds.

1.2.2.1 Bay-Goose Basin Re-Flooding

While the TSF area in Second Portage Lake will be a permanent loss of fish habitat, the impounded Goose and Portage Pit areas and surrounding former lake basins are planned to be eventually reflooded after mining operations cease. This re-flooded area has formed a significant part of the site's fish habitat compensation under Fisheries Act Authorization NU-03-0191.3. However, since in-pit deposition of tailings material was permitted within the dewatered area in 2019, Agnico is working with DFO to adapt the habitat offsetting plan for NU-03-0191.3 as necessary. The exterior faces of the dewatering dikes (East Dike and Bay Goose Dike) are currently in place as constructed habitat compensation features.

1.2.2.2 Dogleg Pond Enhancements

Dogleg Pond and the "North Portage" ponds, Dogleg North Pond (also called NP-1) and NP-2, were isolated ponds located near the waste rock area, just north of Second Portage Lake. Since drainage of NP-2 into Second Portage Lake became blocked by the waste rock pile on the northern edge of the TSF, a connecting channel was excavated (2013) to direct flow from NP-2 to Dogleg North Pond, effectively increasing the drainage area of Dogleg and Dogleg North Pond. The accompanying increase in wetted area was estimated at 5% for Dogleg Pond, 15% for Dogleg North Pond (NP-1), and 5% for NP-2. Through construction of a diversion channel, connectivity between the ponds has been improved, and previously inaccessible habitat in Dogleg North Pond has become available for use by lake trout, Arctic char and round whitefish currently inhabiting Dogleg Pond.

1.2.2.3 Finger Dikes

In keeping with the original 2006 NNLP, finger dikes are also planned to be constructed on the Bay-Goose Dike extending into Third Portage Lake. These features will provide additional "shoreline" habitat that is used by most species for spawning, and will have a total area of 1 ha at their base.

1.2.3 Vault Area Compensation (NU-03-0191.4, 14-HCAA-01046)

Vault Lake and Phaser Lake, located north of the Portage area, drain into the adjacent Wally Lake, but the connection is not passable to fish. To allow construction of the Vault and Phaser pits, Vault Lake has been separated from Wally Lake with a dike and both lakes have been dewatered.

Post-closure, Vault Lake will connect to Phaser Lake through the Phaser Pit. Both areas will be re-flooded and the connection to Wally Lake re-established with a deeper channel to permit better fish passage, including for Arctic char. This species was only found in Vault Lake during baseline studies, and it was presumed not to be present in Phaser Lake or Wally Lake. Vault and Phaser Lakes will also be expanded by construction of the Vault and Phaser pits, a portion of which is in a terrestrial zone. Alterations of the de-watered basin area outside the pit will improve habitat through the development of shoals and mixed substrate areas.

1.3 OBJECTIVES

The following sections describe the monitoring objectives for compensation features by location. These objectives are fulfilled according to the methods and schedule described in detail in Section 2, below, and in the HCMP.

1.3.1 AWAR Monitoring Objectives

Based on Condition 5.2 of DFO Authorization NU-03-0190.2, the objectives of the AWAR monitoring program are as follows:

- Assess the stability and successful utilization of all compensation features during the spawning and nursery period for Arctic grayling (Condition 5.2.1)

Additional Conditions pertaining to monitoring of HADD sites were no longer required as per the 2014 HCMP Version 3 update (that was designed in consultation with DFO).

1.3.2 Portage and Vault Area Monitoring Objectives

Based on Condition 6 of DFO Authorizations NU-03-0190.3, NU-03-0191.4, and 14-HCAA-01046, the objectives of the Portage area monitoring program are as follows:

- Assess the stability and successful utilization of all fish habitat compensation features according to the methodology and schedule detailed in the Habitat Compensation Monitoring Plan

- Provide a photographic record before, during and after construction, during decommissioning and post-restoration to indicate that all works and undertakings have been completed according to the conditions of the Authorization and the NNLP

1.4 SCHEDULE OF MONITORING

The complete schedule of monitoring events is detailed in the HCMP (Version 4; February, 2017). Monitoring activities conducted in 2019 generally followed the schedule therein, with minor alterations as described in Section 2, below.

SECTION 2 • CURRENT-YEAR MONITORING METHODOLOGY

As per the schedule of monitoring events, monitoring was conducted in 2019 for the AWAR compensation feature (Fisheries Act Authorization NU-0191.2; Condition 5.2.1) and for the Portage area compensation features (Fisheries Act Authorization NU-0191.3; Condition 6). Monitoring for the Vault area compensation features (Fisheries Act Authorizations NU-0191.4 and 14-HCAA-01046; Condition 6) have not yet begun.

A description of the methods used to monitor each habitat compensation feature according to the objectives of DFO Fisheries Act Authorizations is provided in the HCMP. Specific details (e.g. dates, locations) and any adjustments to standard methods in the reporting year's monitoring events are described below.

2.1 AWAR MONITORING

2.1.1 Stability

The compensation features were visually assessed to determine general stability in comparison to previous years. In particular, signs of any significant movement of the coarse substrate material used to construct the berms were noted. Significant movement would be identified as any changes prohibiting the berms from functioning as intended to reduce water flow rates and improve spawning habitat in this area.

2.1.2 Larval Drift Traps

Larval drift trap monitoring proceeded in a manner similar to previous years. In total, 12 larval drift traps (DT) were set at R02 from June 13 through July 15, 2019 (UTM coordinates provided in Table 1; locations shown in Figure 1). Four traps (DT A1 to A4) were upstream of the R02 habitat compensation area. Four traps (DT B1 – B4) were immediately downstream of the R02 habitat compensation, and four traps (DT C1 – C4) were set slightly upstream of the bridge in locations identical to previous monitoring events. Five of the larval drift traps consisted of a square sided metal 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®-type container where the drift was collected. Seven traps consisted of a ~60cm x 30cm square frame which has a 0.5 mm nitex mesh bag, attached to a hard plastic container where the drift was collected. The frames were submerged at least halfway under water (as water levels permitted) and secured by poles on each side. Drift traps were checked at least every three days, but most commonly every day. Larval drift was enumerated in the field and discarded.

Table 1. UTM coordinates for drift traps at R02, 2019. All traps were set from June 13 – July 15, 2019.

Drift Trap ID	GPS Coordinates
A1	14W 0643438 7143416
A2	14W 0643452 7143426
A3	14W 0643444 7143432
A4	14W 0643449 7143430
B1	14W 0643682 7143529
B2	14W 0643699 7143520
B3	14W 0643716 7143574
B4	14W 0643728 7143540
C1	14W 0643762 7143400
C2	14W 0643770 7143406
C3	14W 0643778 7143412
C4	14 W 643786 7143403

2.1.3 Hoopnets

Hoopnets were set upstream of HADD crossing R02 to monitor the passage of fish and evaluate population structure. Nets consisted of either a 4 ft (1.22 m) or 3 ft (0.9 m) diameter front hoop, with interior hoops and traps that prevent fish from escaping but provide enough space for fish to survive. Wings were attached to the front hoop to direct fish into the net. The captured fish were gently removed by field technicians, placed in large tubs filled on location with stream water for biological processing and then placed in a recovery tub. The fish were released up or downstream of the hoopnets, depending on the fish's migration direction. The Animal Use Protocol Report for this work is provided in Appendix A.

Biological processing included:

- measurement of fork length

- measurement of weight using a Pesola field scale (+/-2 to 5 g)
- classification of maturity by gently palpitating the abdomen and visually identifying distinguishable male or female features

Hoopnets were first deployed on June 11, 2019 and were removed on July 12, 2019. 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. In 2019, ice conditions permitted set-up of hoop nets earlier than usual, and water levels were low enough that nets could be set in the thalweg (approx. middle of channel) from the initiation of monitoring.

Hoopnet locations (Table 2) were selected upstream (R02A) and downstream (R02B) of the constructed spawning pads as in previous years.

Table 2. Approximate hoopnet locations, net orientation (upstream-moving fish, US; downstream-moving fish, DS), dates of deployment and approximate stream coverage at crossings R02 in 2019.

Location	GPS Coordinates	Dates	# Nets		Net Days	% Coverage
			US	DS		
R02A	14W 0643511	June 14 - June 15	1	0	1	20
	UTM 7143458	June 15 - June 27	1	1	24	40
		June 27- July 12	3	1	64	80
R02B	14W 0643745	June 11 – June 29	1	1	36	20
	UTM 7143596	June 29 - July 12	3	1	56	40

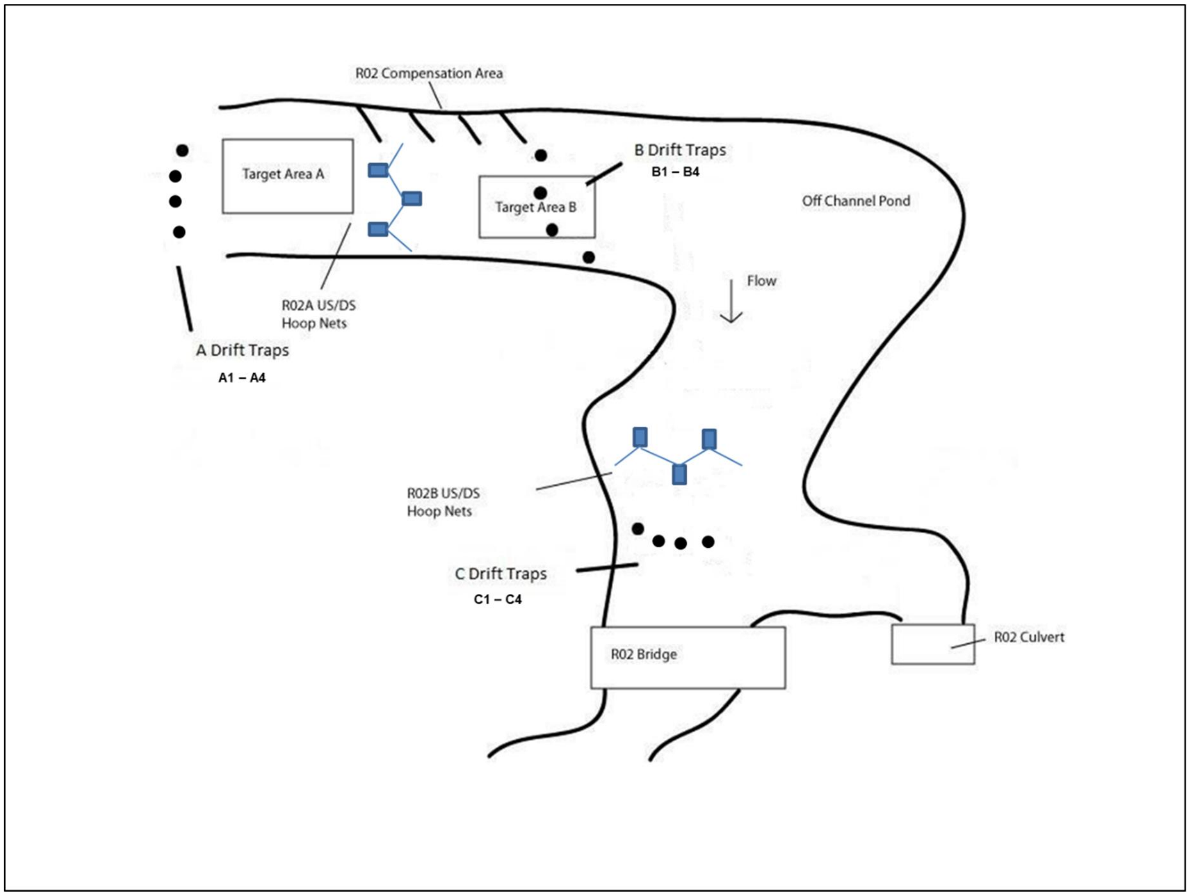


Figure 1. Locations of hoopnets and larval drift traps in 2019 with respect to the R02 habitat compensation feature.

2.1.4 Angling

Minimal angling was conducted at R02 in 2019. Attempts were made on June 16 by casting with small lures with barbless hooks, focussing on the R02A (spawning pads) area. However, water levels were too low, and hooks were getting stuck in the rocks. No further angling attempts were made since this monitoring tool has been minimally effective in past years.

2.1.5 Underwater Video

In addition to the use of hoopnets and angling, underwater camera video was taken in attempts to directly identify use of the berms by spawning Arctic grayling. The cameras were mounted on a ½” x 12” L shaped piece of rebar which was welded to a 4” x 12” steel “C” beam. The “C” beam acted as a base for the camera mount. A rope with a buoy at one end was attached to the rebar and lowered into the water. The buoy was used as a locator once the camera was deployed under water.

In 2019, the focus areas for the underwater video cameras were between and adjacent to the spawning berms, in areas with sufficient water depth. Cameras were set between June 18 – June 22, and 180 minutes of footage were recorded.

2.1.6 Water Temperature

Water temperature measurements were recorded using a standard mercury thermometer. Although these are not a component of compensation monitoring, they help to provide a record of the environmental setting under which migrations are occurring.

2.2 PORTAGE AREA MONITORING

2.2.1 Interstitial Water Quality

Modeling during the EIA process indicated that metals leaching from quarried rock used in dike construction would not significantly impact the aquatic environment. Nevertheless, interstitial water quality of constructed habitat compensation features is assessed through the HCMP to verify predictions.

Typically, in order to collect a representative sample from the bioactive zone between the rocks, an electric diaphragm pump with food-grade silicon tubing is used. Samples are planned to be collected at depths between 1 and 2 m at previously established locations (Table 3), and analyzed for total suspended solids, phosphate, hardness, and total and dissolved metals. Results are compared to background (reference station) concentrations and CCME guidelines where available.

In 2019, interstitial water quality sampling was not conducted for the East Dike and Bay-Goose Dike exterior. In all previous monitoring events (2011, 2015, 2017) no exceedances of CCME guidelines occurred except for total phosphorus (2011 only), and occasional exceedances of TSS (2015, 2017) in individual samples where the dike material was likely disturbed by the sampler.. Further interstitial water quality sampling was therefore deferred until the next HCMP monitoring year (2021).

Table 3. UTM coordinates for historical dike pore water monitoring locations (approximate locations of underwater video monitoring and angling).

Location	Station ID	UTM Coordinates	Depth
East Dike	ED-PW-2*	14W 0639382 7214257	1.8 m
	ED-PW-4	14W 0639381 7213846	1.5 m
Bay Goose Dike	BG-PW-2	14W 0638993 7212783	1.9 m
	BG-PW-4	14W 0639001 7212509	1.6 m
	BG-PW-6	14W 0638592 7211820	1.7 m
Third Portage Lake Reference Station	TPL-REF	14W 0639289 7210860	1.9 m
Second Portage Lake Reference Station	SP-REF	14W 0640510 7213187	1.7 m

**Note that in the 2015 report, this location was misidentified as PW-1, but coordinates are the same*.

2.2.2 Periphyton Growth

Periphyton monitoring was conducted by Agnico Eagle technicians with the assistance of Azimuth Consulting Group. Methods and results for this component are summarized here, and details are provided in Appendix K of the 2019 CREMP Report.

Generally, periphyton community sampling was completed on August 9th, 10th and 14th in 2019. Periphyton samples were collected in the following areas in relation to each dike HCF (sampling locations are shown in Figure 2):

East Dike HCF (Second Portage Lake)

- East Dike (SP-ED)
- Drilltrail Arm reference area (SP-DT)

Bay-Goose Dike HCF (Third Portage Lake – East basin)

- Bay-Goose Dike – North section (TPE-BGN)
- Bay-Goose Dike – South section (TPE-BGS)

Reference area (TPE-G)

Five replicate samples were collected from each area and analyzed independently. Periphyton samples were preserved in the field with a small amount of Lugol's solution and sent to Plankton R Us Inc. (Winnipeg, MB) for taxonomic identification and biomass (µg/cm^2) estimation.

2.2.3 Fish Use

Angling and underwater motion camera monitoring was performed by Agnico Eagle technicians between July 26 and August 7, 2019. Ice fishing was performed between November 24 and December 23, 2019 for Dogleg and Third Portage Lake locations. Both the angling and underwater motion camera monitoring took place in and around the 2017 interstitial water sampling locations, as shown on Figure 2, but specific coordinates were not recorded for each event (beyond Second Portage Lake or Third Portage Lake designations). The Animal Use Protocol Report for this work is provided in Appendix A.

A total angling effort of 15 h was completed. This included 9 h at locations along the East Dike and the Second Portage Lake reference station (combined), 5 h at locations along the Bay-Goose Dike and the Third Portage Lake reference station (combined), and 1 h in Dogleg Pond. All fish were caught using a jigging method with a small jigging spoon with barbless hooks. All fish caught by angling were recorded, and the majority were weighed, measured, tagged, and released. To minimize stress, each fish was processed quickly and then released, by holding underwater until it was able to swim away on its own.

This was the third year of underwater motion camera monitoring, and a total effort of 3 h of video footage was collected at Second Portage Lake locations only. Cameras were attached to custom-made heavy metal stands and lowered by rope along the face of the dikes and reference areas. Cameras were collected approximately 2 – 4 h later. Due to the cold water temperatures, the battery life on the underwater motion cameras was restricted to 2 h.

2.2.4 Structure

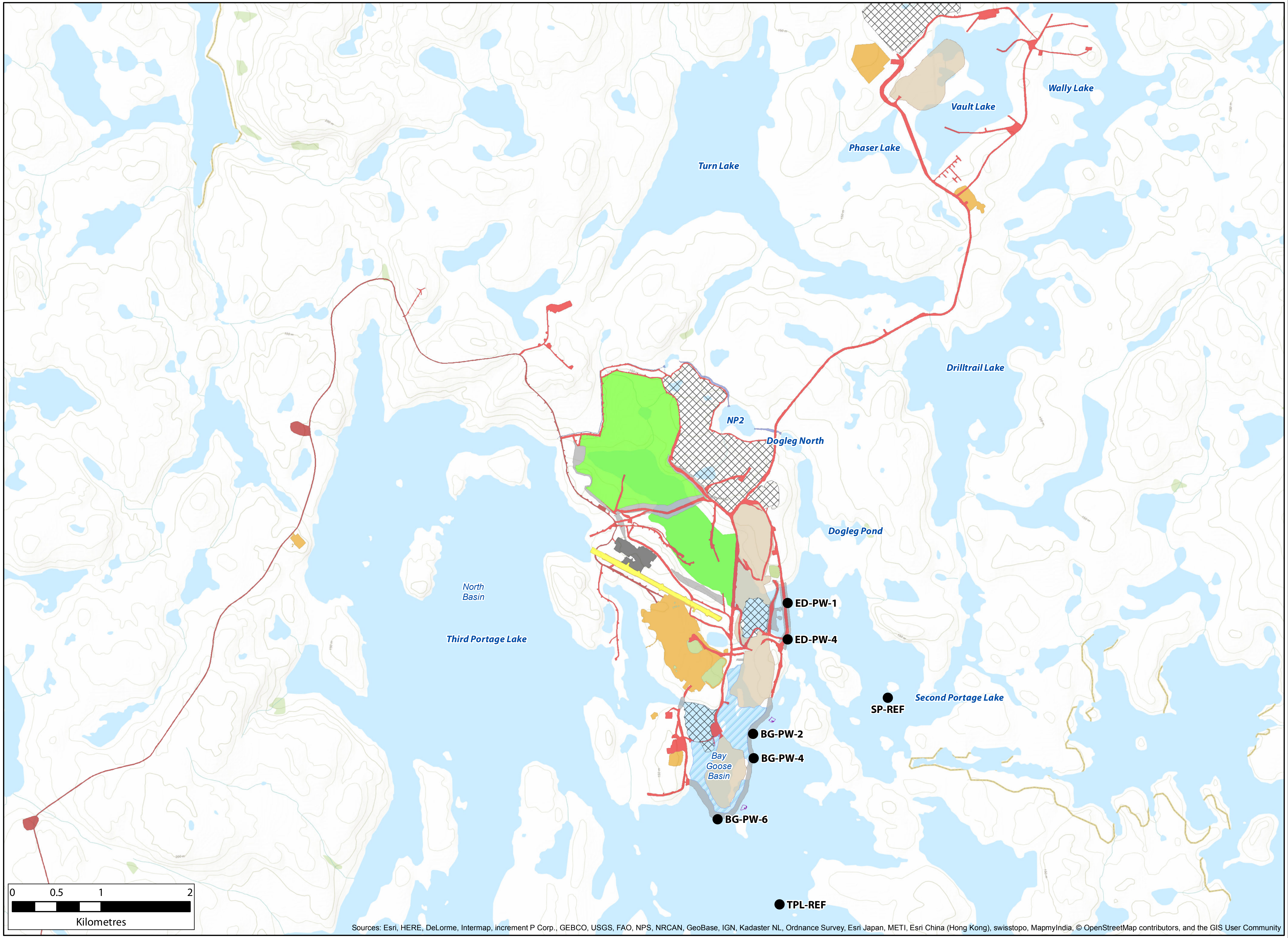
Design intent of the East and Bay-Goose Dikes was incorporated into the 2012 NNLP and no additional monitoring is planned in the HCMP.

Design intent of the access improvements for the Dogleg system were planned to be monitored beginning in 2015 to confirm whether construction of the diversion channel from NP-2 to Dogleg North Pond (NP-1) is increasing the wetted area of these ponds as assumed, and to confirm the potential for fish movement, especially between Dogleg Pond and Dogleg North Pond (NP-1).

Planned monitoring includes bathymetric surveys to determine the water depth or area of each pond, and an assessment of water depth in connecting channels. These surveys could not be completed in 2015 and were conducted in 2017 and 2019.

2.3 VAULT AREA MONITORING

According to the HCMP (2017), assessments of structure (particularly substrate types) within the dewatered Vault and Phaser Lake basins will occur prior to significant flooding of these areas. Since mining operations have now ceased in the Vault and Portage pits, habitat structure assessments will be conducted in 2020. These assessments will aim to document whether changes to post-flooding habitat type areas within these basins are complete as designed in the accepted NNL or Offsetting plans. The assessments prior to significant re-flooding will focus on mapping substrate types, while final surface area and depth zones will be determined after flooding is complete, along with analyses of water quality and fish use.



Legend

- Habitat Monitoring Location

Mine Plan (2015)

- Quarry
- AWPAR Quarry
- Dewatered Lake
- Tailings Storage Facility
- Roads
- AWPAR
- Dikes
- Diversion Ditch
- Stockpiles
- Pits
- Facility
- Airstrip
- Waste Dump
- Potential Finger Dike

Habitat Compensation Monitoring Locations

DOUGAN & ASSOCIATES
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77 Wyndham Street South • Guelph ON N1E 5R3
T 519.822.1609 • F 519.822.5389 • www.dougan.ca

PROJECT: DA11-062-06

CLIENT: Agnico-Eagle Mines Ltd., Meadowbank Div.

N E S W
UTM Zone 14 NAD83

DATE: MARCH 2016

SCALE: 1:40,000

DRAWN BY: LC

CHECKED BY:

FIGURE:

2

SECTION 3 • RESULTS

3.1 AWAR MONITORING

3.1.1 Stability

Visual observations indicated little to no movement of the spawning berm material. The berms appear to be functioning as intended to reduce water flow rates and depths. Gravel substrate on the downstream side of each berm is intact.

3.1.2 Larval Drift Traps

3.1.2.1 Current Year Results

In 2019, 2536 young of the year (YOY) were collected in the R02 reach studied. Of these, 661 YOY were collected in traps A1 – A4, which were placed upstream of the compensation area and downstream of natural spawning habitat (Table 4). In total, 771 YOY were collected in traps B1 – B4, which were located just downstream of the habitat compensation area. Drift traps C1 – C4 were placed further downstream, and collected a total of 1104 YOY.

Table 4. Total, daily average and daily maximum catch of young of the year fish in drift traps at R02 in 2019.

Drift Trap ID	Total	Average	Max
A1	23	1.0	6
A2	179	7.5	38
A3	184	7.7	65
A4	275	11.5	123
Total	661		
B1	114	4.2	17
B2	185	6.9	33
B3	279	10.3	55
B4	193	7.1	73
Total	771		
C1	107	4.0	33
C2	211	7.8	27
C3	321	11.9	46
C4	465	17.2	67
Total	1104		

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).

In 2019 at R02, peak larval drift catch occurred around June 16, when the water temperature was 2°C (Figure 3). In previous years, peak catch has occurred at a similar time point (June 13 – 24), but water temperatures were warmer (4 – 6°C). These results suggest that fish caught in drift traps in recent years, and particularly 2019, include YOY of fall spawners (e.g. lake trout or round whitefish), which hatch in late spring in this region.

In 2006 - 2007, taxonomic ID of drift trap catch was formally performed by a consulting laboratory. In 2006, 4 of 56 YOY were identified as Arctic grayling, while the remainder were small-bodied fish (slimy sculpin or stickleback). In 2007, 89% of the 327 fish were determined to be grayling. In 2008, taxonomic ID was determined by the consulting laboratory, but only total numbers of Arctic grayling were reported. In 2009, fish larvae identification was confirmed at a University of Guelph laboratory by an Agnico environmental biologist using a suitable larval taxonomic key (Auer, 1982). Since that time, field ID has been performed, and only total Arctic grayling catch has been reported (except in 2010, when 2 stickleback were reported among 1136 grayling). However, based on the very early presence of larval drift catch in 2019 (June 13 at water temperatures of 2°C), it’s likely that alternate (fall-spawning) species are in fact present and these may have been misidentified in the field as Arctic grayling in recent years. Historical results (Section 3.1.2.2, Figure 4) are interpreted in that context. Total larval drift catch is assessed, rather than Arctic grayling only.

Current methods for larval drift monitoring are viewed as a suitable assessment of spawning activity within the R02 reach area. However, prior to the next monitoring event (2021), Agnico will work with DFO to modify HCMP monitoring methods for R02 to more effectively assess the successful utilization of the spawning pads themselves. This could include targeted visual surveys for spawning activity at key times, and kick net sampling to identify presence of eggs.

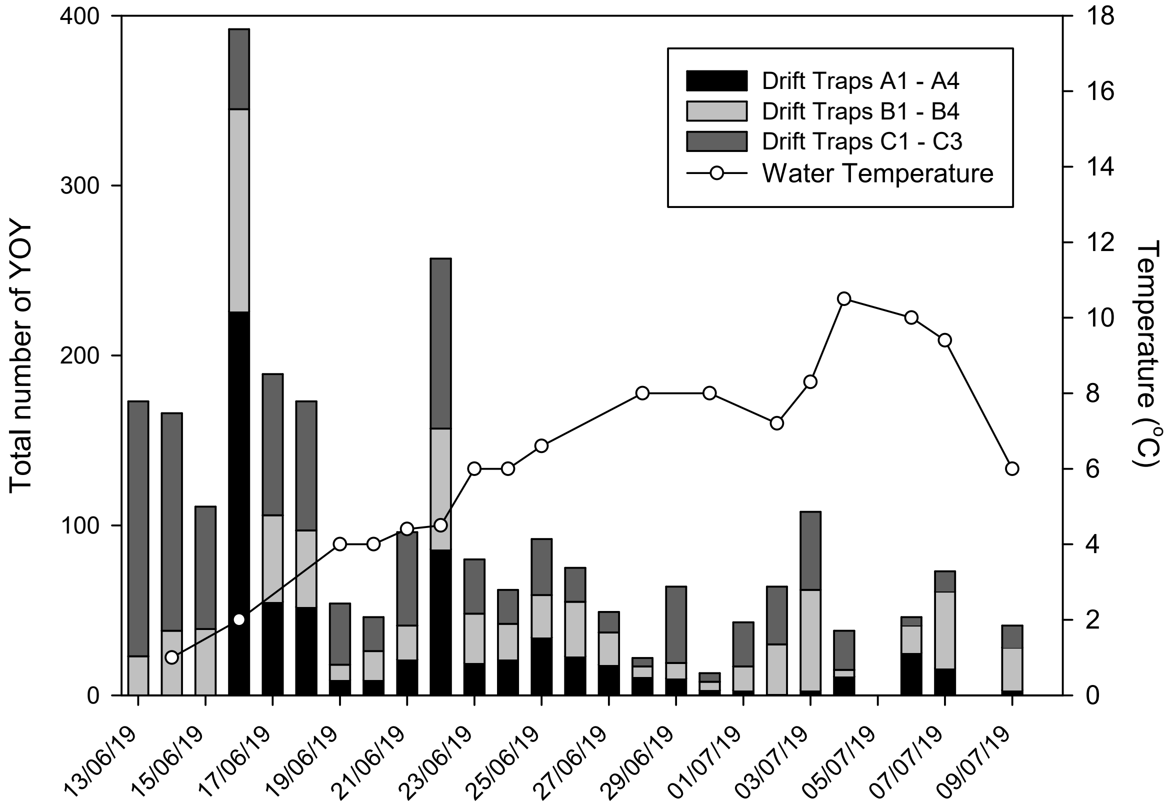

Figure 3. Water temperature and total number of Arctic grayling YOY collected at drift trap areas A, B and C from June 13 – July 15, 2019.

3.1.2.2 Historical Results

Since 2005, the number of drift traps and dates of monitoring have varied at R02 (Table 5). Therefore, the year-over-year change in larval drift observed in annual monitoring programs is more effectively compared if values are standardized to the number of traps and number of days monitored. The trapping period in 2019 was near average, with traps set for approximately 33 days from mid-June to mid- July. In 2006, 2008, 2011, 2015, and 2017 the monitoring period was about 24 days, although in 2017 traps were set at least 3 days earlier than any other year, and pulled 13 days earlier. In 2007, 2009 and 2010, the trapping period was extended to late July or early August, and was 37 – 45 days long. In late July of each year, larval drift was essentially reduced to nil. To provide a preliminary comparison of standardized counts, the first 24 days of each monitoring period are examined (for 2017, only 23 days are available) in Figure 4.

In 2005, no larvae were collected at R02, likely because only one drift trap was set. This is not considered to be a representative sample, so is excluded from the comparison.

Table 5. Summary of larval drift trap sets at R02 from 2005 to 2019.

Drift Traps	2005	2006	2007	2008	2009	2010	2011	2013	2015	2017	2019
Date in	Jun 29	Jun 24	Jun 23	Jun 21	Jun 24	Jun 24	Jun 22	Jun 14	Jun 18	Jun 10	Jun 13
Date out	Jul 17	Jul 19	Jul 29	Jul 16	Aug 07	Aug 01	Jul 17	Jun 29	Jul 17	Jul 2	Jul 15
Max # traps	1	2	7	8	9	12	12	9	12	11	12
# trap days	19	52	259	160	405	468	288	117	348	253	380
# YOY (total)	0	56	327	NR	585	1138	NR	NR	NR	NR	NR
# ARGR	0	4	292	158	508	1136	1831	479	2272	636	2536

YOY – Young of the year
ARGR – Arctic grayling

Total catch per trap day was relatively low in 2017 compared to other post-construction years, but was similar to values observed in 2009 (Figure 4). This was likely due to low water levels overall, and warmer water temperatures occurring earlier in the season than recent years. For example, in 2015, temperatures of 8-10°C (when larval drift typically tails off) were not reached until July 1+, whereas temperatures in that range occurred as early as June 15 in 2017 (Figure 3). In 2019, drift trap catch per trap day was similar to 2015, and temperatures of 8-10°C were similarly reached between June 28 – July 4.

Larval catch per trap day was similar between stations A and B in 2019, and slightly higher at station C. There is no clear trend between drift trap locations year-over-year.

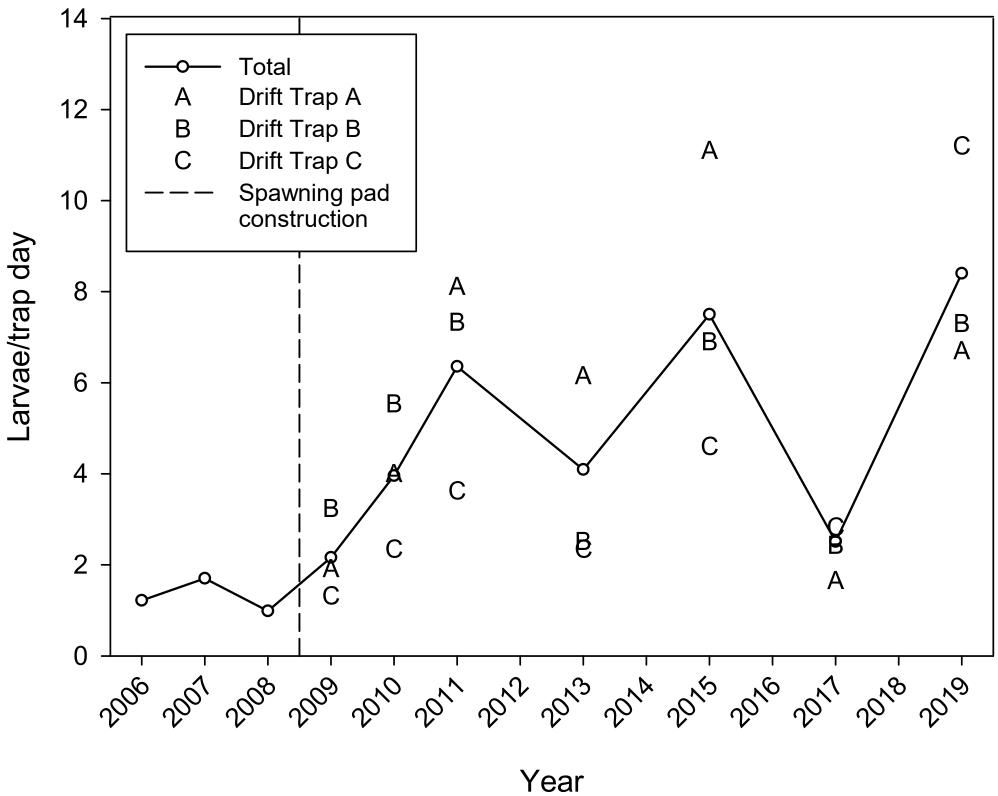

Figure 4. Total relative larval drift count (# larvae/trap day for the first 24 study days), and relative larval drift count upstream and downstream of the constructed spawning pad area at R02 from 2006 to 2019.

3.1.3 Hoopnets and Angling

3.1.3.1 Total Catch

All records of hoopnet catch are provided in Appendix B. No fish were caught through angling. As in the past, the predominant species of adult fish collected in 2019 along the AWAR were Arctic grayling (*Thymallus arcticus*) (175 fish). Ten round whitefish (*Prosopium cylindraceum)* and eight lake trout (*Salvelinus namaycush)* were also caught. A summary of the total number of adult fish collected is provided in Table 6. Since Arctic grayling are the primary species of concern in this study, the majority of the data analysis includes only individuals of that species (as indicated).

Table 6. Total number of fish collected by species.

Species	Total Catch
Arctic Grayling	175
Lake Trout	8
Round Whitefish	10
Total	193

By standardizing the catch to the number of nets and number of days fished, a cursory comparison of inter-annual trends can be performed. It should be noted, however, that many factors can affect the how well hoopnet catches represent the true population. For example, longer study periods involve a greater proportion of days on which fewer fish are migrating. If the study continues beyond the actual migration period, the total number of fish per unit effort is reduced when compared with shorter studies. Studies at R02 have been initiated immediately once ice conditions are safe for work, but those conditions can vary significantly from year to year, resulting in study initiation dates ranging by 19 days (June 10 – June 29). Another factor affecting total catch and catch per unit effort in both 2017 and 2019 was significantly warmer water temperatures (2017) and/or lower water levels (2017 and 2019) than observed previously. By the end of the study period, hoopnets were not able to be submerged to their full width, reducing catch efficiency.

Nevertheless, catch per unit effort (CPUE as fish per net-day; Figure 5) in 2019 was similar to most post-construction years (2009, 2010, 2011, 2015, and 2017). Up to eight nets were deployed over a near one-month study period resulting in 181 net-days (Table 7). Although CPUE was comparatively elevated during the first two baseline years (2005 and 2006), effort was substantially lower, with only two nets deployed for about three weeks (increasing catch efficiency, assuming nets target optimal migratory habitat). No significant trend in total CPUE is apparent since 2007.

Table 7. Summary of dates and number of nets (upstream and downstream) used at R02 from 2005 to 2019.

Hoop Nets	2005	2006	2007	2008	2009	2010	2011	2013	2015	2017	2019
Date in	Jun 29	Jun 24	Jun 24	Jun 17	Jun 26	Jun 25	Jun 24	Jun 14	Jun 17	Jun 10	Jun 11
Date out	Jul 18	Jul 19	Jul 20	Jul 16	Aug 02	Aug 01	Jul 19	Jun 29	Jul 17	Jul 7	Jul 12
Max # nets	2	2	5	4	9	7	9	10	10	8	8
# net days	42	50	132	124	234	227	219	122	237	212	181

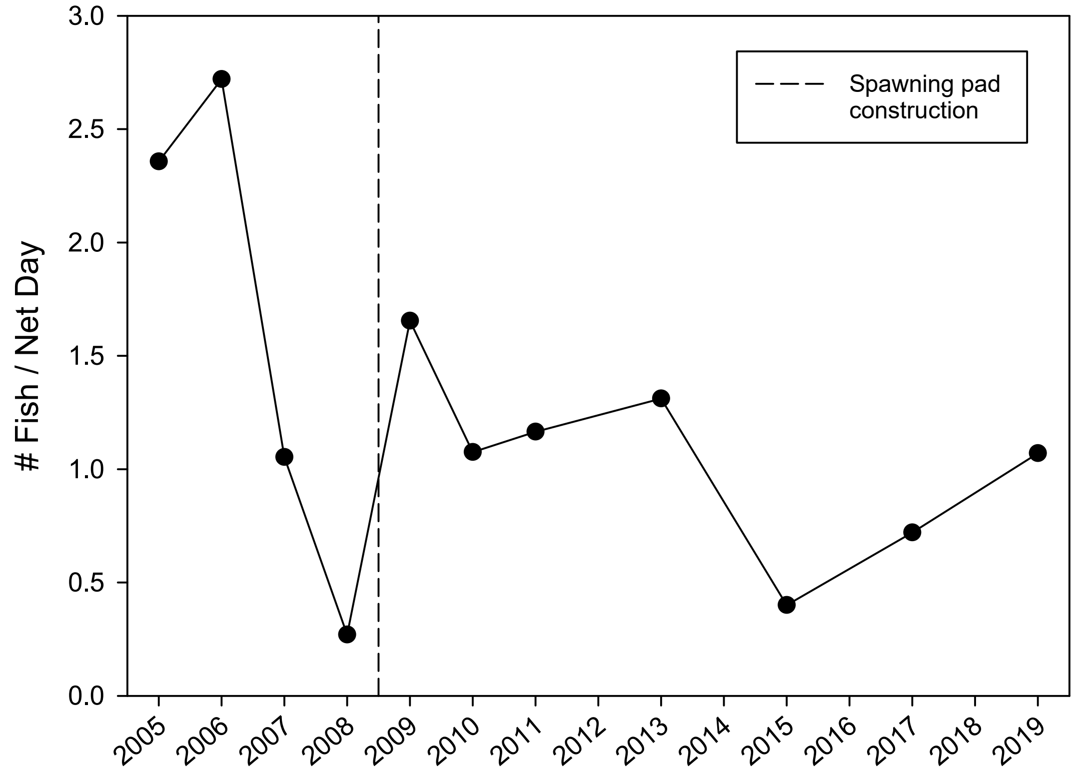

Figure 5. Number of fish captured per unit effort (# fish/net day) at R02 from 2005 to 2019.

3.1.3.2 Movements

A total of 138 Arctic grayling were captured moving upstream and 37 moving downstream (Figure 6). Fish were caught on the first sampling day (June 12), when temperatures were < 1°C (similar to 2015).

Peak larval drift (June 16; Section 3.1.2) occurred prior to the observed peak adult Arctic grayling upstream migration (June 23 – June 30), further supporting evidence that in 2019, early larval drift may have included YOY of fall spawning species.

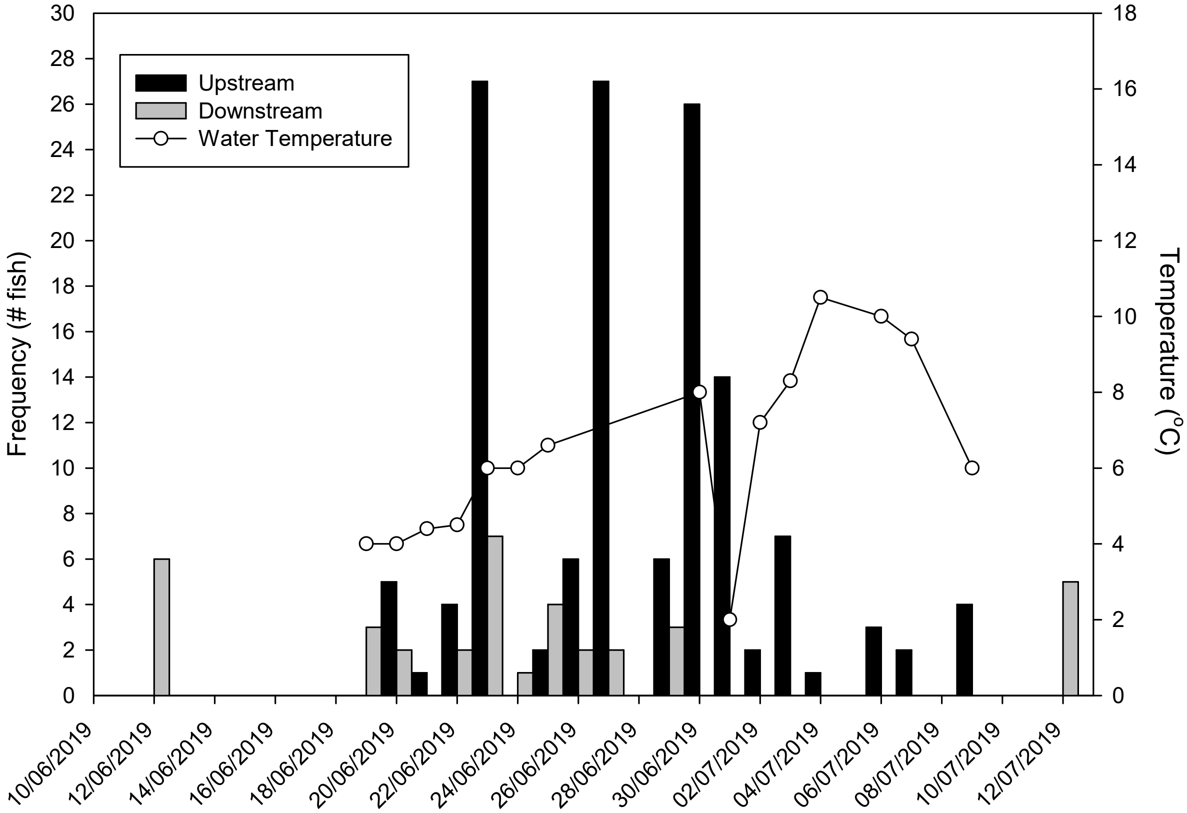

Figure 6. Upstream and downstream movements of Arctic grayling at R02 in 2019.

The R02 nets were set in two locations - just upstream (R02A) and downstream of the habitat compensation area (R02B). Similar to the 2017, many more fish (157) were collected at R02A than R02B (36) (see Table 8), likely due to the higher proportion of stream coverage at this location (80 vs 20%; Section 2.1.3) and very low water levels at R02B in both 2017 and 2019.

Table 8. Upstream and downstream movements of Arctic grayling by net location since 2010.

R02 Hoopnet ID	Fish Movement	2010	2011	2013	2015	2017	2019
A	US	61	175	81	19	138	144
	DS	58	13	41	32	6	13
B	US	103	25	33	8	2	6
	DS	8	16	5	14	1	30
C	US	3	1	-	-	-	-
	DS	11	25	-	-	-	-
Total	US	167	201	114	27	140	149
	DS	77	54	46	46	7	44

3.1.3.3 Condition Factor

Table 9 provides a summary of the average, maximum and minimum length and weight, and the average condition factor of Arctic grayling collected. Distributions of lengths and weights are similar to previous years. The average condition factor (K) was greater than 1.00, which demonstrates a healthy population. Six Arctic grayling were lost in transfer prior to recording length or weight data, resulting in a sample size of 169 fish.

Table 9. Average, maximum and minimum Arctic grayling length, weight and average condition factor (K).

	Length (mm)			Weight (g)			K*
n	Avg	Max	Min	Avg	Max	Min	Avg
169	259	620	104	255	2041	2	1.16

* K = (weight/((length/10)^3)) x 100

Condition factors for years 2006 – 2019 are shown in Figure 7. Condition factor and variability are similar to previous years.

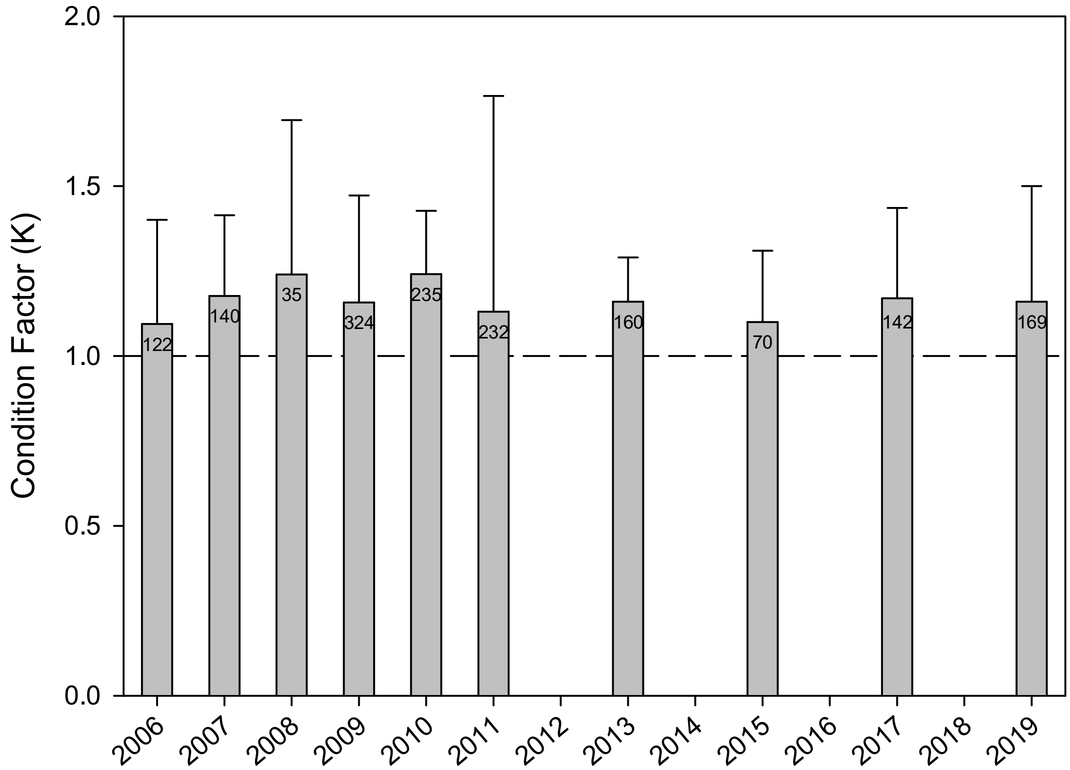

Figure 7. Average condition factor of Arctic grayling captured at R02. Error bars indicate standard deviation. Values indicate total number of fish.

3.1.3.4 Size Distribution and Maturity

As in the past, the length-frequency distribution (Figure 8) of fish collected at R02 is approximately normally distributed with the largest number of fish collected in the 230-250 mm size class (54 fish). This data demonstrates that recruitment is occurring as would be expected.

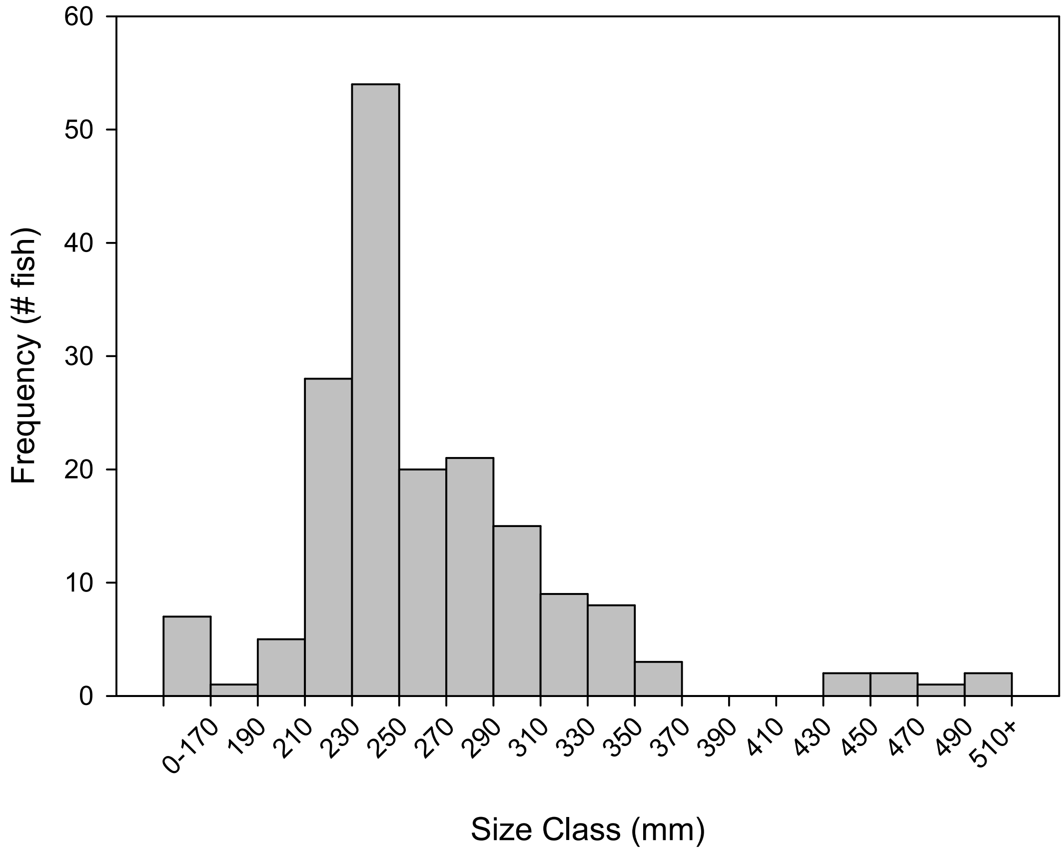

Figure 8. Length-frequency distribution of Arctic grayling captured at R02 in 2019.

The total numbers of male and female fish captured by spawning classification are shown in Table 10. Numbers of male and female fish were approximately equal. Most fish captured were identified as immature (85 fish).

Table 10. Number of fish by spawning classification caught at R02 in 2019.

Classification	Catch
Immature (F1/M6)	85
Female	
Ready (F2)	5
Waiting (F3)	7
Spent (F4)	4
Male	
Ready (M7)	15
Waiting (M8)	4
Spent (M9)	8
Unknown (F5/M10)	36

3.1.3.5 Current Year Recaptures

Floy tags are commonly used to provide population density measurements, but they are also very useful in tracking the activities of migrating fish. Table 11 provides the results of the current year tagging program, or "recaptures". In 2019, 2 fish were re-captured at R02 (both Arctic grayling). One was recaptured within one day, and one was recaptured after four days.

Table 11. Arctic grayling captured and re-captured in the current year at R02.

Fish	Date Collected	Net	US/DS	Tag #	Length	Weight	Sex/ Maturity	Maturity
1	6/23/19	R02A	US	743	233	140	F1/M6	Female or Male, Immature
	6/27/19	R02A	US		232	145	F5/M10	Female or Male Maturity Unknown
2	7/01/19	R02A	US	509	240	160	F5/M10	Female or Male Maturity Unknown
	7/02/19	R02A	US		240	160	F5/M10	Female or Male Maturity Unknown

3.1.3.6 Previous Year Recaptures

In 2019, no fish tagged in previous years were recaptured.

3.1.4 Underwater Video

In the 180 minutes of footage recorded between June 18 and 22, no fish were observed.

3.2 PORTAGE AREA MONITORING

3.2.1 Interstitial Water Quality

3.2.1.1 Results

No interstitial water quality monitoring was conducted in 2019. The next sampling event will occur in 2021.

3.2.2 Periphyton Growth

Full results for this monitoring component are provided in Appendix K of the 2019 CREMP Report, and summarized here.

In early-stage periphyton communities at the East Dike and Bay-Goose Dike HCFs, diatoms were the predominant taxa group colonizing the new substrate. However, this has shifted over the years to a more heterogeneous mix of cyanobacteria, diatoms, and to a lesser extent, chlorophyte taxa at both the East Dike and Bay-Goose Dike HCFs.

Biomass steadily increased on the HCFs in Second Portage and Third Portage Lakes in the post-dike construction phase up to 2017. In 2019, a slight decrease in biomass was observed on all the HCFs in Second Portage and Third Portage Lakes except at TPE-G, which showed an increase in biomass compared to previous sampling years. In 2019, the total biomass at each site was still lower compared to the reference areas (particularly at the Bay-Goose Dike HCFs). It is apparent that these communities take time to develop and it appears that a decade is not sufficient for full colonization of new barren rock surfaces to background levels of biomass. The presence of a structurally similar periphyton community at each of the HCFs relative to their respective reference areas indicates a healthy periphyton community. While total biomass growth is still expected as periphyton community succession progresses, there may be variation from year to year.

Overall, the progress at the Bay-Goose Dike towards a heterogenous periphyton community has been slower than what has been observed for SP-ED; however, in 2019 some progress was made at each area (i.e., higher diversity at TPE-BGN and TPE-BGS and higher biomass at TPE-BGN). At the East Dike HCF, taxa richness and Simpson's Diversity values are nearly identical to the reference area in Second Portage Lake indicating the presence of a community similar to background conditions, as was the case in 2017.

While in previous years a more abundant (biomass and density) and diverse (taxa richness and Simpson's Diversity) periphyton community was observed at the southern extent of Bay-Goose Dike compared to the northern portion of the Dike, the same pattern was not observed in 2019. While this does not align with the 2017 suggestion that the southern aspect at TPE-BGS provides better growing conditions (i.e., exposure to sunlight) than the eastern aspect at TPE-BGN, it may be attributed to natural variability in the data. Furthermore, as was observed in 2017, the temporal biomass trajectory seen at the SP-ED (eastern aspect) is similar to that seen at TPE-BGS (southern aspect). Interestingly, while mean diversity metrics at TPE-BGS were lower than at TPE-BGN, some of the results for individual replicates were actually higher, highlighting the influence of high natural variability in periphyton data.

The next HCMP periphyton event is scheduled for 2021.

3.2.3 Fish Use

As in 2015 and 2017, analysis of fish use of the habitat compensation features constructed to date (dike faces and Dogleg Ponds) was assessed through the minimally invasive techniques of angling and underwater motion video prescribed in the 2017 HCMP. This proved to be a successful non-lethal program which demonstrated continued fish presence in and around the study areas.

3.2.3.1 Angling

The complete angling effort and catch for dike monitoring stations and Dogleg Pond is provided in Table 12. A total of 20 fish were caught through angling. This includes 17 fish in Second Portage Lake (9 h of effort), and 3 fish in Third Portage Lake (5 h of effort). Of these, three fish were lost in transfer before they could be fully tagged, weighed, or measured. Two hours of effort were performed at Dogleg Pond, but no fish were caught. Both of these were ice fishing events.

Specific fishing stations were only recorded for three events in 2019, so differences in CPUE between dike face habitat and natural habitat was not assessed. However, the available results indicate that fish across a range of size classes are frequenting the area around dike faces. In 2015, catch per unit effort (CPUE) was similar in all cases, or slightly higher at dike stations compared to reference stations, indicating that fish use of dike face habitat was not reduced compared to reference stations, which was also observed in 2011. This trend will be re-assessed in 2021 prior to integrating all results into a weight-of-evidence assessment of success of the habitat compensation features. No specific criteria for success are associated with fish use of the dike faces (see Habitat Compensation Monitoring Plan, February, 2017), so the reduced data availability for 2017 and 2019 is not expected to significantly affect the overall assessment.

In 2015, Arctic char were first caught in Dogleg Pond. Access for that species was conservatively excluded from habitat compensation calculations in 2012. However, it was suggested that Arctic char may eventually access this area from Second Portage Lake due to changes in water levels as a result of construction of the channel from NP-2. Since Arctic char were captured in Dogleg Pond in 2015 and 2017, the channel connecting Dogleg Pond to Second Portage Lake will ultimately be assessed to determine whether fish passage is now possible and Arctic char are accessing the Dogleg system via this route.

No fishing was conducted in NP-1 or NP-2 ponds in 2019. Pond NP-1 habitat was fishless prior to the 2013 construction of the channel between NP-2 and NP-1. Fish were observed on underwater camera in that pond in 2017, so follow up monitoring will be conducted in subsequent events to confirm use of this area by fish.

Table 12. Angling effort and fish capture for East Dike locations (SP), Bay Goose Dike locations (TPL, BG-PW-4), and Dogleg Pond. LTR = lake trout. ARCH = Arctic char. F4/M9 = spent female or male. M6 = immature male.

Date	Angling Time	Location	Species	Tag #	Fork Length (mm)	Weight (g)	Sex/Maturity
7/26/19	11:20 - 11:50	SP	LTR	449	457	1800	F4
7/27/19	10:00 - 11:30	SP	LTR	448	300	350	M6
7/31/19	16:00 - 17:30	SP	ARCH	-	390	-	-
		SP	ARCH	-	-	-	-
		SP	LTR	764	716	4310	
		SP	LTR	763	380	550	-
		SP	LTR	761	447	545	-
		SP	LTR	-	-	-	-
8/02/19	13:37 - 15:22	SP	LTR	761	838	8391	F4 or M9
		SP	LTR	760	406	907.1	F4 or M9
8/06/19	15:30 - 17:00	TPL	LTR	446	501	1814	
		TPL	LTR	445	590	2268	
		TPL	LTR	444	686	3402	
8/07/19	13:30 - 16:00	SP	LTR	442	285	300	
		SP	LTR		200	260	
		SP	LTR	428	705	4445	
8/08/19	19:00 - 19:30	SP	LTR	429	370	680	
		SP	LTR	977	450	1270	
		SP	LTR	978	400	794	
		SP	LTR	979	410	907	
11/24/19	13:20 - 14:50	BG-PW-4	No fish				
11/26/19	13:45 - 14:45	BG-PW-4	No fish				
11/27/19	13:30 - 14:30	Dogleg	No fish				
12/07/19	14:45 - 15:45	BG-PW-4	No fish				
12/23/19	14:15 – 15:15	Dogleg	No fish				

3.2.3.2 Underwater Camera

A single lake trout sighting was captured on camera around the East Dike during the underwater motion camera monitoring program (3 h of footage between July 25 – July 31).

3.2.4 Structure

The NNLP for the Meadowbank site (2012) identified the projected increase in wetted area as 5% for Dogleg Pond, 15% for Dogleg North Pond (NP-1), and 5% for NP-2. The area used in baseline calculations and projected increase in area for each pond is described in Table 13. Baseline areas were initially determined from bathymetric surveys conducted by Agnico technicians in August 2010 and 2011, and used in conjunction with air photos (unknown date) by a GIS consultant (Dougan & Associates) to map baseline pond areas.

In 2017 and 2019, bathymetric surveys were conducted to confirm whether construction of the diversion channel from NP-2 to Dogleg North (NP-1) is increasing the wetted area of these ponds as assumed in the 2012 NNLP, and to confirm the potential for fish movement, especially between Dogleg Pond and NP-1 (which was previously determined to be fishless).

However, bathymetric surveys by boat in these shallow ponds omit a significant portion of shallow shoreline area, and thus under-report total surface area. Results of surveys in 2017 and 2019 are provided in Table 13 for continuity, but moving forward (2021), final surface area measurements could be made through a combination of bathymetric survey and updated air photo interpretation to better align with baseline methods.

The Dogleg Ponds are planned to be monitored until at least 2025 prior to determination of habitat compensation success, so final calculations of area will be made prior to that time.

Table 13. Area and shoreline elevations used in baseline calculations, projected change in area according to 2012 NNLP, and measured area/shoreline elevation for the Dogleg Ponds by bathymetric survey in 2017 and 2019. 2017 and 2019 surface area measurements by bathymetric survey under-report true surface area due to omission of shallow shoreline areas. *Estimated from 2012 NNLP, Figure 4-7.

Location	Metric	Baseline	Projected Change	September 17, 2017	July 21 – 24, 2019
Dogleg Pond	Area (ha)	21.2	22.2 (+5%)	*(13.6)*	*(14.3)*
	Max. Depth (m)	11	-	12	10
	Shoreline Elevation (m)	-	-	-	132
NP-1 (Dogleg North Pond)	Area (ha)	3.2	3.7 (+15%)	*(2.5)*	*(2.1)*
	Max. Depth (m)	3.8	-	4	4
	Shoreline Elevation (m)	Approx.. 133.17*	-	135.25	134
NP-2	Area (ha)	8.7	9.1 (+5%)	-	*(7.8)*
	Max. Depth (m)	5	-	-	5.4
	Shoreline Elevation (m)	Approx.. 143.50*	-	-	140

SECTION 4 • SUMMARY

4.1 AWAR MONITORING

The intention of the constructed spawning pad feature was to decrease flow rates and water depths, and provide suitable substrate for Arctic grayling spawning. Stability of the feature was visually confirmed in 2019, with minor shifting of material since construction, as anticipated.

Data collected in 2019 indicate that fish migrating at R02 continue to have a well distributed population structure and are generally in good body weight (K > 1). No significant trend in catch per unit effort (fish/net day) is apparent in data collected since prior to construction, despite very low water levels in 2017 and 2019 which may have reduced catch efficiency. Overall, these data confirm continued use of the R02 reach by Arctic grayling without major changes in population structure.

For total larval drift, catch per unit effort for a standardized study period has increased since construction of the spawning pads. The timing of peak catch with very low water temperatures in recent years (and particularly 2019) suggest that YOY of fall-spawning species may now form a significant portion of the catch, along with Arctic grayling larvae.

In the HCMP, no specific criteria are established for determining success of the spawning pads constructed at R02 based on fish use metrics (hoopnet catch, larval drift). However, changes to monitoring programs will be considered in consultation with DFO prior to the next event (2021) to better evaluate successful utilization of the spawning pads themselves. This could include visual surveys for spawning activity within the area at key times, and targeted kick net sampling to identify presence of eggs.

Since monitoring will be ongoing until road decommissioning, overall success of the compensation feature will be assessed at that time taking into account the weight of evidence of all data collected throughout the monitoring program.

4.2 PORTAGE AREA MONITORING

As described in Meadowbank's 2012 NNLP, outer faces of the dewatering dikes (Bay Goose and East Dike) are assumed to provide simulated reef habitat for fish in Second and Third Portage Lakes. Monitoring goals for these features as described in the HCMP include assessment of interstitial water quality, periphyton growth and fish use every two years until 2021. In 2019, interstitial water quality was not assessed. Periphyton communities continue to develop towards reference community structure, but total biomass has not yet reached reference levels. Fish use of habitat in and around the dike faces was confirmed through angling and underwater motion cameras, though total effort was low in 2019 compared to previous years. For exterior faces of the East and Bay-Goose Dikes, success as compensation will be determined following monitoring events in 2021, according to the HCMP schedule.

Construction of the diversion channel between NP-2 and NP-1 was planned to result in slightly increased water levels, improved connectivity between these ponds, and especially to open previously inaccessible habitat in Dogleg North Pond (NP-1). Fish use of NP-1 was confirmed in 2017 through underwater motion camera surveys (though only 1 fish was observed). No underwater camera surveys were conducted in 2019, and no fish were caught through ice fishing (1 hr) at Dogleg Pond. Bathymetric surveys were completed, but air photo interpretation combined with bathymetric surveys will be conducted moving forward to confirm total surface area in comparison to baseline measurements. Monitoring for the Dogleg Ponds will be conducted in 2021 and 2025, after which time success will be determined.

SECTION 5 • ACTIONS

5.1 AWAR MONITORING

The following actions were planned for 2019. Agnico's responses are indicated below each action.

- Engineering options will be investigated to reduce the amount of poor quality video footage in streams.
  - No changes were made to stream video methods in 2019.

The following actions are planned for 2021:

- Prior to the 2021 monitoring event, Agnico will look to update the HCMP to improve the effectiveness of monitoring at R02 to better evaluate successful utilization of the constructed spawning pads. Any updated plans will be provided to DFO for review and approval prior to implementation.

5.2 PORTAGE AREA MONITORING

The following actions were recommended for Portage area monitoring in 2019, and Agnico's responses are provided below:

- Further investigate software to facilitate video processing and potentially allow a more precise identification of fish species.
  - Software assessed in 2017 did not bring added value. And thus status quo was maintained on images collected and analysed.
- Compare differences in baseline mapping and 2017 bathymetry for Dogleg System.

  - Complete. Differences between baseline mapping and 2017/2019 bathymetric mapping were due to the omission of shallow shoreline areas in 2017/2019 results. Air photo interpretation combined with bathymetric surveys will be conducted in 2021 to better compare results with baseline mapping.

- Complete bathymetric survey of NP-2.
  - Complete.

- Assess flow in connecting channels within the Dogleg system to confirm potential for improved fish passage (including channels between NP-2 and NP-1, NP-1 and Dogleg Pond, and Dogleg Pond to Second Portage Lake).
  - Not completed. Will be completed in 2021.

- Record angling effort specifically by monitoring station to facilitate catch-per-unit effort calculations.
  - Not completed. Updated HCMP SOPs will be developed to clarify angling and underwater video camera monitoring methods prior to 2021.

The following actions are planned in conjunction with the 2021 monitoring event:

- Air photo interpretation combined with bathymetric surveys will be conducted in 2021 for the Dogleg Ponds area to better compare results with baseline mapping.
- Visually assess flow in connecting channels within the Dogleg system to confirm potential for improved fish passage (including channels between NP-2 and NP-1, NP-1 and Dogleg Pond, and Dogleg Pond to Second Portage Lake).
- Develop updated HCMP SOPs to clarify angling and underwater video camera monitoring methods.

5.3 VAULT AREA MONITORING

The following actions are planned for Vault and Phaser Lakes HCMP monitoring in 2020:

- Substrate mapping will be conducted for the dewatered basins of Vault and Phaser Lakes and compared to requirements of the accepted NNL and Offsetting plans for these areas.

REFERENCES

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APPENDIX A

Animal Use Protocol Report

Date: July 3rd 2019

To: Robin Allard (Environment General Supervisor), Agnico Eagle Mines Ltd

Subject: Animal Use Protocol - Letter of Approval

Dear Robin,

Your 2019 Animal Use Protocol (AUP), number FWI-ACC-2019-27, entitled “Meadowbank Mine: Fisheries Habitat Compensation Monitoring All-Weather Access Road (AWAR) and Mine Site Authorization Monitoring” has been reviewed and approved by the Freshwater Institute Animal Care Committee.

Keep this signed letter of approval as well as the signed AUP application form 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.

The Canadian Council on Animal Care requires Post approval Monitoring of Animal Use Protocols (AUP) and as such the Freshwater Institute Animal Care Committee is going to randomly choose AUP’s and ask for photographs or video that shows the handling or interaction with the animals in these AUPs.

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. The report form is attached in your approval email.

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

Sincerely,

Michelle Wetton-Salo

Chair Person of FWI-ACC

Freshwater Institute Animal Care Committee
Arctic & Aquatic Research
Central & Arctic / Région du Centre et de l’Arctique
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APPROVAL BY ANIMAL CARE COMMITTEE MEMBERS

Signatures of ACC Members

Andrew Chapelsky

Marc Brandson

Dr. Ericka Anseeuw D.V.M.

Chantelle Sawatzky

Kerry Wautier

Travis Durhack

Brent Young

Interim Approval ☐ **Final Approval** ☒

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

APPENDIX B

2019 AWAR Fisheries Data

Table B- 1. Data collected for fish captured through hoopnets at location R02 in 2019. US = upstream; DS = downstream; PYRC = previous year recapture; CYRC = current year recapture; ARGR = Arctic grayling; WTF = round whitefish; LTR = lake trout.

Date/Time	Water Temp	Staff Gauge	Direction (US or DS)	Net ID	Fish #	Tag #	Fork Length (mm)	Weight (g)	Sex/ Maturity	PYRC/ CYRC	Species
6/12/19	-	390	DS	R02B	1	None	131	-	-	-	ARGR
6/12/19	-	390	DS	R02B	2	None	125	-	-	-	ARGR
6/12/19	-	390	DS	R02B	3	None	122	-	-	-	ARGR
6/12/19	-	390	DS	R02B	4	None	133	-	-	-	ARGR
6/12/19	-	390	DS	R02B	5	None	105	-	-	-	ARGR
6/12/19	-	390	DS	R02B	6	None	104	-	-	-	ARGR
6/14/19	1	495	DS	R02B	7	None	153	60	F1 or M6	-	WTF
6/14/19	1	495	DS	R02B	8	None	130	40	F1 or M6	-	WTF
6/14/19	1	495	DS	R02B	9	None	130	50	F1 or M6	-	WTF
6/16/19	2	513	DS	R02B	10	None	125	20	F1 or M6	-	WTF
6/19/19	4	481	DS	R02A	11	703	338	400	M7	-	ARGR
6/19/19	4	481	DS	R02A	12	704	298	300	M8	-	ARGR
6/19/19	4	481	DS	R02A	13	706	279	270	M7	-	ARGR
6/20/19	4	460	US	R02A	14	707	325	420	F3	-	ARGR
6/20/19	4	460	US	R02A	15	708	321	400	M7	-	ARGR
6/20/19	4	460	US	R02A	16	709	309	350	M7	-	ARGR
6/20/19	4	460	US	RO2A	17	710	270	250	F3	-	ARGR
6/20/19	4	460	US	RO2A	18	711	249	190	F1 or M6	-	ARGR
6/20/19	4	460	DS	RO2A	19	-	-	-	-	-	ARGR
6/20/19	4	460	DS	RO2A	20	-	-	-	-	-	ARGR
6/21/19	4.4	450	US	RO2A	21	714	322	380	M7	-	ARGR
6/22/19	4.5	420	US	RO2A	22	716	295	280	F3	-	ARGR
6/22/19	4.5	420	US	RO2A	23	717	302	320	F3	-	ARGR
6/22/19	4.5	420	US	RO2A	24	718	331	400	F2	-	ARGR
6/22/19	4.5	420	US	RO2A	25	719	368	500	F3	-	ARGR
6/22/19	4.5	420	DS	R02B	26	720	306	300	M6 or F1	-	ARGR
6/22/19	4.5	420	DS	R02B	27	723	287	250	M7	-	ARGR
6/23/19	6	400	DS	R02B	28	724	292	300	F2	-	ARGR
6/23/19	6	400	US	R02A	29	725	215	120	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	30	749	266	170	F1/M6	-	ARGR

Date/Time	Water Temp	Staff Gauge	Direction (US or DS)	Net ID	Fish #	Tag #	Fork Length (mm)	Weight (g)	Sex/ Maturity	PYRC/ CYRC	Species
6/23/19	6	400	US	R02A	31	748	243	170	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	32	747	240	160	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	33	746	238	160	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	34	745	233	160	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	35	744	238	160	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	36	743	233	140	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	37	742	239	150	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	38	741	238	150	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	39	740	289	290	F2	-	ARGR
6/23/19	6	400	US	R02A	40	739	220	130	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	41	737	235	140	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	42	736	243	170	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	43	733	240	170	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	44	-	215	120	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	45	732	237	170	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	46	731	241	170	M6	-	ARGR
6/23/19	6	400	US	R02A	47	727	236	140	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	48	726	240	190	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	49	927	240	190	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	50	928	275	250	F4	-	ARGR
6/23/19	6	400	US	R02A	51	929	338	450	M7	-	ARGR
6/23/19	6	400	US	R02A	52	930	320	340	M7	-	ARGR
6/23/19	6	400	US	R02A	53	-	215	110	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	54	-	205	110	F1/M6	-	ARGR
6/23/19	6	400	US	R02A	55	-	239	130	F1/M6	-	ARGR
6/23/19	6	400	DS	R02A	56	931	239	150	F1/M6	-	ARGR
6/23/19	6	400	DS	R02A	57	932	225	140	F1/M6	-	ARGR
6/23/19	6	400	DS	R02A	58	935	224	130	F1/M7	-	ARGR
6/23/19	6	400	DS	R02A	59	-	218	140	F1/M6	-	ARGR
6/23/19	6	400	DS	R02A	60	-	203	110	F1/M6	-	ARGR
6/23/19	6	400	DS	R02A	61	-	197	110	F1/M6	-	ARGR
6/24/19	6	390	DS	R02B	62	938	285	280	F4	-	ARGR
6/24/19	6	390	DS	R02B	63	-	120	50	F1 or M6	-	WTF

Date/Time	Water Temp	Staff Gauge	Direction (US or DS)	Net ID	Fish #	Tag #	Fork Length (mm)	Weight (g)	Sex/ Maturity	PYRC/ CYRC	Species
6/25/19	6.6	375	DS	R02B	64	-	164	60	F1 or M6	-	ARGR
6/25/19	6.6	375	DS	R02B	65	-	170	70	F1 or M6	-	ARGR
6/25/19	6.6	375	DS	R02B	66	-	169	60	F1 or M6	-	ARGR
6/25/19	6.6	375	DS	R02B	67	-	-	-	-	-	ARGR
6/25/19	6.6	375	US	R02A	68	-	-	-	-	-	ARGR
6/25/19	6.6	375	US	R02A	69	-	-	-	-	-	ARGR
6/26/19			US	R02A	70	-	240	160	F1 or M6		ARGR
6/26/19			US	R02A	71	393	280	290	M8		ARGR
6/26/19			US	R02A	72	940	305	310	M9		ARGR
6/26/19			US	R02A	73	-	245	200	F1 or M6		ARGR
6/26/19			US	R02A	74	-	230	170	F1 or M6		ARGR
6/26/19			US	R02A	75	941	250	200	M8		ARGR
6/26/19			DS	R02A	76	-	265	190	F1 or M6		ARGR
6/26/19			DS	R02A	77	-	203	120	F1 or M6		ARGR
6/27/19		355	US	R02A	78	942	310	360	M9		ARGR
6/27/19		355	US	R02A	79	943	245	180	F5		ARGR
6/27/19		355	US	R02A	80	X	270	210	M9		ARGR
6/27/19		355	US	R02A	81	945	230	150	F4		ARGR
6/27/19		355	US	R02A	82	946	290	295	M9		ARGR
6/27/19		355	US	R02A	83	947	230	145	F1/M6		ARGR
6/27/19		355	US	R02A	84	948	235	160	F1/M6		ARGR
6/27/19		355	US	R02A	85	950	325	400	M9		ARGR
6/27/19		355	US	R02A	86	376	245	195	F5/M10		ARGR
6/27/19		355	US	R02A	87	378	265	215	F5/M10		ARGR
6/27/19		355	US	R02A	88	380	305	350	F3		ARGR
6/27/19		355	US	R02A	89	743	232	145	F5/M10	CYRC	ARGR
6/27/19		355	US	R02A	90	381	230	160	F1/M6		ARGR
6/27/19		355	US	R02A	91	382	335	395	M8		ARGR
6/27/19		355	US	R02A	92	383	240	160	F1/M6		ARGR
6/27/19		355	US	R02A	93	384	285	280	F4		ARGR
6/27/19		355	US	R02A	94	385	323	360	M9		ARGR
6/27/19		355	US	R02A	95	386	285	255	F5/M10		ARGR
6/27/19		355	US	R02A	96	387	240	180	M9		ARGR

Date/Time	Water Temp	Staff Gauge	Direction (US or DS)	Net ID	Fish #	Tag #	Fork Length (mm)	Weight (g)	Sex/ Maturity	PYRC/ CYRC	Species
6/27/19		355	US	R02A	97	388	227	150	F5		ARGR
6/27/19		355	US	R02A	98	X	197	100	F1/M6		ARGR
6/27/19		355	US	R02A	99	389	235	160	M6		ARGR
6/27/19		355	US	R02A	100	390	248	175	F5/M10		ARGR
6/27/19		355	US	R02A	101	391	240	160	F5/M10		ARGR
6/27/19		355	US	R02A	102	392	242	185	M10		ARGR
6/27/19		355	US	R02A	103	393	230	145	F5/M10		ARGR
6/27/19		355	US	R02A	104	394	245	160	F5/M10		ARGR
6/27/19		355	DS	R02B	105	395	260	180	M10		ARGR
6/27/19		355	US	R02B	106	396	233	160	F5/M10		ARGR
6/27/19		355	US	R02B	108		355	415	M9		ARGR
6/29/19		350	US	RO2A	109	387	285	300	F3		ARGR
6/29/19		350	DS	RO2B	110	-	110	2	F1/M6		ARGR
6/29/19		350	DS	RO2B	111	-	180	80	F1/M6		LTR
6/29/19		350	DS	RO2B	112	-	240	130	F5		ARGR
6/29/19		350	DS	RO2B	113	-	230	160	M6		ARGR
6/29/19		350	US	RO2B	114	528	235	170	M6		ARGR
6/29/19		350	US	RO2B	115	529	237	150	F1		ARGR
6/29/19		350	US	RO2B	116	530	242	160	M7		ARGR
6/29/19		350	US	RO2B	117	533	255	200	M7		ARGR
6/29/19		350	US	RO2B	118	535	337	150	F1		ARGR
6/30/19	8		US	RO2A	119	-	275	150	F1/M6		ARGR
6/30/19	8		US	RO2A	120	-	260	175	F1/M6		ARGR
6/30/19	8		US	RO2A	121	-	260	140	M6		ARGR
6/30/19	8		US	RO2A	122	-	270	150	F1/M6		ARGR
6/30/19	8		US	RO2A	123	-	280	150	F1/M6		ARGR
6/30/19	8		US	RO2A	124	500	310	300	F5		ARGR
6/30/19	8		US	RO2A	125	540	340	350	F1/M6		ARGR
6/30/19	8		US	RO2A	126	542	310	300	F1/M6		ARGR
6/30/19	8		US	RO2A	127	-	260	150	F1/M6		ARGR
6/30/19	8		US	RO2A	128	-	270	150	F1/M6		ARGR
6/30/19	8		US	RO2A	129	-	280	150	F5/M10		ARGR
6/30/19	8		US	RO2A	130	544	310	275	F5/M10		ARGR

Date/Time	Water Temp	Staff Gauge	Direction (US or DS)	Net ID	Fish #	Tag #	Fork Length (mm)	Weight (g)	Sex/ Maturity	PYRC/ CYRC	Species
6/30/19	8		US	RO2A	131	-	250	100	F5/M10		ARGR
6/30/19	8		US	RO2A	132	-	260	150	F5/M10		ARGR
6/30/19	8		US	RO2A	133	-	240	150	F5/M10		ARGR
6/30/19	8		US	RO2A	134	-	290	200	F5/M10		ARGR
6/30/19	8		US	RO2A	135	545	290	250	F5/M10		ARGR
6/30/19	8		US	RO2A	136	-	280	150	F5/M10		ARGR
6/30/19	8		US	RO2A	137	-	250	150	F5/M10		ARGR
6/30/19	8		US	RO2A	138	-	260	150	F5/M10		ARGR
6/30/19	8		US	RO2A	139	-	240	100	F5/M10		ARGR
6/30/19	8		US	RO2A	140	-	250	150	F5/M10		ARGR
6/30/19	8		US	RO2A	141	-	230	100	F5/M10		ARGR
6/30/19	8		US	RO2A	142	-	270	200	F5/M10		ARGR
6/30/19	8		US	RO2A	143	-	230	100	F1/M6		ARGR
6/30/19	8		US	RO2A	144	-	270	150	F5/M10		ARGR
7/01/19	2		US	RO2A	145	546	310	310	F5/M10		ARGR
7/01/19	2		US	RO2A	146	547	320	350	M7		ARGR
7/01/19	2		US	RO2A	147	549	300	340	F1		ARGR
7/01/19	2		US	RO2A	148	550	320	340	F2		ARGR
7/01/19	2		US	RO2A	149	-	220	150	M6		ARGR
7/01/19	2		US	RO2A	150	521	250	170	F1		ARGR
7/01/19	2		US	RO2A	151	520	240	160	M6		ARGR
7/01/19	2		US	RO2A	152	519	270	240	F1		ARGR
7/01/19	2		US	RO2A	153	518	250	160	M6		ARGR
7/01/19	2		US	RO2A	154	516	260	220	M6		ARGR
7/01/19	2		US	RO2A	155	512	235	140	M6		ARGR
7/01/19	2		US	RO2A	156	-	230	220	M6		ARGR
7/01/19	2		US	RO2A	157	509	240	160	F5 or M10		ARGR
7/01/19	2		US	RO2A	158	508	235	140	F1		ARGR
7/02/19	7.2	400	US	RO2A	159	507	340	350	M7		WTF
7/02/19	7.2	400	US	RO2A	160	502	260	220	F5 or M10		WTF
7/02/19	7.2	400	US	RO2A	161	501	290	260	F5 or M10		ARGR

Date/Time	Water Temp	Staff Gauge	Direction (US or DS)	Net ID	Fish #	Tag #	Fork Length (mm)	Weight (g)	Sex/ Maturity	PYRC/ CYRC	Species
7/02/19	7.2	400	US	RO2A	162	-	240	130	F1 or M6		WTF
7/02/19	7.2	400	US	RO2A	163	-	230	110	F1 or M6		WTF
7/02/19	7.2	400	US	RO2A	164	509	240	160	F5 or M10	CYRC	ARGR
7/03/19	8.3	350	US	RO2A	165	600	280	260	F2		ARGR
7/03/19	8.3	350	US	RO2A	166	599	270	270	M7		ARGR
7/03/19	8.3	350	US	RO2A	167	597	290	250	M7		ARGR
7/03/19	8.3	350	US	RO2A	168	596	280	260	F4 or M9		ARGR
7/03/19	8.3	350	US	RO2A	169	-	220	140	F1 or M6		ARGR
7/03/19	8.3	350	US	RO2A	170	594	230	160	F1 or M6		ARGR
7/03/19	8.3	350	US	RO2A	171	592	240	170	F1 or M6		ARGR
7/04/19	10.5	340	US	RO2A	172	-	240	175	F1 or M6		WTF
7/04/19	10.5	340	US	RO2A	173	590	230	150	F1 or M6		ARGR
7/06/19	10	420	US	RO2A	174	-	620	2000	F4		LTR
7/06/19	10	420	US	RO2A	175	-	470	1000	M7		LTR
7/06/19	10	420	US	RO2A	176	589	290	300	M7		ARGR
7/06/19	10	420	US	RO2A	177	588	320	340	M7		ARGR
7/06/19	10	420	US	RO2A	178	587	240	160	M6		ARGR
7/07/19	9.4	341	US	R02A	179	586	230	180	F1		ARGR
7/07/19	9.4	341	US	R02A	180	585	220	170	F1		ARGR
7/09/19	6	343	US	R02A	181	584	560	2041	F4		LTR
7/09/19	6	343	US	R02A	182	583	490	1360	M9		LTR
7/09/19	6	343	US	R02A	183	582	450	1133	M7		LTR
7/09/19	6	343	US	R02A	184	581	440	1360	M4		LTR
7/09/19	6	343	US	R02A	185	580	340	1360	F1		ARGR
7/09/19	6	343	US	R02A	186	579	230	180	M6		ARGR
7/09/19	6	343	US	R02A	187	578	230	200	F1		ARGR
7/09/19	6	343	US	R02A	188	577	310	300	F1		ARGR
7/12/19	-	430	US	R02A	189	-	455	1400	F5/M10		LTR
7/12/19	-	430	DS	R02B	190	-			F1/M6		ARGR
7/12/19	-	430	DS	R02B	191	-	220	90	F1/M6		ARGR
7/12/19	-	430	DS	R02B	192	-	165	50	F1/M6		ARGR
7/12/19	-	430	DS	R02B	193	-	109	40	F1/M6		ARGR

Date/Time	Water Temp	Staff Gauge	Direction (US or DS)	Net ID	Fish #	Tag #	Fork Length (mm)	Weight (g)	Sex/ Maturity	PYRC/ CYRC	Species
7/12/19	-	430	DS	R02B	194	-	338	500	F5/M10		ARGR