MEADOWBANK GOLD PROJECT

Addendum to the 2012 No Net Loss Plan for the Meadowbank Site:

Implementation of Contingency Option 3 - Construction of Arctic Grayling Spawning Pads

In Accordance with Fisheries Act Authorization NU-03-0191.3

Prepared by:

Agnico Eagle Mines Limited – Meadowbank Division

Version 1

December, 2020

EXECUTIVE SUMMARY

As described in the 2012 No Net Loss Plan for the Meadowbank site, a portion of site-wide fish habitat compensation was to be achieved through re-flooding the dewatered areas of Second and Third Portage Lake after closure of the Portage and Goose pits. However, with the recently permitted deposition of tailings material in this area, Agnico recognizes that there is an increased uncertainty around habitat quality after re-flooding. Although Agnico remains committed to ensuring suitability of this area for aquatic biota under closure plans, contingency options from the 2012 NNLP will now also be implemented to reduce uncertainty in achieving successful offsetting.

This document describes the:

- losses to fish habitat and fish production that have been incurred in the Portage and Goose pits area,
- gains in fish production that can be achieved through implementation of the selected contingency option (constructed stream spawning pads),
- possible siting options for new spawning pads, along with the construction and consultation schedule,
- details of the monitoring plan that has been developed to confirm ecological function and structural stability of the new offsetting feature, including monitoring thresholds and related management actions,
- potential remedial actions and contingency options that could be implemented if monitoring fails to demonstrate success,
- summary of annual and cumulative biomass production for losses, original offsetting (reflooding under the 2012 NNLP), and the replacement offsetting feature (spawning pads).

Overall, construction of the new offsetting feature will fully replace fish biomass production that would have been achieved from reflooding of the Portage and Goose area under the 2012 NNLP. Annual production of the new spawning pads was calculated at a rate of 2.25-times the rate of losses, while the original re-flooding plans would have achieved 1.43-times the rate of losses. Spawning pad construction will also occur two years earlier than re-flooding was planned to be complete (2023 instead of 2025). With greater production rates and a reduced timeline, the spawning pads offsetting feature will result in a net benefit to the local fishery.

Since Agnico remains committed to ensuring water quality within the re-flooded Portage and Goose basin is suitable for aquatic biota under closure plans, the combined benefit achieved from the new offset (spawning pads) plus re-flooding for closure purposes is also described in Appendix A of this document. Depending on the closure scenario, total annual production from these activities will equal 3.25 or 3.97x the rate of lost annual production, which is significantly greater than originally planned gains from re-flooding alone, under the 2012 NNLP (1.43x).

IMPLEMENTATION SCHEDULE

This Addendum is effective immediately (December 2020) subject to any modifications proposed by DFO as a result of the review and approval process.

DISTRIBUTION LIST

Agnico Eagle – Meadowbank Environment Department

Agnico Eagle – Permitting

Fisheries and Oceans Canada (DFO)

DOCUMENT CONTROL

Version	Date	Section	Page	Revision
Draft	02/22/2019	All		Initial document for DFO review. Issued as: Technical Memorandum (Re. Addendum to the 2012 NNLP for the Meadowbank Site - Updated Calculations for Habitat Offsets in Second and Third Portage Lakes)
1	12/2020	All		Comprehensive revision following DFO review. Replaces Tech Memo issued February 22, 2019.

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Approved by:

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Alexandre Lavallée

Environment Superintendent Interim

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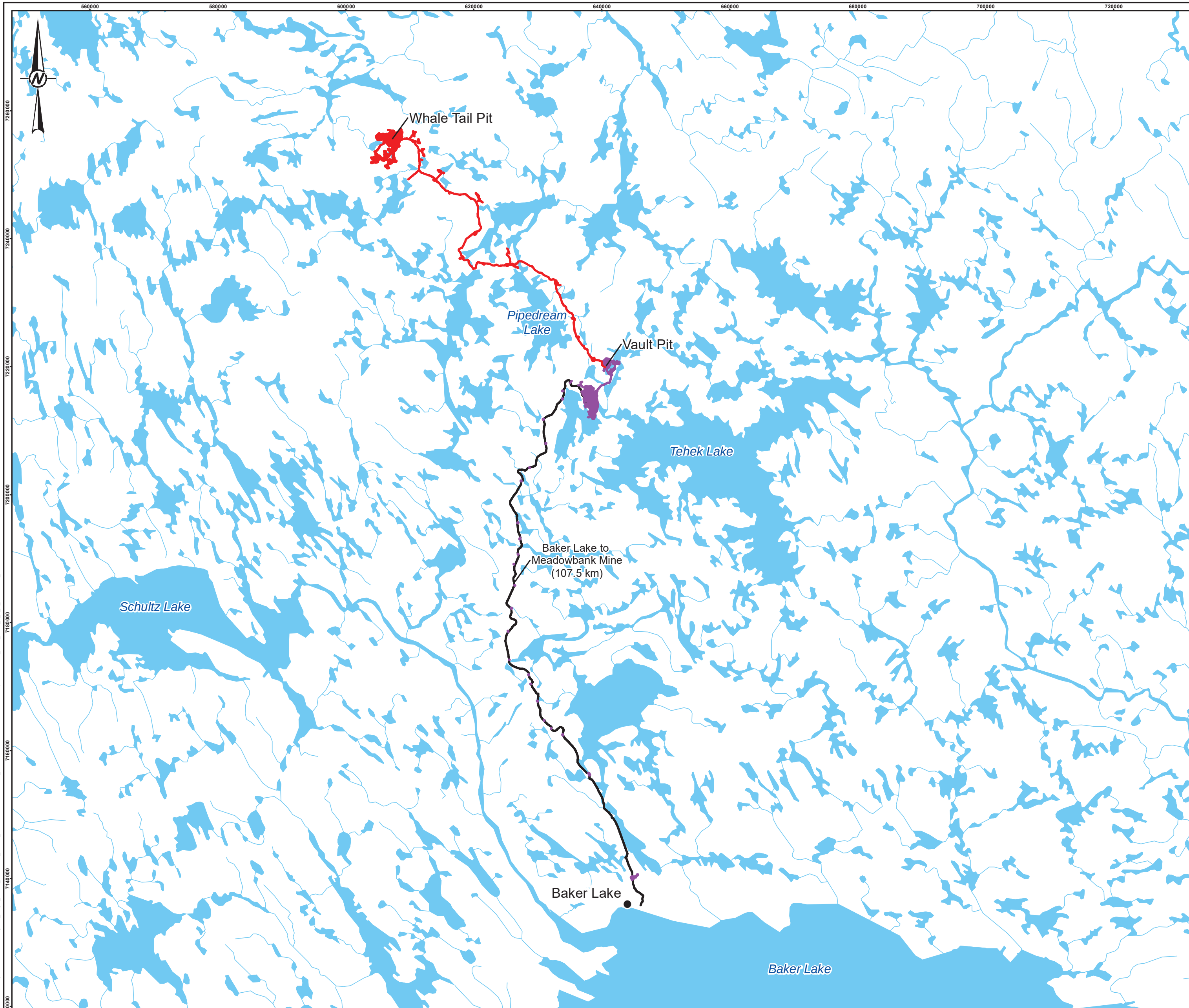
1.1 INTRODUCTION

As a result of mining activities at the Meadowbank site, fish habitat has been lost in Second and Third Portage Lakes. Losses occurred due to dike construction and dewatering to allow development of the Portage and Goose pits. Compensation for these losses was initially described in the 2006 No Net Loss Plan (NNLP) for the Meadowbank site, and authorized by Fisheries and Oceans Canada (DFO) through *Fisheries Act* Authorization (FAA) NU-03-0191. The 2006 NNLP was updated in 2012 to reflect discrepancies in habitat unit (HU) accounting and changes to site plans, and to add a suite of contingency options. The relevant FAA for losses in Second and Third Portage Lakes was then re-issued in 2013 as NU-03-0191.3 based on the 2012 NNLP update.

As detailed in that 2012 NNLP, a portion of site-wide habitat offsets was to be achieved through re-flooding the dewatered Second and Third Portage Lake areas after closure of the Portage and Goose pits. However, in 2018, Agnico Eagle obtained Nunavut Impact Review Board (NIRB) Project Certificate No. 008, Nunavut Water Board (NWB) Type A Water License 2AM-WTP1826 and FAA 16-HCAA-00370 to permit mining of Whale Tail Pit as a satellite development of the Meadowbank site (area overview shown in Figure 1). Related changes to the Meadowbank life of mine required a reassessment of tailings storage options (SLI, 2016). Initial consultations had determined it would be feasible to provide sufficient storage for the associated tailings through installation of lifts within the existing Meadowbank Tailings Storage Facility (O'Kane, 2016). However, through a subsequent Multiple Accounts Analysis of three possible options, in-pit deposition within the Portage and Goose Pits was selected as the preferred method to store tailings waste (SLI, 2016).

Following the Multiple Accounts Analysis, Agnico Eagle reviewed the implications of in-pit disposal of tailings material on fish habitat offsetting plans in consultation with DFO. Discussions with DFO occurred in meetings on November 21 and December 11, 2018, and January 15, 2019. In recognition of uncertainty around habitat quality in the deposition area post-closure, Agnico Eagle proposed to implement one or more contingency options from the 2012 NNLP to replace habitat gains that would have been achieved from reflooding the Portage and Goose pits area. In February 2019, Agnico Eagle submitted to DFO an initial draft of this NNLP Addendum document, detailing plans to implement contingency options, along with preliminary calculations of habitat gains. A review of the document by DFO was discussed by conference call on April 1, 2019, during which DFO requested a more detailed analysis of data to support calculations of habitat gains provided by the primary contingency offsetting measure (Arctic Grayling spawning habitat enhancement). Through subsequent communication with DFO (conference call January 31, 2020), Agnico also understood that further consideration of time-lag implications was required. Agnico has completed these analyses, and this document presents a revised addendum to the 2012 NNLP for the Meadowbank site.

A review of habitat losses and changes in habitat offsets under this Addendum is presented, along with siting considerations, construction timing, consultation plans, and the proposed monitoring approach.



LEGEND

- ● COMMUNITY
- HAUL ROAD
- ALL WEATHER ROAD
- WHALE TAIL PIT
- MEADOWBANK OPERATION AND INFRASTRUCTURE
- WATERCOURSE
- WATERBODY

0 12 24
1:600,000 KILOMETRES

REFERENCE(S)

1. HAUL ROAD OBTAINED FROM AGNICO EAGLE MINES LIMITED.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
3. INSET MAP DATA OBTAINED FROM ESRI.

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT
AGNICO EAGLE
AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT
WHALE TAIL PIT - EXPANSION PROJECT

TITLE
PROJECT LOCATION

CONSULTANT
GOLDER

YYYY-MM-DD	2018-11-22
DESIGNED	JR
PREPARED	CDB
REVIEWED	JR
APPROVED	DF

PROJECT NO.	CONTROL	REV.	FIGURE
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1.2 APPROACH

Agnico Eagle remains committed to ensuring water quality within the re-flooded Portage and Goose basin is suitable for aquatic biota prior to opening dikes for fish access. Based on current closure plans, either 66.5 or 114.1 habitat units (HUs) will be gained from re-flooding, depending on the closure scenario (refer to Appendix A for detailed calculations). However, in recognition of uncertainty around the potential utility of this area as productive fish habitat, Agnico Eagle has agreed to also implement one or more contingency options from the 2012 NNLP to fully replace the gains in HUs that were originally planned to be obtained from re-flooding (94.2 HUs, as described in the 2012 NNLP).

While three different contingency options from the 2012 NNLP were initially considered, further review has identified stream spawning habitat enhancement as the optimal candidate for construction at this time. Calculations of habitat losses, original planned gains from re-flooding, and new proposed gains from the contingency option are detailed below. Habitat gains as a function of time for the original offset (re-flooding) and the new offset (spawning pad construction) are discussed in Section 1.7.

1.3 HABITAT LOSSES

In the 2012 NNLP, total habitat losses for the dewatered area containing the Portage and Goose pits (where tailings deposition is occurring) were initially calculated as 66.1 HUs (144.9 ha) (Table 1). These losses comprise the area of Second Portage Lake between the East Dike and Central Dike, and the area of Third Portage Lake enclosed by the Bay Goose Dike and South Camp Dike, as shown in Figure 2 (all calculations include dike footprints). These losses were incurred in 2008 and 2010 following construction of the dewatering dikes and subsequent fish-outs. Under the 2012 NNLP, the entire dewatered area was considered lost habitat, and offsets were developed to replace the full 66.1 HU lost.

There is no change to the lost habitat area under the new in-pit deposition scenario. However, Agnico Eagle has re-calculated the losses using fish biomass production (kg/yr) as a surrogate measure of fishery productivity to facilitate comparison to gains achieved through the proposed offsite stream habitat enhancement. The re-calculation of losses was completed using the fish-out datasets for Second and Third Portage Lakes. Full details of the calculation are provided in Appendix B and results are summarized here.

Lost biomass production for the dewatered area was determined as the sum of annual production losses, plus the instantaneous loss of standing stock removed during the fish-outs. For Second Portage Lake, a single fish-out was conducted for the entire Northwest Arm (area west of the East Dike), which now contains the Tailings Storage Facility (TSF) as well as the Central Dike and Portage pit area (Figure 2). Only biomass losses associated with the Central Dike, Portage pit area and East Dike were included in these calculations, because the TSF area is unaffected by the in-pit deposition of tailings. As detailed in Appendix B, lost biomass as calculated from fish-out results was not assumed to be equally distributed within the Northwest Arm, but was apportioned according to calculated habitat units from the 2012 NNLP. From this calculation, 41.4% of the fish-out biomass (465 kg) was assumed to be lost from the area containing the

Central Dike, Portage pit area, and East Dike. Using growth equations, the ongoing lost annual production from this stock was calculated as 100.5 kg/yr (Appendix B).

Biomass loss for Third Portage Lake was determined as the standing stock removed during the fish-out of Bay-Goose Basin (273 kg), plus a loss in annual biomass production of 78.7 kg/yr (Appendix B).

Annual and cumulative biomass losses over time from both fish-outs are compared to gains achieved from offsets in Section 1.7.

Table 1. Area and calculated baseline habitat units (HUs) for habitat losses in Second and Third Portage Lakes, excluding the TSF (from the 2012 NNLP for the Meadowbank Site).

Habitat Type	Depth Zone	Substrate Type	Area (ha)	HUs
1	0-2m	Fine	0.36	0.05
2	0-2m	Mixed	0.00	0.00
3	0-2m	Coarse	29.57	9.42
4	2-4m	Fine	9.20	3.73
5	2-4m	Mixed	0.00	0.00
6	2-4m	Coarse	20.02	17.01
7	>4m	Fine	84.34	34.81
8	>4m	Mixed	0.00	0.00
9	>4m	Coarse	1.41	1.10
10	>10m	Pit area, stratified	N/A	N/A
11	>10m	Pit area, suitable water quality	N/A	N/A
Total			**144.90**	**66.12**

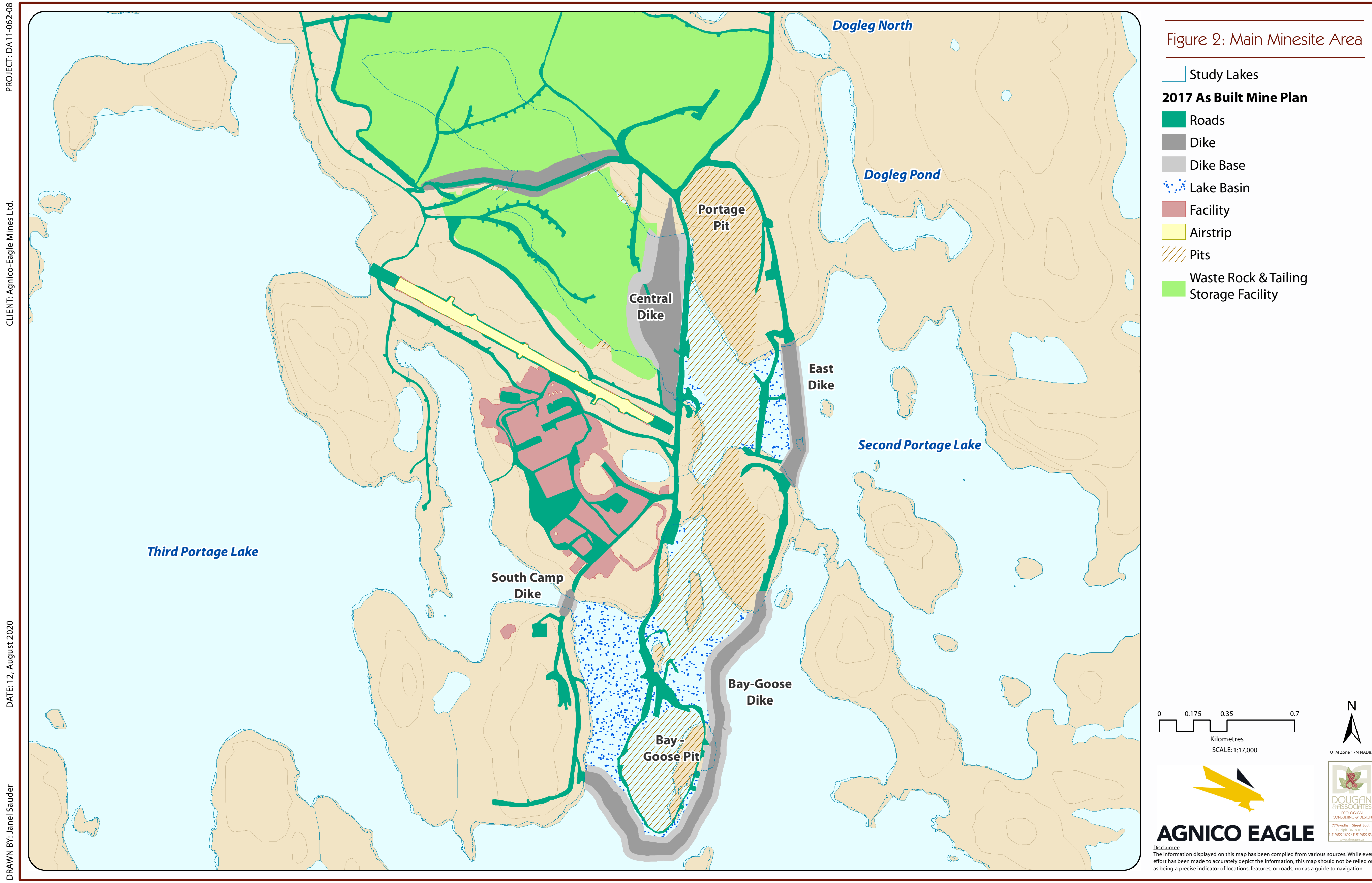
Figure 2: Main Minesite Area
Study Lakes
2017 As Built Mine Plan
Roads
Dike
Dike Base
Lake Basin
Facility
Airstrip
Pits
Waste Rock & Tailing Storage Facility
Dogleg North
Dogleg Pond
Portage Pit
Central Dike
East Dike
Second Portage Lake
Third Portage Lake
South Camp Dike
Bay-Goose Dike
Bay - Goose Pit
0 0.175 0.35 0.7
Kilometres
SCALE: 1:17,000
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UTM Zone 17N NAD83
AGNICO EAGLE
DOUGAN & ASSOCIATES
Disclaimer:
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PROJECT: DA11-062-08
CLIENT: Agnico-Eagle Mines Ltd.
DATE: 12, August 2020
DRAWN BY: Janel Sauder

1.4 HABITAT OFFSETS

Under the 2012 NNLP, a total of 94.2 HU were planned to be gained through re-flooding of the Portage and Goose pits area, compared to 66.1 HU of losses in this area[1]. This increase in habitat units occurred in the post-construction scenario primarily due to aquatic habitat creation from pit development in adjacent terrestrial zones, along with habitat improvements (e.g. creation of boulder gardens, shoals). Re-flooding was planned to be complete in 2023, with breach of the dike to allow fish entry in 2025. Assuming the same ratio of biomass production per habitat unit as calculated for baseline conditions (179.2 kg/yr produced by 66.1 HU – Appendix B), this would have resulted in a production rate of 256.3 kg/yr after the area met full functionality.

Under the current mine plan with in-pit deposition of tailings, infilling of the affected Portage and Goose pits will be ongoing along with active closure and reflooding through 2029. Agnico Eagle understands that as a result of this project, there is increased uncertainty around the potential utility of the future re-flooded area of Second and Third Portage Lakes as productive fish habitat. Therefore, the offsets originally planned to be provided by re-flooding this area (256.3 kg/yr) will be fully replaced.

Although Agnico Eagle still plans to re-flood the diked-off portions of Second and Third Portage Lakes for closure purposes and ensure suitable water quality for aquatic biota (refer to Appendix A for calculation of those habitat gains), habitat offsets for the purposes of DFO FAA NU-03-0191.3 will now be achieved through one of the contingency options presented in Section 6 of the 2012 NNLP. This approach will reduce any uncertainty in achieving offsetting objectives for the FAA, and increases overall benefits to the local fishery since habitat gains will now be achieved both from reflooding for closure purposes and from the new habitat offset.

Through discussions with DFO since late 2017, Agnico has reviewed the contingency options identified in the 2012 NNLP (in particular, meeting of January 15, 2018). While three contingency options were proposed for implementation following initial discussions with DFO (see draft version 1 of this Addendum; February 22, 2019), the majority of offsets were planned to be achieved through construction of spawning pads in local streams (86% of offset HUs). Based on subsequent options review and supporting calculations, Agnico Eagle considers constructed spawning pads alone to have sufficient potential as an offsetting measure to meet the requirements of the Meadowbank Site FAA. Additionally, Agnico has the highest degree of confidence in the success of this option since they have an existing history of stream spawning pad construction and monitoring at the R02 crossing. Therefore, through consideration of construction feasibility, DFO's preferences among the contingency options, and potential gains in fishery productivity, the optimal candidate has been identified as Option 6.2 (2012 NNLP, Section 6) - Construction of stream spawning pads, primarily aimed at enhancing productivity of Arctic Grayling populations.

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[1] It is noted that re-flooding the Portage and Bay-Goose area after habitat improvements was only one component of offsetting in the 2012 NNLP. Other offsets are located outside of this area and are not affected by in-pit deposition, so are not discussed here.

1.4.1 Existing Arctic Grayling Spawning Pads

As described in the 2012 NNLP, a habitat compensation project was constructed at stream crossing R02 (previously B1/Bridge 1) along the Meadowbank All-Weather Access Road (AWAR) in 2009 to provide compensation for habitat alteration, disruption or destruction (HADD) occurring through the construction of that road.

The compensation project consists of four sets of berms and associated spawning pads. Berms were constructed from boulders sourced onsite, and extend between 40 and 60 m from the shoreline (see photo, Figure 3). Berms were created to reduce velocities on their downstream side to provide suitable flow rates for spawning and rearing, and to protect gravel spawning material from ice scour. On the downstream side of each berm, three gravel-substrate spawning pads were formed within U-shaped boulder-cobble frames. These spawning pads were built according to design specifications that met biological criteria aimed at enhancing Arctic Grayling productivity in this reach. Mainly, the intent was to create zones of clean gravel substrate (<50 mm), with water velocities approximately <0.2 m/s and depths <0.4 m during the spawning and egg incubation period (approximately six weeks, from freshet to early July). Complete specifications for the original designs are provided in Golder, 2007 (Appendix C).

Figure 3. Arctic Grayling spawning pads constructed at Meadowbank all weather road crossing R02.

Visual assessments of stability indicate that 10 years after construction, the berms and spawning pads remain substantially intact. Monitoring data collected since 2006 was therefore thoroughly analyzed to assess the increase in Arctic grayling spawning that has occurred at the R02 location and determine the benefits to productivity could be provided by construction of a new similar set of spawning pads (Section 1.4.2 and Appendix D).

1.4.2 Offset Calculation

Monitoring data from the R02 spawning pads combined with a literature review of Arctic Grayling life history statistics were used to calculate productivity gains that would be provided by a similarly constructed new set of spawning pads, where productivity gains would be measured using biomass production as the equivalency unit. This approach is similar to the Conceptual Fish Offsetting Plan for Sabina Gold and Silver Corp.'s Back River Project (Sabina, 2015), where improvements to stream habitat were used to offset losses from dewatering of a lake, and fish biomass was used as the equivalency metric.

The complete calculation is provided in Appendix D. Briefly, larval drift data collected between 2007 and 2019 within the reach where spawning pads were constructed was analyzed. There was a clear difference in larval densities (CPUE) between pre- and post-construction years. A modified Leslie matrix model was constructed using life history inputs derived from the literature to estimate the potential net increase in fish production from the R02 spawning pads. This modeling exercise determined that the net gain in Arctic Grayling production generated from one year of successful spawning on the four sets of spawning pads is equivalent to 402.89 kg when considering annual production generated from that cohort over an assumed 9-year fish life span (Appendix D – Table 2). Assuming successful spawning events each year, maximum annual production of 402.89 kg/yr would be reached by offsetting year 10, as demonstrated in Table 2.

Assumptions of the calculation are clearly detailed in Appendix D. In general, a conservative approach was taken to help reduce uncertainty in achieving the required offsetting ratio. In particular, while the spawning pads constructed at the R02 location specifically targeted Arctic Grayling because they formed more than 90% of the stream community composition in baseline studies, it is possible that other species, such as adfluvial Round Whitefish could also benefit from this type of constructed gravel spawning habitat. Increased biomass production for other species are not included in these offsetting calculations.

Table 2. Total biomass production (kg) each year following construction of the proposed spawning pad habitat enhancement project, with spawning events occurring each year (Event 1, 2, 3, etc.). Values are the calculated annual production (kg) of each age cohort, as identified for Event 1. With ongoing spawning events and an assumed fish lifespan of 9 years, maximum production rates (402.89 kg/yr) are reached at offsetting year 10 (bolded).

Offsetting Year	Event 1 (kg)	Event 2 (kg)	Event 3 (kg)	Event 4 (kg)	Event 5 (kg)	Event 6 (kg)	Event 7 (kg)	Event 8 (kg)	Event 9 (kg)	Event 10 (kg)	…	Total Annual Production (kg)
1	0 (Age 0)											
2	124.22 (Age 1)	0										124.22
3	149.52 (Age 2)	124.22	0									273.74
4	75.75 (Age 3)	149.52	124.22	0								349.49
5	31.43 (Age 4)	75.75	149.52	124.22	0							380.92
6	12.55 (Age 5)	31.43	75.75	149.52	124.22	0						393.47
7	5.15 (Age 6)	12.55	31.43	75.75	149.52	124.22	0					398.62
8	2.36 (Age 7)	5.15	12.55	31.43	75.75	149.52	124.22	0				400.98
9	1.26 (Age 8)	2.36	5.15	12.55	31.43	75.75	149.52	124.22	0			402.24
10	0.65 (Age 9)	1.26	2.36	5.15	12.55	31.43	75.75	149.52	124.22	0		**402.89**
11	0	0.65	1.26	2.36	5.15	12.55	31.43	75.75	149.52	124.22	0	**402.89**
…	0	0	0.65	1.26	2.36	5.15	12.55	31.43	75.75	149.52	124.22	**402.89**

Note: see assumptions underlying biomass projections in Appendix D.

1.4.3 Offset Siting and Construction

Considering the apparent success of the R02 spawning pads, Agnico Eagle will construct a similarly sized spawning habitat enhancement project in the Meadowbank area to offset for losses from dike construction and dewatering in Second and Third Portage Lakes (excluding the original TSF area).

For the purposes of this offsetting plan, a new set of similarly-sized spawning pads is assumed to produce the same gains in biomass production as calculated for the R02 spawning pads. It is recognized that in reality, the absolute change in production will depend on many factors, such as existing population size in the chosen stream system, other limits to carrying capacity, influences from annual changes in climate, competition from conspecifics and other natural phenomena that underlie population dynamics. To help alleviate uncertainties in this regard, a site selection process will be initiated in collaboration with all identified stakeholders to determine potential locations for offset construction that are ecologically similar to the model (R02) system. Depending on results of detailed site assessments, one or more locations may be chosen for spawning enhancement to fulfill offsetting ratio obligations (detailed in Section 1.7). Pre- and post-construction monitoring (see Section 1.6) will be conducted to confirm success of the offsetting project.

1.4.3.1 Siting

Specific locations will be chosen through field investigations to identify watercourses where spawning habitat may be limited, where streambed features can be enhanced through modification of substrate and velocity, and where sufficient connectivity exists to support all life history requirements of an Arctic Grayling population (e.g., access to overwintering habitat). Logistical considerations such as machinery access and minimizing construction footprints will also be taken into account.

Final site selection will be conducted in consultation with all stakeholders (Baker Lake Hunters and Trappers Organization (HTO), Kivalliq Inuit Association (KivIA), DFO), and will incorporate Inuit Qaujimajatuqangit (IQ).

A preliminary site identification exercise was conducted using available resources in 2020 to ensure that theoretically suitable locations for the proposed offsetting project are available. Potential sites were initially explored at the desktop level, with follow-up field visits by Agnico Eagle technicians to conduct site reconnaissance. The initial list of potential sites was created though the application of a site-specific statistical model developed by a research team at the University of Waterloo, combined with available field data collected in previous years. This team, lead by graduate student Jared Ellenor and advisor Dr. Heidi Swanson, has been conducting research on determinants of Arctic Grayling presence in Meadowbank-area streams since 2018 (Ellenor 2020). Their project was established as one of the complementary fish habitat offsetting measures for Agnico Eagle's Whale Tail Pit project. The use of their findings to help identify potential new locations for offsetting is an exciting application of this research. The complete methods and results of their desktop siting exercise are provided in Appendix E[2] and described briefly here.

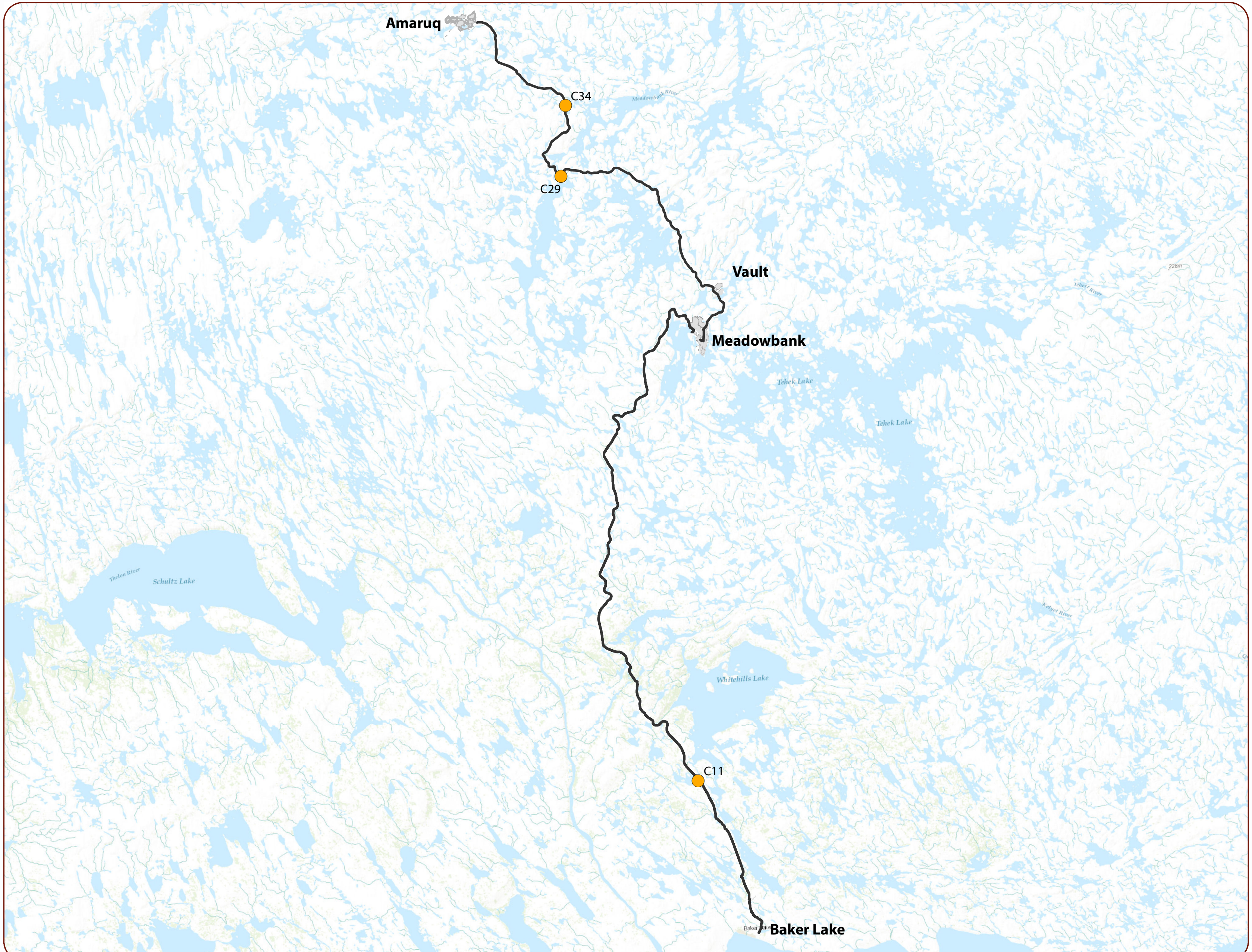
The first step of the site identification exercise was to identify streams in suitable proximity (<500 m) to access roads through GIS analysis. The likelihood that each of these streams supports Arctic Grayling young-of-year (YOY) was then assessed using the site-specific probabilistic (occupancy) model developed as an outcome of the research conducted by the University of Waterloo team (full details in Ellenor, 2020). For streams with a high likelihood of Arctic Grayling occupancy, existing habitat conditions were examined where field data were available with the aim of identifying streams that would benefit most from spawning habitat enhancement. Generally, this examination focused on available substrate and flow data. Overall these methods resulted in the desktop identification of streams meeting several minimum requirements for spawning habitat enhancement:

1. Suitable proximity to infrastructure for construction to be feasible with minimal disruption to surrounding tundra,
2. Arctic Grayling populations are highly likely or known to be present, indicating flow rates and connectivity are sufficient to support a population,
3. Existing stream habitat conditions are not optimal for spawning, primarily due to lack of suitable substrate.

From this desktop review, three streams were identified as top candidates for further study, and were visited by Agnico Eagle environment technicians in September, 2020 to conduct additional reconnaissance. These streams are identified as C11, C29, and C34 in Figure 4, and are described below. Detailed field studies on the streams will be initiated in the open water season of 2021 to inform conceptual engineering design and to finalize the offsetting location (see timeline, Section 1.5). Agnico Eagle aims to conduct field-camp style assessments, involving representatives of local stakeholders (e.g. HTO, KivIA) to facilitate the sharing of knowledge. The aim of these assessments will be to further evaluate site suitability for habitat enhancement from both scientific and cultural perspectives, and to document baseline conditions for the purposes of comparisons with post-construction monitoring data. Final site selection will then be made based on feedback received during consultation with all stakeholders, combined with results of the detailed site assessments in 2021.

[2] As part of the technical memorandum included here as Appendix E, the authors developed lists of candidate streams for two types of offsetting projects – spawning habitat enhancement, as well as connectivity improvements. In keeping with 2012 contingency plans, only spawning habitat enhancement projects are considered here. Connectivity improvements may be considered in the future for new offsetting plans.

Figure 4: Candidate Stream Locations



Candidate Stream Locations
Roadway
Mine Site

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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Kilometres
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UTM Zone 17N NAD83

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PROJECT: DA11-062-08
CLIENT: Agnico-Eagle Mines Ltd.
DATE: 12, August 2020
DRAWN BY: Janel Sauder

1.4.3.1.1 *Stream C11*

Stream C11 is located approximately 25 km north of Baker Lake, along the AWAR. Its outflow converges with the Prince River south of Whitehills Lake. The AWAR crossing at this location has previously been referred to as B2/Bridge 2 or R06. In a 2005 habitat assessment, this stream was identified as a migratory route for Arctic Grayling and Round Whitefish, though lower flows exposing boulder fields at the inlet and outlet later in the season may impede passage (Cumberland Resources Ltd. 2005). Both adults and YOY were captured within this stream, indicating a likelihood of nearby spawning habitat. However, habitat data collected in 2005 in the upper reaches of the stream near the AWAR crossing found no gravel habitat. Riffles were dominated by cobble (65%) then boulder (35%), while pools are more evenly mixed (50% cobble, 50% boulder). Habitat data collected in 2019, in the lower reaches of this stream near the convergence with the Prince River, were dominated by boulder (92%) followed by cobble (8%) (Ellenor, 2020). These results are further supported by assessments conducted at four cross sections along the stream in September, 2020 (field sheets in Appendix F). The presence of migrating Arctic Grayling and large percentages of boulder substrate in the stream makes it a good candidate for spawning substrate enhancement. Fish passage will need to be assessed, and some connectivity improvements (e.g. boulder removal) may need to be paired with any spawning habitat enhancement efforts.

Figure 5. Stream C11 (previously identified as Bridge 2/R06) location from satellite imagery, and possible access points. Black line indicates Meadowbank all-weather access road.

Figure 6. Upper reach of C11 (76 m upstream of the road), looking downstream towards the road (September 27, 2020).

Figure 7. Middle reach of C11 (79 m downstream of the road), looking downstream (September 27, 2020).

Figure 8. Lower reach of stream C11 looking downstream at the convergence with the Prince River (July 20, 2019).

1.4.3.1.2 *Stream C29*

Stream C29, known as the Meadowbank River, is located approximately 32 km north of Meadowbank, along the Whale Tail Haul Road. This river has a contributing upstream lake area of 316 km², which is considerably larger than any other stream assessed (see Appendix E for full range of upstream lake areas for all streams). Field assessments in September 2020 (Appendix F) along with available imagery indicate that river substrate is boulder dominant, potentially limiting spawning habitat for Arctic Grayling. This river was electrofished on one occasion in 2014, and although no Arctic Grayling were captured, it was identified as a likely migration route, and possible spawning location for the species (C. Portt and Associates 2015).

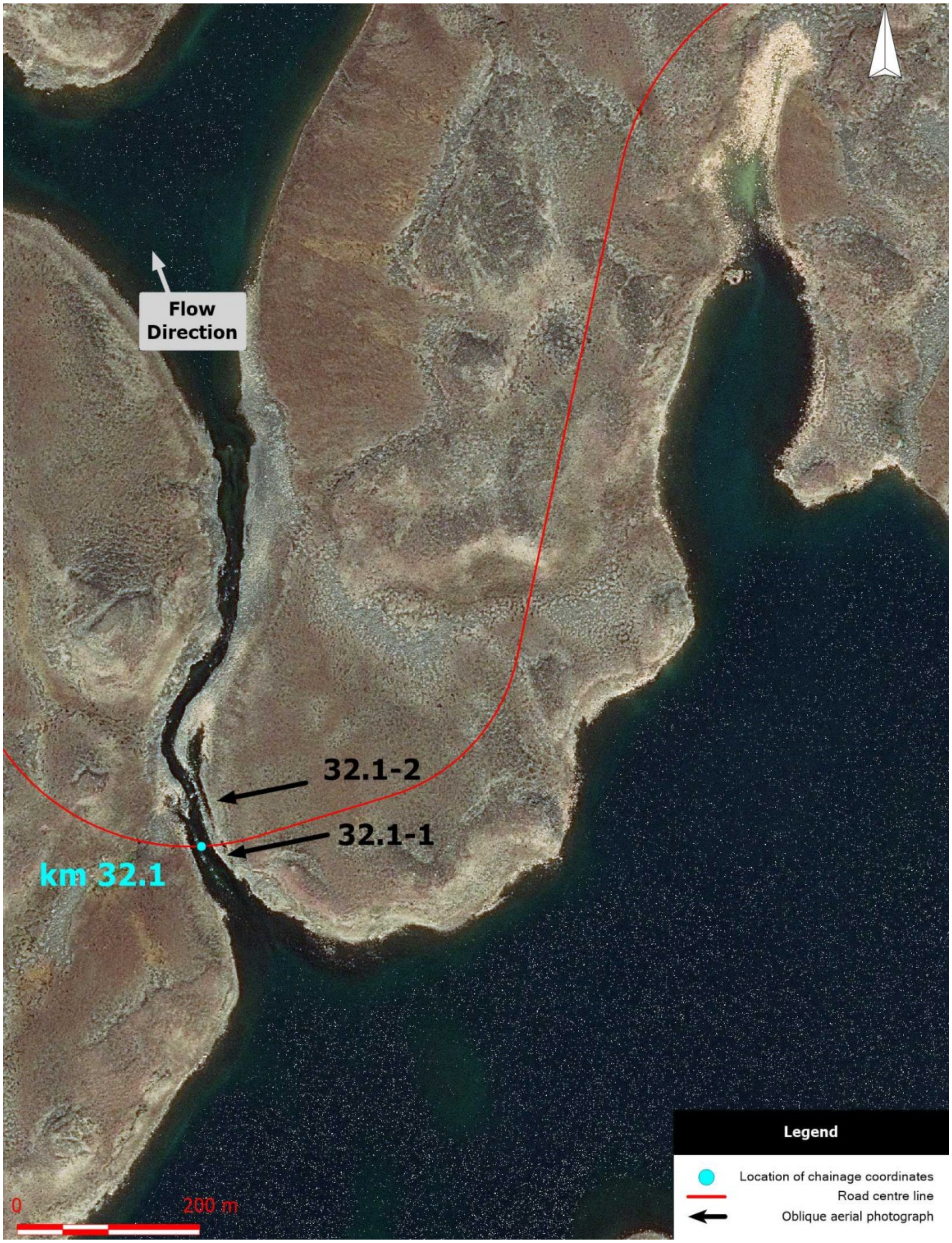

Figure 9. Stream C29 (Meadowbank River; located at original Whale Tail Haul Road km 32.1 as shown on the figure, now referred to as km 147.1). Aerial photograph showing the road centre line, the flow direction, and the location of oblique aerial photographs (below). From C. Portt and Associates, 2015.

Figure 10. Stream C29 (Meadowbank River; located at original Whale Tail Haul Road km 32.1, now referred to as km 147.1). Oblique aerial photograph 32.1-1 in Figure 9. August 30, 2014. From C. Portt and Associates, 2015.

Figure 11. Stream C29 (Meadowbank River; located at original Whale Tail Haul Road km 32.1, now referred to as km 147.1). Oblique aerial photograph 32.1-2 in Figure 9. June 29, 2015. From C. Portt and Associates, 2015.

Figure 12. Stream C29 (Meadowbank River) width in the upper reach, 68 m upstream from the road (September 27, 2020).

Figure 13. Stream C29 (Meadowbank River), 42 m downstream of the road (September 27, 2020).

Figure 14. Stream C29 (Meadowbank River), 140 m downstream of the road (September 27, 2020).

Figure 15. Stream C29 (Meadowbank River) lower reach, 250 m from the road, looking downstream towards outlet (September 27, 2020).

Figure 16. Stream C29 (Meadowbank River) looking downstream from the bridge (September 27, 2020).

1.4.3.1.3 *Stream C34*

Stream C34, located approximately 42 km north of Meadowbank, was the only stream along the road from Meadowbank to Amaruq where Arctic Grayling were captured during baseline roadwork surveys in 2014 and 2015 (C. Portt and Associates, 2015). The stream immediately upstream of C34 as well as two streams that discharge into same lake as C34 were not found to contain YOY during 2019 surveys (Ellenor 2020). Stream C34 originates as a gently sloping single channel at the inflow, and branches into slightly steeper braided channels near the road crossing. Substrate in this stream is variable (including gravel in the upper reach; Appendix F), however habitat surveys downstream of the road crossing in 2019 suggest that boulder dominates the braided portion of the stream (90%), followed by cobble (10%) (Ellenor 2020). The likely importance of this stream for spawning, and dominance of boulder substrate in the lower reach makes it a strong candidate for spawning substrate enhancement. Further field assessment will be needed to quantify existing spawning areas and determine potential for improvement.

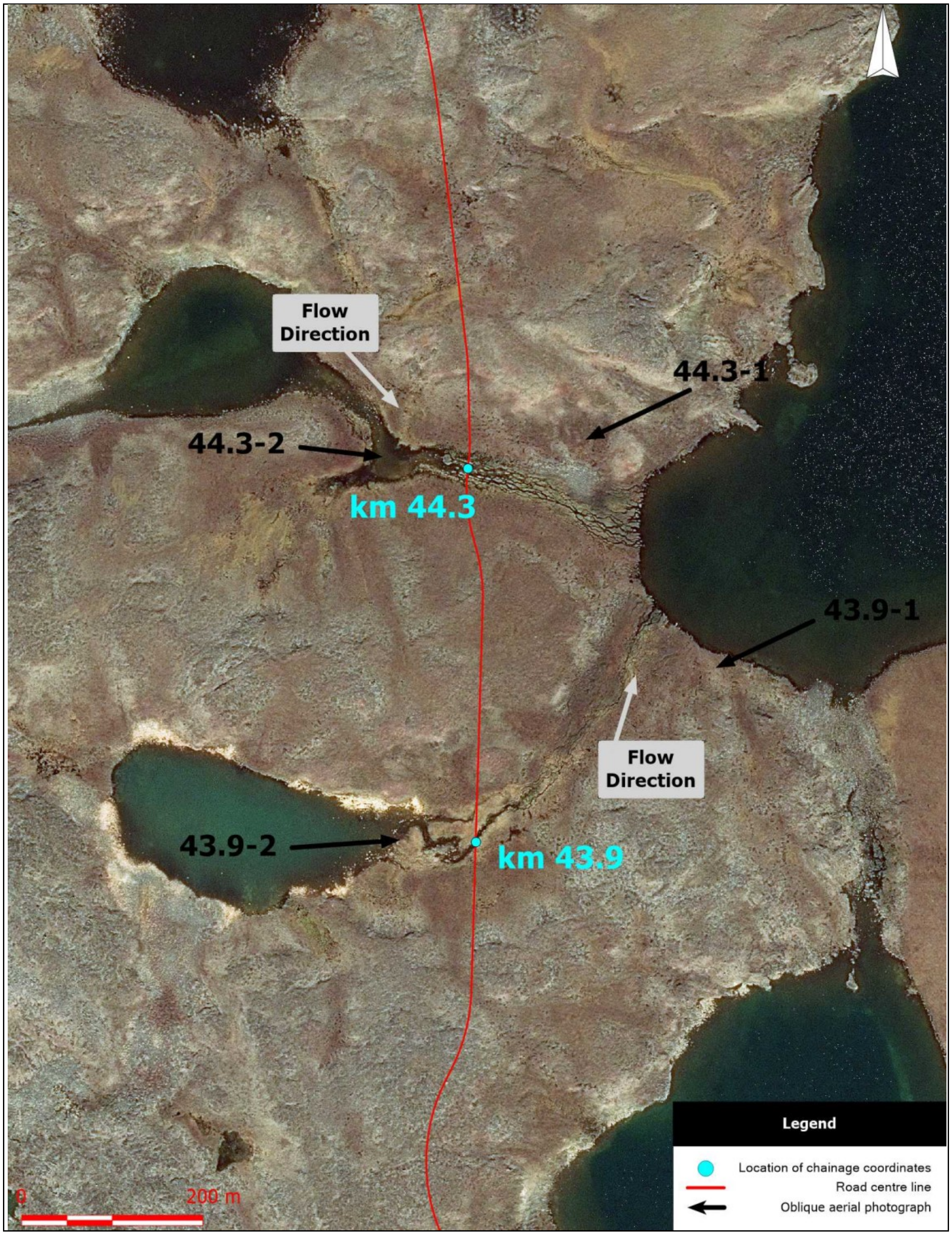

Figure 17. Stream C34 (located at original Whale Tail Haul Road km 44.3 as shown on this figure, now referred to as km 159.3). Aerial photograph showing the road centre line, the flow direction, and the location of oblique aerial photographs (below). From C. Portt and Associates, 2015.

Figure 18. Stream C34 (located at original Whale Tail Haul Road km 44.3, now referred to as km 159.3). Oblique aerial photograph 44.3-1 on Figure 17. August 30, 2014 (C. Portt and Associates, 2015).

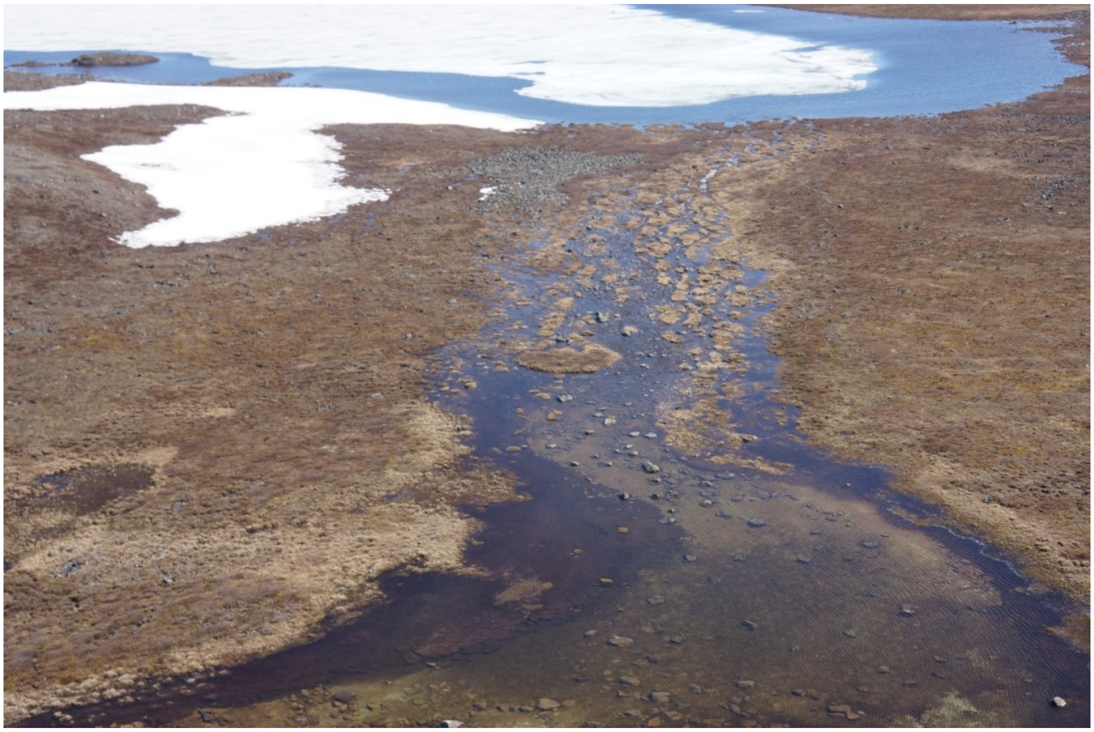

Figure 19. Stream C34 (located at original Whale Tail Haul Road km 44.3, now referred to as km 159.3). Oblique aerial photograph 44.3-2 on Figure 17. June 29, 2015 (C. Portt and Associates, 2015).

Figure 20. Stream C34 (located at original Whale Tail Haul Road km 44.3, now referred to as km 159.3). Photograph from the ground. Downstream view from downstream of the road crossing location. September 1, 2014 (C. Portt and Associates, 2015).

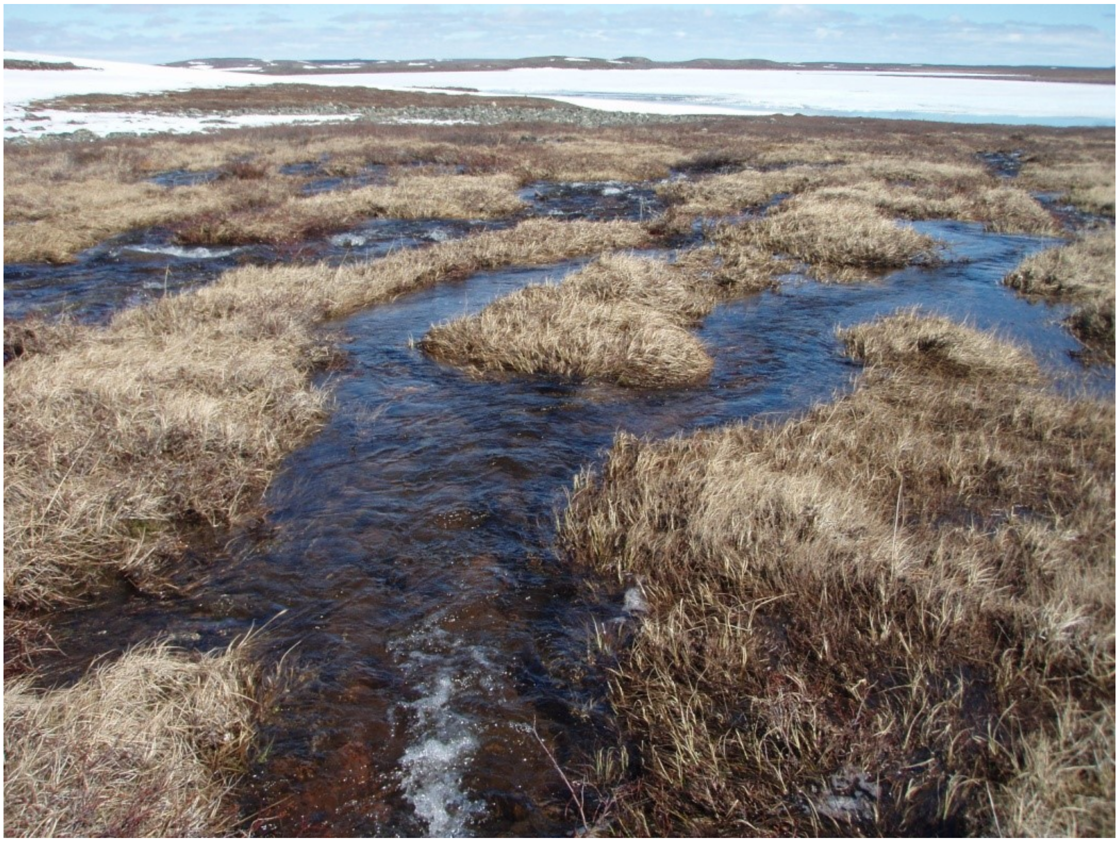

Figure 21. Stream C34 (located at original Whale Tail Haul Road km 44.3, now referred to as km 159.3). Photograph from the ground. Downstream view from downstream of the road crossing location. June 23, 2015 (C. Portt and Associates, 2015).

Figure 22. Stream C34, upper reach, 147 m from the road looking upstream at the inlet (September 27, 2020).

Figure 23. Stream C34 braided section, looking upstream under the bridge (September 27, 2020).

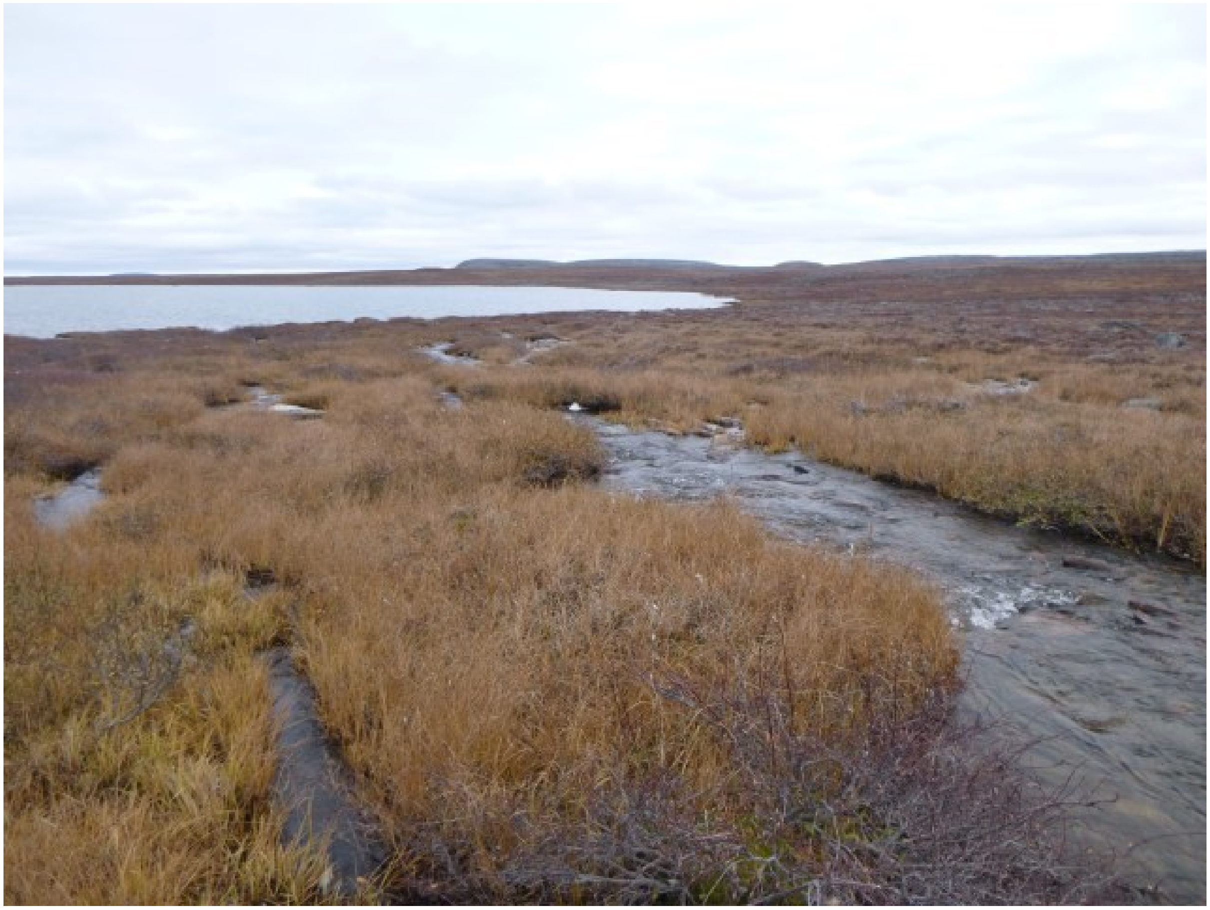

Figure 24. Stream C34 outlet, 47 m downstream from the road, looking downstream (September 27, 2020).

1.4.3.2 Construction

Construction of the spawning habitat enhancement feature will follow previous experience with the R02 spawning pads, though design considerations will be updated to reflect chosen site conditions, current practices, more recently available literature, and IQ.

Generally, the focus will continue to be on creating zones of optimal substrate composition, water velocity and depth during the spawning and egg incubation period.

Design plans for the R02 spawning pads are provided in Appendix C. Briefly, four berms consisting of locally sourced rounded or subrounded stones (>300 mm diameter) were constructed directly on the river bed substrate, with a side slope of 1:1, and a top elevation equivalent to estimated peak flood elevation. Berms were constructed from the shoreline towards the middle of the stream (total length approximately 40-60 m) at an angle of 30 degrees on the downstream side. On the downstream side of each berm, gravel pads were constructed by covering river substrate with a gravel (90%)/cobble (10%) mix to a layer depth of 300 mm. Gravel pads were encircled on three sides by river rocks (>300mm diameter), extending 200 mm above the new substrate. Area of the gravel spawning pads (outside of berms and space between the pads) totalled 0.122 ha.

As done for the R02 spawning pad construction, instream work will occur between freeze-up and freshet, and not during the active spawning, rearing, and foraging window for Arctic Grayling. Sediment and erosion control best practices will be designed and implemented according to conditions at the chosen site.

Complete design plans will be developed after site selection and prior to construction. The timeline for design and construction of the offsetting feature is provided in Section 1.5.

1.5 CONSTRUCTION AND CONSULTATION SCHEDULE

The estimated timeline for construction of the offsetting project and the proposed plan for consultation and community engagement throughout this process is provided in Table 3.

A summary of consultation initially conducted to develop the 2012 NNLP with the spawning pad contingency option is provided in Appendix C of that document.

Table 3. Construction timeline and consultation plan.

Timepoint	Activity	Consultation/Engagement
Summer 2020	Plan development, preliminary site investigations	Initial stakeholder communications. Telephone discussion with DFO to describe timing and approach of updated NNLP (July 7). Virtual presentation to Baker Lake HTO to introduce the project and initial opportunity for comment (July 31). Virtual presentation to Kivalliq Inuit Association (KivIA) to introduce the project and initial opportunity for comment (September 3 & 4).
Winter/Spring 2021	Site short-list finalization	Review and confirm preliminary site short-list for 2021 field assessments in consultation with all stakeholders (HTO/KIA/DFO).
Summer 2021	Pre-construction monitoring: Habitat assessments/biophysical	Facilitate HTO/KivIA participation in field habitat assessments.

Timepoint	Activity	Consultation/Engagement
	baseline data collection for short-listed sites.	Simultaneous IQ collection regarding spawning habitat requirements.
Fall 2021	Final site selection	Finalize site selection in consultation with all stakeholders (HTO/KivIA/DFO).
Winter 2021/2022	Develop updated recommendations for biophysical requirements of the spawning area enhancement.	Incorporate IQ from 2021 field habitat assessment phase.
Summer 2022	Pre-construction monitoring: Biophysical, hydrological and geotechnical baseline data collection (as required for engineering design and post-construction monitoring comparisons)	-
Fall 2022	Final engineering construction designs	Incorporating updated biophysical requirements for Arctic Grayling spawning and rearing, including IQ.
Winter 2023	Construction	-
Summer 2023-2028	Post-construction monitoring, including structural and ecological monitoring (see Section 1.6.3)	-

1.6 MONITORING PLAN

In keeping with existing habitat compensation monitoring plans for the Meadowbank site, both physical and ecological components will be included in offset monitoring for the new spawning pads to record whether this habitat enhancement feature is constructed and functioning as intended, meeting the conditions of the Fisheries Act Authorization.

This monitoring plan focuses on visual inspections and structural assessments, along with complementary surveys of fish use to determine when ecological endpoints are met. Quantitative offsetting measurement endpoints will be developed to the extent possible to best characterize pre- and post-construction changes.

1.6.1 Ecological Monitoring

The comprehensive monitoring plan will be finalized following final site selection and spawning pad design, providing an opportunity to incorporate site-specific factors (e.g. number and size of spawning pads will affect number of monitoring locations), and IQ from the field habitat assessment phase. Monitoring will focus on approaches that minimize environmental impacts to terrestrial and aquatic habitats including those that minimize risks to fish health while being able to establish full ecological functionality of the offsetting feature.

Methods will be field-tested and adapted as necessary during baseline habitat assessments to address uncertainty in data collection. To the extent possible, methods will align with monitoring for the existing R02 spawning pads, and will quantitatively compare spawning activity within the chosen stream site pre- and post-construction of the offsetting feature.

Methods will focus on demonstrating that successful spawning is occurring within the constructed spawning pads. The study design will also include up to three years of post-construction monitoring, with the methods and results from each ecological monitoring year summarized in an annual report for submission to DFO.

The methods for the ecological monitoring program are recommended to include egg kick-net surveys, larval drift-net traps, and visual fish surveys. The specifications of these surveys are summarized in detail below:

Egg kick-net plots

- Kick-net surveys for quantifying the abundance and distribution of Arctic Grayling eggs will be the primary monitoring method used to determine whether spawning is occurring within the constructed spawning pads.
- At least two kick-net surveys will be conducted to follow immediately after the peak spawning window for Arctic Grayling each ecological monitoring year (approximate 2-3 week egg incubation window from freshet to early July) over a known representative area within each spawning pad where 1 m^2 plots will be deployed over substrate that is gently agitated upstream of a D-net positioned on the streambed.
- Eggs captured within the D-net will be then identified to species and immediately enumerated in the field and released back to the area of collection; a minimum of 10 plots will be deployed per spawning pad location (with plots on and immediately adjacent to a spawning pad), and the study design will include plots deployed upstream of the spawning pads to provide a reference dataset for each monitoring year.
- Other supporting data to be collected at each plot include spatial coordinates, mid-water column velocity, substrate composition, water temperature, water depth, and incidental visual observations of any fish in the vicinity of plots.
- The primary measurement endpoints for evaluating whether offsetting objectives are achieved will include habitat data combined with biological data on the abundance and distribution of Arctic Grayling eggs.
- Depending on the site selected, it is possible that adfluvial populations of fall-spawning species (e.g. Round Whitefish) may make use of the new spawning habitat. If this is determined to be likely, kick net surveys using methods described for Arctic Grayling may be initiated in the fall to identify the abundance and distribution of eggs.

Larval drift-net traps

- Similar to the on-going program at the R02 spawning pads, larval drift-net traps will be deployed upstream and downstream of the constructed spawning pads to record changes in production of larvae within the study system.
- During each ecological monitoring year, traps will be installed for the approximate duration of the larval emergence and drift window (approximately 2 to 3 week duration in July through August), to be based on local water temperatures and Arctic Grayling reproductive phenology.
- A minimum of three traps will be deployed upstream of the spawning pads and a minimum of six traps will be deployed adjacent to, or downstream of the spawning pads; the upstream traps would provide a reference dataset for each monitoring year.
- Traps will be checked daily, where all larvae will be identified species, enumerated, and a subsample from each trap (e.g. up to ten fish) will be measured for length and weight.
- A small subset of representative larvae (e.g. up to five fish) from the daily catch of larvae will be preserved and archived for submission to a qualified laboratory for confirmation of taxonomic identification.
- Other supporting data to be collected during the deployment and operation of the larval drift-net traps include spatial coordinates of traps, continuous water temperature (using data loggers) in the vicinity of the traps,
- The measurement endpoint for evaluating the performance of the offsetting measure will be abundance of Arctic Grayling larvae, and the assessment will compare abundance pre- versus post-construction of the spawning pads, and the abundance upstream versus downstream of the spawning pads.

Visual surveys of fish

- Systematic visual surveys for the presence of fish will be conducted at, and around the spawning pads in conjunction with egg-kick surveys and the deployment and operation of larval-drift net traps; data collected from these surveys will be used to better understand fish use of the spawning pads.
- At least three visual surveys will be completed during an ecological monitoring year, surveys will follow predetermined routes spanning the entire length of the spawning enhancement area, extending a minimum 100 m upstream and 100 m downstream of the spawning pads.
- Observational data collected during the survey include visual observation of fish, species of fish, approximate size or age of fish (e.g. adult versus juvenile), and behaviour of fish (e.g. exhibiting spawning or holding behavior).
- Supporting data collected during the survey include a GPS track file of survey route, number and names of recorders and observers, spatial coordinates for start and end points, time of survey, duration of survey for calculation of effort, and water temperature.
- Since relatively low densities of adult fish are anticipated based on baseline data collected for the region and the success of the visual surveys in detecting fish is unknown at this time,

results of this program may provide only a qualitative or semi-quantitative estimation of fish use before and after construction.

1.6.2 Structural Monitoring

In addition to ecological monitoring, structural inspections will be conducted regularly to confirm stability of the spawning pad features. Following construction, as-built designs will be created by a qualified engineer. Ongoing annual structural assessments will be completed through visual surveys by appropriately trained personnel to document condition of the berms and spawning gravel substrate. Year-over-year photographic documentation (e.g. aerial photographs) is proposed.

The measurement endpoint for structural monitoring will be the area (ha) of spawning habitat created (excluding berms, and native stream bed between spawning pads). Total area of the spawning habitat will be identified in as-built design plans. Photographs of the spawning pads and berms will be consistently collected at multiple locations throughout the enhancement area. Photographs will include underwater photographs at selected locations to capture any changes in substrate over time. Results of annual visual surveys and interpretation of the photographs to document condition of the spawning pads will be assessed qualitatively and summarized in an annual monitoring report to be submitted to DFO.

1.6.3 Monitoring Schedule and Criteria for Success

Specific criteria for success have been developed to demonstrate that the spawning feature is functioning as intended to enhance local fish biomass production.

Monitoring will occur over a period of 5 years, after which time compliance with criteria for success will be assessed. The offsetting project will be considered successful, for example, if a minimum of 0.1 ha (+/- 20%) of optimal spawning habitat is created (i.e. the approximate same area created for the R02 spawning pads), and Arctic Grayling eggs are identified within the spawning pads, and there is an increase in abundance of larvae compared to baseline conditions or a suitable reference location (e.g. upstream location).

While it is likely that Arctic Grayling will be the primary beneficiary of the new spawning area, use by other species such as adfluvial populations of Round Whitefish may also be considered in determining success.

This monitoring plan is summarized in Table 4, along with field measurements, analyses, and thresholds for management actions, including the implementation of contingencies. Contingencies are discussed further in Section 1.6.4.

Table 4. Ecological monitoring and management framework for proposed spawning pads.

<table>
<tr><th colspan="2">Objective: Confirm fish use and reproductive success of the spawning pad</th></tr>
<tr><th colspan="2">Stage 1</th></tr>
<tr><td>Study Design</td><td>To characterize fish use of proposed spawning pads, repeated visual surveys combined with a suite of sampling methods for evaluating spawning activity and reproductive success for Arctic Grayling will be deployed pre- and post-construction at the selected spawning pad location and upstream (non-enhanced) reference location</td></tr>
<tr><td>Monitoring Frequency/ Timing</td><td>In offsetting Year 0 (baseline), and Years 1 and 2 (post-construction), with possible monitoring during Year 5 depending on results from Years 1 and 2 (see Year 2 Management Actions below). General study design would include the following:
i) two egg kick-net surveys during the egg incubation period (approximately a 2-week window) following the predicted peak period of spawning activity in mid June,
ii) deploy and operate larval drift-net traps during the larval emergence and drift period for a minimum of two weeks in July through August, and
iii) a minimum of three visual surveys of fish use for the spawning pad reach coinciding with the egg kick-net surveys and deployment of larval drift-net traps
(Note that annual structural inspections will also be conducted in Years 1 – 5, as described in Section 1.6.2)</td></tr>
<tr><td>Field Measurements</td><td>• Geo-referenced locations and photographs of plots, traps, and survey routes
• Total number of Arctic Grayling eggs captured in D-nets
• Substrate composition, water depths, velocities, and underwater photographs of 1 m^2 plots
• Daily catch totals of larval fish and trapping effort per drift-net trap
• Species and age/size of fish and behaviour of fish observed during a visual survey
• Duration of visual survey, number of observers and recorders, and length of the visual survey path
• Mapping habitat types of area that was directly and indirectly enhanced by offsetting measure</td></tr>
<tr><td>Supporting Data</td><td>• Fish length and weight measurements for a subset of larval fish captured in traps
• Qualitative estimate of predation on the spawning pads (based on visual assessment of other fish present)
• Continuous data on water temperature, water levels, and river discharge
• Laboratory confirmation of species identification for larval fish
• Incidental observations of fish species during all monitoring activities</td></tr>
</table>

Table 4. Ecological monitoring and management framework for proposed spawning pads.

<table>
<tr><th colspan="3">Objective: Confirm fish use and reproductive success of the spawning pad</th></tr>
<tr><td>Analyses</td><td colspan="2">
• Quantitative summaries of daily trends in water temperatures and flow discharge for the monitoring year
• Comparison of water temperatures and flow discharge to ‘normals’ and/or previous monitoring years
• Descriptive statistics (e.g., means, standard deviations) of substrate, velocity, and water depths of plots
• Comparison of habitat statistics to previously published suitability curves for spawning / egg-rearing stages
• Quantitative summary of the area of habitat that was enhanced through offsetting (from annual structural assessments; see Section 1.6.2)
• Descriptive statistics of egg densities upstream, on, and immediately adjacent to the spawning pads
• Statistical comparison of egg densities (e.g. using confidence intervals, Analysis of Variance)
• Calculation of mean daily catch rates of larval fish per upstream and downstream locations
• Descriptive plots of mean daily catch rates relative to mean daily water temperature and flow discharge
• Statistical comparison of daily catch rates (e.g. using confidence intervals, Analysis of Variance)
• Descriptive summary of visual observations as supporting evidence for any observed trends
• Update estimation of projected biomass gains using monitoring results (if required)
</td></tr>
<tr><td>Reporting (Annual)</td><td colspan="2">
Annual reports will include the following:
• A review of quantitative targets for establishing effectiveness / success
• Detailed field methods, sampling intensity, and duration
• Maps depicting the locations of each plot and trap relative to the spawning pads
• Table(s) summarizing recorded depths, velocities, and substrate characteristics
• Geo-referenced photos
• Table(s) summarizing statistical tests
• Table(s) with eggs and larvae enumerated by location and treatment type
• Estimation of (realized) offset gains
• Discussion of results for egg densities and larval catch relative to previous years
• Discussion on the effectiveness of monitoring, and the effectiveness of the offsetting measure
• Recommendations for the next field season
</td></tr>
<tr><td>Management Thresholds and Actions</td><td>Scenario 1</td><td>Scenario 2</td></tr>
<tr><td>Year 1 Action Threshold(s)</td><td>Minimum of 0.1 ha (+/- 20%) of suitable spawning habitat is created</td><td>Less than 0.08 ha of suitable spawning habitat is created</td></tr>
</table>

Table 4. Ecological monitoring and management framework for proposed spawning pads.

<table>
<tr><th colspan="3">Objective: Confirm fish use and reproductive success of the spawning pad</th></tr>
<tr><td>Year 1 Management Action(s)</td><td>Continue with regular, scheduled monitoring</td><td>• Engage with DFO
• Build additional habitat features in the offsetting area to meet the habitat area target as required (see Section 1.6.4)</td></tr>
<tr><td>Year 2 Action Threshold(s)</td><td>Minimum of 0.1 ha (+/- 20%) of suitable spawning habitat is created, AND EITHER
Arctic Grayling eggs are recorded in plots on, or near spawning pads,
OR
Larval densities in traps are higher downstream than upstream (or are higher than baseline)</td><td>Less than 0.08 ha of suitable spawning habitat is created,
OR
Arctic Grayling eggs are not recorded on, or near spawning pads,
AND
No or very few larvae are captured in traps</td></tr>
<tr><td>Year 2 Management Actions(s)</td><td>Continue with annual structural inspections until Year 5;
Need for Year 5 ecological monitoring to be determined based on strength of Year 1 and 2 results, through discussion with DFO.</td><td>• Engage with DFO
• Identify potential causes of results and implement remediation as required (see Section 1.6.4)
AND
→Move to Stage 2 Monitoring</td></tr>
<tr><td colspan="3">Stage 2</td></tr>
<tr><td>Study Design</td><td colspan="2">• Expected to be the same as Stage 1 with the exception that the study design may be expanded, for example, to include an increase in survey effort (e.g., number of plots, number of traps) or the implementation of a special study; modifications to the monitoring plan would be considered following discussions with DFO (also discussed in Section 1.6.4)</td></tr>
<tr><td>Monitoring Frequency / Timing</td><td colspan="2">• Stage 2 monitoring would be initiated in Year 4 and 5 if required based on Year 2 results (assuming 1 year for monitoring plan amendments and/or implementation of remedial actions)
• The frequency of monitoring within a given year would be reconsidered following review of results from Year 0 - 2, and discussions with DFO</td></tr>
<tr><td>Field Measurements</td><td colspan="2">• Same as Stage 1 with modifications as needed based on Year 2 results and any remedial actions that are implemented</td></tr>
<tr><td>Supporting Data</td><td colspan="2">• Refer to the Supporting Data Requirements for Stage 1; the collection of supplementary mechanistic data on habitat connectivity will be discussed with DFO and considered for the next field season, as needed</td></tr>
<tr><td>Analyses</td><td colspan="2">• Refer to the Analytical Requirements for Stage 1; additional analyses for any new supporting data will be performed, as needed</td></tr>
<tr><td>Reporting (Annual)</td><td colspan="2">• Same as Stage 1</td></tr>
<tr><td>Management Thresholds and Actions</td><td>Scenario 1</td><td>Scenario 2</td></tr>
</table>

Table 4. Ecological monitoring and management framework for proposed spawning pads.

<table>
<tr><th colspan="4">Objective: Confirm fish use and reproductive success of the spawning pad</th></tr>
<tr><td>Year 4 Action Threshold(s)</td><td colspan="2">Minimum of 0.1 ha (+/- 20%) of suitable spawning habitat is created,
AND
Arctic Grayling eggs are recorded in plots on, or near spawning pads, OR
Larval densities in traps are higher downstream than upstream (or are higher than baseline)</td><td>Less than 0.08 ha of suitable spawning habitat is created,
OR
Arctic Grayling eggs are not recorded on, or near spawning pads, AND
No or very few larvae are captured in traps</td></tr>
<tr><td>Year 4 Management Action(s)</td><td colspan="2">Continue with regular, scheduled Stage 2 monitoring</td><td>• Engage with DFO
• Identify potential causes of results and implement remediation (e.g. see Section 1.6.4)
AND
→Continue with Stage 2 Year 5 monitoring</td></tr>
<tr><td>Management Thresholds and Actions</td><td>Scenario 1</td><td>Scenario 2</td><td>Scenario 3</td></tr>
<tr><td>Year 5 Action Threshold(s)</td><td>Arctic Grayling eggs are often recorded in plots on, or near spawning pads,
OR
Larval densities in traps are higher downstream than upstream (or are higher than baseline).</td><td>Eggs are uncommon in plots on, or near spawning pads (densities are lower than expected), but biomass gains can still be achieved over time,
OR
Larval catch downstream of spawning pads may not always be greater than upstream or baseline estimates, but biomass gains can still be achieved over time.</td><td>Arctic Grayling eggs are not recorded on, or near spawning pads,
AND
Larval Arctic Grayling are not captured in traps, and significant biomass gains over time are unlikely.</td></tr>
<tr><td>Year 5 Management Actions(s)</td><td>Criteria for success are met.
Offset monitoring complete.</td><td>• Re-assess the potential cause of results and whether any remedial actions (Section 1.6.4) can be taken.
• Engage with DFO to discuss results and possible extension of the monitoring period or whether criteria for success are met based on available data.</td><td>• Re-assess the potential cause of results and whether any remedial actions (Section 1.6.4) can be taken.
• Engage with DFO to determine requirements for implementing contingency measures (see Section 1.6.4)
• Submit addendum to NNLP, as required</td></tr>
</table>

1.6.4 Remedial Actions and Contingency Plan

1.6.4.1 Remedial Actions

In the event that the offsetting action thresholds fail to be met for a given monitoring year, management actions will first include a review of available data to assess the likely cause for lack of success. The following potential causes and associated remedial management actions have been identified.

1. Insufficient spawning habitat
    - The amount of constructed spawning area will be assessed in offsetting Year 1 using as-built designs.
    - If the total area of optimal spawning habitat (outside of any berms and space between spawning pads) is less than 0.08 ha, design plans will be developed for supplemental spawning habitat and remedial construction will occur as soon as feasible.
2. Structural failure of the spawning habitat
    - Structural integrity of the spawning pads is assessed through annual visual surveys.
    - If the amount of optimal spawning habitat constructed is reduced below 0.08 ha, potentially due to material shifting, design plans will be developed for remediation and construction will occur as soon as feasible.
3. Barriers to fish movement
    - Pinch-points upstream or downstream of the spawning pads that preclude successful movements by Arctic Grayling to the spawning pad area may have gone unidentified in initial assessments or may arise over time.
    - These types of barriers and potential remedial actions may include:
        i. Stream sections characterized by boulder gardens and dispersed flows where low-flow channels can be built to mitigate existing barriers for fish passage using non-mechanized methods (see Sabina 2015), or
        ii. Stream sections with small cascades or chutes where rock weir structures can be built to mitigate existing velocity barriers for fish passage using non-mechanized methods.
4. Ineffective monitoring
    - The effectiveness of the study design and monitoring methods in collecting the required data (e.g. species detection probability or catchability) and addressing natural variation in the field measurements (including biases) will be reviewed.
    - If the apparent lack of success is determined to be due to ineffective monitoring, alternate methods will be used, or sampling effort will be increased to better address variability in the collected data.
5. Monitoring period extension, with or without changes to monitoring methods.
    - In the event that one or more potential causes of lack of success are identified, an extension to the monitoring duration may be implemented
    - Likely to be recommended if spawning pads are structurally intact and reviewers have reason to believe that spawning has occurred on the spawning

pads or will soon occur as habitat connectivity within the study system can allow for colonization of the constructed spawning pads.

1.6.4.2 Contingency Measures

In the event that criteria for success cannot be met after the initial five-year monitoring period or any monitoring extension agreed to in consultation with DFO, AND the requirement for supplemental offsetting is determined in consultation with DFO, one or more alternate contingency options from Section 6 of the 2012 No Net Loss Plan for the Meadowbank site could be implemented.

Options still considered feasible from a construction standpoint include:

Section 6.1 (Option 1): Improvement of Airplane Lake culverts

Section 6.3 (Option 3): Construction of additional Arctic Grayling spawning pads.

Section 6.4 (Option 4): Remediation of Airplane Lake

Section 6.5 (Option 5): Funding for validation of habitat suitability indices (or other research studies on the biology and habitat requirements of Northern fish species) – i.e. complementary measures

As an alternate contingency option, habitat improvements (e.g. boulder gardens, reef/shoal features) within the dewatered area of Second and Third Portage Lakes could be implemented prior to re-flooding to improve habitat value post-closure. The calculated value of reflooding based on closure plans is detailed in Appendix A.

1.7 **NNL ACCOUNTING SUMMARY**

As described in Section 1.3, calculated losses of fish biomass due to dewatering and dike construction in Second and Third Portage Lakes (excluding the Tailings Storage Facility) totalled:

- 738 kg of standing stock losses due to fishouts (465 kg in 2008 for Second Portage Lake, and 273 kg in 2010 for Third Portage Lake)
- Ongoing annual biomass losses of 179.2 kg/yr (100.5 kg/yr in Second Portage Lake plus 78.7 kg/yr in Third Portage Lake)

Under the 2012 NNLP, gains in biomass production from reflooding the Portage and Goose pits area would have totalled 256.3 kg/yr (Section 1.4). According to estimated construction schedules at the time (Habitat Compensation Monitoring Plan Version 2, 2013), re-flooding was planned to be complete by 2023, with dike breach (allowing repopulation at natural emigration rates) occurring in 2025. Assuming 10 years for the area to reach full functionality post-breach, maximum production rates would have been reached by 2034.

Under this plan update (implementation of the proposed contingency option to replace gains achieved from re-flooding), net gains from spawning pads similar to those constructed at R02 will be 402.9 kg/yr (Section 1.4). This maximum rate of production will be met in offsetting year 10. Spawning pad construction is anticipated for 2023, with full functionality of those pads the following spring and maximum production rates reached by 2032.

The projected annual biomass losses and offsets are represented in Figure 25, and cumulative biomass losses and offsets are represented in Figure 26. As shown in these figures, gains from spawning pad construction are achieved sooner than those from originally planned re-flooding under the 2012 NNLP (prior to tailings deposition) would have been, and the annual rate of biomass production is greater. Therefore although in-pit deposition of tailings increases the time frame prior to re-flooding for closure purposes (now estimated to be complete by 2030), the implementation of contingency plans to replace gains achieved through re-flooding actually reduces the time lag prior to offsetting completion, and results in a net benefit to local fish populations.

The combined benefit achieved from the proposed offset (spawning pads) plus re-flooding for closure purposes under current mine plans is described in Appendix A.

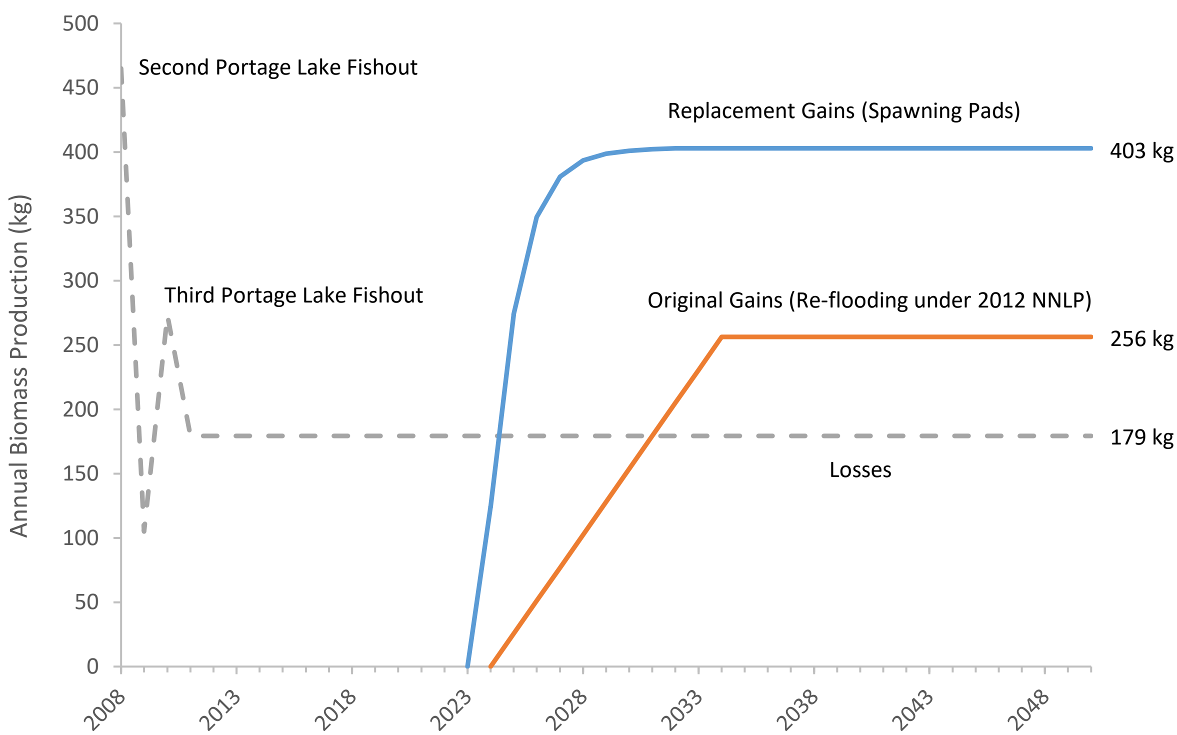

Figure 25. Annual biomass losses associated with the 2008 and 2010 fishouts of Second and Third Portage Lake, biomass production associated with re-flooding under 2012 mine plans, and biomass production associated with the replacement offset (spawning pad construction).

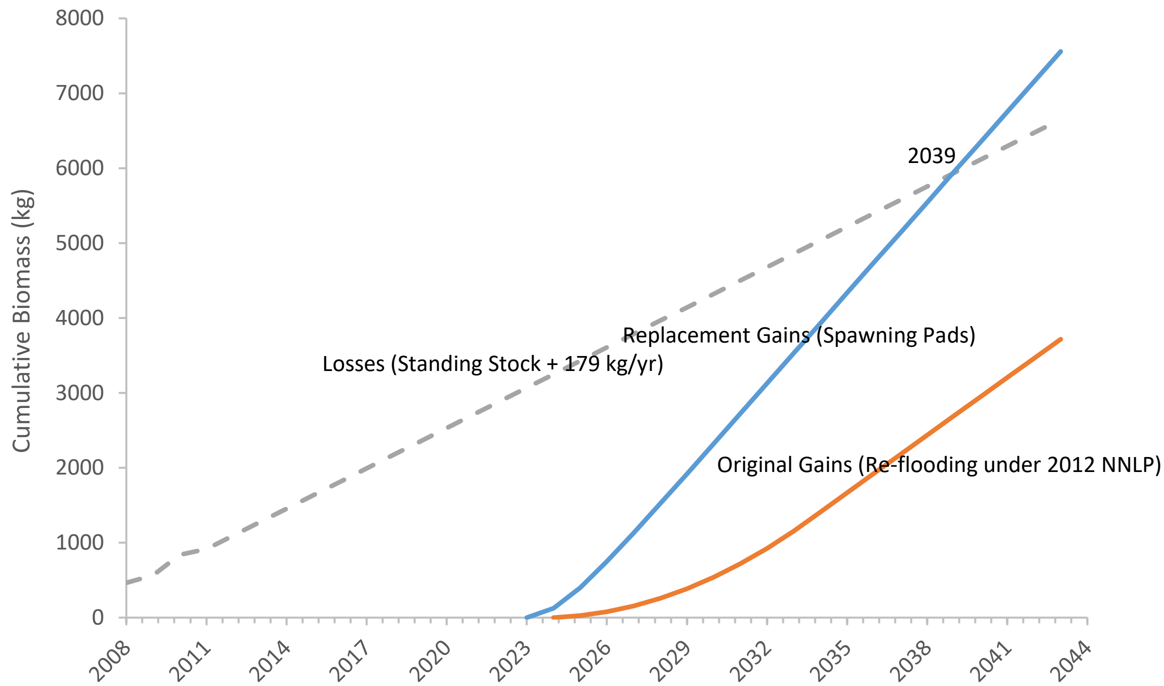

Figure 26. Cumulative biomass losses associated with the 2008 and 2010 fishouts of Second and Third Portage Lake (removal of 738 kg standing stock plus total production rate of 179 kg/yr), and cumulative gains associated with planned spawning pad construction in 2023 (403 kg/yr after 10 years) and the originally planned re-flooding option under 2012 mine plans (256 kg/yr after 10 years).

As demonstrated in Figures 25 and 26, under the new planned offsetting scenario (stream spawning habitat enhancement), offset construction occurs two years earlier than breach of the dikes after re-flooding was planned (2023 instead of 2025), and will be fully functional for spawning the following spring. Maximum annual production of the spawning pads was calculated at a rate of 2.25-times the rate of losses, while the production rate associated with original re-flooding plans would have been 1.43-times the rate of losses. With a time lag of 15 years prior to spawning pad offset construction (2008 – 2023), cumulative biomass gains will fully offset cumulative losses after 16 years (2039 – Figure 26). For comparison, with a time lag of 17 years prior to dike breach (2008 - 2025) and a lower offsetting ratio, gains from the original re-flooding offset would have exceeded losses by approximately 2082[3].

[3] For clarity, the re-flooding of Second and Third Portage Lakes formed only a portion of total offsets in the 2012 NNLP and associated FAA NU-03-0191.3. Additional offsets are not impacted by tailings deposition plans, and are not discussed in this update.

1.8 CONCLUSION

The site-wide history of fish habitat accounting at Meadowbank is complex, and involves multiple FAAs with HUs from various offsetting projects split between them. This addendum describes the replacement of offsets that would have been achieved through re-flooding the Portage and Goose pit area (as described in Agnico's accepted 2012 NNLP) with a contingency option previously presented in that same plan (AEM, 2012; Section 6.0). As detailed in Section 1.3, no changes to habitat losses in the Portage and Goose pit area will occur.

Based on the calculations provided here, the implementation of the contingency offsetting option (stream spawning habitat enhancement) will fully compensate for offsets that were previously planned to be achieved through reflooding the Portage and Bay-Goose pit areas. There is also a reduction in the time-lag incurred prior to implementation of this offset compared to the original plan of offsetting through re-flooding, resulting in an overall net benefit to local fish populations and confidence that the FAA objectives will be achieved.

Re-flooding of the Portage and Bay-Goose Pit area continues to form part of closure plans, and while no longer considered a fish habitat offset for the purposes of FAA NU-03-0191.3, benefits to fish populations from this activity are discussed in Appendix A.

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APPENDIX A

Revised Habitat Gains from Closure-Phase Re-flooding of Second and Third Portage Lakes

APPENDIX A –HABITAT GAINS FROM CLOSURE-PHASE RE-FLOODING

1.1 INTRODUCTION

Losses to fish habitat associated with Meadowbank's Portage and Goose pits occurred in 2008 and 2010 after dewatering portions of Second and Third Portage Lakes to permit pit development. As detailed in the 2012 NNLP for this project, calculated losses in this area totalled 66.1 habitat units (HUs). Habitat offsets for the minesite were to be obtained in part from re-flooding these dewatered basins and newly excavated pits. The construction of boulder gardens, reef and shoal features within the dewatered basins was proposed to increase habitat value, along with partial pit backfill and conversion of terrestrial areas to aquatic habitat.

Although a contingency project (stream spawning habitat enhancement) is now planned to replace the portion of habitat gains that was to be obtained from re-flooding (as described in the preceding document), Agnico Eagle still plans to ensure suitable water quality for fish within the re-flooded area of Second and Third Portage Lakes as part of closure planning. As a result, it is expected that dewatering dikes will ultimately be breached and this area re-gained as fish habitat.

Habitat gains from re-flooding under current mine closure plans are calculated here.

As identified in Section 1.6.4 of the main document, fish habitat improvements within the dewatered area could be considered as part of updated contingency plans, in the event that the newly constructed spawning pads fail to meet criteria for success. However, calculations provided here only assess value of the reflooded habitat after closure-related activities have been implemented.

1.2 HABITAT EVALUATION PROCEDURE

This evaluation uses the 2012 NNLP Habitat Evaluation Procedure (HEP) as described in that document to facilitate comparisons to HU losses, which are not recalculated here.

All post-closure habitat patches identified in the 2012 NNLP for the dewatered area were evaluated to identify any changes in area, depth, or substrate under updated mine plans. The complete description of assumptions for each habitat patch under the 2012 NNLP and this update is shown in Tables A-1 and A-2. Depth and substrate categories for each habitat patch were then used to assign Habitat Types 1 – 10, and calculate the associated habitat units (HU), using the Habitat Suitability Index (HSI) as described in the 2012 NNLP (HU = area (ha) x HSI).

The major change to habitat post-closure under the current in-pit disposal scenario is that no ultra-deep water pit habitat will remain. Through a combination of backfill with rock material and tailings deposition, 100% of Portage and Goose pits will be in-filled. Final water depth in backfilled areas will be in the range of 4 – 9 m below water surface (125 – 130 masl), and depths in areas with tailings material will be approximately 50-60 m below water surface (70 – 80 masl).

Based on current closure plans (Meadowbank Interim Closure and Reclamation Plan - Update 2019, March 27, 2020), the option of adding a 1-m aggregate cap to the tailings is still being assessed. Agnico Eagle will be reviewing the proposed concept as part of the Final Closure Plan and will evaluate its requirements based on the geochemical stability of the tailings and whether they can support fish in the long term. Agnico Eagle will also review the technical feasibility of this concept based on expected field conditions at closure and geotechnical stability of the tailings. Since this concept is still under review, two closure-phase scenarios are assessed here to determine the gains in fish habitat that will be achieved both with and without an aggregate cap.

Both of these scenarios assume adequate long-term water quality to support healthy fish populations. In Scenario 1, without a cap, the tailings area is conservatively assigned habitat type 10, which has no habitat value. In Scenario 2, with an aggregate cap, the tailings surface is assigned habitat type 9, reflecting pelagic habitat with coarse substrate and a depth range of >4 m.

Additional changes in these updated calculations compared to the 2012 NNLP include a slight increase in the land-to-lake area due to enlarged pit footprints into terrestrial zones, and the addition of shoal-like features formed from the tailings pipeline pads.

While not assessed here, supplemental habitat improvements could be considered to further improve habitat function in the reflooded area, such as additional reef/shoal features, boulder gardens, or intentional spawning habitat.

Table A- 1. Second Portage Lake (2PL): Assumptions used to calculate habitat type areas associated with each habitat patch, post-closure. Scenario 1 assumes no aggregate cap on the deposited tailings. Scenario 2 assumes a full aggregate cap. *All updated areas were calculated using 2017 mine plan.

Habitat Patch Name	Description of Feature	Post-Closure Habitat Type Assumptions		
		2012 NNLP	2020 Update - Scenario 1	2020 Update - Scenario 2
Basin	Area of the lake bed between East and Central Dikes that is not covered by any other feature	100% of fine substrate zones changed to mixed substrate; no change in depth zones from baseline.	Updated area*; no change in assumptions from 2012	Updated area; no change in assumptions from 2012
Portage Pit in 2PL - Backfilled	Portion of Portage Pit that overlays 2PL and is backfilled	Backfilled with coarse substrate to 4 - 10 m (HT 9)	Updated area; backfilled with coarse substrate to 4 - 10 m (HT 9)	Updated area; backfilled with coarse substrate to 4 - 10 m (HT 9)
Portage Pit Land-to-Lake - Backfilled	Portion of Portage Pit in terrestrial zone north and south of 2PL	Backfilled with coarse substrate to 4 - 10 m (HT 9)	Updated area; backfilled with coarse substrate to 4 - 10 m (HT 9)	Updated area; backfilled with coarse substrate to 4 - 10 m (HT 9)
Portage Pit A in 2PL	Portion of Portage Pit A that overlays 2PL	N/A	Tailings deposition zone. Infilled to 70 masl. Assigned HT 10 (no habitat value)	Tailings deposition zone. Infilled to 70 masl with coarse substrate cap. Assigned HT 9.
Portage Pit A Land-to-Lake	Portion of Portage Pit A in terrestrial zone north of 2PL	Habitat types change based on pit excavation depths; all substrate is coarse; > 10 m is HT 11	Tailings deposition zone. Infilled to 70 masl. Assigned HT 10 (no habitat value)	Tailings deposition zone. Infilled to 70 masl with coarse substrate cap. Assigned HT 9.
Pit Cap in 2PL	Safety set-back of coarse material around outside of Portage Pit in in-water portion of 2PL, used to protect pit edge from sediment	Coarse substrate; no change in depth zone from baseline. Assumed width of 30 m.	Updated area; no change in assumptions from 2012.	Updated area; no change in assumptions from 2012.

Habitat Patch Name	Description of Feature	Post-Closure Habitat Type Assumptions		
		2012 NNLP	**2020 Update - Scenario 1**	**2020 Update - Scenario 2**
Roads	Road and adjacent parking pad between pit and East Dike;	Coarse substrate; no change in depth zones from baseline.	Updated area; no change in assumptions from 2012.	Updated area; no change in assumptions from 2012.
Central Dike	Dike on west side of Portage Pit, divides TSF from 2PL basin; gains occur on east side only (west side is permanent loss);	Coarse substrate; assume base width is 2x top width and area calculated based on 2:1 slope	No change from 2012.	No change from 2012.
East Dike	Dike on east side of Portage Pit, divides dewatered area from rest of 2PL	Coarse substrate; assume base width is 2x top width and area calculated based on 2:1 slope	No change from 2012.	No change from 2012.
Pipeline corridor	Coarse rock material pad used to support pipelines for tailings deposition within pits	N/A	Assumed 3 m total width per pipe; no change in depth zone; Only refers to the area where pipes do not overlay other features (e.g. roads, backfilled area)[4]	Assumed 3 m total width per pipe; no change in depth zone; Only refers to the area where pipes do not overlay other features (e.g. roads, backfilled area)

[4] While in reality, pipeline pads may create slightly elevated shoal features throughout the reflooded basin, they generally run over other similar coarse-material features, such as roads, so no significant changes to habitat types in non-basin areas are expected.

Table A- 2. Third Portage Lake (3PL): Assumptions used to calculate habitat type areas associated with each habitat patch, post-closure. Scenario 1 assumes no aggregate cap on the deposited tailings. Scenario 2 assumes a full aggregate cap. *All updated areas were calculated using 2017 mine plan.

Habitat Patch Name	Description of Feature	Post-Closure Habitat Type Assumptions		
		2012 NNLP	2020 Update - Scenario 1	2020 Update - Scenario 2
Basin	Area of the current lake bed between the mainland and Bay-Goose Dike that is not covered by any other feature	100% of fine substrate zones changed to mixed substrate; no change in depth zones from baseline.	Updated area*; no change in assumptions from 2012.	Updated area; no change in assumptions from 2012.
Portage Pit E in 3PL	Portion of Portage Pit that overlays 3PL	All habitat types change based on pit excavation depths; all substrate is coarse; > 10m is HT 11	Tailings deposition area (infilled to 70 masl). Updated area; assigned HT 10 (0 habitat value)	Tailings deposition area (infilled to 70 masl) with coarse substrate cap. Updated area; assigned HT 9.
Portage Pit E in 3PL Cap	Safety set-back of coarse material around outside of Portage Pit in in-water portion of 3PL	Coarse substrate; no change in depth zone from baseline. Assumed width of 30 m.	Updated area; no change in assumptions from 2012.	Updated area; no change in assumptions from 2012.
Portage Pit E Land-to-Lake	Portion of Portage Pit E that overlays land, north of the Bay-Goose Basin	Habitat types change based on pit excavation depths; all substrate is coarse; > 10 m is HT 11	Tailings deposition area (infilled to 70 masl). Updated area; assigned HT 10 (0 habitat value).	Tailings deposition area (infilled to 70 masl) with coarse substrate cap. Updated area; assigned HT 9.
Goose Pit in 3PL - Tailings	Portion of Goose Pit that overlays 3PL and receives tailings	All habitat types change based on pit excavation depths; all substrate is coarse; > 10 m is HT 11	Tailings deposition area (infilled to 80 masl). Updated area; assigned HT 10 (0 habitat value).	Tailings deposition area (infilled to 80 masl) with coarse substrate cap. Updated area; assigned HT 9.
Goose Pit in 3PL – Backfilled Area	Portion of Goose Pit that overlays 3PL and is backfilled	N/A	New habitat patch; backfilled with coarse material to 4-10 m depth zone (HT 9)	New habitat patch; backfilled with coarse material to 4-10 m depth zone (HT 9)

Habitat Patch Name	Description of Feature	Post-Closure Habitat Type Assumptions		
		2012 NNLP	**2020 Update - Scenario 1**	**2020 Update - Scenario 2**
Goose Pit Cap	Safety set-back of coarse material around outside of Goose Pit in in-water portion of 3PL	Coarse substrate; no change in depth zone from baseline. Assumed width of 30 m.	Updated area; no change in assumptions from 2012.	Updated area; no change in assumptions from 2012.
Goose Pit Land-to-Lake - Tailings	Portion of Goose Pit that overlays land (Goose Island) and receives tailings	All habitat types change based on pit excavation depths; all substrate is coarse; > 10 m is HT 11	Tailings deposition area (infilled to 80 masl). Updated area; assigned HT 10 (0 habitat value).	Tailings deposition area (infilled to 80 masl) with coarse substrate cap. Updated area; assigned HT 9.
Goose Pit Land-to-Lake - Backfilled	Portion of Goose Pit that overlays land (Goose Island) and receives backfill	N/A	New habitat patch; backfilled with coarse material to 4-10 m depth zone (HT 9)	New habitat patch; backfilled with coarse material to 4-10 m depth zone (HT 9)
Road	As-built road between minesite and Goose Pit	Coarse substrate; assume > 4 m below water surface (HT 9)	Updated area; no change in assumptions from 2012.	Updated area; no change in assumptions from 2012.
Bay Goose Dike	Largest dike in 3PL	Coarse substrate; assume base width is 2x top width and area calculated based on 2:1 slope	No change from 2012.	No change from 2012.
South Camp Dike	Small dike between Third Portage Lake and Bay-Goose Basin	Coarse substrate; assume base width is 2x top width and area calculated based on 2:1 slope	No change from 2012.	No change from 2012.

Habitat Patch Name	Description of Feature	Post-Closure Habitat Type Assumptions		
		2012 NNLP	2020 Update - Scenario 1	2020 Update - Scenario 2
Dike Breaches	Sections of the dewatering dikes will be removed to re-flood the pits	Assumes 100 m wide section of Bay-Goose dike top becomes submerged to a depth of 2-4 m; coarse substrate (HT 6)	Three breaches in the Bay Goose Dike, one breach in the South Camp Dike. All breaches 3 m deep, 10 m wide (base), 3:1 side slope, coarse substrate (HT 6).	Three breaches in the Bay Goose Dike, one breach in the South Camp Dike. All breaches 3 m deep, 10 m wide (base), 3:1 side slope, coarse substrate (HT 6).
Boulder Garden/Goose NPAG Storage Area	Coarse substrate rock garden between Goose Island Pit and South Island	2.97 ha of coarse substrate; no change in depth zones from baseline	Updated area (increase to 14.55 ha); no change in assumptions from 2012.	Updated area (increase to 14.55 ha); no change in assumptions from 2012.
Pipeline corridor	Coarse rock material pad used to support pipelines for tailings deposition within pits	N/A	Assumed 3 m total width per pipe; no change in depth zone; Only refers to the area where pipes do not overlay other features (e.g. roads, backfilled area)[5]	Assumed 3 m total width per pipe; no change in depth zone; Only refers to the area where pipes do not overlay other features (e.g. roads, backfilled area)

[5] While in reality, pipeline pads may create slightly elevated shoal features throughout the reflooded basin, they generally run over other similar coarse-material features, such as roads, so no significant changes to habitat types in non-basin areas are expected. Post-closure water levels were assumed equal to water levels in Third Portage Lake (134 masl).

1.3 HABITAT GAINS FROM REFLOODING

Total habitat gains from re-flooding without an aggregate cap on the tailings (Scenario 1) were calculated at 66.5 HUs. This habitat would be gained upon re-flooding and breach of the dewatering dikes to allow fish entry, which is estimated to occur in 2030, based on current closure plans.

With capping of the entire area of deposited tailings with coarse aggregate material (Scenario 2), total habitat gains would be 114.1 HUs.

Total areas (ha) and HU for each habitat type (1 – 11) are shown in Table A-3. Sub-totals for each habitat patch (feature) are provided in Attachment A-1.

Table A- 3. Habitat losses (area and calculated habitat units (HUs)) in the Portage and Goose Pit area, and gains associated with re-flooding at mine closure, with and without aggregate capping of the deposited tailings (Scenario 1 = no cap; Scenario 2 = cap). HSIs for each habitat type are described in the 2012 NNLP. *includes habitat improvements as described in the 2012 NNLP.

Habitat Type	Depth Zone	Substrate Type	Habitat Losses (2012 NNLP)		Habitat Gains from Re-flooding					
					2012 NNLP*		2020 Update – Scenario 1		2020 Update – Scenario 2	
			Area (ha)	HUs	Area (ha)	HUs	Area (ha)	HUs	Area (ha)	HUs
1	0-2m	Fine	0.36	0.05	0.00	0.00	0.00	0.00	0.00	0.00
2	0-2m	Mixed	0.00	0.00	0.07	0.01	0.03	0.01	0.03	0.01
3	0-2m	Coarse	29.57	9.42	16.72	5.33	17.98	5.73	17.98	5.73
4	2-4m	Fine	9.20	3.73	0.00	0.00	0.00	0.00	0.00	0.00
5	2-4m	Mixed	0.00	0.00	3.23	2.06	1.52	0.97	1.52	0.97
6	2-4m	Coarse	20.02	17.01	13.08	11.11	13.62	11.57	13.62	11.57
7	>4m	Fine	84.34	34.81	0.00	0.00	0.00	0.00	0.00	0.00
8	>4m	Mixed	0.00	0.00	22.27	13.67	16.33	10.02	16.33	10.02
9	>4m	Coarse	1.41	1.10	42.79	33.39	48.92	38.18	109.94	85.80
10	>10m	Pit area, no value	N/A	N/A	-	-	61.02	0.00	0.00	0.00
11	>10m	Pit area, some pelagic value	N/A	N/A	58.47	28.60	-	-	-	-
Total			**144.9**	**66.1**	**156.6**	**94.2**	**159.4**	**66.5**	**159.4**	**114.1**

1.4 POST-CLOSURE TOTAL PRODUCTION ESTIMATE

To compute total gains achieved from construction of the spawning pad offsetting feature plus reflooding for closure purposes, the rate of production in the reflooded area per habitat unit was assumed using the same ratio as calculated for this area under baseline conditions (179.2 kg/yr produced by 66.1 HU – Appendix B). Assuming suitable water quality, reflooding under Scenario 1 (no capping; 66.5 HU) would result in a production rate of 180.3 kg/yr after the area met full functionality, and reflooding under Scenario 2 (with capping; 114.1 HU) would result in a production rate of 309.3 kg/yr (Table A-4).

The impact of reflooding under these two scenarios in addition to the proposed stream habitat enhancements is shown in Figure A-1. As described in Section 1.7 of the main document, a time period of 10 years was assumed for the reflooded area to reach maximum production rates.

Table A- 4. Calculated habitat units and biomass production for the dewatered area of Second and Third Portage Lakes. Baseline production was calculated from fishout data and growth equations, as described in Appendix B. Production under Scenario 1 and 2 was calculated from the baseline ratio of HU:production.

Scenario	Habitat Units (HU)	Biomass Production (kg/yr)
Losses/Baseline (Appendix B)	66.1	179.2
Reflooding under 2012 NNLP	94.2	256.3
Scenario 1 (reflooding without capping)	66.5	180.3
Scenario 2 (reflooding with capping)	114.1	309.3
Spawning Pads	-	402.9

Depending on the post-closure scenario, total annual production for the offsetting feature (spawning pads) and reflooded pits area will be either 583.2 kg/yr (Scenario 1) or 712.2 kg/yr (Scenario 2), after full production rates are reached. This represents a gain:loss ratio of 3.25:1 or 3.97:1 for this area, which are both significantly greater than originally planned gains from re-flooding alone, under the 2012 NNLP (1.43:1).

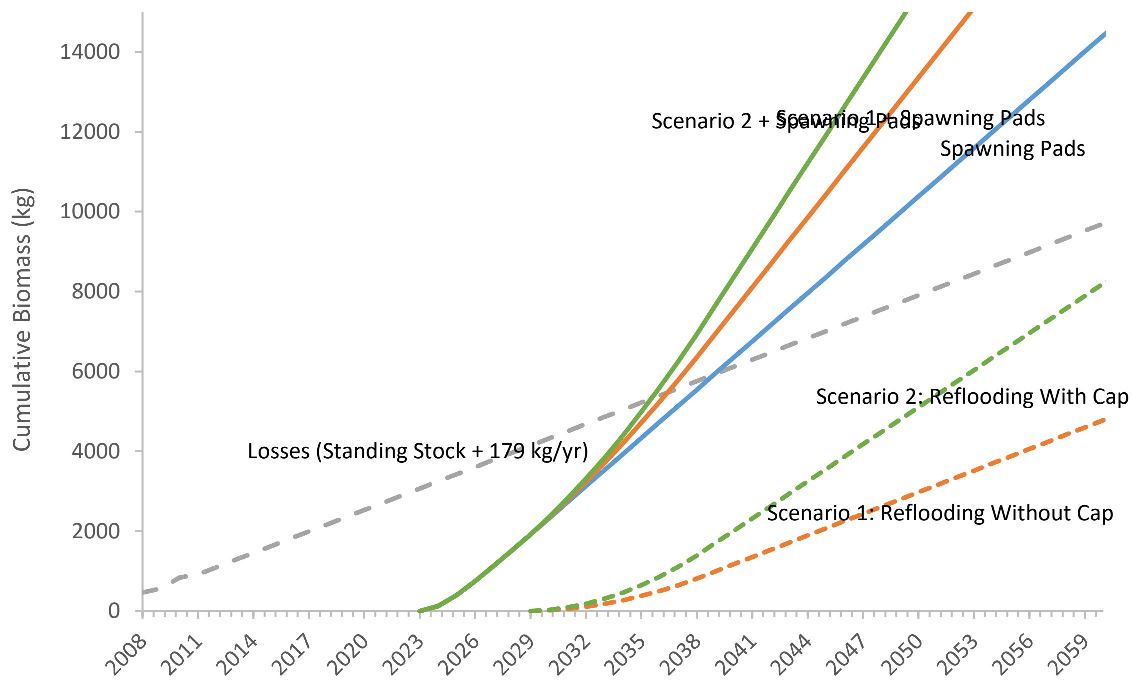

Figure A- 1. Cumulative biomass losses associated with the 2008 and 2010 fishouts of Second and Third Portage Lake (removal of 738 kg standing stock plus total production rate of 179 kg/yr), and cumulative gains associated with spawning pad construction in 2023 (403 kg/yr after 10 years), as well as two reflooding scenarios (Scenario 1: 180 kg/yr after 10 years; Scenario 2: 309 kg/yr after 10 years).

APPENDIX A - ATTACHMENT A-1

Habitat Unit Subtotals by Habitat Patch (Mine Site Feature)

Table AA-1. Scenario 1 - Habitat gains from re-flooding Second Portage Lake without capping deposited tailings.

TOTAL BY PATCH - Summary | HU GAINS - Species Totals | HU GAINS -Species Sub-Totals

Second Portage Lake		
Portage Pit A in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9		0.00
10	0.03	0.00
Sub-total	0.03	0.00

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Second Portage Lake		
Portage Pit A Cap in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.07	0.02
4		0.00
5		0.00
6	0.04	0.03
7		0.00
8		0.00
9	0.08	0.06
10		0.00
Total	0.19	0.12

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.05	0.05	0.01	0.01	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Second Portage Lake		
Roads	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.61	0.20
4		0.00
5		0.00
6	0.63	0.54
7		0.00
8		0.00
9	3.66	2.85
10		0.00
Total	4.91	3.59

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.11	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.22	0.23	0.07	0.03	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.16	1.25	0.30	0.15	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.43	1.59	0.39	0.19	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.06	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.06	0.06	0.06	0.04	0.06	0.06	0.06	0.05	0.02	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.33	0.17	0.33	0.33	0.36	0.18	0.36	0.36	0.08	0.05	0.05	0.11	0.04	0.01	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.02	0.02	0.00	0.00	0.05	0.05
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.39**	**0.25**	**0.42**	**0.37**	**0.42**	**0.30**	**0.46**	**0.40**	**0.10**	**0.09**	**0.08**	**0.12**	**0.04**	**0.02**	**0.06**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.01**	**0.02**	**0.03**	**0.00**	**0.00**	**0.06**	**0.05**

Second Portage Lake		
Basin	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.63	0.20
4		0.00
5	0.05	0.03
6	1.37	1.16
7		0.00
8	5.39	3.31
9	0.62	0.49
10		0.00
Total	8.07	5.19

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.11	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
6	0.46	0.50	0.14	0.06	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.34	1.45	0.32	0.20	0.00	0.00	0.00	0.00
9	0.20	0.21	0.05	0.03	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.07	2.29	0.54	0.29	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.06	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.12	0.12	0.12	0.09	0.13	0.13	0.13	0.10	0.04	0.04	0.03	0.03	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.24	0.24	0.37	0.49	0.26	0.26	0.39	0.53	0.04	0.04	0.08	0.16	0.07	0.00	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.03	0.03	0.00	0.00	0.07	0.07
9	0.06	0.03	0.06	0.06	0.06	0.03	0.06	0.06	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.43**	**0.43**	**0.58**	**0.64**	**0.46**	**0.49**	**0.64**	**0.69**	**0.10**	**0.10**	**0.13**	**0.21**	**0.09**	**0.02**	**0.09**	**0.10**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.02**	**0.05**	**0.04**	**0.00**	**0.00**	**0.09**	**0.09**

Table AA-1. Scenario 1 - Habitat gains from re-flooding Second Portage Lake without capping deposited tailings.

TOTAL BY PATCH - Summary

Second Portage Lake

East Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.36	0.11
4		0.00
5		0.00
6	0.08	0.07
7		0.00
8		0.00
9	0.09	0.07
10		0.00
Total	0.53	0.25

HU GAINS - Species Totals

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.03	0.06	0.01	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.09	0.12	0.03	0.01	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.02	0.02	0.00	0.00	0.04	0.03	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.02**	**0.03**	**0.03**	**0.01**	**0.02**	**0.05**	**0.04**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**

Species >>	SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Second Portage Lake

Central Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.02	0.01
4		0.00
5		0.00
6	0.10	0.08
7		0.00
8		0.00
9	0.91	0.71
10		0.00
Total	1.03	0.80

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.03	0.04	0.01	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.29	0.31	0.07	0.04	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.32	0.35	0.09	0.04	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.08	0.04	0.08	0.08	0.09	0.04	0.09	0.09	0.02	0.01	0.01	0.03	0.01	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.09**	**0.05**	**0.09**	**0.09**	**0.10**	**0.06**	**0.10**	**0.10**	**0.02**	**0.02**	**0.02**	**0.03**	**0.01**	**0.00**	**0.01**	**0.01**

Species >>	SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**

Second Portage Lake

Portage Pit A Land to Lak	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9		0.00
10	20.06	0.00
Total	20.06	0.00

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Species >>	SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Second Portage Lake

Portage Pit in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	20.08	15.67
10		0.00
Total	20.08	15.67

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	6.36	6.87	1.63	0.81	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	6.36	6.87	1.63	0.81	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.82	0.91	1.82	1.82	1.96	0.98	1.96	1.96	0.45	0.30	0.30	0.59	0.20	0.07	0.27	0.27
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.82**	**0.91**	**1.82**	**1.82**	**1.96**	**0.98**	**1.96**	**1.96**	**0.45**	**0.30**	**0.30**	**0.59**	**0.20**	**0.07**	**0.27**	**0.27**

Species >>	SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.09	0.13	0.00	0.00	0.25	0.25
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.13**	**0.03**	**0.09**	**0.13**	**0.00**	**0.00**	**0.25**	**0.25**

Table AA-1. Scenario 1 - Habitat gains from re-flooding Second Portage Lake without capping deposited tailings.

TOTAL BY PATCH - Summary		
Second Portage Lake		
Portage Pit Land to Lake	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	6.85	5.35
10		0.00
Total	6.85	5.35

HU GAINS - Species Totals								
HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	2.17	2.34	0.56	0.28	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.17	2.34	0.56	0.28	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals																																
Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.62	0.31	0.62	0.62	0.67	0.33	0.67	0.67	0.15	0.10	0.10	0.20	0.07	0.02	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.03	0.04	0.00	0.00	0.09	0.09
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.62**	**0.31**	**0.62**	**0.62**	**0.67**	**0.33**	**0.67**	**0.67**	**0.15**	**0.10**	**0.10**	**0.20**	**0.07**	**0.02**	**0.09**	**0.09**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.04**	**0.01**	**0.03**	**0.04**	**0.00**	**0.00**	**0.09**	**0.09**

Second Portage Lake		
Pipeline Corridor in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.00	0.00
4		0.00
5		0.00
6	0.00	0.00
7		0.00
8		0.00
9	0.03	0.02
10		0.00
Total	0.03	0.03

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table AA-2. Scenario 1 - Habitat gains from re-flooding Third Portage Lake without capping deposited tailings.

TOTAL BY PATCH - Summary | HU GAINS - Species Totals | HU GAINS -Species Sub-Totals

Third Portage Lake		
Portage Pit E in 3PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9		0.00
10	12.69	0.00
Total	12.69	0.00

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Third Portage Lake		
Portage Pit E Cap in 3PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.67	0.21
4		0.00
5		0.00
6	0.98	0.83
7		0.00
8		0.00
9	1.51	1.18
10		0.00
Total	3.16	2.22

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.11	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.33	0.36	0.10	0.04	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.48	0.52	0.12	0.06	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.87	0.99	0.25	0.11	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.07	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.09	0.09	0.09	0.07	0.10	0.10	0.10	0.07	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.14	0.07	0.14	0.14	0.15	0.07	0.15	0.15	0.03	0.02	0.02	0.04	0.02	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.02	0.02
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.23**	**0.19**	**0.26**	**0.20**	**0.24**	**0.24**	**0.29**	**0.22**	**0.06**	**0.07**	**0.05**	**0.07**	**0.03**	**0.02**	**0.04**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.02**	**0.01**	**0.00**	**0.00**	**0.03**	**0.03**

Third Portage Lake		
Portage Pit E Land-to-Lal	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9		0.00
10	16.11	0.00
Total	16.11	0.00

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Third Portage Lake		
Goose Pit in 3PL - Tailings	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9		0.00
10	8.95	0.00
Total	8.95	0.00

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table AA-2. Scenario 1 - Habitat gains from re-flooding Third Portage Lake without capping deposited tailings.

TOTAL BY PATCH - Summary

Third Portage Lake

Goose Pit Cap	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.67	0.21
4		0.00
5		0.00
6	0.52	0.44
7		0.00
8		0.00
9	1.35	1.05
10		0.00
Total	2.54	1.71

HU GAINS - Species Totals

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.12	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.18	0.19	0.05	0.02	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.43	0.46	0.11	0.05	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.66	0.77	0.19	0.09	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.07	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.02	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.12	0.06	0.12	0.12	0.13	0.07	0.13	0.13	0.03	0.02	0.02	0.04	0.01	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.02	0.02
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.17**	**0.14**	**0.20**	**0.16**	**0.18**	**0.18**	**0.23**	**0.17**	**0.05**	**0.05**	**0.04**	**0.05**	**0.02**	**0.02**	**0.03**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.00**	**0.00**	**0.03**	**0.02**

Third Portage Lake

Goose Pit Land-to-Lake -	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9		0.00
10	3.17	0.00
Total	3.17	0.00

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Third Portage Lake

Basin	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2	0.03	0.01
3	5.24	1.67
4		0.00
5	1.47	0.94
6	2.42	2.05
7		0.00
8	10.94	6.71
9	0.50	0.39
10		0.00
Total	20.59	11.77

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.47	0.90	0.19	0.11	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.37	0.40	0.12	0.06	0.00	0.00	0.00	0.00
6	0.82	0.89	0.25	0.10	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	2.72	2.94	0.65	0.41	0.00	0.00	0.00	0.00
9	0.16	0.17	0.04	0.02	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.54	5.29	1.25	0.69	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.24	0.24	0.00	0.00	0.51	0.38	0.00	0.00	0.12	0.08	0.00	0.00	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.02	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.07	0.10	0.10	0.10	0.07	0.11	0.11	0.11	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.01
6	0.22	0.22	0.22	0.16	0.24	0.24	0.24	0.18	0.07	0.07	0.05	0.05	0.02	0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.03	0.02
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.49	0.49	0.74	0.99	0.53	0.53	0.80	1.07	0.08	0.08	0.16	0.32	0.15	0.00	0.11	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.07	0.07	0.00	0.00	0.14	0.14
9	0.05	0.02	0.05	0.05	0.05	0.02	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.83**	**1.07**	**1.34**	**1.30**	**0.89**	**1.42**	**1.58**	**1.40**	**0.19**	**0.31**	**0.33**	**0.43**	**0.20**	**0.10**	**0.20**	**0.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.05**	**0.07**	**0.12**	**0.09**	**0.00**	**0.03**	**0.21**	**0.18**

Third Portage Lake

Bay-Goose Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	3.12	0.99
4		0.00
5		0.00
6	1.22	1.04
7		0.00
8		0.00
9	0.75	0.59
10		0.00
Total	5.09	2.62

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.28	0.53	0.12	0.06	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.41	0.45	0.13	0.05	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.24	0.26	0.06	0.03	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.93	1.24	0.30	0.14	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.14	0.14	0.00	0.00	0.30	0.23	0.00	0.00	0.07	0.05	0.00	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02	0.01	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.11	0.11	0.11	0.08	0.12	0.12	0.12	0.09	0.04	0.04	0.03	0.03	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.07	0.03	0.07	0.07	0.07	0.04	0.07	0.07	0.02	0.01	0.01	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.18**	**0.29**	**0.32**	**0.15**	**0.19**	**0.46**	**0.42**	**0.16**	**0.05**	**0.12**	**0.08**	**0.05**	**0.02**	**0.05**	**0.05**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.03**	**0.03**	**0.01**	**0.00**	**0.02**	**0.03**	**0.02**

Third Portage Lake

South Camp Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.13	0.04
4		0.00
5		0.00
6	0.00	0.00
7		0.00
8		0.00
9		0.00
10		0.00
Total	0.13	0.04

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table AA-2. Scenario 1 - Habitat gains from re-flooding Third Portage Lake without capping deposited tailings.

TOTAL BY PATCH - Summary

HU GAINS - Species Totals

HU GAINS -Species Sub-Totals

Third Portage Lake		
Roads	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	2.23	0.71
4		0.00
5		0.00
6	1.17	0.99
7		0.00
8		0.00
9	2.77	2.16
10		0.00
Total	6.16	3.86

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.20	0.38	0.08	0.04	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.40	0.43	0.12	0.05	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.88	0.95	0.23	0.11	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.47	1.76	0.43	0.20	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.10	0.10	0.00	0.00	0.22	0.16	0.00	0.00	0.05	0.03	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.11	0.11	0.11	0.08	0.11	0.11	0.11	0.09	0.03	0.03	0.03	0.03	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.25	0.13	0.25	0.25	0.27	0.14	0.27	0.27	0.06	0.04	0.04	0.08	0.03	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.03	0.03
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.36	0.33	0.46	0.33	0.38	0.47	0.55	0.36	0.10	0.13	0.10	0.11	0.04	0.05	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.02	0.00	0.01	0.06	0.05

Third Portage Lake		
Dike Breach	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	1.33	0.42
4		0.00
5		0.00
6	0.34	0.29
7		0.00
8		0.00
9		0.00
10		0.00
Total	1.67	0.71

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.12	0.23	0.05	0.03	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.12	0.12	0.04	0.01	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.24	0.35	0.08	0.04	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.06	0.06	0.00	0.00	0.13	0.10	0.00	0.00	0.03	0.02	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.03	0.09	0.09	0.02	0.03	0.16	0.13	0.02	0.01	0.04	0.03	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00

Third Portage Lake		
Pipeline Corridor in 3PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.00	0.00
4		0.00
5		0.00
6	0.00	0.00
7		0.00
8		0.00
9	0.00	0.00
10		0.00
Total	0.01	0.00

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Third Portage Lake		
Goose Pit - Land to Lake I	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	0.01	0.01
10		0.00
Total	0.01	0.01

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table AA-2. Scenario 1 - Habitat gains from re-flooding Third Portage Lake without capping deposited tailings.

TOTAL BY PATCH - Summary		
Third Portage Lake		
Goose Pit in 3PL - Backfill	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	2.81	2.19
10		0.00
Total	2.81	2.19

HU GAINS - Species Totals								
HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.89	0.96	0.23	0.11	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.89	0.96	0.23	0.11	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals																																
Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.25	0.13	0.25	0.25	0.27	0.14	0.27	0.27	0.06	0.04	0.04	0.08	0.03	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.04	0.04
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.25**	**0.13**	**0.25**	**0.25**	**0.27**	**0.14**	**0.27**	**0.27**	**0.06**	**0.04**	**0.04**	**0.08**	**0.03**	**0.01**	**0.04**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.00**	**0.01**	**0.02**	**0.00**	**0.00**	**0.04**	**0.04**

Third Portage Lake		
Goose NPAG Storage Are	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	2.90	0.92
4		0.00
5		0.00
6	4.74	4.03
7		0.00
8		0.00
9	6.91	5.40
10		0.00
Total	14.55	10.35

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.26	0.50	0.11	0.06	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.61	1.74	0.49	0.19	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	2.19	2.36	0.56	0.28	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.06	4.60	1.16	0.53	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.13	0.13	0.00	0.00	0.28	0.21	0.00	0.00	0.06	0.04	0.00	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02	0.01	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.43	0.43	0.43	0.32	0.46	0.46	0.46	0.35	0.14	0.14	0.11	0.11	0.05	0.03	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.00	0.00	0.06	0.04
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.63	0.31	0.63	0.63	0.68	0.34	0.68	0.68	0.15	0.10	0.10	0.20	0.07	0.02	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.03	0.04	0.00	0.00	0.09	0.09
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.05**	**0.87**	**1.19**	**0.95**	**1.14**	**1.08**	**1.35**	**1.02**	**0.29**	**0.31**	**0.25**	**0.31**	**0.12**	**0.09**	**0.18**	**0.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.07**	**0.05**	**0.07**	**0.07**	**0.00**	**0.02**	**0.15**	**0.13**

Table AA-3. Scenario 2 - Habitat gains from reflooding Second Portage Lake after capping tailings with aggregate.

TOTAL BY PATCH - Summary

Second Portage Lake

Portage Pit A in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	0.03	0.03
10		0.00
Sub-total	**0.03**	**0.03**

HU GAINS - Species Totals

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Second Portage Lake

Portage Pit A Cap in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.07	0.02
4		0.00
5		0.00
6	0.04	0.03
7		0.00
8		0.00
9	0.08	0.06
10		0.00
Total	0.19	0.12

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.05	0.05	0.01	0.01	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Second Portage Lake

Roads	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.61	0.20
4		0.00
5		0.00
6	0.63	0.54
7		0.00
8		0.00
9	3.66	2.85
10		0.00
Total	4.91	3.59

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.11	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.22	0.23	0.07	0.03	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.16	1.25	0.30	0.15	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.43	1.59	0.39	0.19	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.06	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.06	0.06	0.06	0.04	0.06	0.06	0.06	0.05	0.02	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.33	0.17	0.33	0.33	0.36	0.18	0.36	0.36	0.08	0.05	0.05	0.11	0.04	0.01	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.02	0.02	0.00	0.00	0.05	0.05
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.39**	**0.25**	**0.42**	**0.37**	**0.42**	**0.30**	**0.46**	**0.40**	**0.10**	**0.09**	**0.08**	**0.12**	**0.04**	**0.02**	**0.06**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.01**	**0.02**	**0.03**	**0.00**	**0.00**	**0.06**	**0.05**

Second Portage Lake

Basin	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.63	0.20
4		0.00
5	0.05	0.03
6	1.37	1.16
7		0.00
8	5.39	3.31
9	0.62	0.49
10		0.00
Total	8.07	5.19

HU total per species x access weight

Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.11	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
6	0.46	0.50	0.14	0.06	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.34	1.45	0.32	0.20	0.00	0.00	0.00	0.00
9	0.20	0.21	0.05	0.03	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.07	2.29	0.54	0.29	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight

Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.06	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.12	0.12	0.12	0.09	0.13	0.13	0.13	0.10	0.04	0.04	0.03	0.03	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.24	0.24	0.37	0.49	0.26	0.26	0.39	0.53	0.04	0.04	0.08	0.16	0.07	0.00	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.03	0.03	0.00	0.00	0.07	0.07
9	0.06	0.03	0.06	0.06	0.06	0.03	0.06	0.06	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.43**	**0.43**	**0.58**	**0.64**	**0.46**	**0.49**	**0.64**	**0.69**	**0.10**	**0.10**	**0.13**	**0.21**	**0.09**	**0.02**	**0.09**	**0.10**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.02**	**0.05**	**0.04**	**0.00**	**0.00**	**0.09**	**0.09**

Table AA-3. Scenario 2 - Habitat gains from reflooding Second Portage Lake after capping tailings with aggregate.

TOTAL BY PATCH - Summary		
Second Portage Lake		
East Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.36	0.11
4		0.00
5		0.00
6	0.08	0.07
7		0.00
8		0.00
9	0.09	0.07
10		0.00
Total	0.53	0.25

HU GAINS - Species Totals								
HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.03	0.06	0.01	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.09	0.12	0.03	0.01	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals																																
Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.02	0.02	0.00	0.00	0.04	0.03	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.02**	**0.03**	**0.03**	**0.01**	**0.02**	**0.05**	**0.04**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Second Portage Lake		
Central Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.02	0.01
4		0.00
5		0.00
6	0.10	0.08
7		0.00
8		0.00
9	0.91	0.71
10		0.00
Total	1.03	0.80

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.03	0.04	0.01	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.29	0.31	0.07	0.04	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.32	0.35	0.09	0.04	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.08	0.04	0.08	0.08	0.09	0.04	0.09	0.09	0.02	0.01	0.01	0.03	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.09**	**0.05**	**0.09**	**0.09**	**0.10**	**0.06**	**0.10**	**0.10**	**0.02**	**0.02**	**0.02**	**0.03**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**

Second Portage Lake		
Portage Pit A Land to Lal	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	20.06	15.66
10		0.00
Total	20.06	15.66

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	6.35	6.86	1.63	0.81	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	6.35	6.86	1.63	0.81	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.81	0.91	1.81	1.81	1.96	0.98	1.96	1.96	0.45	0.30	0.30	0.59	0.20	0.07	0.27	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.09	0.13	0.00	0.00	0.25	0.25
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.81**	**0.91**	**1.81**	**1.81**	**1.96**	**0.98**	**1.96**	**1.96**	**0.45**	**0.30**	**0.30**	**0.59**	**0.20**	**0.07**	**0.27**	**0.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.13**	**0.03**	**0.09**	**0.13**	**0.00**	**0.00**	**0.25**	**0.25**

Second Portage Lake		
Portage Pit in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	20.08	15.67
10		0.00
Total	20.08	15.67

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	6.36	6.87	1.63	0.81	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	6.36	6.87	1.63	0.81	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.82	0.91	1.82	1.82	1.96	0.98	1.96	1.96	0.45	0.30	0.30	0.59	0.20	0.07	0.27	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.09	0.13	0.00	0.00	0.25	0.25
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.82**	**0.91**	**1.82**	**1.82**	**1.96**	**0.98**	**1.96**	**1.96**	**0.45**	**0.30**	**0.30**	**0.59**	**0.20**	**0.07**	**0.27**	**0.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.13**	**0.03**	**0.09**	**0.13**	**0.00**	**0.00**	**0.25**	**0.25**

Table AA-3. Scenario 2 - Habitat gains from reflooding Second Portage Lake after capping tailings with aggregate.

TOTAL BY PATCH - Summary		
Second Portage Lake		
Portage Pit Land to Lake	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	6.85	5.35
10		0.00
Total	6.85	5.35

HU GAINS - Species Totals								
HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	2.17	2.34	0.56	0.28	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.17	2.34	0.56	0.28	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals																																
Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.62	0.31	0.62	0.62	0.67	0.33	0.67	0.67	0.15	0.10	0.10	0.20	0.07	0.02	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.03	0.04	0.00	0.00	0.09	0.09
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.62**	**0.31**	**0.62**	**0.62**	**0.67**	**0.33**	**0.67**	**0.67**	**0.15**	**0.10**	**0.10**	**0.20**	**0.07**	**0.02**	**0.09**	**0.09**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.04**	**0.01**	**0.03**	**0.04**	**0.00**	**0.00**	**0.09**	**0.09**

Second Portage Lake		
Pipeline Corridor in 2PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.00	0.00
4		0.00
5		0.00
6	0.00	0.00
7		0.00
8		0.00
9	0.03	0.02
10		0.00
Total	0.03	0.03

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table AA-4. Scenario 2 - Habitat gains from reflooding Third Portage Lake after capping tailings with aggregate.

TOTAL BY PATCH - Summary

HU GAINS - Species Totals

HU GAINS -Species Sub-Totals

Third Portage Lake		
Portage Pit E in 3PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	12.69	9.91
10		0.00
Total	12.69	9.91

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	4.02	4.34	1.03	0.51	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.02	4.34	1.03	0.51	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.15	0.57	1.15	1.15	1.24	0.62	1.24	1.24	0.28	0.19	0.19	0.38	0.13	0.04	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.06	0.08	0.00	0.00	0.16	0.16
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.15**	**0.57**	**1.15**	**1.15**	**1.24**	**0.62**	**1.24**	**1.24**	**0.28**	**0.19**	**0.19**	**0.38**	**0.13**	**0.04**	**0.17**	**0.17**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.08**	**0.02**	**0.06**	**0.08**	**0.00**	**0.00**	**0.16**	**0.16**

Third Portage Lake		
Portage Pit E Cap in 3PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.67	0.21
4		0.00
5		0.00
6	0.98	0.83
7		0.00
8		0.00
9	1.51	1.18
10		0.00
Total	3.16	2.22

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.11	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.33	0.36	0.10	0.04	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.48	0.52	0.12	0.06	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.87	0.99	0.25	0.11	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.07	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.09	0.09	0.09	0.07	0.10	0.10	0.10	0.07	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.14	0.07	0.14	0.14	0.15	0.07	0.15	0.15	0.03	0.02	0.02	0.04	0.02	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.02	0.02
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.23**	**0.19**	**0.26**	**0.20**	**0.24**	**0.24**	**0.29**	**0.22**	**0.06**	**0.07**	**0.05**	**0.07**	**0.03**	**0.02**	**0.04**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.02**	**0.01**	**0.00**	**0.00**	**0.03**	**0.03**

Third Portage Lake		
Portage Pit E Land-to-Lal	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	16.11	12.57
10		0.00
Total	16.11	12.57

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	5.10	5.51	1.31	0.65	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	5.10	5.51	1.31	0.65	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.46	0.73	1.46	1.46	1.57	0.79	1.57	1.57	0.36	0.24	0.24	0.48	0.16	0.05	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.03	0.08	0.10	0.00	0.00	0.20	0.20
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.46**	**0.73**	**1.46**	**1.46**	**1.57**	**0.79**	**1.57**	**1.57**	**0.36**	**0.24**	**0.24**	**0.48**	**0.16**	**0.05**	**0.22**	**0.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.10**	**0.03**	**0.08**	**0.10**	**0.00**	**0.00**	**0.20**	**0.20**

Third Portage Lake		
Goose Pit in 3PL - Tailings	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	8.95	6.98
10		0.00
Total	8.95	6.98

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	2.83	3.06	0.73	0.36	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.83	3.06	0.73	0.36	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.81	0.40	0.81	0.81	0.87	0.44	0.87	0.87	0.20	0.13	0.13	0.26	0.09	0.03	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.04	0.06	0.00	0.00	0.11	0.11
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.81**	**0.40**	**0.81**	**0.81**	**0.87**	**0.44**	**0.87**	**0.87**	**0.20**	**0.13**	**0.13**	**0.26**	**0.09**	**0.03**	**0.12**	**0.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.06**	**0.01**	**0.04**	**0.06**	**0.00**	**0.00**	**0.11**	**0.11**

Table AA-4. Scenario 2 - Habitat gains from reflooding Third Portage Lake after capping tailings with aggregate.

TOTAL BY PATCH - Summary		
Third Portage Lake		
Goose Pit Cap	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.67	0.21
4		0.00
5		0.00
6	0.52	0.44
7		0.00
8		0.00
9	1.35	1.05
10		0.00
Total	2.54	1.71

HU GAINS - Species Totals								
HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.12	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.18	0.19	0.05	0.02	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.43	0.46	0.11	0.05	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.66	0.77	0.19	0.09	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals																																
Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.03	0.03	0.00	0.00	0.07	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.02	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.12	0.06	0.12	0.12	0.13	0.07	0.13	0.13	0.03	0.02	0.02	0.04	0.01	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.02	0.02
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.17	0.14	0.20	0.16	0.18	0.18	0.23	0.17	0.05	0.05	0.04	0.05	0.02	0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.03	0.02

Third Portage Lake		
Goose Pit Land-to-Lake -	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	3.17	2.47
10		0.00
Total	3.17	2.47

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.00	1.08	0.26	0.13	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.00	1.08	0.26	0.13	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.29	0.14	0.29	0.29	0.31	0.15	0.31	0.31	0.07	0.05	0.05	0.09	0.03	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.04	0.04
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.29	0.14	0.29	0.29	0.31	0.15	0.31	0.31	0.07	0.05	0.05	0.09	0.03	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.04	0.04

Third Portage Lake		
Basin	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2	0.03	0.01
3	5.24	1.67
4		0.00
5	1.47	0.94
6	2.42	2.05
7		0.00
8	10.94	6.71
9	0.50	0.39
10		0.00
Total	20.59	11.77

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.47	0.90	0.19	0.11	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.37	0.40	0.12	0.06	0.00	0.00	0.00	0.00
6	0.82	0.89	0.25	0.10	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	2.72	2.94	0.65	0.41	0.00	0.00	0.00	0.00
9	0.16	0.17	0.04	0.02	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.54	5.29	1.25	0.69	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.24	0.24	0.00	0.00	0.51	0.38	0.00	0.00	0.12	0.08	0.00	0.00	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.02	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.07	0.10	0.10	0.10	0.07	0.11	0.11	0.11	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.01
6	0.22	0.22	0.22	0.16	0.24	0.24	0.24	0.18	0.07	0.07	0.05	0.05	0.02	0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.03	0.02
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.49	0.49	0.74	0.99	0.53	0.53	0.80	1.07	0.08	0.08	0.16	0.32	0.15	0.00	0.11	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.07	0.07	0.00	0.00	0.14	0.14
9	0.05	0.02	0.05	0.05	0.05	0.02	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.83	1.07	1.34	1.30	0.89	1.42	1.58	1.40	0.19	0.31	0.33	0.43	0.20	0.10	0.20	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.07	0.12	0.09	0.00	0.03	0.21	0.18

Third Portage Lake		
Bay-Goose Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	3.12	0.99
4		0.00
5		0.00
6	1.22	1.04
7		0.00
8		0.00
9	0.75	0.59
10		0.00
Total	5.09	2.62

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.28	0.53	0.12	0.06	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.41	0.45	0.13	0.05	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.24	0.26	0.06	0.03	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.93	1.24	0.30	0.14	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.14	0.14	0.00	0.00	0.30	0.23	0.00	0.00	0.07	0.05	0.00	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02	0.01	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.11	0.11	0.11	0.08	0.12	0.12	0.12	0.09	0.04	0.04	0.03	0.03	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.07	0.03	0.07	0.07	0.07	0.04	0.07	0.07	0.02	0.01	0.01	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.18	0.29	0.32	0.15	0.19	0.46	0.42	0.16	0.05	0.12	0.08	0.05	0.02	0.05	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03	0.01	0.00	0.02	0.03	0.02

Third Portage Lake		
South Camp Dike	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.13	0.04
4		0.00
5		0.00
6	0.00	0.00
7		0.00
8		0.00
9		0.00
10		0.00
Total	0.13	0.04

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table AA-4. Scenario 2 - Habitat gains from reflooding Third Portage Lake after capping tailings with aggregate.

TOTAL BY PATCH - Summary

HU GAINS - Species Totals

HU GAINS -Species Sub-Totals

Third Portage Lake		
Roads	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	2.23	0.71
4		0.00
5		0.00
6	1.17	0.99
7		0.00
8		0.00
9	2.77	2.16
10		0.00
Total	6.16	3.86

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.20	0.38	0.08	0.04	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.40	0.43	0.12	0.05	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.88	0.95	0.23	0.11	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.47	1.76	0.43	0.20	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.10	0.10	0.00	0.00	0.22	0.16	0.00	0.00	0.05	0.03	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.11	0.11	0.11	0.08	0.11	0.11	0.11	0.09	0.03	0.03	0.03	0.03	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.25	0.13	0.25	0.25	0.27	0.14	0.27	0.27	0.06	0.04	0.04	0.08	0.03	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.03	0.03
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.36**	**0.33**	**0.46**	**0.33**	**0.38**	**0.47**	**0.55**	**0.36**	**0.10**	**0.13**	**0.10**	**0.11**	**0.04**	**0.05**	**0.07**	**0.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.02**	**0.03**	**0.02**	**0.00**	**0.01**	**0.06**	**0.05**

Third Portage Lake		
Dike Breach	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	1.33	0.42
4		0.00
5		0.00
6	0.34	0.29
7		0.00
8		0.00
9		0.00
10		0.00
Total	1.67	0.71

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.12	0.23	0.05	0.03	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.12	0.12	0.04	0.01	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.24	0.35	0.08	0.04	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.06	0.06	0.00	0.00	0.13	0.10	0.00	0.00	0.03	0.02	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.03**	**0.09**	**0.09**	**0.02**	**0.03**	**0.16**	**0.13**	**0.02**	**0.01**	**0.04**	**0.03**	**0.01**	**0.00**	**0.02**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**

Third Portage Lake		
Pipeline Corridor in 3PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	0.00	0.00
4		0.00
5		0.00
6	0.00	0.00
7		0.00
8		0.00
9	0.00	0.00
10		0.00
Total	0.01	0.00

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Third Portage Lake		
Goose Pit Land to Lake B	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	0.01	0.01
10		0.00
Total	0.01	0.01

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table AA-4. Scenario 2 - Habitat gains from reflooding Third Portage Lake after capping tailings with aggregate.

TOTAL BY PATCH - Summary		
Third Portage Lake		
Goose Pit Backfill in 3PL	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3		0.00
4		0.00
5		0.00
6		0.00
7		0.00
8		0.00
9	2.81	2.19
10		0.00
Total	2.81	2.19

HU GAINS - Species Totals								
HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.89	0.96	0.23	0.11	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.89	0.96	0.23	0.11	0.00	0.00	0.00	0.00

HU GAINS -Species Sub-Totals																																
Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.25	0.13	0.25	0.25	0.27	0.14	0.27	0.27	0.06	0.04	0.04	0.08	0.03	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.04	0.04
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.25**	**0.13**	**0.25**	**0.25**	**0.27**	**0.14**	**0.27**	**0.27**	**0.06**	**0.04**	**0.04**	**0.08**	**0.03**	**0.01**	**0.04**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.00**	**0.01**	**0.02**	**0.00**	**0.00**	**0.04**	**0.04**

Third Portage Lake		
Goose NPAG Storage Are	Area (ha)	HUs
Habitat Type	Gains	Gains
1		0.00
2		0.00
3	2.90	0.92
4		0.00
5		0.00
6	4.74	4.03
7		0.00
8		0.00
9	6.91	5.40
10		0.00
Total	14.55	10.35

HU total per species x access weight								
Species >>	ARCH	LKTR	RNWH	BURB	SLSC	NNST	CISC	ARGR
Access >>	1	1	1	1	1	1	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.26	0.50	0.11	0.06	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.61	1.74	0.49	0.19	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	2.19	2.36	0.56	0.28	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4.06	4.60	1.16	0.53	0.00	0.00	0.00	0.00

Habitat type area x HSI x species weight x life function weight																																
Species >>	ARCH				LKTR				RNWH				BURB				SLSC				NNST				CISC				ARGR			
Life Function >>	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW	SP	NU	FO	OW
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.13	0.13	0.00	0.00	0.28	0.21	0.00	0.00	0.06	0.04	0.00	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02	0.01	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.43	0.43	0.43	0.32	0.46	0.46	0.46	0.35	0.14	0.14	0.11	0.11	0.05	0.03	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.00	0.00	0.06	0.04
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.63	0.31	0.63	0.63	0.68	0.34	0.68	0.68	0.15	0.10	0.10	0.20	0.07	0.02	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.03	0.04	0.00	0.00	0.09	0.09
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.05**	**0.87**	**1.19**	**0.95**	**1.14**	**1.08**	**1.35**	**1.02**	**0.29**	**0.31**	**0.25**	**0.31**	**0.12**	**0.09**	**0.18**	**0.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.07**	**0.05**	**0.07**	**0.07**	**0.00**	**0.02**	**0.15**	**0.13**

APPENDIX B

Calculation of Target Gains in Fish Production for the Meadowbank NNLP Update (Golder, April 2020)

GOLDER

TECHNICAL MEMORANDUM

DATE 29 July 2020 **Project No.** 20145113-489-TM-Rev0

TO Nancy Duquet Harvey, Environmental Superintendent
Agnico Eagle Mines Ltd.

CC Leilan Baxter, Jen Range

FROM Cam Stevens **EMAIL cestevens@golder.com**

CALCULATION OF TARGET GAINS IN FISH PRODUCTION FOR THE MEADOWBANK NNLP UPDATE

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) presented an addendum (update) to the 2012 No Net Loss Plan (NNLP) for the Meadowbank Site (Agnico Eagle 2019) to Fisheries and Oceans Canada (DFO) by email on 22 February 2019. This update included an evaluation of in-pit deposition of tailings in Portage and Goose Pits for the offsetting requirements for the Meadowbank Site under the existing the Fisheries Act Authorization (FAA) NU-030191.4. Since Portage and Goose Pits were planned to be reflooded and restored to fish habitat as part of the previously submitted 2012 NNLP, the gains that otherwise would have been achieved at closure were re-evaluated. The initial calculation of losses for Main Mine Site were also revisited as the benchmark to determine the required offsetting target that otherwise would have been achieved from pit restoration at closure.

The losses that were described in Agnico Eagle (2019) for Second and Third Portage lakes included estimates of habitat units generated using the same Habitat Evaluation Procedure (HEP) described in the 2012 NNLP for the Meadowbank Site. As presented in Table 1 of Agnico Eagle (2019), total losses for the Main Mine Site are 66.2 habitat units (HUs; where 26.5 HUs are losses from Second Portage Lake and 39.7 HUs are losses from Third Portage Lake), representing 144.9 ha of lake habitat (42.9 ha in Second Portage Lake and 102.0 ha in Third Portage Lake). Main Mine Site losses for Second Portage Lake were defined as the area between the East Dike and Central Dike, representing 34.9% of the total area (122.7 ha) of lake habitat altered in the Northwest Arm, or 41.4% of the total estimated suitable habitat lost (64.3 HU) in the Northwest Arm.

The losses in Second and Third Portage lakes, which include dike footprints, were complete following construction of the dikes and dewatering of the diked areas in the Northwest Arm in 2008 and in the Bay-Goose Basin in 2010. Recognizing that an off-site location was now being proposed to replace the original offsetting design for Portage and Goose Pits, Agnico Eagle (2019) suggested that the current offsetting currency (habitat units) be updated to provide a realistic comparison of losses at the Main Mine Site versus gains achieved at an off-site location. In this case, the results from an evaluation of candidate contingency measures indicated that in-river construction of spawning pads for enhancing the productivity of adfluvial Arctic Grayling populations had the most potential as an offsetting measure to meet the requirements of the Meadowbank Site FAA. Therefore, to provide a transferable unit for the comparison of losses at the Main Mine Site versus gains generated from a habitat enhancement project on a watercourse, Agnico Eagle (2019) proposed that fish production be used as a surrogate measure of fisheries productivity (Randall et al. 2013) for the Amendment to the Meadowbank NNLP; where production (*P*) at the level of a fish population was defined as a product of the standing stock biomass (*B*) and the rate at which the population grows over a year (*G*) as a direct measurement of the productivity of fish (Dolbeth et al. 2012).

In support of Agnico Eagle's application for an Amendment to the existing Meadowbank Site FAA, Golder's objective was to recalculate the losses incurred by in-pit deposition using a fish production currency, which can then be used to set a new target for gains that will meet the requirements of the FAA. This objective was achieved by summarizing and analyzing the data collected during the 2008 fish out of the Northwest Arm of Second Portage Lake (Azimuth 2009) and 2010 fish out of Bay-Goose Basin in Third Portage Lake (North/South 2011).

2.0 PRODUCTIVITY LOSSES

Biomass production has been proposed as the currency for determining losses and equivalency targets based on the premise that fisheries production (e.g., biomass) is an acceptable surrogate of fisheries productivity (Randall and Minns 2000; Randall et al. 2013). The biomass production unit provides a transferrable unit for the calculation of both losses at the Main Mine Site and gains for an offsetting measure similar in concept to the R02 spawning pads discussed in Agnico Eagle (2019). Using the biomass production approach, the biomass removed from each fish-out was summarized (see Section 2.1) and then used to estimate annual losses to fish biomass production during operations resulting from mortality incurred from each fish-out (see Section 2.3). Methods related to the calculation of the annual losses to biomass production are provided in Section 2.2.

2.1 Fish-Out Catch Summary

Northwest Arm, Second Portage Lake

The fish-out of the diked area of the Northwest Arm of Second Portage Lake was conducted in summer 2008 (Azimuth 2009). Fishing efforts removed a total of 3,079 fish, weighing 1,123 kg. About two-thirds of the fish were Lake Trout (66% of all fish enumerated), followed in abundance by Arctic Char (16%), Round Whitefish (10%), and Burbot (9%). Captured fish were assessed for length, weight, external condition, sex, and reproductive status where possible. The maximum size of Lake Trout was 975 mm, Arctic Char was 600 mm, Round Whitefish was 420 mm, and Burbot was 563 mm (Table 1). Measurements on fish length and weight were also used to develop curves for quantifying the relationship between length and weight for each species (Table 2). A subset of detailed biological data on lengths and weights, sex, maturity, fecundity, stomach contents and aging structures were collected for Lake Trout (n = 50), Arctic Char (n = 63), and Round Whitefish (n = 51).

The 2008 fish-out program also included collection of data related to water quality, phytoplankton, zooplankton and benthic invertebrates. Analyses of these data confirm that lake productivity is low (Azimuth 2009).

Table 1: Species Length and Weight Statistics for Second Portage Lake and Third Portage Lake

Lake	Species	*n*	Length (mm)			Weight (g)		
			Min	Max	Mean	Min	Max	Mean
Second Portage	Arctic Char	474	100	600	333	11	2,550	622
	Lake Trout	1,991	90	975	250	5.5	12,700	359
	Round Whitefish	258	79	420	250	2	1,900	289
	Burbot	273	120	563	239	7	1,150	109
Third Portage*	Arctic Char	772	68	554	159	8	1,950	70
	Lake Trout	615	65	887	211	10	8,750	227
	Round Whitefish	504	62	565	201	2	825	235
	Burbot	236	95	595	217	16	2,000	111

*summarized weight measurements were a subset of fish measured for length (i.e., only weight measurements deemed reliable were used for statistical summaries); Source: Azimuth (2009) and North/South (2011).

Table 2: Species Weight-Length Regression Coefficients for Second Portage Lake and Third Portage Lake

Species	Second Portage Lake				Third Portage Lake			
	n	R^2	*a*	*b*	*n*	R^2	*a*	*b*
Arctic Char	563	0.93	-4.53	2.81	474	0.99	-5.16	3.08
Lake Trout	485	0.97	-4.67	2.87	1991	0.99	-5.07	3.04
Round Whitefish	341	0.98	-5.42	3.18	258	0.99	-5.75	3.32
Burbot	187	0.90	-5.15	3.01	273	0.94	-5.23	3.02

Note: Log_{10}(Weight in g) = a + b (Log_{10}[Length in mm]); Source: Azimuth (2009) and North/South (2011).

Bay-Goose Basin, Third Portage Lake

The fish out of Bay-Goose Basin of Third Portage Lake was implemented during the summer of 2010 (North/South 2011). Fishing efforts removed a total of 2,139 fish from the Bay-Goose Basin, weighing 273 kg. Thirty six percent of the fish caught were Arctic Char, followed in abundance by Lake Trout (29%), Round Whitefish (24%), Burbot (11%) and a few Ninespine Stickleback (less than 1%). Captured fish were assessed for length, weight, external condition, sex, and reproductive status where possible. The maximum size of Lake Trout was 887 mm, Arctic Char was 554 mm, Round Whitefish was 565 mm, and Burbot was 595 mm (Table 1). Measurements on fish length and weight were also used to develop curves for quantifying the relationship of length versus weight for each species (Table 2). A further subset of the population of Arctic Char (*n* = 50), Lake Trout (*n* = 50), and Round Whitefish (*n* = 48) were collected for detailed biological assessment, including age.

In 2010, unlike the 2008 fish-out of Second Portage Lake Impoundment, part of the focus of the fish-out program was to transfer as many live fish as possible from the Bay-Goose Basin to the main body of Third Portage Lake (North/South 2011). Over half of all fish captured were successfully rescued and live transferred (59%). The majority of fish transferred were Arctic Char, followed in abundance by Lake Trout, Round Whitefish, and Burbot.

2.2 Production Estimation Methods

Annual fish biomass production was calculated for Northwest Arm of Second Portage Lake and the Bay-Goose Basin of Third Portage Lake using data collected from 2008 and 2010 fish-out programs, which are summarized in Section 2.1. Estimates of fish production followed the general method described by Ricker (1975), where annual production is a function of instantaneous growth rate and biomass:

$$P = G \times B \qquad \text{Equation 1}$$

G (instantaneous growth rate) and B (biomass) were estimated on an age-specific basis:

$$P = \sum_{a=0}^{n} G_a\, B_a \qquad \text{Equation 2}$$

where a is age in years and n is the maximum age. Production estimates were generated for all species that accounted for greater than one percent of the total catch and included Lake Trout, Arctic Char, Round Whitefish, and Burbot (excluding the very few Ninespine Stickleback that were captured). Total production was based on the sum of production of Arctic Char, Lake Trout, Round Whitefish, and Burbot.

Following the statistical summary of catch and abundance data in Azimuth (2009) and North/South (2011), the steps of the production model involved:

- estimation of abundance and biomass per age cohort for each species and fish out event (see Section 2.2.1 for details)
- estimation of instantaneous somatic growth rate (G*a*) per species and fish-out event:

$$G_a = \ln(w_{a+1}) - \ln(w_a) \qquad \text{Equation 3}$$

- estimation of total annual production (see Equation 2)

2.2.1 Biomass Per Age Cohort

Recognizing that most of the fish catch from both fish-outs was measured for length (total and/or fork length in mm) and mass (weight in kg), and that only a subset of the total catch (approximately 50 samples per species) had an otolith removed in the field that was later analyzed for age in a laboratory, an age-at-length (or weight) model was required to predict the age for fish that did not have an otolith removed for ageing. For the study dataset it was determined that age-at-length models were potentially more reliable over an age-at-weight models because of the potentially greater measurement error that is inherent to the use of scales for weight. Because there were no ageing structures collected for Burbot, life history data from another fish-out in the Canadian Arctic was used as substitute for developing age-at-lengths models (DeBeers 2015).

Length-at-age relationships for Arctic Char, Lake Trout, Round Whitefish, and Burbot were generated by fitting ages and corresponding lengths to a von Bertalanffy (1938) growth curve using the following equation:

$$l_a = L_\infty(1 - e^{-K(a-a_0)}) \qquad \text{Equation 4}$$

where a is age in years, l_a is length-at-age a, L_∞ is the asymptotic length at which growth rate is zero, K is a growth rate parameter, and a_0 is the age at which length would be zero. The mean length-at-age was estimated from the von Bertalanffy growth curve and converted to mean weight-at-age using the relationship between weight and length for each species. All curves were developed using the length-at-age analysis within the FAO-ICLARM Stock Assessment Tool (FiSAT II) (Gayanilo et al. 2005).

Biomass per age cohort for each species was then calculated by:

$$B_a = w_a * N_a \qquad \text{Equation 5}$$

where B_a is the biomass per age cohort a, w_a is the weight-at-age, and N_a is the abundance-at-age.

2.3 Results

2.3.1 Length-at-Age

Growth curves were fitted using the von Bertalanffy (1938) growth equation to assign length-at-age relationships for the four species per fish-out dataset. Convergence criteria was met for models using FiSAT II. The parameter coefficients for the curves for all species are presented in Table 3, and the equations for Arctic Char, Lake Trout, and Round Whitefish are illustrated in Figure 1. A visual comparison of growth curves suggests that Lake Trout (Figure 1B, E) grow slower than the other study species.

Table 3: Model Coefficients for the von Bertalanffy Growth Equation for the Length-at-Age Relationship

Species	Northwest Arm, Second Portage Lake			Bay-Goose Basin, Third Portage Lake		
	L_∞	K	t_0	L_∞	K	t_0
Arctic Char	662.3	0.13	0	1105	0.05	0
Lake Trout	1950[(a)]	0.02	0.04	629.6	0.08	0
Round Whitefish	447.1	0.16	1.35	444.8	0.16	0
Burbot[(b)]	1143	0.06	0.75	1143	0.06	0.75

Note: constraints for length-at-age 0 (t_0) parameter set at 0 to 10 mm, and maximum constraint for the asymptotic length parameter (L_∞) set at two-times maximum length for each species dataset

a) estimate equivalent to maximum parameter constraint;

b) the equation developed from data collected in Kennady Lake, NWT (DeBeers 2015) was applied to both fish-outs

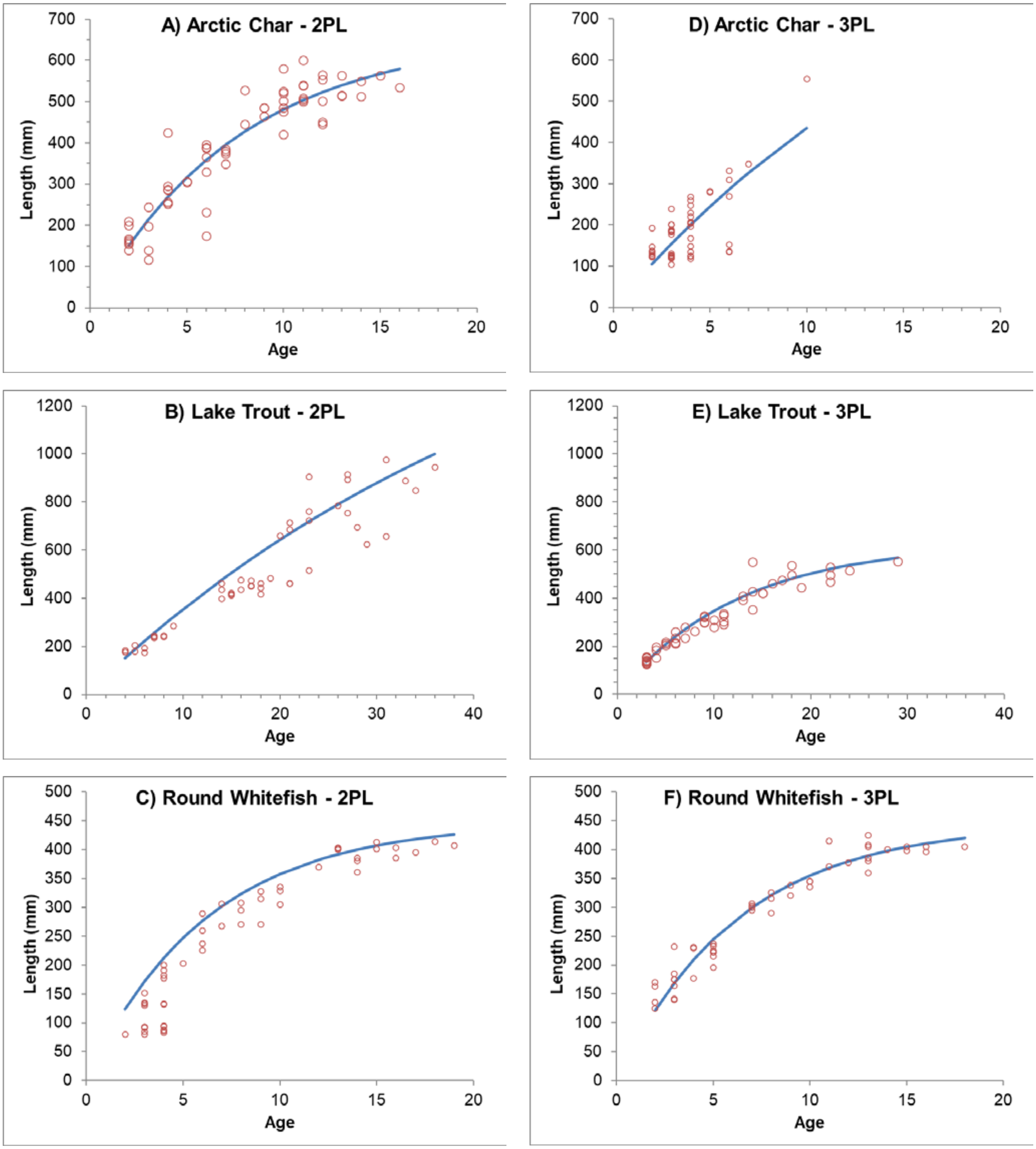

Figure 1: Plots of the Length-at-Age Relationship and von Bertalanffy Growth Equation by Species per Second Portage Lake (2PL; A to C) and Third Portage Lake (3PL; D to F)

2.3.2 Production per Age Cohort for the Northwest Arm, Second Portage Lake

The biomass production estimates in Tables 4 to 7 were summed across all ages and species to estimate total annual biomass production in the Northwest Arm of Second Portage Lake. The total estimated annual production was 242.76 kg/yr, most of which was production from the Lake Trout population (150 kg/yr), followed by Arctic Char (57.07 kg/yr), Burbot (24.25 kg/yr), and Round Whitefish (11.19 kg/yr). The resulting P:B ratio of total annual production (242.76 kg/yr) to standing stock biomass (1,123 kg) from the fish-out of the Northwest Arm of Second Portage Lake was calculated as 0.216:1. The estimated P:B ratio for Second Portage Lake was similar to that calculated using data from the fish-out of Kennady Lake, NWT, which was 0.21:1 (De Beers 2015).

Table 4: Arctic Char Productivity and Biomass Model Summary, 2008

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	1	0.00	0.0000	0.0000
1	81	5	0.01	4	0.02	1.9412	0.0402
2	152	36	0.24	115	4.15	1.0595	4.3920
3	214	104	0.11	53	5.51	0.7010	3.8635
4	269	210	0.09	45	9.43	0.5065	4.7777
5	317	348	0.04	20	6.96	0.3850	2.6785
6	359	511	0.04	18	9.20	0.3024	2.7831
7	396	692	0.09	42	29.05	0.2431	7.0631
8	428	882	0.08	40	35.29	0.1987	7.0116
9	457	1,076	0.09	45	48.42	0.1645	7.9657
10	482	1,268	0.07	36	45.66	0.1375	6.2809
11	504	1,455	0.06	27	39.30	0.1159	4.5551
12	523	1,634	0.03	15	24.52	0.0983	2.4100
13	540	1,803	0.02	10	18.03	0.0838	1.5112
14	555	1,961	0.02	8	15.69	0.0718	1.1256
15	568	2,107	0.01	3	6.32	0.0617	0.3897
16	580	2,241	0.00	1	2.24	0.0531	0.1191
17	590	2,363	0.00	0	0.00	0.0459	0.0000
18	599	2,474	0.00	1	2.47	0.0398	0.0984
19	606	2,574	0.00	0	0.00	0.0000	0.0000

Table 5: Lake Trout Productivity and Biomass Model Summary, 2008

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	0	0.00	0.0000	0.0000
1	39	1	0.00	1	0.00	2.0769	0.0012
2	76	5	0.00	7	0.03	1.2025	0.0381
3	114	15	0.16	319	4.80	0.8445	4.0576

Table 5: Lake Trout Productivity and Biomass Model Summary, 2008

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
4	150	35	0.10	202	7.08	0.6484	4.5903
5	186	67	0.19	381	25.54	0.5244	13.3919
6	221	113	0.14	275	31.14	0.4389	13.6668
7	255	176	0.11	216	37.94	0.3763	14.2750
8	288	256	0.05	107	27.38	0.3285	8.9942
9	321	355	0.05	95	33.76	0.2909	9.8197
10	353	475	0.04	72	34.22	0.2604	8.9124
11	385	617	0.03	64	39.47	0.2353	9.2868
12	416	780	0.05	94	73.35	0.2142	15.7116
13	446	967	0.05	92	88.94	0.1963	17.4548
14	476	1176	0.01	30	35.29	0.1808	6.3808
15	505	1409	0.00	8	11.28	0.1674	1.8872
16	534	1666	0.00	3	5.00	0.1556	0.7777
17	562	1947	0.00	1	1.95	0.1451	0.2825
18	590	2251	0.00	0	0.00	0.1358	0.0000
19	616	2578	0.00	2	5.16	0.1275	0.6575
20	643	2929	0.00	2	5.86	0.1200	0.7029
21	669	3302	0.00	4	13.21	0.1132	1.4952
22	694	3698	0.00	3	11.09	0.1070	1.1872
23	719	4116	0.00	3	12.35	0.1014	1.2514
24	743	4555	0.00	3	13.66	0.0962	1.3141
25	767	5015	0.00	5	25.07	0.0914	2.2918
26	791	5495	0.00	3	16.48	0.0870	1.4341
27	814	5994	0.00	2	11.99	0.0829	0.9942
28	836	6512	0.00	1	6.51	0.0792	0.5154
29	858	7049	0.00	5	35.24	0.0756	2.6655
30	880	7602	0.00	3	22.81	0.0724	1.6502
31	901	8173	0.00	4	32.69	0.0693	2.2651
32	922	8759	0.00	1	8.76	0.0664	0.5818
33	942	9361	0.00	2	18.72	0.0637	1.1930
34	962	9977	0.00	0	0.00	0.0612	0.0000
35	982	10606	0.00	1	10.61	0.0588	0.6237
36	1001	11249	0.00	0	0.00	0.0000	0.0000

Table 6: Round Whitefish Productivity and Biomass Model Summary, 2008

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	0	0.00	0.0000	0.0000
1	66	2	0.18	54	0.11	2.0463	0.2171
2	122	15	0.19	55	0.84	1.0982	0.9182
3	170	46	0.09	27	1.23	0.7142	0.8790
4	211	93	0.03	8	0.74	0.5068	0.3775
5	246	155	0.05	15	2.32	0.3782	0.8768
6	276	226	0.03	10	2.26	0.2914	0.6574
7	301	302	0.08	24	7.25	0.2296	1.6638
8	323	380	0.05	14	5.32	0.1839	0.9777
9	341	457	0.04	12	5.48	0.1490	0.8164
10	357	530	0.04	13	6.89	0.1219	0.8398
11	370	599	0.05	15	8.98	0.1005	0.9021
12	382	662	0.04	11	7.28	0.0833	0.6063
13	391	719	0.05	15	10.79	0.0694	0.7483
14	400	771	0.04	12	9.25	0.0580	0.5364
15	407	817	0.01	2	1.63	0.0486	0.0794
16	413	858	0.01	2	1.72	0.0409	0.0701
17	418	893	0.00	0	0.00	0.0344	0.0000
18	422	925	0.00	1	0.92	0.0291	0.0269
19	426	952	0.00	0	0.00	0.0000	0.0000

Table 7: Burbot Productivity and Biomass Model Summary, 2008

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	0	0.00	0.0000	0.0000
1	81	5	0.00	0	0.00	1.9412	0.0000
2	152	36	0.10	28	1.01	1.0595	1.0694
3	214	104	0.50	140	14.56	0.7010	10.2056
4	269	210	0.30	85	17.82	0.5065	9.0245
5	317	348	0.05	15	5.22	0.3850	2.0089
6	359	511	0.01	2	1.02	0.3024	0.3092
7	396	692	0.00	0	0.00	0.2431	0.0000
8	428	882	0.02	6	5.29	0.1987	1.0517
9	457	1076	0.00	1	1.08	0.1645	0.1770
10	482	1268	0.00	1	1.27	0.1375	0.1745
11	504	1455	0.00	0	0.00	0.1159	0.0000
12	523	1634	0.00	0	0.00	0.0983	0.0000
13	540	1803	0.00	0	0.00	0.0838	0.0000
14	555	1961	0.00	0	0.00	0.0718	0.0000
15	568	2107	0.00	1	2.11	0.0617	0.1299
16	580	2241	0.00	0	0.00	0.0000	0.0000

2.3.3 Production per Age Cohort for Bay-Goose Basin, Third Portage Lake

The biomass production estimates in Tables 8 to 11 were summed across all ages and species to estimate total annual biomass production in the Bay-Goose Basin of Third Portage Lake. The total estimated annual production was 78.73 kg/yr. By species, annual production for Arctic Char was 26.36 kg/yr, Lake Trout was 22.43 kg/yr, Round Whitefish was 16.67 kg/yr, and Burbot was 13.27 kg/yr. The resulting P:B ratio of total annual production (78.73 kg/yr) to standing stock biomass from the fish-out of Bay-Goose Basin of Third Portage Lake (273 kg) was 0.288. The P:B ratio for Third Portage Lake was approximately 33% higher than the ratio for Second Portage Lake.

Table 8: Arctic Char Productivity and Biomass Model Summary, 2010

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	0	0.00	0.0000	0.0000
1	54	2	0.00	1	0.00	1.8784	0.0041
2	105	14	0.35	272	3.85	1.0706	4.1265
3	154	41	0.35	269	11.12	0.7402	8.2305
4	200	87	0.18	136	11.79	0.5594	6.5928
5	244	152	0.08	60	9.10	0.4453	4.0508
6	286	237	0.03	24	5.68	0.3667	2.0829
7	326	342	0.01	6	2.05	0.3094	0.6339
8	364	465	0.00	2	0.93	0.2657	0.2472
9	400	607	0.00	0	0.00	0.2314	0.0000
10	435	765	0.00	0	0.00	0.2037	0.0000
11	467	938	0.00	0	0.00	0.1809	0.0000
12	499	1124	0.00	0	0.00	0.1619	0.0000
13	528	1321	0.00	1	1.32	0.1458	0.1927
14	556	1529	0.00	1	1.53	0.1320	0.2018
15	583	1744	0.00	0	0.00	0.0000	0.0000

Table 9: Lake Trout Productivity and Biomass Model Summary, 2010

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	0	0.00	0.0000	0.0000
1	48	1	0.00	1	0.00	1.8768	0.0027
2	93	10	0.03	17	0.16	1.0527	0.1712
3	134	27	0.27	164	4.49	0.7162	3.2190
4	172	56	0.27	164	9.20	0.5325	4.8983
5	208	96	0.14	86	8.22	0.4169	3.4247
6	240	145	0.10	62	8.99	0.3375	3.0330
7	270	203	0.05	28	5.69	0.2798	1.5916
8	298	269	0.04	25	6.72	0.2361	1.5864
9	323	340	0.02	12	4.08	0.2020	0.8248
10	347	416	0.01	9	3.75	0.1746	0.6545
11	368	496	0.00	0	0.00	0.1523	0.0000
12	388	577	0.00	2	1.15	0.1337	0.1545
13	407	660	0.01	7	4.62	0.1182	0.5460
14	424	743	0.01	6	4.46	0.1049	0.4677
15	440	825	0.00	3	2.48	0.0936	0.2316

Table 9: Lake Trout Productivity and Biomass Model Summary, 2010

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
16	455	906	0.00	1	0.91	0.0837	0.0759
17	468	985	0.01	7	6.90	0.0752	0.5186
18	480	1062	0.00	0	0.00	0.0677	0.0000
19	492	1137	0.00	3	3.41	0.0611	0.2084
20	502	1208	0.00	0	0.00	0.0553	0.0000
21	512	1277	0.00	2	2.55	0.0501	0.1280
22	521	1342	0.00	1	1.34	0.0455	0.0611
23	530	1405	0.00	1	1.40	0.0414	0.0581
24	537	1464	0.00	2	2.93	0.0377	0.1103
25	544	1520	0.00	0	0.00	0.0343	0.0000
26	551	1574	0.01	5	7.87	0.0313	0.2465
27	557	1624	0.00	0	0.00	0.0286	0.0000
28	563	1671	0.00	0	0.00	0.0262	0.0000
29	568	1715	0.00	2	3.43	0.0239	0.0821
30	572	1757	0.00	0	0.00	0.0219	0.0000
31	577	1796	0.00	1	1.80	0.0201	0.0361
32	581	1832	0.00	0	0.00	0.0184	0.0000
33	585	1866	0.00	0	0.00	0.0169	0.0000
34	588	1898	0.00	0	0.00	0.0155	0.0000
35	591	1928	0.00	0	0.00	0.0143	0.0000
36	594	1955	0.00	1	1.96	0.0131	0.0256
37	597	1981	0.00	3	5.94	0.0120	0.0715
38	599	2005	0.00	0	0.00	0.0000	0.0000

Table 10: Round Whitefish Productivity and Biomass Model Summary, 2010

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	0	0.00	0.0000	0.0000
1	66	2	0.13	66	0.15	1.9600	0.2972
2	122	16	0.29	145	2.36	1.0519	2.4873
3	170	47	0.16	83	3.88	0.6840	2.6509
4	210	93	0.07	37	3.42	0.4855	1.6621
5	245	150	0.04	21	3.16	0.3622	1.1437
6	274	216	0.01	4	0.86	0.2791	0.2412
7	300	286	0.05	25	7.14	0.2199	1.5699
8	321	356	0.06	30	10.67	0.1761	1.8796
9	339	424	0.06	29	12.30	0.1427	1.7563
10	355	489	0.03	15	7.34	0.1168	0.8572
11	368	550	0.02	12	6.60	0.0962	0.6351
12	380	606	0.03	13	7.87	0.0798	0.6279
13	389	656	0.02	8	5.25	0.0664	0.3485
14	397	701	0.01	7	4.91	0.0555	0.2724
15	404	741	0.01	4	2.96	0.0466	0.1380
16	410	776	0.00	1	0.78	0.0392	0.0304
17	415	807	0.00	2	1.61	0.0330	0.0533
18	420	834	0.00	0	0.00	0.0278	0.0000
19	424	858	0.00	1	0.86	0.0235	0.0202
20	427	878	0.00	0	0.00	0.0000	0.0000

Table 11: Burbot Productivity and Biomass Model Summary, 2010

Age	Length at Age (mm; L_a)	Weight at Age (g; W_a)	Proportion of Population	Population at Age (N_a)	Biomass at Age (kg; B_a)	Growth Rate at Age (G_a)	Production at Age (kg/yr)
0	0	0	0.00	0	0.00	0.0000	0.0000
1	54	2	0.00	0	0.00	1.8784	0.0000
2	105	14	0.03	6	0.09	1.0706	0.0910
3	154	41	0.19	46	1.90	0.7402	1.4075
4	200	87	0.44	105	9.10	0.5594	5.0900
5	244	152	0.20	47	7.13	0.4453	3.1731
6	286	237	0.08	19	4.50	0.3667	1.6490
7	326	342	0.01	3	1.02	0.3094	0.3169
8	364	465	0.01	3	1.40	0.2657	0.3709
9	400	607	0.01	3	1.82	0.2314	0.4212
10	435	765	0.00	1	0.76	0.2037	0.1558
11	467	938	0.00	0	0.00	0.1809	0.0000
12	499	1124	0.00	0	0.00	0.1619	0.0000
13	528	1321	0.01	2	2.64	0.1458	0.3854
14	556	1529	0.00	0	0.00	0.1320	0.0000
15	583	1744	0.00	1	1.74	0.1201	0.2095
16	609	1967	0.00	0	0.00	0.0000	0.0000

3.0 ACCOUNTING SUMMARY

The reported biomass results from the two fish outs, combined with the new results from the production-at-age estimation per species and fish-out catch are intended to provide supporting documentation to advance the Meadowbank NNLP. The main assumptions underlying calculations for the NNLP accounting update are the following:

- The estimated biomass losses for Second Portage Lake reflect only the proportion of the Northwest Arm that is intersected by the footprint of Main Mine Site (i.e., excludes the Tailings Storage Facility); this proportion was conservatively assumed as the proportion of total habitat units (HUs) affected by the Main Mine Site in the Northwest Arm (i.e., 41.4%; Agnico Eagle 2019)
- The estimated biomass losses for Third Portage Lake conservatively reflects the total loss measured from the Bay-Goose Basin including all fish captured during the fish-out even though over half the fish catch was successfully rescued and live transferred to the main basin of Third Portage Lake (North/South 2011)

In summary, annual losses incurred by the Main Mine Site were measured by a rate of 100.5 kg/yr in Second Portage Lake (41.4% of total production lost in the Northwest Arm), and by a rate of 78.7 kg/yr in Third Portage Lake, which together generate a combined rate of loss over time at 179.2 kg/yr. With the application of the combined rate of production loss to a predetermined ratio of offsetting gains to losses that is greater than one (Agnico Eagle 2019), the recommended target for an offsetting measure would be to generate a minimum of 179.2 kg/yr within the reference years to be defined for the Meadowbank NNLP. For comparison, the fish production generated from one year of successful spawning from one spawning cohort on the previously installed spawning pads at the R02 watercourse crossing may provide a minimum gain of 403.0 kg of biomass (Golder 2020).

4.0 CLOSURE

This technical memorandum was prepared and reviewed by the undersigned.

Golder Associates Ltd.

Cam Stevens, MSc, PhD	Kasey Clipperton, MEDes, PBiol
Associate, Aquatic Biologist	*Principal, Fisheries Biologist*

CS/KC/pls

https://golderassociates.sharepoint.com/sites/128909/project files/5 technical work/20145113-489-tm-meadowbanknnlplosscalculation-revb.docx

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APPENDIX C

Design Report on R02 Fisheries Habitat Compensation Design (Golder, 2007)

Golder Associates Ltd.

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Telephone 604-296-4200
Fax 604-298-5253

DESIGN REPORT ON

R02 Fisheries Habitat Compensation Design
All Weather Private Access Road
Meadowbank Gold Project
Nunavut

Submitted to:
Agnico Eagle Mines Ltd.
Suite 950 One Bentall Centre
Vancouver, BC
V7X 1M4

DISTRIBUTION:

2 Copies : Meadowbank Mining Corp.
2 Copies : Golder Associates Ltd.

September 14, 2007 07-1413-0047

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1.0 INTRODUCTION

The purpose of this report is to provide detailed design guidelines for fish habitat compensation at crossing R02 of the All-Weather Private Access Road (AWPAR), Meadowbank Gold Project, Nunavut. Figure 1 and 2 show the Project location and the R02 site location, respectively.

The habitat compensation design was developed in reference to the biophysical requirements of Arctic grayling for spawning, rearing and foraging provided by Azimuth (2007a) in their technical memorandum dated July 11, 2007 and included as Appendix A. The design and accompanying construction notes detail the compensatory work aimed at modifying or replacing low to moderate value habitat and creating high value spawning habitat for Arctic grayling.

The detailed design presented herein was prepared based on limited understanding of the geotechnical conditions at the site. Actual site conditions (e.g., depth to bedrock, soil characteristics and properties) may vary and field-fitting may be required during construction.

2.0 SITE DESCRIPTION

The proposed habitat compensation works at crossing R02 are intended to provide high value habitats covering an area of 5,600 m^2. Azimuth (2007a) recommended that the fish habitat compensation design focus on the creation of spawning habitat, with some minor alterations to channel substrates and flow conditions for the creation of rearing pools.

Two potential habitat compensation areas (COA and COB) were identified by Azimuth (2007), while a third (COC) was identified during site visit by Golder Associates Ltd. (Golder) on August 18, and 19, 2007 (Golder, 2007a; included as Appendix B). The following sections summarize the habitat characteristics and hydrological conditions of the three areas as compiled from Azimuth's technical memorandum and observations made by Golder during the site visit (Golder, 2007a).

2.1 Habitat Characteristics for COA

COA is located downstream of the Golder staff gauge in a southern side channel, upstream of the bridge crossing R02 (see Figure 3). This area is described as having a moderate to high habitat value by Azimuth (2007a).

COA is characterized by boulder and cobble substrates, with pockets of spawning gravel and side pools for rearing. The D_{50} (median diameter) for this area is approximately 300 mm based on limited pebble count data (Golder, 2007a).

2.2 Habitat Characteristics for COB

COB is located in an area opposite to the Golder staff gauge (see Figure 3). This area is described as low to moderate habitat by Azimuth (2007a). The D_{50} for this area is 140 mm and the substrate is characterized by the presence of boulders and cobbles.

The creation of high value spawning habitat at COB is considered to provide greater potential return for compensation in comparison with COA.

2.3 Habitat Characteristics for COC

COC is located next to the Golder staff gauge on the channel right bank (looking downstream), opposite COB (see Figure 3). It is currently low-lying marsh land and rock. This area is submerged during flood events.

It is anticipated that the excavation in this area would provide moderate value off-channel rearing habitat; however, with the presence of the relatively large off-channel pond along the existing channel alignment (Figure 3), rearing habitat is not considered to be limiting within the reach. Furthermore, while COC may be subject to flowing water during the spawning period, there would be the potential for sediment infilling during flood recession. Some blasting would likely be required to excavate in this area.

3.0 FISH HABITAT COMPENSATION DESIGN

The fish habitat compensation design presented in Figures 1 to 6 is focused on the construction of spawning habitat at COB due to its potential higher rate of return for habitat improvements (Golder, 2007a). The works are to be constructed in winter in order to minimize the disturbance to the channel and surrounding tundra, and limit the potential release of sediment or sediment-laden water downstream.

Figure 4 shows the proposed habitat compensation layout at COB. The design consists of two types of compensation features: berms and pads. These features are intended to provide appropriate flow velocities and substrate conditions to generate moderate to high value rearing and spawning habitat over a range of flow conditions.

The construction of a series of berms is intended to provide moderate to high value rearing habitat throughout COB. The berm structures (see Figures 4 and 5) are expected to deflect high flow velocities toward the center and opposite side of the channel, dissipate peak flow energy and provide low velocities for fish rearing and foraging within the COB area. The berms also provide protection from scour during ice break up and over the expected range of flows.

High value spawning habitat would be created through the construction of several spawning pads along the length of COB. Specifically, existing channel bed substrate within the pad areas is to be removed and replaced with a mixture of 90% spawning gravel and 10% cobble. The pads are to be offset from one another and oriented facing upstream to create rearing pools and low flow areas within the pads. The offset pads positioning and upstream orientation also provides opportunities for deposition of gravel scoured from an upstream pad within a pad located downstream.

The typical spawning pad design, positioning and orientation within COB are shown in Figures 4 and 5. The pads are intended provide a minimum of 0.122 ha of total spawning habitat area. As detailed in Figure 4, different options are available with respect to the number of pads and their size depending on the construction material available at the site. Table 1 presents several options for spawning pad size and quantity. Other options are also possible providing total spawning pad area meets or exceeds 0.122 ha.

Table 1. Options for Spawning Pad Design

Spawning Pad Size	Spawning Pads Required	Estimated Total Area (ha)
6 m wide by 5 m long	41	0.123
10 m wide by 5 m long	25	0.125
12 m wide by 9 m long	12	0.130

Note: Refer to Figure 5 for spawning pad design details.

3.1 Construction Notes

General construction notes for the R02 fish habitat compensation design are provided in Figure 6. Biophysical requirements for Arctic grayling for spawning, rearing and foraging are provided in Azimuth (2007a), which is included as Appendix A.

3.2 Construction Quantities

The estimated quantities of rounded or sub-rounded stones or river rocks (D>300 mm) for each of the berms are summarized in Table 2. Table 3 provides the estimated spawning substrate and pad wall quantities required for each of the spawning pad configuration options presented in Table 1.

Table 2. Estimated Berm Quantities

Total Estimated Berm Volume (m^3)	
Berm 1	30
Berm 2	40
Berm 3	40
Berm 4	45

Table 3. Estimated Spawning Pad Quantities

Spawning Pad Size	Total Estimated Volume (m^3)	
	Spawning substrate	Pad walls
6 m wide by 5 m long (41 pads)	370	165
10 m wide by 5 m long (25 pads)	375	125
12 m wide by 9 m long (12 pads)	390	90

Note: Refer to Figure 5 for spawning pad design details.

4.0 HYDRAULIC ASSESSMENT

The R02 fish habitat compensation works are intended to provide high value habitat during the spawning, rearing and foraging period, which spans approximately from the start of spring freshet to late July. This section presents the typical hydraulic characteristics of the stream at R02 anticipated during that period.

A peak flow estimate of 96.7 m^3/s (Golder, 2007b) was assumed for design. Due to a lack of site specific and regional meteorologic and hydrometric data for the study area, the peak flow estimate was determined based on regional peak unit discharge rate reported by AMEC (2003). A preliminary hydraulic review of the peak flow rates proposed for crossing R02 was completed in November 2006 (Golder, 2006), and based on that review, it was concluded that the peak flow estimate was adequate for design given the limited site-specific data. It was strongly recommended, however, that peak flow estimates continue to be re-evaluated as additional site specific watercourse monitoring data become available.

Estimated average flow velocities and water levels associated with the peak design flow were used in the design of the fish habitat compensation works. The average stream flow velocities and water levels were estimated assuming steady flow analysis using the Hydrological Engineering Center River Analysis System (HEC-RAS) software package developed by the US Army Corps of Engineers. It should be noted that HEC-RAS is a one-dimensional analysis package, and as such, produces average cross-sectional estimates of flow characteristics. Variations in flow velocity with depth and across the cross-section cannot be estimated. Nevertheless, the model results do provide an indication of average flow characteristics expected within the compensation area at the design discharge.

The estimated average water level within COB at the peak design flow rate is approximately 68.5 metres above sea level (masl), corresponding to average cross-sectional maximum flow depth of 0.95 m, and an average cross-sectional flow velocity of 0.91 m/s. While these values exceed the values recommended by Azimuth (2007) (i.e., velocities < 0.2 m/s and water depth < 0.4 m), they do fall within the range of biophysical conditions for spawning reported in the literature (see Table 1). It should also be noted that local hydraulic characteristics will likely vary from the estimated cross-sectional average values, and as such, the construction of the proposed berms and spawning pads are expected to create adequate hydraulic habitat conditions over varying discharges.

As discussed in Section 6.0, the habitat function of the works once constructed will be monitored and adaptively managed .

5.0 ESTIMATED HABITAT COMPENSATION GAIN

The proposed habitat compensation works at COB have been designed to exceed the AWPAR DFO Authorization requirement to create 0.80 habitat units (HU) or a net habitat gain of approximately 0.27 HU above the estimated HU loss resulting from the AWPAR bridge installations (0.53 HU; Cumberland, 2006).

The surface area of COB is estimated at 0.56 ha. Existing habitat within COB is classified as low to moderate habitat (Azimuth, 2007a), with the extent of each roughly split equally within the reach (G. Mann, pers. comm.).

The proposed habitat enhancement is expected to create high value rearing and spawning habitat throughout COB. However, if it is conservatively assumed the existing habitat will be replaced with only 0.122 ha of high value habitat (ie. Spawning pad area) while the remaining 0.41 ha (total remaining area less berm footprints) will be moderate habitat, the corresponding COB habitat would be approximately 1.69 HU based on a Habitat Sustainability Index of 9.34 HU/ha, 5.01 HU/ha and 0.43 HU/ha for high, medium and low value habitats, respectively (Cumberland 2006). This would correspond to a net habitat gain (COB HU gain less AWPAR HU loss) of 1.16 HU, roughly four times the Authorization requirement of 0.27 HU, and a compensation to loss ratio of approximately 3 to 1.

6.0 MAINTENANCE AND MONITORING

Natural adjustments to the proposed fish habitat compensation works by fluvial processes are expected following construction, and these adjustments may be beneficial to habitat function and stability over the long-term.

For the purposes of this design, it has been assumed that the habitat function and stability (including channel bed and bank erosion) of the works will be monitored and adaptively managed following the detailed monitoring and maintenance programs presented in:

- *Meadowbank Gold Project Aquatics Effects Management Program (AEMP)* (Cumberland, 2005);
- *Meadowbank Gold Project No-Net-Loss Plan (NNLP)* (Cumberland, 2006);
- *Monitoring Plan for Meadowbank Project All-Weather Private Access Road (AWPAR) HADD Crossings for Condition 5 of Authorization NU-03-0190 (2)* (Azimuth, 2007b); and,
- *Report on All-Weather Private Access Road Stream Crossings, Meadowbank Gold Project, Nunavut* (Golder, 2007b).

7.0 CLOSING

We trust the information contained in this document meets your requirements at this time. Should you have any questions relating to the above, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED BY

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YAA/DRW/lw

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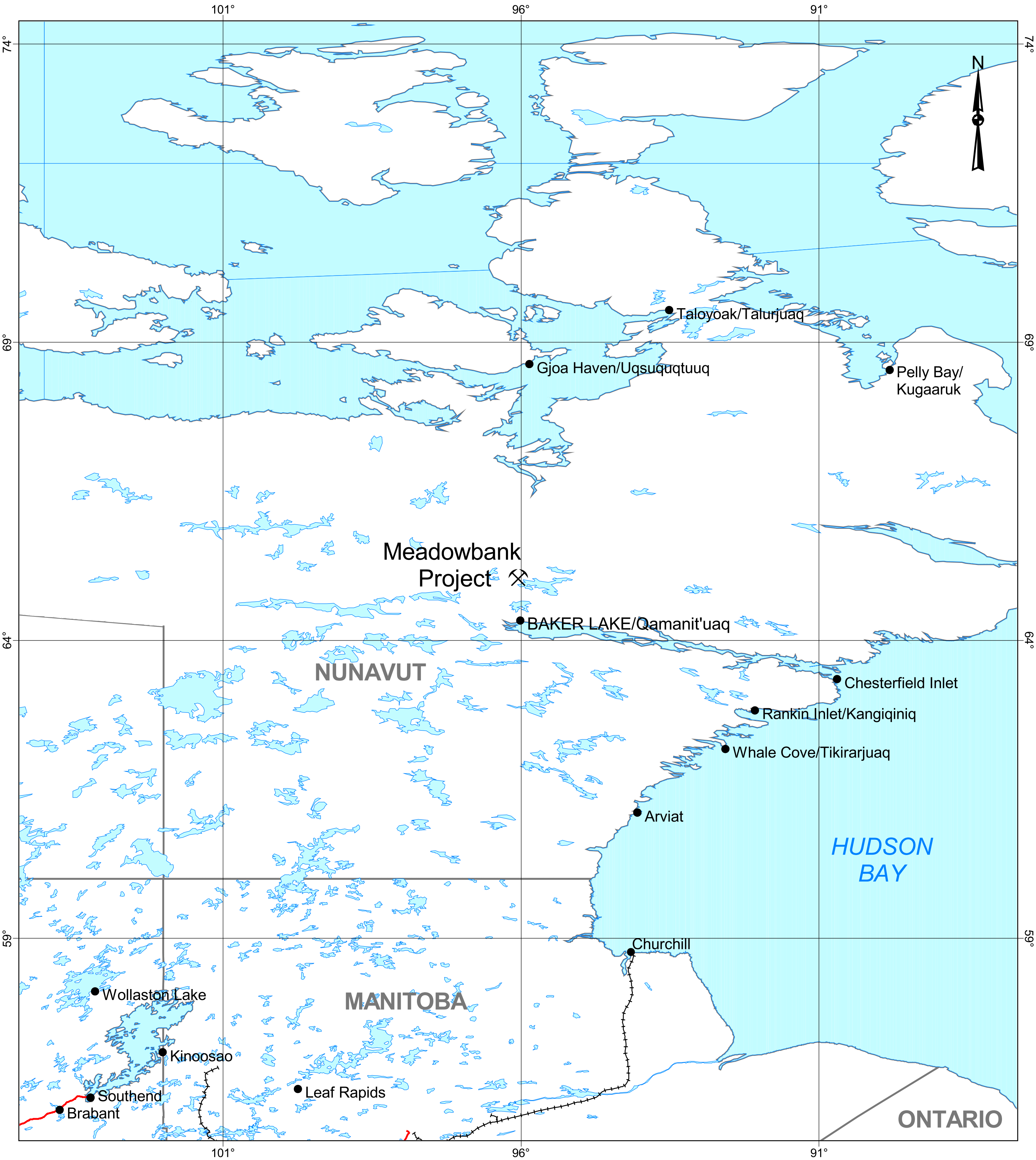

LEGEND

- Meadowbank Project
- Town/Village
- Provincial Border
- Water
- Primary Highway
- Railroad

REFERENCE
Base digital data obtained from ESRI Inc.,
DATUM: WGS84 PROJECTION: Geographic

PROJECT
MEADOWBANK
MINING CORPORATION

TITLE
MEADOWBANK PROJECT
LOCATION PLAN

Golder Associates

PROJECT No. 07-1413-0047			SCALE AS SHOWN	REV. 0
DESIGN	CJC	09 Mar. 2007		
GIS	CDB	09 Mar. 2007	**FIGURE 1**	
CHECK				
REVIEW				

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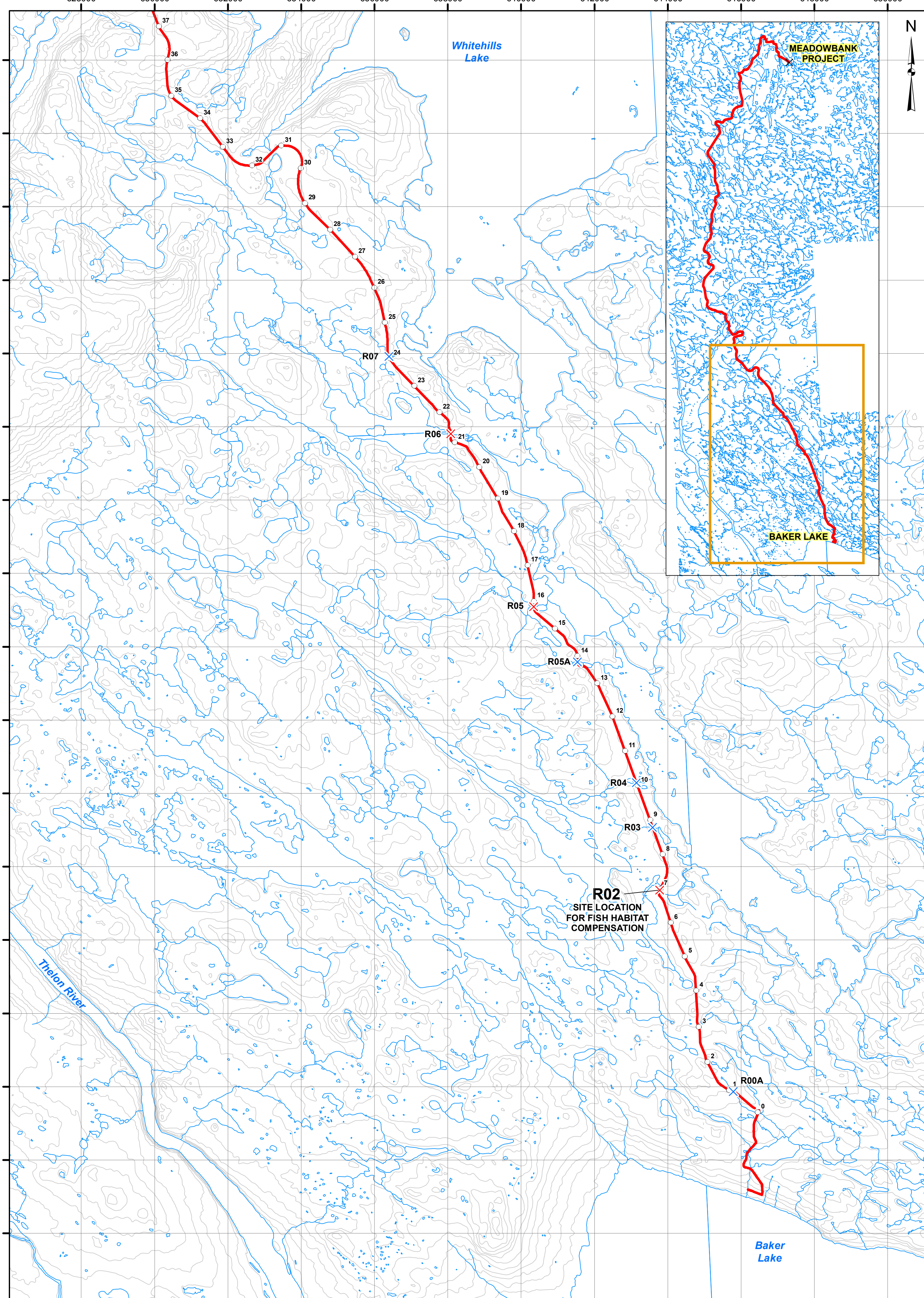

LEGEND

- Meadowbank Project
- Kilometre Marker
- Proposed Route
- Watercourse
- Waterbody
- Contour (10 m interval)
- Watershed Boundary
- Stream Crossing (30 m bridge)
- Stream Crossing (12 m bridge)
- Stream Crossing (multiple culverts at bottom)
- Stream Crossing (single culvert at bottom)

REFERENCE

Cumberland Resources Ltd.
Datum: NAD 83 Projection: UTM Zone 14

2,000 1,000 0 2,000 Metres
Scale - 1:100,000

PROJECT

MEADOWBANK MINING CORPORATION

TITLE

ALL-WEATHER PRIVATE ACCESS ROAD
R02 STREAM CROSSING LOCATION

PROJECT No. 07-1413-0047			SCALE AS SHOWN	REV. 0
DESIGN	JH	21 Nov. 2006	FIGURE 2	
GIS	CDB	24 Aug. 2007		
CHECK				
REVIEW				

Golder Associates
Burnaby, B.C.

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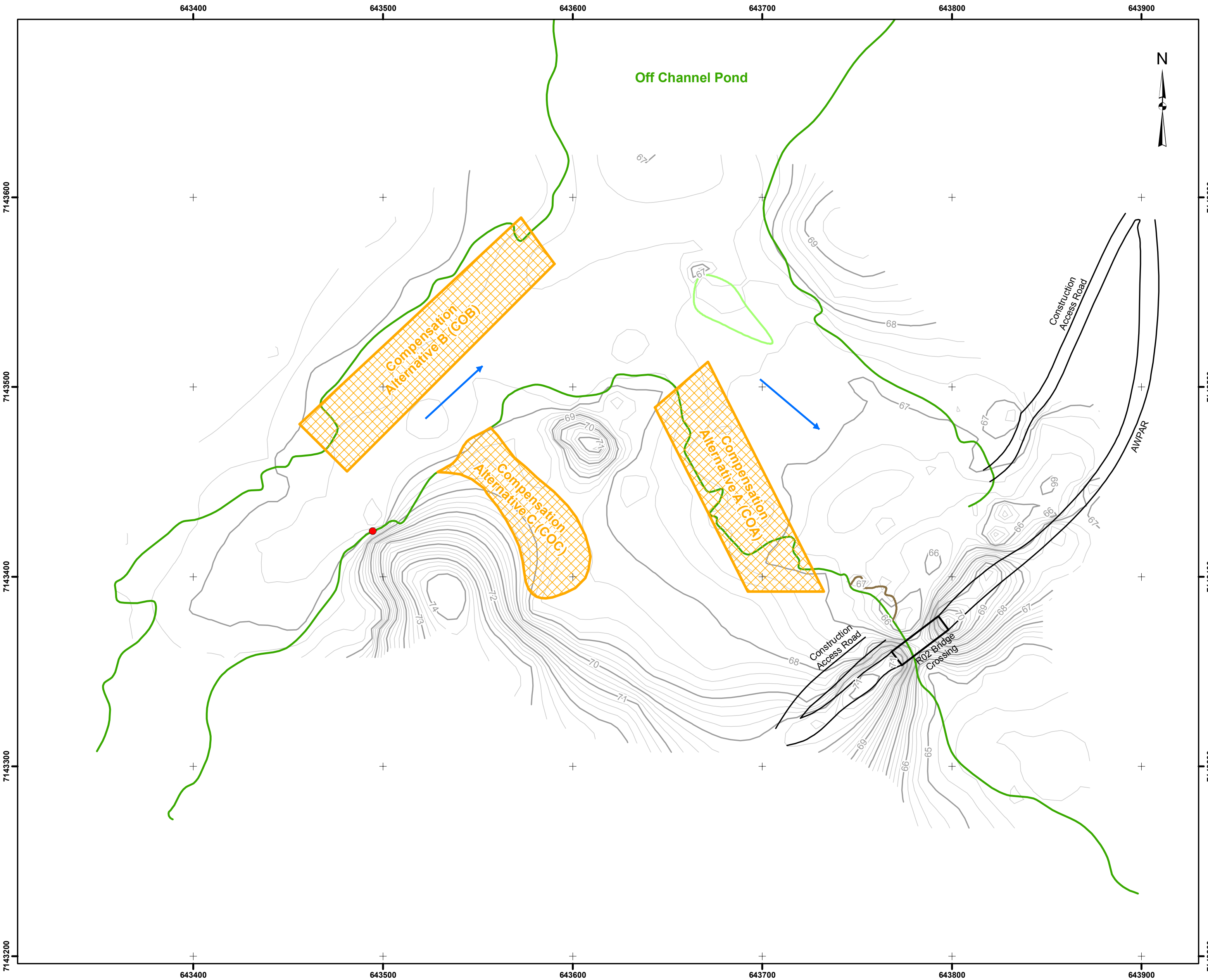

LEGEND

- R02 Staff Gauge
- Fish Habitat Compensation Area
- Bridge
- Road
- Grass Patch
- Turf Island
- Vegetation Limit

Contour
- Index (1 m interval)
- Intermediate (0.25 m interval)

NOTE

Vegetation limits modified from survey based on field observations.

REFERENCE

Projection: Transverse Mercator   Datum: NAD 83   Coordinate System: UTM Zone 14

40   0   40

SCALE 1:2,000   METRES

PROJECT

MEADOWBANK MINING CORPORATION

TITLE

R02 SITE PLAN SHOWING PROPOSED FISH HABITAT COMPENSATION AREAS

Golder Associates
Burnaby, B.C.

PROJECT No. 07-1413-0047			SCALE AS SHOWN	REV. 0
DESIGN	DW	02 Aug. 2007	FIGURE 3	
GIS	CDB	24 Aug. 2007		
CHECK				
REVIEW				

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Coordinates Table for COB Area

Corner of COB area	Northing	Easting
A – NW on Shore	643455	7143480
B – SW Mid Stream	643481	7143455
C – NE on Shore	643573	7143589
D – SE Mid Stream	643590	7143565

Total Estimated Volume for Berms

Berm 1	30 m^3
Berm 2	40 m^3
Berm 3	40 m^3
Berm 4	45 m^3

Total Estimated Volumes for Three Spawning Pad Options

Spawning Pad Size	Spawning substrate	Pad walls
6 m wide by 5 m long (41 pads) Shown on Figure 5	370 m^3	165 m^3
10 m wide by 5 m long (25 pads)	375 m^3	125 m^3
12 m wide by 9 m long (12 pads)	390 m^3	90 m^3

NOTES

1. Field Conditions may vary from shown.
2. Berm crest elevation shall be at approximately elevation 68.5m asl.

REFERENCES

Survey date: Golder Associates Ltd., July 18-20, 2007.
NAD 83 UTM Zone 14.

PROJECT
MEADOWBANK
MINING CORPORATION

TITLE
COB AREA - PLAN LAYOUT
R02 FISHERIES HABITAT COMPENSATION

Golder Associates

PROJECT No. 07-1413-0047			FILE No. 0714130047-5200-A_1	
DESIGN	DW	07SEP07	SCALE AS SHOWN	REV. 0
CADD	MJH	07SEP07		
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REVIEW				

FIGURE 4

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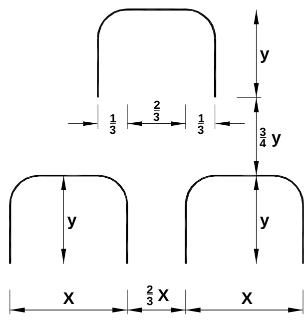
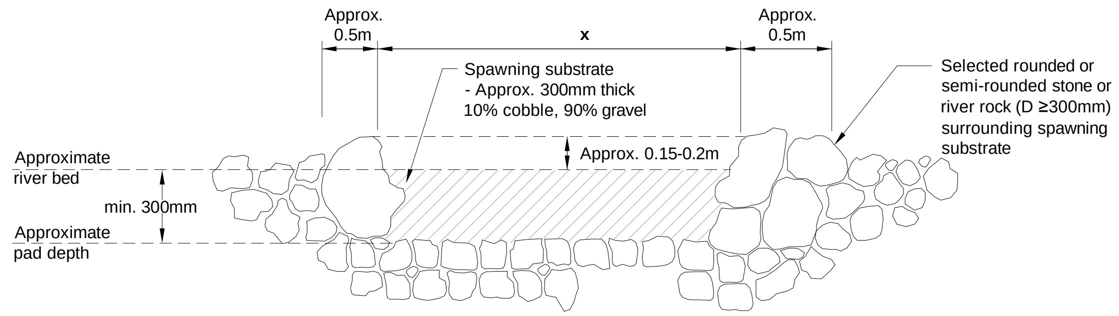


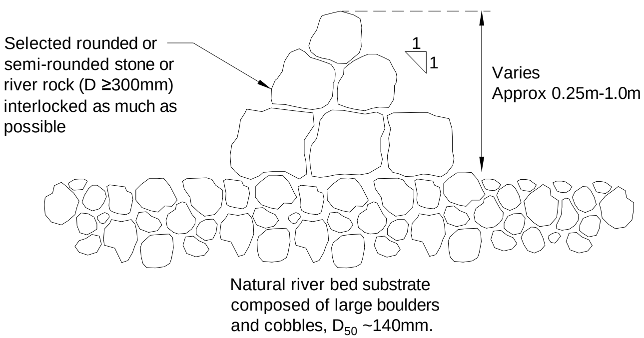
1 TYPICAL PAD OFFSET

NOTES

1. Pads are dug approx. 300mm into river bed.
2. Pad wall shall be large rounded or semi-rounded stone or river rock having a D ≥300mm.
3. The spawning substrate layer shall be min. 300mm thick.
4. Pad walls shall extend approx. 200mm above gravel surface.
5. Pad length is calculated in "**y**" and pad width in "**x**".



2 TYPICAL PAD CROSS-SECTION



3 TYPICAL BERM CROSS-SECTION

NOTES

1. Crest of berm shall be approximately at elevation 68.5m.
2. Berm material shall be composed of locally sourced boulders or large rocks of size D ≥300mm.
3. Berms side slope approx. 1H:1V.

PROJECT
MEADOWBANK
MINING CORPORATION

TITLE
TYPICAL BERM AND PAD CROSS-SECTIONS R02 FISHERIES HABITAT COMPENSATION

Golder Associates

PROJECT No. 07-1413-0047			FILE No.	0714130047-5200-A_2
DESIGN	DW	07SEP07	SCALE N.T.S.	REV. 0
CADD	MJH	07SEP07		
CHECK			**FIGURE 5**	
REVIEW				

CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0047\Drafting\5200\0714130047-5200-A_2.dwg By: MHinlay REVISION DATE: 07/09/13 10:45AM

Construction Notes

Access to Site: shall be through the already built AWPAR. A temporary access road will be required to connect the AWPAR to the proposed compensation areas. All traffic on and off of the site shall be restricted to stabilized construction entrances/exits to minimize disturbance to the tundra. Traffic within the site shall also be limited to stabilized construction roads.

Construction Window: Instream work shall occur between fall freeze-up and spring freshet (approximately mid October to mid May). Instream work and channel bed disruptions shall not occur during the active spawning, rearing and foraging window (spring freshet to July 31). Instream work should also be coordinated to minimize the duration of instream work. A qualified environmental monitor shall be on site at all times during construction.

Sediment and Erosion Control: All work shall be conducted in such a manner that will prevent the release of sediment or sediment-laden water into the channel. Provisions shall be made for monitoring, maintaining and repairing sediment and erosion control measures implemented on-site until completion of the compensation work. General sediment and erosion control practices applicable to the prevailing site conditions during the construction period include:

1. Construction activities within the channel areas shall be kept to a practical minimum and shall be completed in the dry where practical.
2. Any required stockpiles of materials shall be located away from watercourses and stabilized against erosion as soon as possible by temporarily covering with a geotextile or by placement of a perimeter sediment control structure.
3. Disturbed areas shall be minimized as much as possible.
4. Any disturbed soils and slopes within or near the channels shall be stabilized when possible with a permanent covering of clean shot rock underlain by geotextile to prevent loss of fines.
5. Silt fencing shall be placed along the edges of all areas where soils are disturbed or material is stockpiled, until completion of all compensation works. Silt fences shall follow the contour as much as possible and shall be removed upon completion of works.
6. Eroded sediments shall be contained on site with additional erosion and sediment control structures as required.
7. Upon completion of construction, all accumulated sediment, debris and work related material shall be removed for proper disposal in completed borrow pits.
8. During periods of moderate to heavy precipitation, work may need to be altered or shut down as necessary to avoid silting of the channel and receiving environment.
9. Regular construction site inspections shall be conducted to determine compliance with the above protocols.

Berm Construction: shall be positioned from the estimated water shoreline towards the middle of the stream, stopping at the edge of the COB area. The berms shall be angled by approximately 30° to the length of the COB area. The berm crest shall be at approximately 68.5 masl. Berm side slope shall be approximately 1 Horizontal :1 Vertical

Berm material: shall be composed of locally found rounded or subrounded stones or river rocks of diameter greater than or equal to 300 mm. Berm material shall be placed directly on the river bed substrate in a manner to minimize the release of suspended sediments.

Spawning Pad Construction: The spawning pads shall provide a total habitat area of 0.122 ha. Pad number and plan size may vary (see Figure 4). Pad construction shall involve replacing minimum 300 mm depth of existing river substrate with a spawning gravel pad surrounded by a wall of large river rocks. The elevation of the pad wall shall extend approximately 200 mm above the river bed. The spawning substrate top elevation shall coincide with the existing river bed such that adequate water depths and velocities are maintained within the pads during the active spawning, rearing and foraging window (spring freshet to July 31). The spawning substrate shall have a minimum thickness of 300 mm. The pad shape shall resemble that of a horseshoe or a U, with the opening facing upstream. The pads shall be placed offset from one another, spaced laterally by a distance equivalent to approximately 2/3 of their width, and longitudinally by a distance of approximately 3/4 of their length.

Spawning Pad material: The pad wall shall consist of locally found and selected rounded or subrounded stones or river rocks of diameter greater than or equal to 300 mm placed along the pad periphery. The spawning substrate layer shall consist of a mix of approximately 90% gravel (clean, 50 mm minus, found locally or imported) and 10% cobble (100 mm minus, found locally). Spawning gravel substrate gradation shall general comply with the following gradation: 10% passing 10 mm, 30% passing 17.5 mm, 50% passing 25 mm, 70% passing 35 mm, and 90% passing 50 mm. The spawning substrate shall be free of all rocks, stones, sticks, roots, sharp objects or debris of any kind. Spreading of the spawning substrate layer shall be done horizontally across the pad.

Estimated Quantities: for berms, and spawning pad substrate and walls are provided on Figure 4.

PROJECT
MEADOWBANK
MINING CORPORATION

TITLE
CONSTRUCTION NOTES
R02 FISHERIES HABITAT COMPENSATION

Golder Associates

PROJECT No. 07-1413-0047			FILE No. 0714130047-5200-A_3	
DESIGN	DW	07SEP07	SCALE 1:750	REV. 0
CADD	MJH	07SEP07		
CHECK			**FIGURE 6**	
REVIEW				

REVISION DATE: 07/09/14 08:56AM By: MHinkley CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0047\Drafting\5200\0714130047-5200-A_3.dwg

APPENDIX A

FISHERIES CRITERIA FOR HABITAT COMPENSATION IN SUPPORT OF HYDROLOGICAL ASSESSMENT AT R02

Technical Memorandum

Date: 11 July 2007

To: **Dan Walker, Golder Associates**

Cc: **Louise Grondin (Meadowbank Mining Corp.)**

From: **Gary Mann and Ryan VanEngen (Minnow)**

RE: **Fisheries Criteria for Habitat Compensation in Support of Hydrological Assessment at R02**

Overview

The DFO Authorization for the All Weather Private Access Road (AWPAR) requires the detailed design of fish habitat compensation at crossing R02 by 15 August 2007. Pursuant to this requirement, Azimuth and Golder had planned on undertaking joint studies in late June/early July to select an appropriate location and configuration for the compensation works tailored to Arctic grayling. As logistical issues precluded this joint undertaking, Azimuth is providing this technical memorandum to document the biophysical requirements of Arctic grayling for spawning, rearing and foraging.

Gary Mann and Ryan VanEngen performed a reconnaissance at R02 in late June 2007 to map out general substrate and flow characteristics in support and identification of potential AWPAR compensation. As outlined in the No-Net-Loss Plan (November 2006), the conceptual plan for compensation is to modify or replace low or moderate value habitat to create high value spawning habitat for Arctic grayling. This memo briefly outlines the biological criteria, rationale for design criteria and suggested compensation locations so that Golder can complete their hydrological assessment and subsequent detailed design of compensation works. Given the preliminary nature of the site-specific data, there is substantial latitude in the location/configuration aspects of this memo; further refinement and interaction with Golder may be necessary upon completion of their hydrological assessment.

The biophysical criteria for substrate, stream flow/velocity and water depth for relevant life history stages of Arctic grayling are presented in **Tables 1 and 2**. This information, in conjunction with the discussion on spawning and development timing, should be used to guide detailed design of compensatory works.

Timing (paraphrased from NNLP)

Spawning migrations typically start in early spring, prior to or at ice breakup on over-wintering lakes. This would correspond to water temperatures in the streams of approximately 3 to 5°C. Spawning takes place over a two to three-week period (as temperatures rise), with young hatching within 16 to 18 days at 9°C. Newly hatched alevin spend three to five days within substrate prior to emerging as fry, which are typically first collected in late June/early July.

Given this information, optimal conditions supporting both spawning and early development should last approximately 6 weeks (three for spawning and three more to reach emergence) from the onset of spawning. Based on our 2005 and 2006 results, optimal conditions should persist until late July to maximize productivity of the compensation works.

Table 1: Biophysical criteria for Arctic grayling riverine life history stages.

Life Stage	Substrate	Flow/ Velocity	Water Depth	Source
Spawning	Unembedded gravel about 25 mm diameter	<1.4 m/s	Varying depths	Evans et al., 2002
	Clean gravel		0.3 - 0.8 m	Williston, 2002
	< 80 mm gravel	<0.21 m/s	Pools nearby	Beauchamp, 1990
		0.15- 0.25 m/s		Deegram et al. 2005
Rearing	Fry reside in pools and side channels over boulder, cobble, silt sand substrates.	0.8 m/s	Semi deep	Evans et al., 2002
	Sand and coarse pebbles	0 - 0.1m/s	0 – 0.4 m	Sempeski and Gaudin, 1995
Foraging	Post spawning in rubble and gravel, fine-coarse grain substrates.		Semi deep pools	Evans et al. 2002
	Boulder to gravel (32 - 64mm)	0.3 m/s	0.5 m	Vehemen 2004

(Complete citations will be provided in the final report)

Region-specific Data on Spawning Areas

The biophysical criteria listed in **Table 1** are corroborated by evidence seen in the field. Arctic grayling spawning behaviour was observed at R06 between June 27 and 30, 2007, in an area adjacent to the present bridge dominated by < 25 mm gravel. In 2005, numerous (20) Arctic grayling larvae were also collected in drift traps set at the present R06 bridge crossing. Azimuth representatives Ryan VanEngen and Tom Mannik (Baker Lake) documented the flow, depth and substrate preferences observed within this spawning reach. Velocities in upstream pools, dominated by boulder and cobble were <0.10 m/s (depth 0.2 - 0.7m), gravel dominated glides were 0.11 - 0.27 m/s (depth 0.25 – 0.6m) and riffle dominated by cobble and boulder were 0.3 – 0.8 m/s (depth 0.15 – 0.25) at representative cross sections.

Rationale for Spawning Design Criteria

The above information provides a range of biophysical conditions for spawning. Our recommendations for optimal Arctic grayling habitat are clean gravel substrate in about 0.3-m deep water flowing 0.1 - 0.2 m/s (**Table 2**). This type of spawning habitat will be the primary goal in the design and construction of the compensation area at R02, with few alterations for the creation of pools for rearing. Interestingly, the spawning observed at R06 was on substrate introduced during bridge construction. This area may serve as a good reference location to view known spawning substrate.

Table 2: Summary of Design Criteria

Life Stage	Substrate	Flow/ Velocity	Water Depth
Spawning	10% cobble, 90% gravel	0.1 - 0.2 m/s	0.2 - 0.4m
Rearing	33% boulder, cobble, gravel	0 - 0.1 m/s	0 – 0.8m
Foraging	40% boulder, 40% cobble, 20% gravel	< 1.0 m/s	0 – 0.8m

Possible Locations at R02 for Compensation:

The DFO Authorization, based on the No-Net-Loss Plan and discussions with Azimuth, stipulates that compensation for all five HADD bridges occurs upstream of the bridge crossing at R02. Two areas were identified: the southern side channel just upstream from the bridge (Compensation Option A – COA) and an area opposite the Golder staff gauge (COB). See photos for location and specific details at COA and COB.

Table 3: GPS coordinates (14W NAD83) for rough boundaries for Compensation Option A and B at R02.

Compensation Area	Corner of Area	Northing	Easting
Staff Gage (COB)	NW on Shore	643432	7143458
	SW Mid R.	643452	7143438
	NE on Shore	643566	7143583
	SE Mid R.	643579	7143565
Side Channel (COA)	NW on Shore	643655	7143498
	NE Mid R.	643683	7143522
	SW on Shore	643704	7143401
	SE Mid R.	643744	7143429

Based on the No-Net-Loss Plan HADD area total of 0.53 habitat units[1], this would entail modifying 900 m^2 of low value habitat to high value habitat to achieve the 1.5:1 gain-to-loss ratio agreed to with DFO. The approximate area (m^2) calculated from the provided GPS Coordinates (see **Table 3**) is (350m x 30m) 10,500 at C0B and C0B.

[1] Actual HADD areas associated with AWPAR can only be determined once all bridges are completed. The August deadline for detailed habitat compensation design precludes knowing HADD areas exactly. Consequently, consideration should be given to increasing the areas by 25 to 50% to account for potential unauthorized variances related to "field fitting" the bridges.

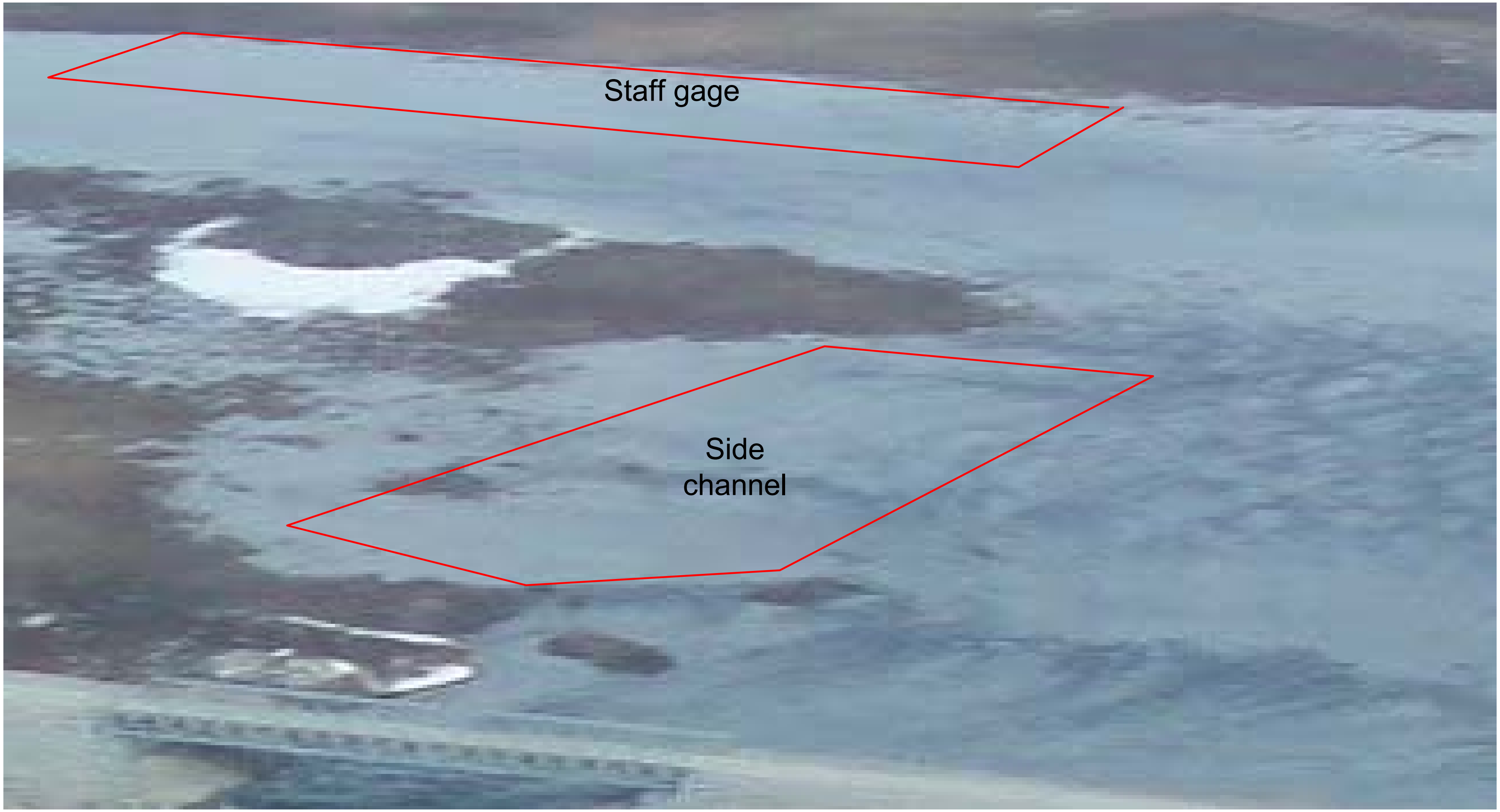
Azimuth representatives completed depth and velocity flow measurements on 3 transects across COB (upstream riffle portion, mid-channel glide and downstream glide) and 4 transects across C0A (upstream riffle, midstream glide, midstream riffle and downstream pool) on June 29, 2007 (immediately post spawning). While both areas appear to offer suitable depth, flow, complexity, morphology, preliminary drift data indicates that COA may already be used as spawning habitat (high value habitat) and already provides ideal pooling for rearing (moderate value habitat, with possible exposed boulder areas that could be altered to provide high value). In comparison, the preliminary data collected at COB indicates that it may provide greater returns for compensation as most of it is low to moderate valued habitat with significantly fewer fish larvae collected through this reach. Given the much higher rate of return for improvements to low value habitat, we recommend that priority be give to the staff gauge area (COB) or similar-featured locations nearby.

As indicated previously, Golder's hydrological assessment is needed to ensure that any areas are suitable to create and maintain productive spawning habitat through all hydrological conditions. Thus, these locations are flexible and we are open to exploring other options.

R02 Proposed Compensation Areas

Option staff gage (COB) and side channel (COA), photo taken
on July 7, 2006

R02 Proposed Compensation Areas



Option Staff Gage: characterized by its laminar flow with large boulder cobble substrate (presently low value habitat).

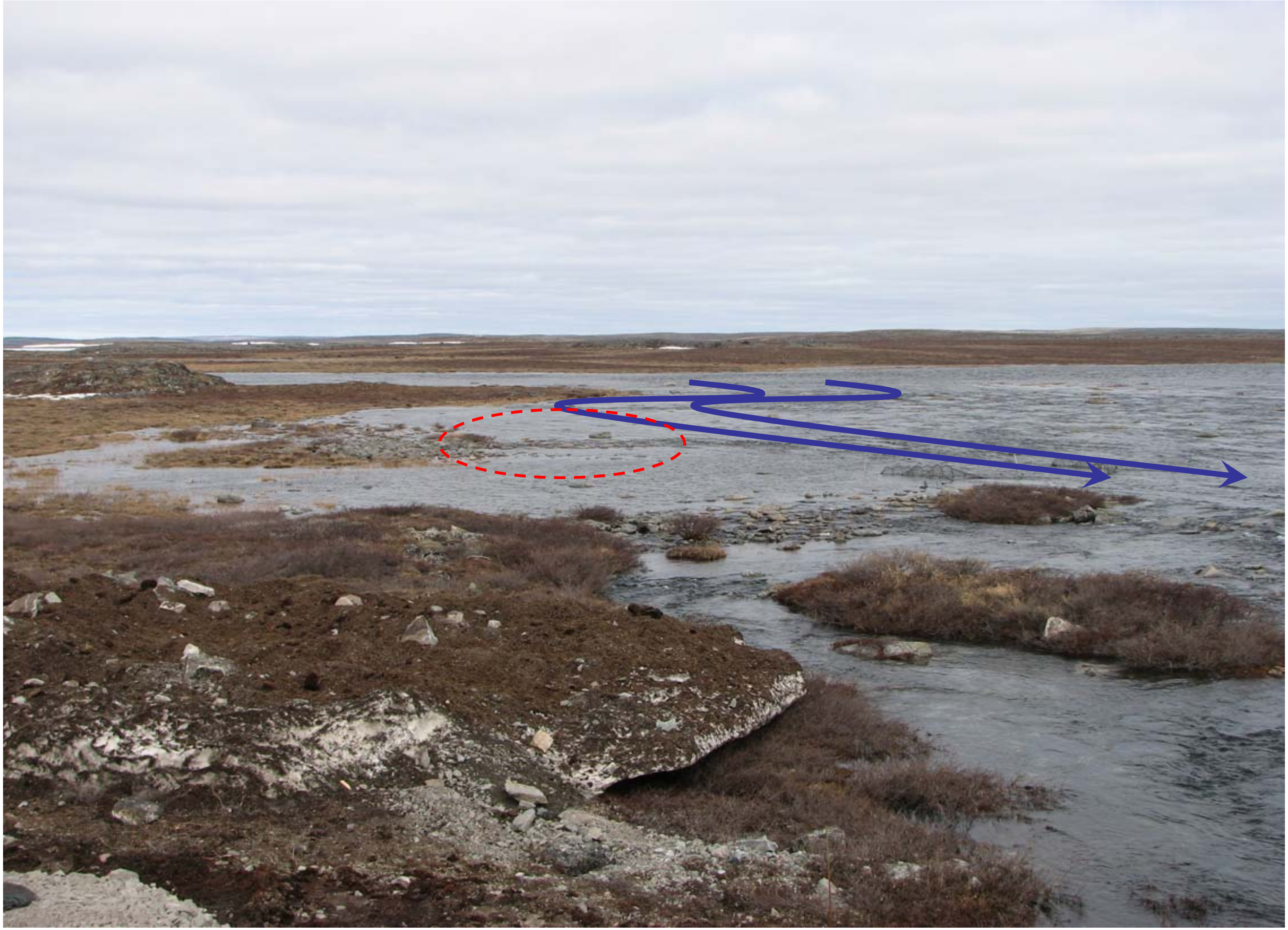
Option Side Channel: characterized as riffle- run with boulder and cobble substrate with spawning areas with gravel and side pools for rearing. Some exposed boulder and sedge that could be altered (presently moderate with some high value habitat).

(photo taken June 18, 2007)

Compensation Option Side Channel (COA)

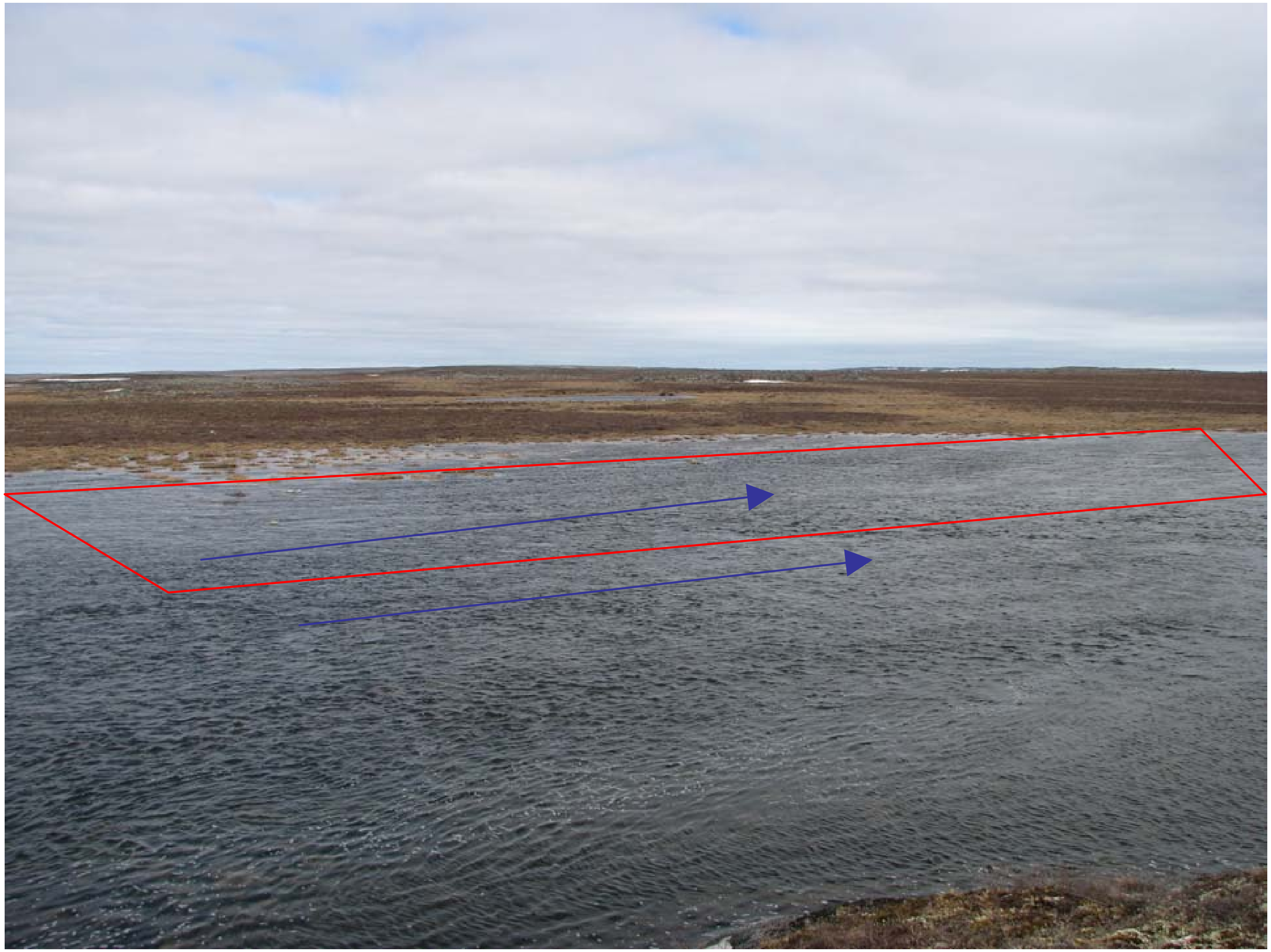
Possibly alter flow and substrate to support Arctic Grayling spawning at compensation option “Side Channel”. Boulder and cobble in red lines would be selectively removed and replaced with 0.5- 2.0cm gravel. Possible alteration of flow (represented in green arrows) to accommodate seasonal flow characteristics. Blue arrows represent present flow characteristics.

Compensation Option Side Channel



Alter flow regime and substrate to support Arctic Grayling spawning at compensation option side channel (COA). Blue lines represent existing main stream flow. Boulder and cobble in red dashed circle area would be selectively removed and replaced with 0.5- 3.0 cm gravel maintaining complexity and creating ideal flows. This might replace moderate value habitat with high value habitat. (photo taken June 27,2007)

Compensation Option Staff Gage (COB)



Alter substrate in compensation area Staff Gage (COB) by selectively removing large boulders and cobble, and replacing with 0.5- 3.0 cm gravel substrate. Possible alteration of shoreward zone to accommodate rearing pools. Improvement of the present riffle portions US and mid channel.

(photo taken June 27,2007)

APPENDIX B

MEADOWBANK FISH HABITAT COMPENSATION DESIGN SITE VISIT, CROSSING R02, ALL-WEATHER PRIVATE ACCESS ROAD, MEADOWBANK GOLD PROJECT, NUNAVUT – JULY, 2007

TECHNICAL MEMORANDUM

Golder Associates Ltd.
#202 - 2790 Gladwin Road
Abbotsford, B.C., Canada V2T 4S8
Telephone: 604-850-8786
Fax Access: 604-850-8756

TO:	Louise Grondin	**DATE:**	August 27, 2007
CC:	Stephane Robert, Martin Bergeron and Gary Mann	**JOB NO:**	07-1413-0047
FROM:	Mike Paget and Dan Walker	**DOC NO:**	504
EMAIL:	**mpaget@golder.com; drwalker@golder.com**	**VERSION:**	**0**

RE: MEADOWBANK FISH HABITAT COMPENSATION DESIGN SITE VISIT, CROSSING R02, ALL-WEATHER PRIVATE ACCESS ROAD, MEADOWBANK GOLD PROJECT, NUNAVUT – JULY, 2007

1.0 INTRODUCTION

This memo provides details of the site visit to Crossing R02 on the Meadowbank All-Weather Private Access Road (AWPAR) by Dan Walker and Fern Webb of Golder Associates between July 18, and July 20, 2007. The purpose of the site visit was to:

- Characterize hydraulic/fish habitat conditions by visual inspection in order to evaluate potential fish habitat compensation alternatives;

- Perform a topographic survey of the channel banks upstream and downstream of the bridge crossing using an RTK system; and

- Evaluate substrate material sizes by visual inspection and pebble count methods to assist with fish habitat compensation design.

2.0 FISH HABITAT COMPENSATION ALTERNATIVES

Based on the DFO Authorization for the AWPAR, the habitat compensation plan is to replace approximately 900 m^2 of low or moderate value Arctic grayling habitat upstream of bridge crossing R02 with high value spawning habitat (Azimuth, 2007). It is understood that habitat compensation is to be focused upstream of the bridge crossing to limit potential adverse affects on the compensated area should there be a bridge failure and/or loss of the AWPAR.

Two potential habitat compensation areas, COA and COB, were identified previously by Azimuth (2007); while a third, COC, was identified during the site visit (Figures 1 and 2). The following sections describe the habitat characteristics and hydrological conditions of the three areas as compiled from Azimuth (2007) and observations made by Golder during the site visit (Golder, 2007). Photographs of proposed habitat compensation areas taken during the site visit are provided in Appendix A.

2.1 Proposed Habitat Compensation Area COA

COA is located downstream of the R02 staff gauge in a southern side channel upstream of the bridge crossing R02 (Figures 1 and 2). This area is described as having a moderate to high habitat value by Azimuth (2007) as the area currently provides suitable rearing habitat (moderate habitat value) and preliminary drift data suggest the area may already be used for spawning (high value habitat).

COA is characterized by boulder and cobble substrates, with pockets of spawning gravel and side pools for rearing. The D_{50} (median diameter) for this area is approximately 300 mm based on limited pebble count data (see Section 4).

Selective removal and replacement of substrate, including exposed boulder areas, would augment the extent of spawning habitat within the reach. The site may also require flow path alterations to optimize water depths and velocities during the spawning season (Azimuth, 2007).

2.2 Proposed Habitat Compensation Area COB

COB is located opposite the R02 staff gauge location (Figures 1 and 2) and is described by Azimuth as having low to moderate habitat. Preliminary drift data collected by Azimuth indicate fewer fish larvae in this reach compared to COA, signifying that the creation of spawning habitat within COB may provide greater returns for compensation.

The substrate through this reach is characterized by the presence of large boulders and cobbles, with a D_{50} of approximately 140 mm (see Section 4). The site will require the selective removal and replacement of existing substrate with spawning gravels in order to achieve recommended spawning habitat conditions. The suitability of flow velocities and depths within the COB reach during the spawning season will need to be determined during detailed design. Azimuth (2007) also suggest habitat design consideration be given to flow path and substrate alterations to create rearing pools in the shoreward zone.

2.3 Proposed Habitat Compensation Area COC

A third potential fish habitat compensation area, COC, was identified during the Golder site visit. COC is located on the channel right bank (facing downstream) downstream of the R02 staff gauge, opposite to COB (Figures 1 and 2). It is currently low-lying marsh land; however, variations in vegetation observed on site suggest that this area is submerged during flood events.

Fish habitat compensation works within this area would consist of excavating overburden to create off-channel pool rearing habitat over a range flows. As it possible that this area would also be subject to flowing water during the spring melt/spawning period, the excavated area would be lined with a mixture of spawning gravels and cobble substrates. Given the proximity of bedrock outcrops, some blasting may be required to achieve the final grade.

3.0 TOPOGRAPHIC SURVEY

A topographic survey of the channel upstream of crossing R02 was completed to assist with detailed design of the fish habitat compensation works. The survey included a GPS survey to delineate the channel banks (vegetation line), and a combined level and RTK survey to measure variations in ground elevation over several cross-sections (Figure 3). Logistical issues (RTK survey equipment delayed in transit) precluded a detailed cross-sectional survey of the off-channel pond along the study reach, or the channel downstream of the stream crossing.

The survey data were used to compile a topographic map of the channel upstream of R02 (Figure 2). The map will be used during detailed design of the fish habitat compensation works to evaluate water depths and average velocities over a range of flows within the channel.

4.0 PEBBLE COUNT

Pebble counts were performed in four general locations upstream of R02 (labeled A to D) in order to characterize bed material substrate within the fish habitat compensation reach (Figure 1). Additional pebble counts were also focused within the COA area. Each of the pebble counts consisted of measuring the b-axis diameter of random samples of bed substrate materials across the entire sample area. The data were then used to estimate the gradation of the bed surface material.

The pebble count results are summarized in Table 1, where D_x is the grain size at which x% of the sampled bed material is finer. In general, the bed material substrate is characterized by large cobbles and boulders. As previously noted however, pockets of finer grained materials were visually observed in areas A to C during the site visit.

TABLE 1: Pebble Count Results[a]

Station	Sample Count	D_{10} (mm)	D_{30} (mm)	D_{50} (mm)	D_{70} (mm)	D_{90} (mm)
A	24	70	100	113	143	200
B	32	120	180	195	230	480
C	35	80	130	160	260	610
D (COB area)	203	70	110	140	180	590
A to C Combined	91	85	130	160	200	490
A to D Combined	294	80	120	140	190	550
COA area	258	100	150	300	400	700

[a]D_x – estimated diameter D at which x% of the bed material is finer

5.0 RECOMMENDED FISH HABITAT COMPENSATION PLAN

Azimuth (2007) recommends that design and construction of fish habitat compensation at R02 focus on the creation of spawning habitat, with some minor alterations to channel substrates and flow conditions for the creation of pools for rearing. Optimal Arctic grayling spawning habitat is characterized by clean gravel (5 to 30 mm diameter) substrate located in approximately 0.3 m deep water flowing at roughly 0.1 - 0.2 m/s. While Azimuth (2007) indicates that both COA and COB appear to offer suitable depth, flow, complexity, and morphology, they recommend that priority be given to COB, given the comparatively higher rate of return for improvements to low value habitat.

It is anticipated that COC would provide high value off-channel rearing habitat; however, with the presence of the relatively large off-channel pond along the existing channel alignment (Figure 1), rearing habitat is not considered to be limiting within the reach. While COC may be subject to flowing water during the spawning period, there would be the potential for sediment infilling during flood recession.

Based on the above, Golder also recommends that habitat compensation works be focused on COB to provide the greatest potential habitat benefit or gain. Specifically, Golder recommends the design and construction of spawning beds within the COB area. The beds would be designed in a manner to protect the fine grained spawning materials from scour during ice break up and over a range of flows. Options to be considered during design include placing spawning gravels within a ring of larger boulders, and/or constructing a berm, or series of berms, of large boulders on the bed of the channel along the length of the works to deflect high flow velocities. Consideration will also be given to the construction of several smaller pads, staggered/offset along the length of COB, such that any gravel scoured from upstream has the opportunity to deposit further downstream within the reach.

As noted above, the proposed the habitat compensation plan is to replace approximately 900 m^2 of low or moderate value Arctic grayling habitat upstream of bridge crossing with high value spawning habitat (Azimuth, 2007). It is understood that the final fish habitat compensation area requirement is subject to completion of the five bridge crossings along AWPAR that result in a "harmful alteration, disruption or destruction" (HADD) of fish habitat as defined in the No-Net-Loss Plan for the project. Actual HADD areas associated with AWPAR can only be determined once all bridges are completed, and therefore the final habitat compensation requirement will not be known for design. For this reason, Azimuth (2007) recommends increasing the habitat compensation area by 25 to 50% (i.e., to 1,125 m^2 to 1,350 m^2) to account for potential variances related to "field fitting" the bridges.

The amount of fish compensation habitat within COB will be confirmed during detailed design. Should the amount area available in COB be constrained, consideration would then be given to developing additional rearing habitat in COB or COC, and/or to selective sediment removal in COA. The preferred alternative would be developed in consultation with Azimuth and Agnico-Eagle Mining based on ease and cost of construction and potential habitat gain.

DRW/NSP/MP/JAH/lw
Attachment: Appendix A – Site Photographs July 18 – 20, 2007
O:\Final\2007\1413\07-1413-0047\504 28Aug_07 - TM Ver 0 Fish Compensation Site Visit.doc

REFERENCES

Azimuth, 2007. Technical Memorandum *Fisheries Criteria for Habitat Compensation in Support of Hydrological Assessment R02*, 11 July 2007.

REVISION DATE: BY: FILE:

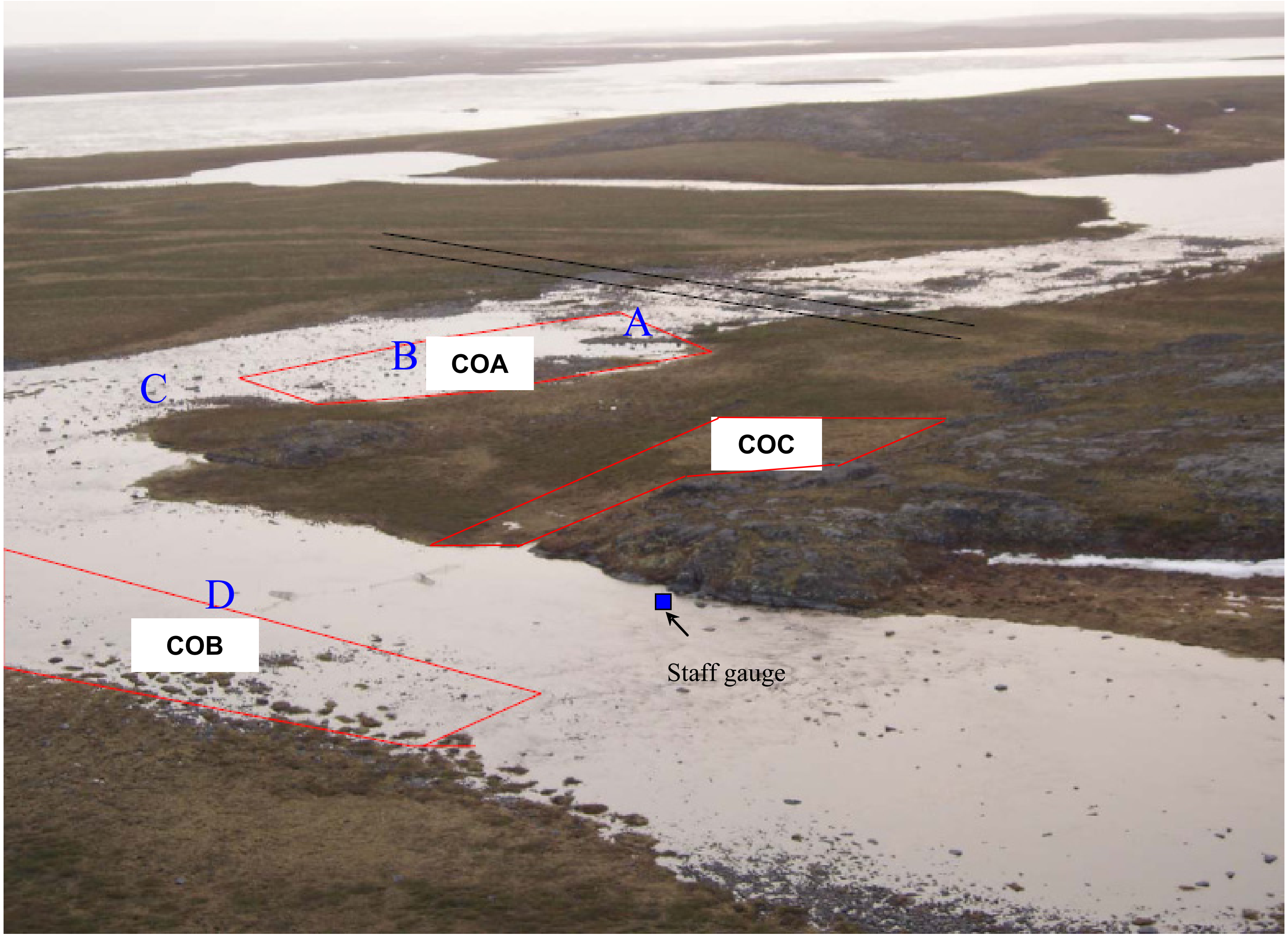
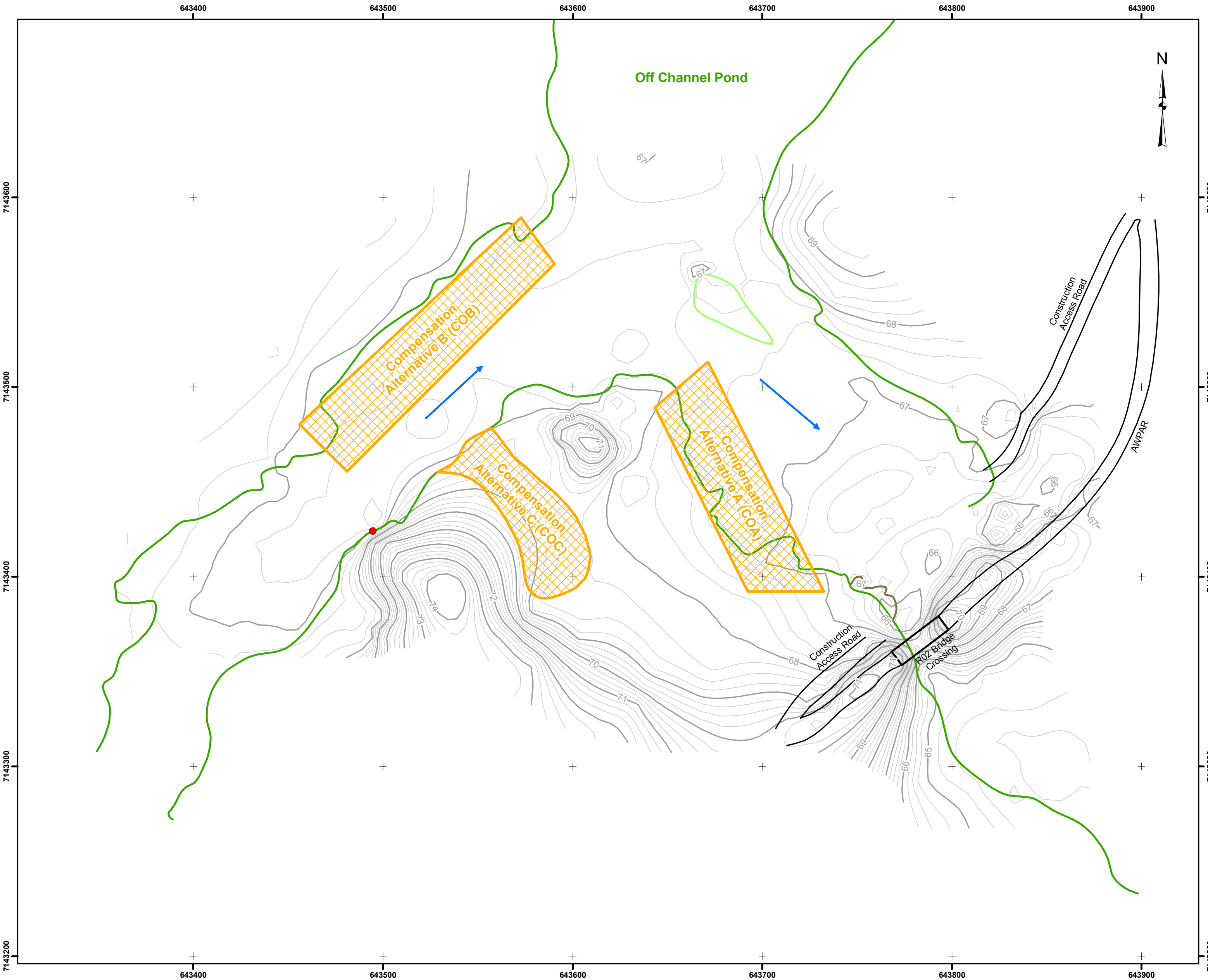


Photo source: Azimuth, 2007

PROJECT	MEADOWBANK MINING CORPORATION MEADOWBANK GOLD PROJECT RO2 HABITAT COMPENSATION
TITLE	**Proposed Compensation Areas COA, COB and COC with Pebble Count Locations**

Golder Associates

PROJECT No.	17-1413-0047		PHASE / TASK No.	5200
DESIGN	MP	08AUG07	SCALE NTS	REV.
CADD	--	08AUG07	**FIGURE 1**	
CHECK	DRW	08AUG07		
REVIEW				



LEGEND

- R02 Staff Gauge
- Fish Habitat Compensation Area
- Bridge
- Road
- Grass Patch
- Turf Island
- Vegetation Limit

Contour
- Index (1 m interval)
- Intermediate (0.25 m interval)

DRAFT

NOTE

Vegetation limits modified from survey based on field observations.

REFERENCE

Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 14

40 0 40

SCALE 1:2,000 METRES

PROJECT

MEADOWBANK
MINING CORPORATION

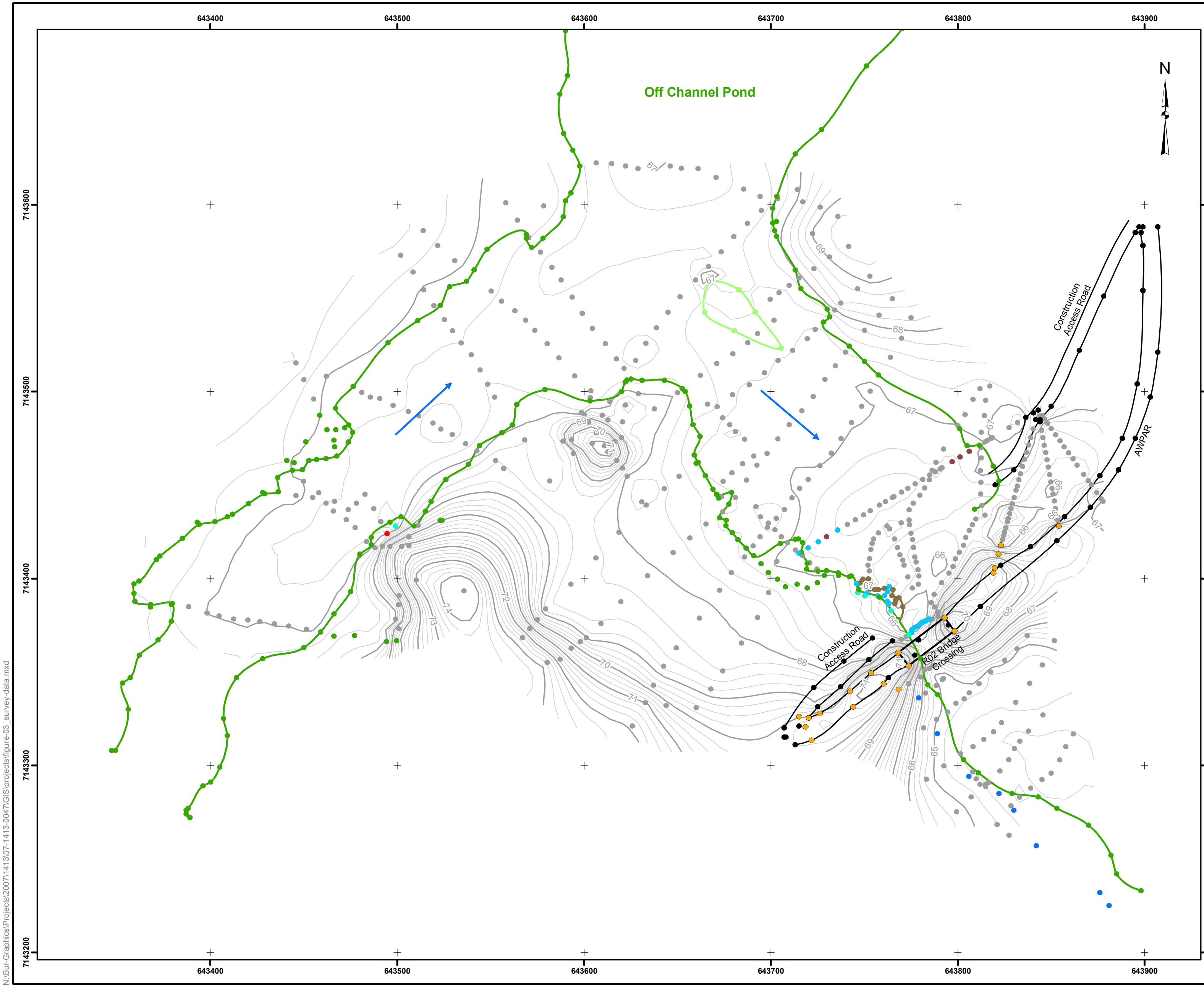
TITLE

**MEADOWBANK GOLD PROJECT
SITE PLAN SHOWING PROPOSED FISH
HABITAT COMPENSATION AREAS**

Golder Associates
Burnaby, B.C.

PROJECT No. 07-1413-0047			SCALE AS SHOWN	REV. 0
DESIGN	DW	02 Aug. 2007	FIGURE 2	
GIS	CDB	02 Aug. 2007		
CHECK				
REVIEW				

N:\Bur-Graphics\Projects\2007\1413\07-1413-0047\GIS\projects\figure-02_site-plan.mxd



LEGEND

- tracklines_mainroad1
- tracklines_mainroad2
- tracklines_mainroad3
- tracklines_vegetationlimits
- tracklines_waterlimit
- topo_grasspatchs
- topo_mainroadbridge
- topo_rockymargins
- topo_sharpstreambanks
- topo_sideroads
- topo_staffgauge
- topo_streamchannels
- topo_turfislands
- topo_vegetationlimit
- topo_rtklevellingsurvey
- Bridge
- Road
- Grass Patch
- Turf Island
- Vegetation Limit

Contour
- Index (1 m interval)
- Intermediate (0.25 m interval)

DRAFT

REFERENCE

Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 14

40 0 40

SCALE 1:2,000 METRES

PROJECT

MEADOWBANK
MINING CORPORATION

TITLE

MEADOWBANK GOLD PROJECT
SURVEY DATA

Golder Associates
Burnaby, B.C.

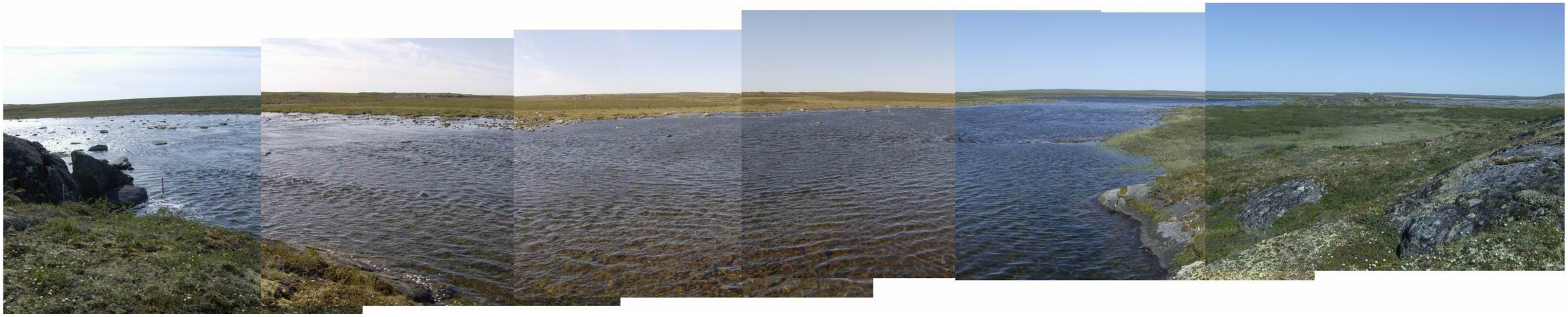
PROJECT No. 07-1413-0047			SCALE AS SHOWN	REV. 0
DESIGN	DW	02 Aug. 2007		
GIS	CDB	02 Aug. 2007		
CHECK				
REVIEW				

FIGURE 3

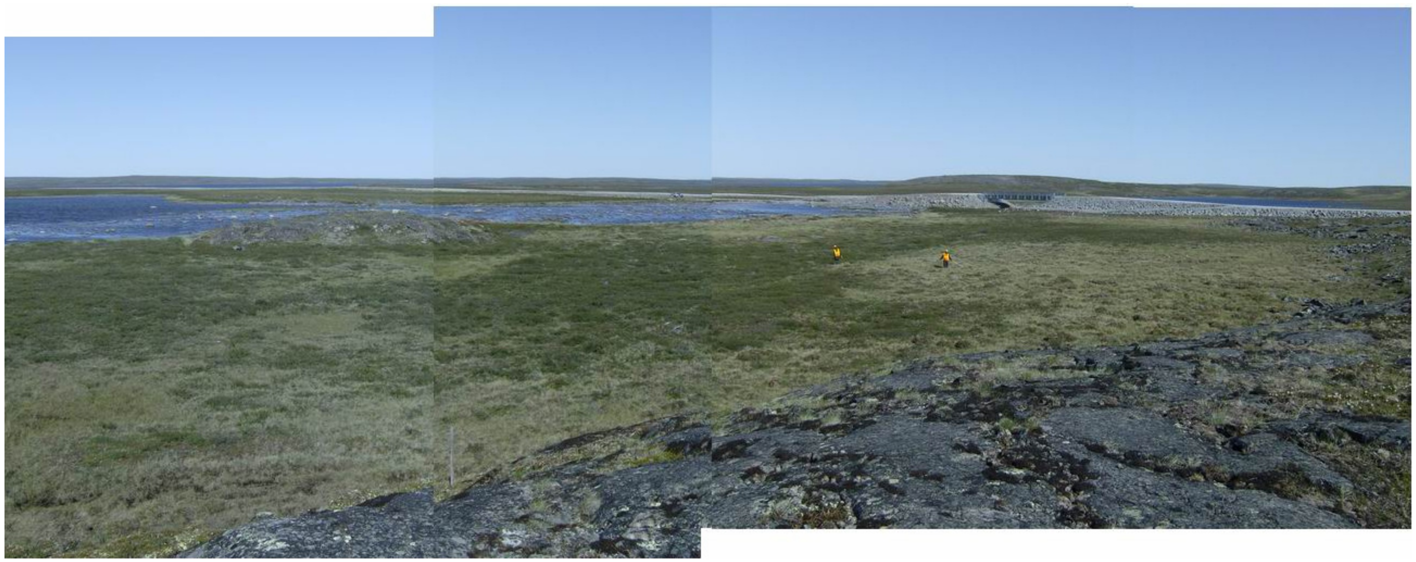
APPENDIX A

SITE PHOTOGRAPHS – JULY 18 TO 20, 2007

REVISION DATE: BY: FILE:



Panoramic standing on right bank near R02 gauge looking upstream to downstream along COB reach



Panoramic standing on right bank near R02 gauge looking downstream to COA, COC and R02 bridge crossing

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
R02 HABITAT COMPENSATION

TITLE

Panoramic Photos from R02 Gauge Location

Golder Associates

PROJECT No.	07-1413-0047		PHASE / TASK No.	5700
DESIGN	MP	07AUG07	SCALE NTS	REV.
CADD	--	07AUG07	**FIGURE A1**	
CHECK	DRW	07AUG07		
REVIEW				

REVISION DATE: BY: FILE:

Standing on right bank at R02 gauge facing slightly upstream

Facing COB from right bank near R02 gauge

Facing downstream to COC inlet from right bank near R02 gauge

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
R02 HABITAT COMPENSATION

TITLE

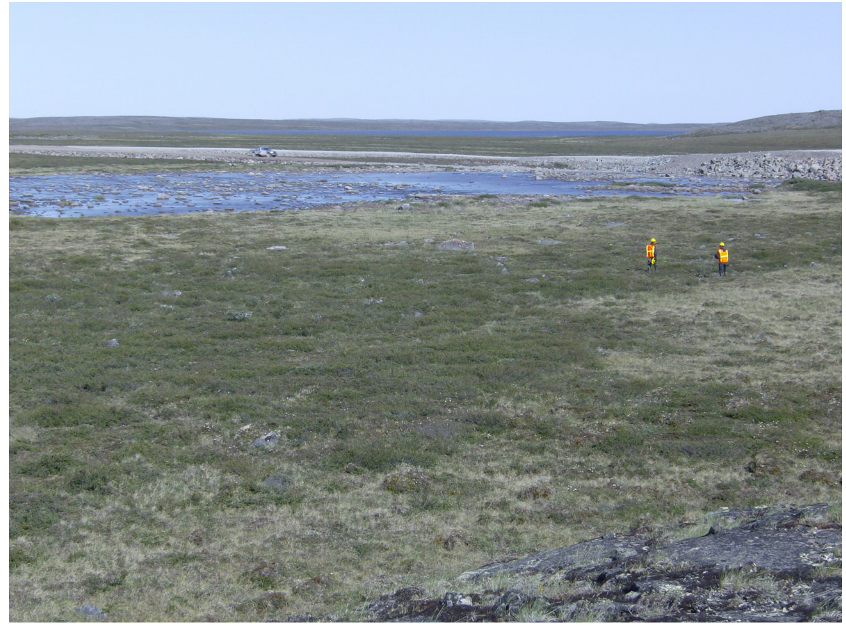
Photos of COB from R02 Gauge Location

Golder Associates

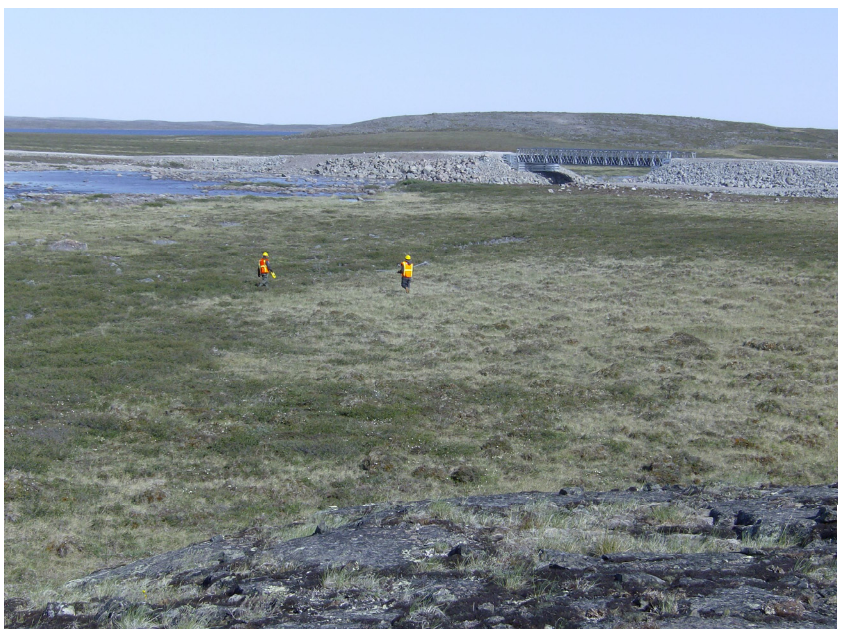
PROJECT No.	07-1413-0047		PHASE / TASK No. 5200	
DESIGN	MP	07AUG07	SCALE NTS	REV.
CADD	--	07AUG07	FIGURE A2	
CHECK	DRW	07AUG07		
REVIEW				

REVISION DATE: BY: FILE:

Standing on left bank opposite R02 gauge looking downstream to R02 bridge



Facing downstream to R02 bridge from right bank near R02 gauge



Facing downstream to R02 bridge from right bank near R02 gauge

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
R02 HABITAT COMPENSATION

TITLE

Photos from R02 Gauge Location

Golder Associates

PROJECT No.	07-1413-0047		PHASE / TASK No.	5200
DESIGN	MP	07AUG07	SCALE NTS	REV.
CADD	--	07AUG07	FIGURE A3	
CHECK	DRW	07AUG07		
REVIEW				

REVISION DATE: BY: FILE:

Standing on left bank near R02 bridge facing upstream

Standing on R02 bridge facing upstream toward left bank

Standing At R02 bridge facing upstream

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
R02 HABITAT COMPENSATION

TITLE

Upstream Photos From R02 Bridge

Golder Associates

PROJECT No.	07-1413-0047		PHASE / TASK No.	5200
DESIGN	MP	07AUG07	SCALE NTS	REV.
CADD	--	07AUG07	FIGURE A4	
CHECK	DRW	07AUG07		
REVIEW				

REVISION DATE: BY: FILE:

Standing at R02 bridge facing upstream along the right bank toward COA

Facing downstream along right bank from R02 bridge

Facing downstream along right bank from R02 bridge

PROJECT	MEADOWBANK MINING CORPORATION MEADOWBANK GOLD PROJECT R02 HABITAT COMPENSATION
TITLE	Photos From R02 Bridge

Golder Associates

PROJECT No.	17-1413-0047		PHASE / TASK No.	5200
DESIGN	MP	07AUG07	SCALE NTS	REV.
CADD	--	07AUG07	FIGURE A5	
CHECK	DRW	07AUG07		
REVIEW				

Facing upstream along right bank from R02 bridge

Facing downstream along right bank from R02 bridge

PROJECT	MEADOWBANK MINING CORPORATION MEADOWBANK GOLD PROJECT R02 HABITAT COMPENSATION
TITLE	Photos From R02 Bridge

Golder Associates	PROJECT No.	07-1413-0047		PHASE / TASK No. 5200	
	DESIGN	MP	07AUG07	SCALE NTS	REV.
	CADD	--	07AUG07	FIGURE A6	
	CHECK	DRW	07AUG07		
	REVIEW				

REVISION DATE: BY: FILE:

APPENDIX D

Evaluation of Arctic Grayling Production at the R02 Spawning Pads (Golder, July 2020)

TECHNICAL MEMORANDUM

DATE 3 April 2020 **Reference No.** 19122020-474-TM-RevA

TO Manon Turmel, Permitting Lead
Agnico Eagle Mines Limited

CC Nancy Duquet Harvey, Jen Range, Cam Mackenzie, Leilan Baxter

FROM Cam Stevens **EMAIL Cameron_Stevens@golder.com**

EVALUATION OF ARCTIC GRAYLING PRODUCTION AT THE R02 SPAWNING PADS

Introduction

On 1 April 2019, staff from Agnico Eagle Mines Limited (Agnico Eagle) and Fisheries and Oceans Canada (DFO) met to discuss the technical memorandum provided by Agnico Eagle on updates to the no-net loss plan (NNLP) for the Meadowbank Site (Agnico Eagle 2019). The technical memo included an analysis of fishery productivity gains (benefits) to be achieved through the implementation of the contingency measures described in the 2012 NNLP. Most of the gains were to be achieved through the construction of spawning pads for enhancing the productivity of Arctic Grayling populations. The predicted gains were quantified using fish production units, specifically biomass generated from spawning habitat enhancements, and calculations were based, in part, on long-term monitoring data collected upstream of the R02 crossing on the All Weather Access Road (AWAR) where four spawning pads were constructed for Arctic Grayling in winter 2008/2009 (Agnico Eagle 2019).

Data on fish presence and spawning activities have been collected by Agnico Eagle upstream of the R02 crossing starting in 2006, and are summarized in annual reports, provided as a component of the Meadowbank Annual Reports submitted each year to the Nunavut Impact Review Board (NIRB). In Agnico Eagle's technical memorandum on the updated NNLP, the collected monitoring data were used to demonstrate the benefits of spawning pad construction for Arctic Grayling production using larvae counts. That analysis suggested that the spawning pads increased larvae (young-of-year) densities by 4.3-times post-construction. Agnico Eagle assumed that this observed increase in larvae catch was directly related to the availability of new spawning habitat, and was consistently proportional to changes in the adult population post-construction. It was proposed that the adult Arctic Grayling biomass in the system increased an average of 70 fish per year or 21 kg per year after 8 years in use.

Upon discussion of the technical memo results with DFO, an outcome of the 1 April 2019 meeting was a request from DFO to provide additional information to confirm the predicted gains in the productivity of the fishery from the construction of four gravel spawning pads above the R02 crossing (Figure 1). In a follow-up email from DFO received on 16 May 2019, the scope of the additional analyses was clarified as more information on assumptions to better understand how changes in larval fish captures relate to changes in fish production, the use of standard criteria or methods for selecting suitable monitoring data for analysis to account for variations in the study design across monitoring years, and a modelling approach that is aligned with other offsetting plans that focus on stream habitat enhancements in the North, such as the Back River Offsetting Plan (Golder 2019).

In response to the information request from DFO, Agnico Eagle then contracted Golder Associates Ltd. (Golder) to provide an evaluation of gains in fish production from the construction of the four spawning pads above the R02 crossing (i.e., the R02 spawning pads). The objectives of this memo are to i) examine changes in the Arctic Grayling population over time using data collected on the Arctic Grayling population upstream of the R02 crossing (from 2007 to 2019) and ii) develop a conceptual fish production model to quantify changes in Arctic Grayling biomass following the construction of spawning pads.

Figure 1: Arctic Grayling Spawning Pads Upstream of the All Weather Access Road (AWAR) Crossing R02 (Agnico Eagle 2019)

R02 Monitoring Results (2006-2019)

Larval Drift Traps

Larval drift traps were set in the R02 study reach since 2006 for varying lengths of time between June 10 and August 7 (see Figure 2; also summarized in Agnico Eagle 2019). No sampling occurred in 2012, 2014, 2016, and 2018 (Figure 2). Because of data issues that could not be resolved in time for this technical memo, larval trap data from 2006 monitoring was excluded from analyses.

The larval drift traps typically consisted of a square-sided cone with a ridged frame that funnelled into a 0.5 mm Nitex mesh bag (Agnico Eagle 2018). Attached at the back of the Nitex mesh bag was a Nalgene®-type container where the drift was collected. Frames were either 60 x 30 cm or 47 x 30 cm. The frame was submerged at least halfway under water and secured to the streambed by poles on each side. Drift traps were checked at least every three days, but most commonly every day. Across the study years, drift traps were set in various locations in the immediate vicinity of the spawning pads, including locations just upstream and downstream of the spawning pads.

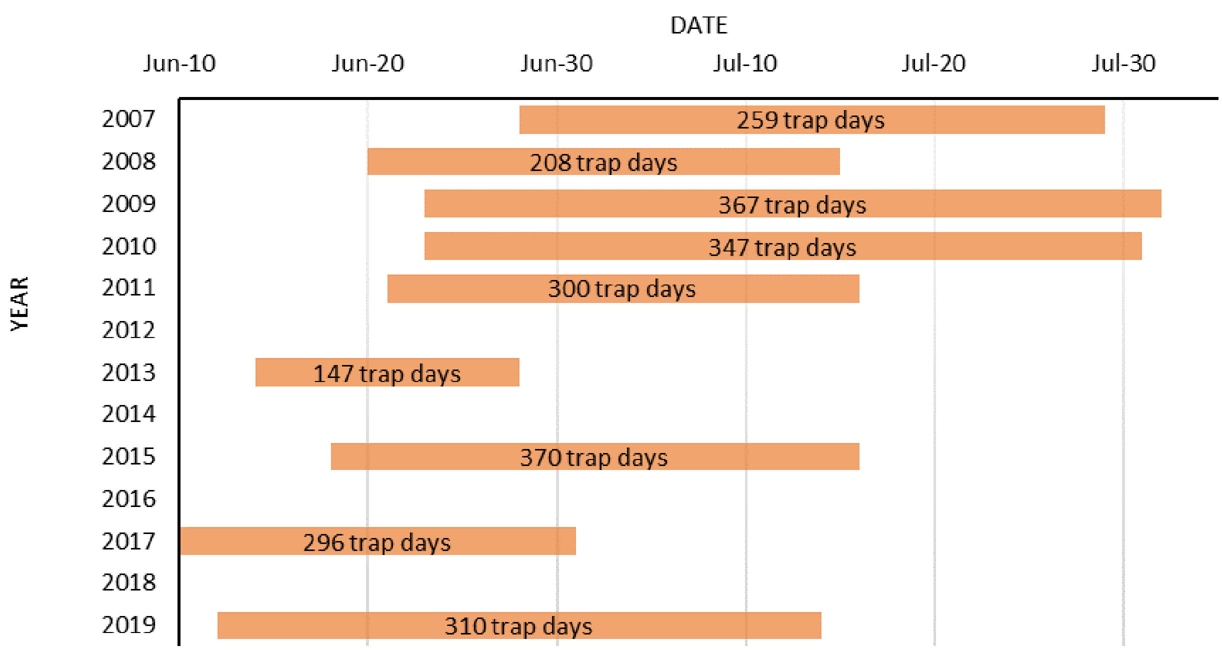


Figure 2: Larval Drift Trap Sampling Schedule and Total Trapping Effort (# Trap Days) During R02 Monitoring Period

The larval drift-trap data provided by Agnico Eagle was summarized as mean daily catch per unit effort (CPUE), calculated as the mean trap CPUE across all traps, for each day. Two summaries were completed, one using the full dataset and then an analysis of a subset of the full dataset to better understand the response of Arctic Grayling to the construction of the R02 spawning pads. The full dataset included all data collected over the monitoring period at both upstream and downstream locations of the four spawning pads. The full dataset was subset to include only data collected downstream of the four spawning pads and data collected after a calculated emergence date for Arctic Grayling. The emergence date was based on water temperature data collected during the trapping program, combined with Arctic Grayling life cycle guidance provided in a review by Stewart et al. (2007). The range of emergence dates was determined with the following conditions:

- Minimum spawning temperatures of 4°C
- Incubation times of 13 to 18 days under normal stream conditions that fluctuate about a mean daily temperature of 8.8°C
- Larval Arctic Grayling emerge from the gravel 3 to 5 days after they hatch

Using water temperature data provided by Agnico Eagle, a polynomial scatterplot smoothing function (i.e., locally weighted scatter-plot smoother) was fit to calculate mean daily temperatures for the duration of the trapping period. As illustrated in Figure 3, expected emergence of larvae was 7 to 14 July, depending on the trapping year, and the analysis of trap data presented further below uses a general guideline of 10 July as the earliest date of emergence of Arctic Grayling. The result of the emergence date analysis indicated that any small fish captured and identified as Arctic Grayling prior to 7 July were likely incorrectly identified as larval Arctic Grayling. Fish samples collected prior to 7 July that were preserved should be re-examined for identification in a laboratory. These samples could be either age-1 year Arctic Grayling or recently emerged young-of-year from an adfluvial coregonid species that spawn either upstream of the trap locations or possibly in the spawning pad area.

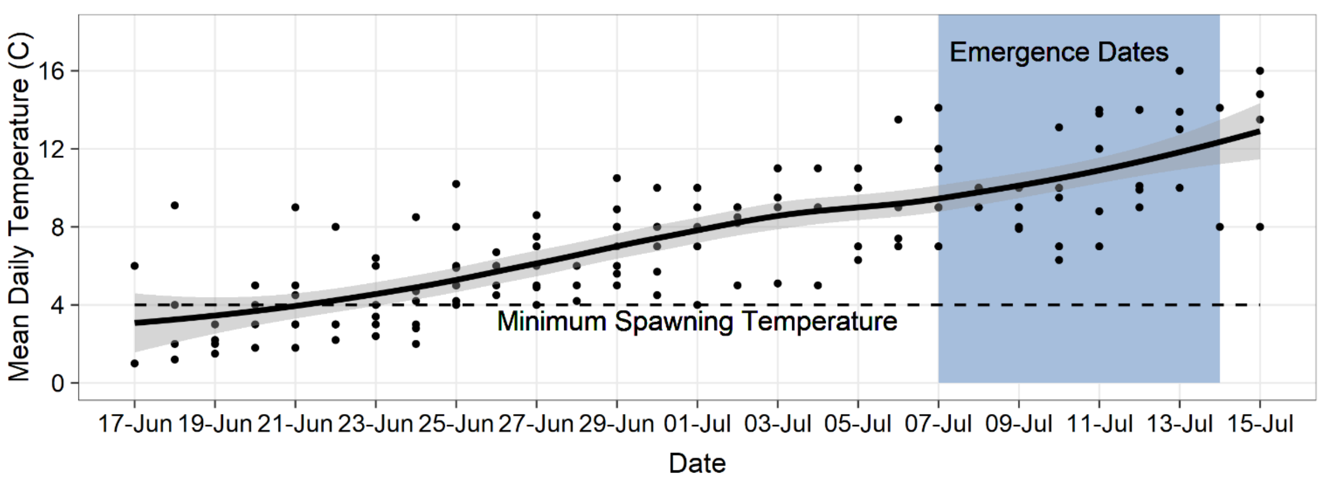


Figure 3: Range of Predicted Arctic Grayling Emergence Dates Based on Observed Water Temperature at R02 Crossing, 2007 – 2019

Note: Line Created Using Polynomial Scatterplot Smoothing Function; Shading = Standard Error

Larval drift-trap data are summarized per year in Figure 4 and Figure 5. Based on visual assessment of the plots in the figures below, notable trends in CPUE include the observations that i) peak catch rates occur prior to 1 July for all trapping years (Figure 4), and ii) catch rates are increasing over time, with measurably higher catches after the construction of the spawning pads in winter 2008/2009 (Figure 4; Figure 5). Using the full dataset from monitoring above the R02 crossing, the mean pre-construction CPUE was 1.1 larvae per trap day (standard deviation [SD] ± 2.7), whereas the mean post-construction CPUE was 5.2 larvae per trap day (SD ± 11.0). Larval densities increased, on average, 4.7-times following the construction of the R02 spawning pads. Similar trends were observed for the subset of data collected on or after the 10 July emergence date for Arctic Grayling in the traps immediately downstream of the R02 spawning pads. Using the reduced dataset, the mean pre-construction CPUE was 0.2 larvae per trap day (SD ± 0.6), whereas the mean post-construction CPUE was 0.8 larvae per trap day (SD ± 3.2). Larval densities collected downstream of the spawning pads after 9 July increased, on average, 4.0-times post-construction per monitoring year.

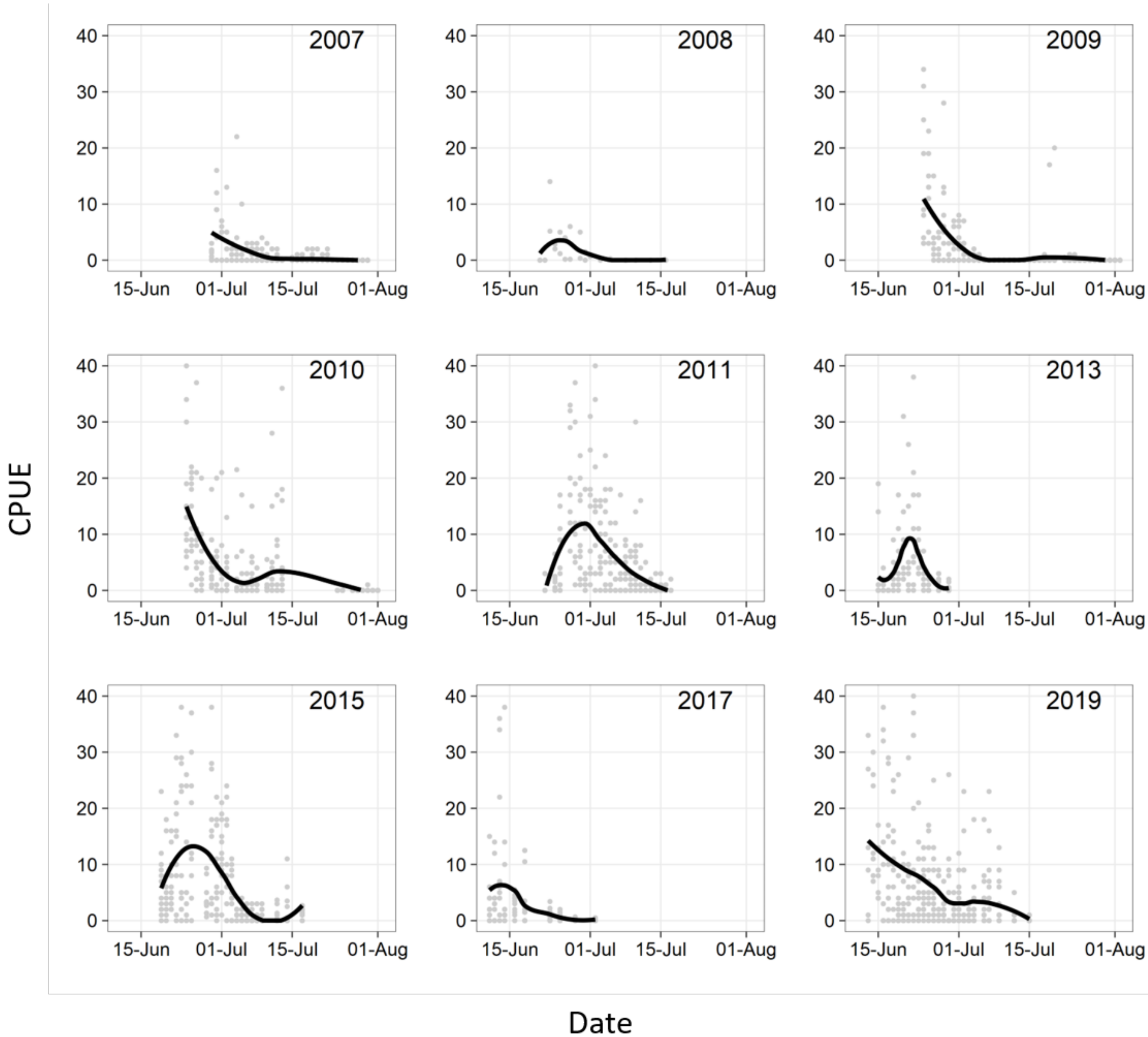


Figure 4: Summary of Larval CPUE using all Larval Data Collected Above the R02 Crossing, 10 June to 7 August

Note: Line Created Using Polynomial Scatterplot Smoothing Function

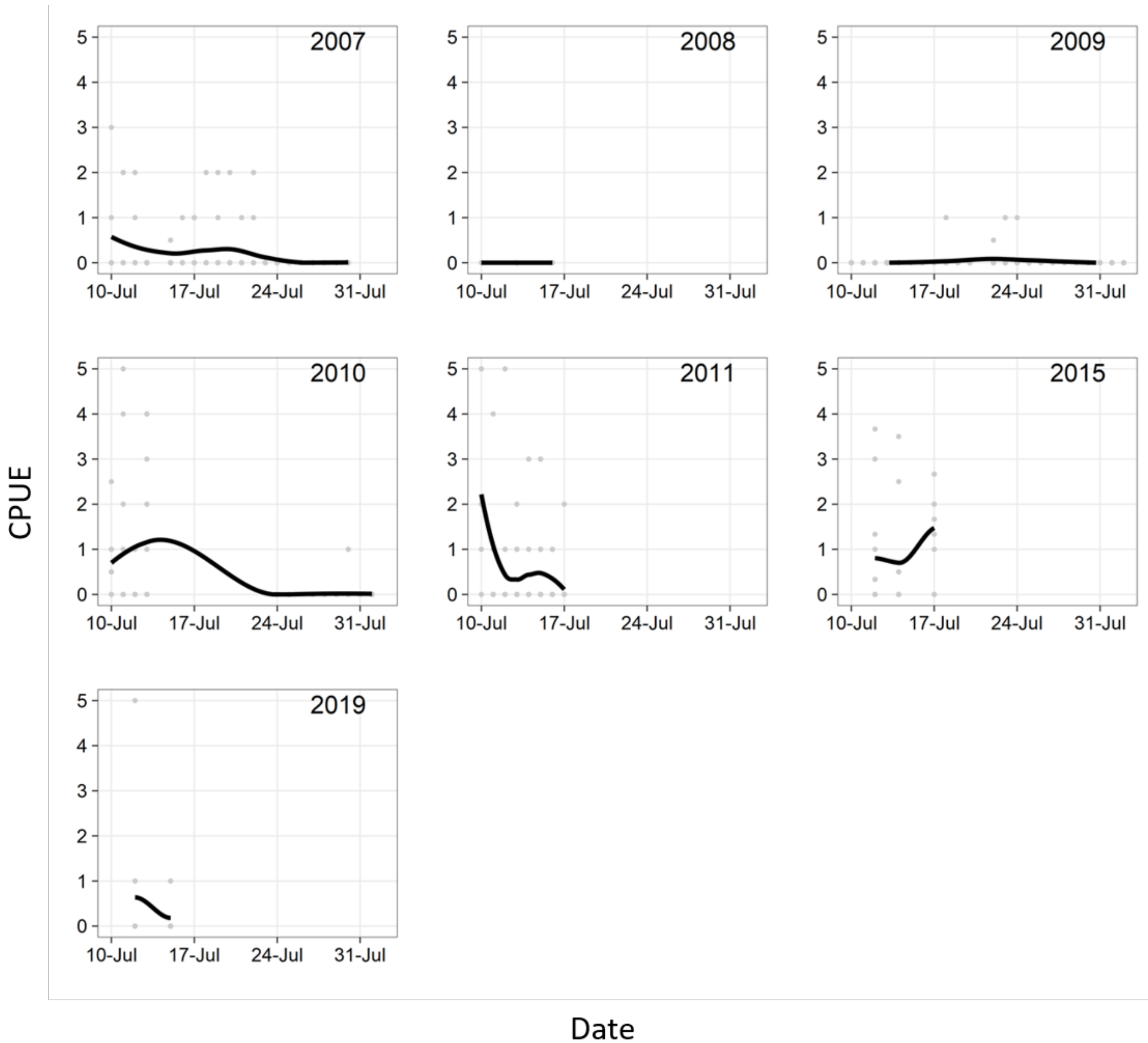


Figure 5: Summary of Larval CPUE using Data Collected Downstream of Spawning Pads after 9 July

Note: Line Created Using Polynomial Scatterplot Smoothing Function

Hoop-Net Traps

Hoop-net traps were set concurrently with the larval traps in the R02 study reach since 2006, however the timing of the larval trap and hoop-net sampling periods in each year did not completely overlap (Figure 6). Hoop-net traps have been set over various periods of time between June 11 and July 19. As with the larval trapping, no sampling occurred in 2012, 2014, 2016, and 2018 (Figure 6).

Hoop-net traps were installed upstream of the R02 crossing with the primary objective to monitor the passage of fish and evaluate population structure of Arctic Grayling (Agnico Eagle 2018). The hoop-net trap design was intended to confirm the continued presence of a self-sustaining population of Arctic Grayling following the construction of the R02 crossing (not necessarily for measuring the size of the spawning population following the construction of the spawning pads). The traps consisted of either a 4 ft (1.22 m) or 3 ft (0.9 m) diameter front hoop, with interior hoops and compartments to hold fish. The configuration of the traps and the number of traps deployed varied across years depending on flow conditions and monitoring objectives. After construction of the spawning pads, the typical configuration was two to three stations deployed upstream, adjacent, and downstream of the spawning pads. Each station was oriented to capture fish moving in both upstream and downstream directions as a two-way design with the front hoop of each trap attached to wings to direct fish into the net. To maximize detection of migrating fish, the hoop-net traps were typically installed in the thalweg of the river depending on ice-flow conditions and stream velocities. However, the wings of each trap station configuration could not effectively span the width of the river given the size of the river under spring flow conditions.

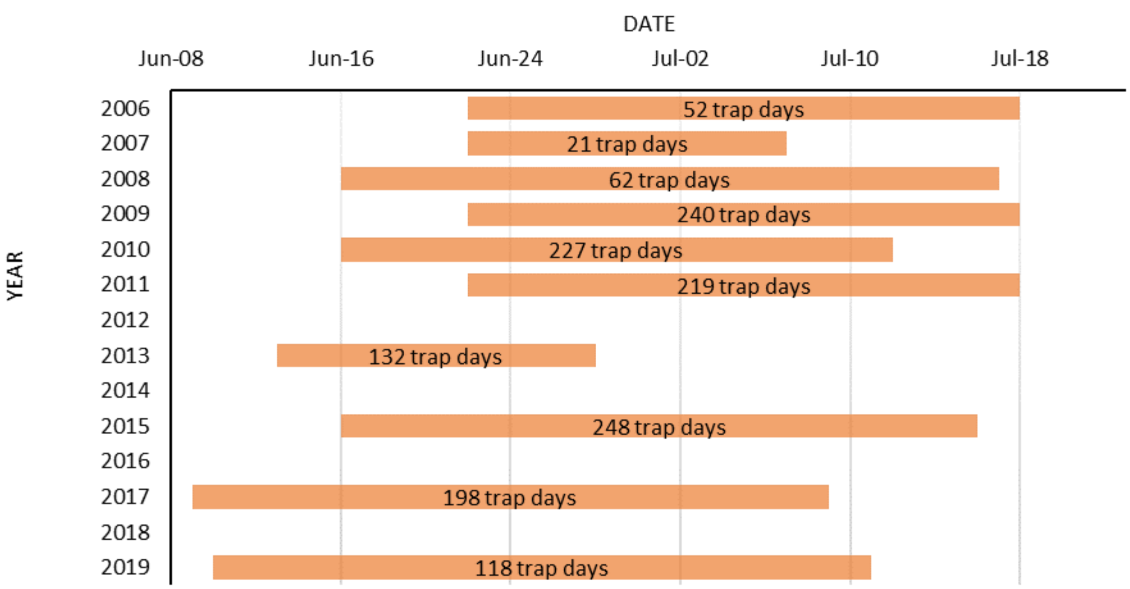


Figure 6: Hoop Net Sampling Schedule and Total Trapping Effort (# Trap Days) During R02 Monitoring Period

Hoop-net data was summarized as mean daily CPUE per year (# Arctic Grayling caught per trap), calculated as the mean of daily catch of Arctic Grayling divided by the reported number of traps for the season. Catch from all traps was considered regardless of direction of fish movement (net orientation), however traps set downstream of the bridge (in 2007 and 2008; outside of the standard survey area) were excluded from the analysis. All results are considered preliminary in that some assumptions were applied around details of the trapping effort and sampling design (e.g., where information was unclear, descriptions from previous sampling years were applied) that require additional follow up before confirmation of trends, or lack thereof. In brief, the hoop-net data summary indicated that Arctic Grayling abundance was variable across monitoring years with high and low CPUEs both before and after the construction of the spawning pads (Figure 7). Although the abundance of migrating fish was variable over time, the long-term dataset incudes evidence of a self-sustaining population of Arctic Grayling above the R02 crossing.

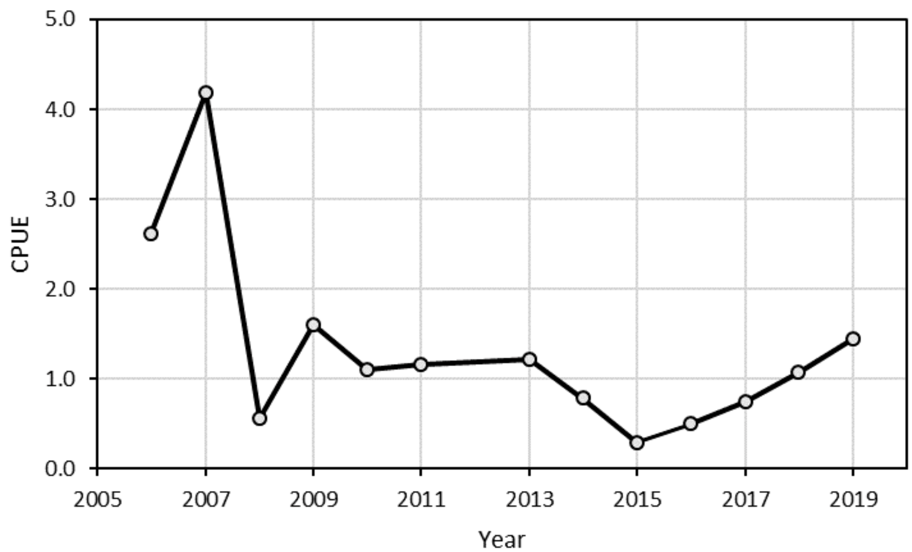


Figure 7: Annual Catch Per Unit Effort (CPUE) of Arctic Grayling in the Hoop-Net Traps, R02 Site, 2006-2019.

Conceptual Fish Production Model

Through discussion with DFO during the 1 April 2019 meeting, biomass production has been proposed as a currency for a spawning pad offsetting measure for the determination of equivalency for the Meadowbank Mine based on the premise that fisheries production (e.g., biomass) is an acceptable surrogate of fisheries productivity (Randall et al. 2013). Fish production would also provide a transferrable unit for both the calculation of losses from activities at the Meadowbank or All Weather Access Road (AWAR) projects and the calculation of gains at the spawning pad offsetting measure constructed upstream of R02 crossing (i.e., R02 spawning pads).

Life History-Based Biomass Predictions

A modified Leslie matrix model was constructed using life history inputs derived from the literature to estimate the potential increase in fish production from the R02 spawning pads. This analysis was intended to supplement that provided by Agnico Eagle (2019) using methods similar to that applied to other offsetting plans for new mining developments in the Northwest Territories and Nunavut.

As an input to the life history modelling, the capacity of the spawning pad reach to support spawning pairs (i.e., the 150 m linear length section of the R02 spawning pads) was first estimated with the assumption that spawning habitat was a limiting habitat feature in the study reach prior to the construction of the R02 spawning pads, and that emigration (or mortality) processes are common when a local population exceeds the carrying capacity of the reach (Einum and Nislow 2005). Based on the calculation of area of affected river habitat using satellite imagery, it was determined that a minimum of 0.4 ha (4,000 m^2) was either moderately enhanced or greatly enhanced from the placement of gravel substrates and the diversity of velocities in the vicinity of four constructed spawning pads. To conservatively estimate the potential gains in fish production, the focal area for calculations was reduced to habitat immediately adjacent of the spawning pads (e.g., within 10 m) where the effects of enhancement may have been greatest, which was visually estimated to be approximately 200 m^2 per pad.

Based on enhanced spawning habitat per constructed pad in the study reach, and a maximum density of one spawning male or one spawning pair per 15 m^2 (Kratt and Smitt 1980), the carrying capacity of each spawning pad was calculated to be 13 spawning pairs of Arctic Grayling under typical flow conditions. Because of the potential for patches of spawning habitat (e.g., gravel) to be present prior to construction, the actual gain in the carrying capacity of habitat resulting from the construction of the R02 spawning pads was determined to be a 4.3 fold increase from three spawning pairs. This was considered a conservative assumption given that pre-construction surveys did not record gravel patches within the spawning pad area (Golder 2007). Therefore, the contribution of the spawning pads to the carry capacity of the study reach was estimated to be a gain of at least 10 spawning pairs per spawning pad (in other words, a total minimum gain of 40 spawning pairs of Arctic Grayling for the enhanced river section).

Fecundity estimates were based on an average fecundity of 9,670 eggs per kg of body weight for a female Arctic Grayling at maturity (Bishop 1971; Stewart et al. 2007). For example, if considering mature female Arctic Grayling with a mean weight of 0.571 kg (Table 1), the R02 spawning pads have the potential to add 220,749 eggs per year.

Key assumptions in the calculation of gains for the spawning pad offsetting measure include age-specific survival rates of Arctic Grayling, and age-specific weights of Arctic Grayling, both of which were included in the production calculations for the R02 spawning pads. Life history statistics were provided up to age 9 years, in part, to simplify the assumptions of the life history modelling even though Arctic Grayling can live much longer beyond age 9 years (Table 1; Stewart et al. 2007). Age-specific statistics for lengths and weights were obtained from the Gahcho Kué Diamond Mine fish-out summary report (Table 1; De Beers 2015). Because data on survival rates for Arctic Grayling were limited to a long-term survival study of adult Arctic Grayling in the Kuparuk River, Alaska (Buzby and Deegan 2004), survival rates for younger ages were supplemented with data from a diversity of salmonid species to provide the most reliable predictions as possible (Table 1).

Table 1: Arctic Grayling Life History Inputs Used in Fish Production Calculations

Age / Stage	Length[1] (mm)	Weight (kg)[1]	Annual Biomass Production (kg)	Survival Rate[2]
Egg	-	-	-	40%
0 (YOY)	-	-	-	10%
1	111	16.6	16.6	30%
2	189	83.2	66.6	35%
3	244	179.7	96.5	40%
4	282	279.8	100.1	45%
5	309	368.8	89.0	50%
6	328	441.4	72.6	60%
7	341	497.6	56.2	70%
8	350	539.7	42.2	70%
9	357	570.7	31.0	70%

YOY = young of year; "-" not applicable as biomass gains are not attributed to Year 0 in the model; [1]source includes De Beers (2015); [2]sources include Lee and Rieman (1997), Shuter et al (1998), Siter et al. (1999), Barlaup and Moen (2001), Aprahamian et al. (2003), Peterson et al. (2004), Buzby and Deegan (2004), and Honea et al. (2009)

Age-specific survival rates were obtained from the literature (Table 1) so that when linked to the abundance of a population and age-specific weights, annual fish production could be determined for a specific cohort of Arctic Grayling. Previous researchers noted an average survival of salmonid eggs of 67% to hatching (range of 6% to 98%; reviewed in Barlaup and Moen 2001), and others used values that ranged from 10% to 70% to model salmonid population sizes (Lee and Rieman 1997). Researchers found annual variability in egg to fry survival for Chinook Salmon, with mean survival rates of 49% to 69% annually, and reach-specific survival ranging between 9% to 91% (Roni et al. 2006). Researchers have also noted a 2% survival rate of fertilized egg to first summer for Atlantic Salmon (Shearer 1961), 4% survival rate of eyed-egg to first summer for Atlantic Salmon (Kennady and Strange 1981), and 1% to 3% survival rate of eyed-egg to first autumn parr for Brown Trout (Syrjänen et al. 2015). Lee and Rieman (1997) modelled populations of salmonids using an incubation success rate in the range of 10% to 70%, a fry survival rate in the range of 10% to 40%, and a juvenile survival rate in the range of 15% to 60%.

Annual survival rates are generally higher as individuals grow making them less susceptible to predation; for example, Honea et al. (2009) modelled populations of Chinook Salmon using the following rates per ocean stage: 5% for year 1 wild fish (or 3% for year 1 hatchery fish), 80% for year 2, and 90% for years 3 and 4. In the Aprahamian et al. (2003) review, average survival from summer age 1 to age 2 smolt for wild Atlantic Salmon was 19% to 45%, much higher than earlier life history stages. Similarly, age 1 survival for Lake Trout can be 40% (Sitar et al. 1999) and annual survival for age 3 and older Lake Trout can be 92% for unexploited populations (Shuter et al. 1998). High survival rates have also been recorded for first-time spawning adults for Brown Trout (90%; Berg et al. 1998). For unexploited to lightly exploited populations of Arctic Grayling, mean survival rates calculated for a long-term study of Arctic Grayling in Alaska was 71% (Buzby and Deegan 2004).

At each stage of development, a survival rate at the lower end of what has been reported in the literature was applied as a conservative assumption (Table 1). This approach aims to address any uncertainty related to the calculation of biomass of recruits (Table 2), which showed that Arctic Grayling production generated from one year of successful spawning on the spawning pads is equivalent to 403 kg when considering annual production from that cohort over a 10-year period. Repeated annual spawning over a 10-year period in the enhancement area may generate as much as 4,030 kg of cumulative biomass production when considering gains from all ten cohorts combined. Assumptions underlying this forecast are consistent conditions over time that reflect the selected vital rates in the life history model and a scenario where the R02 spawning pads are at capacity every year.

Finally, it is important to note that cumulative gains in fish production may be much greater than what was calculated using the model presented in this technical memo. For example, gains will be higher under the following conditions:

- the actual area or size of a male territory is smaller than what was selected for understanding carry capacity of the R02 spawning pads
- the area of enhanced habitat is greater than was visually estimated using satellite imagery
- the placement of spawning pads created spawning habitat in an area of the river where pre-construction substrates and velocities were not suitable for spawning
- the actual survival and fecundity rates are higher than the selected inputs used in the biomass production model
- the mean weights and growth rate of the local population are higher than what was selected for the biomass production model
- the spawning pads have the potential to provide recruits that are a source of mature adults for spawning in other locations in the study system

Table 2: Arctic Grayling Production Generated from One Year of Successful Spawning on Enhanced Habitat (Four Spawning Pads) in the R02 Study Reach

Stage (Age)	Survival Rate	Number of Fish	Mean Weight (kg)	Standing Stock Biomass (kg)	Annual Production (kg)
Egg	0.40	187,071	--	--	--
Age 0	0.10	74,828	--	--	--
Age 1	0.30	7,483	0.0166	124.22	124.22
Age 2	0.35	2,245	0.0832	186.78	149.52
Age 3	0.40	786	0.1797	141.24	75.85
Age 4	0.45	314	0.2798	87.86	31.43
Age 5	0.50	141	0.3688	52.00	12.55
Age 6	0.60	71	0.4414	31.34	5.15
Age 7	0.70	42	0.4976	20.90	2.36
Age 8	0.70	30	0.5397	16.19	1.26
Age 9	0.70	21	0.5707	11.98	0.65
				Total	***402.99***

Summary

The benefits of constructing spawning pads for river-spawning Arctic Grayling were demonstrated by i) examining monitoring data collected on the Arctic Grayling population upstream of the R02 crossing (from 2007 to 2019) and ii) developing a conceptual fish production model to quantify changes in Arctic Grayling biomass following the construction of spawning pads. The conclusions from this study were consistent with those made by Agnico Eagle in their NNPL update, and are supported by other research, including research by DFO Scientists (e.g., Loughlin and Clarke 2014). The use of physical in-stream structures, including the placement of gravel and cobble substrates to improve spawning habitat and provide cover and habitat for fish, is a common technique applied in fisheries conservation and management (reviewed in Roni et al. 2005; Fitzsimons 1996).

The extensive dataset from long-term monitoring of the Arctic Grayling population upstream of the R02 crossing clearly identifies a self-sustaining population of Arctic Grayling that can benefit from the constructed spawning pads (for more details see the Meadowbank Mine annual reports submitted to NIRB). Results from the larval drift traps combined with the life history modelling completed in this technical memo also provide the evidence to demonstrate gains in fish production were achieved from the construction of the four spawning pads above the R02 crossing in winter 2008/2009. The magnitude of the annual gain has the potential to be substantial, approximately a 4-fold increase in larval recruitment every year post-construction, which is consistent with the conclusions drawn by Agnico Eagle in the NNPL update.

The life history model developed for this study, which was a modified Leslie matrix model similar to that used for offsetting plans for other projects in the North (e.g., Golder 2019), demonstrated that Arctic Grayling production generated from only one year of successful spawning on the four spawning pads is expected to provide a minimum gain of 403 kg of biomass. This prediction considers the annual production resulting from one spawning event that would be generated from one cohort over a 10-year period. Over a ten year period with successful spawning events each year, the minimum cumulative gain would be 4,030 kg of biomass. It is important to note that predicted gains in fish production may be much greater than what was calculated using the conservative model inputs selected in this technical memo (e.g., if carrying capacity of the spawning pads are higher than what was assumed, or if fecundity rates are higher than the selected inputs).

To reduce any uncertainty around the identified trends and recognizing that the monitoring program was initially designed to monitoring Arctic Grayling movements in relation to the construction of the R02 crossing, it is recommended that future monitoring is adapted to focus on the distribution and abundance of incubating eggs on the spawning pads. Site-specific information on Arctic Grayling egg incubation would also help address any potential uncertainties related to the identification of larvae captured during spring sampling. That said, there remains sufficient evidence to support the use of the spawning pad concept as a contingency measure for the Meadowbank Site. Given the results presented in this memo as a reply to concerns raised by DFO, future offsetting plans can be scaled by adjusting the number of spawning pads to be installed as a cost-effective offsetting tool to counterbalance a range of residual effects on fish habitat (i.e., losses in fish production) from mining-related activities.

GOLDER ASSOCIATES LTD.

This technical memorandum was prepared and reviewed by the undersigned.

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CM/CS/jr/bh/al

https://golderassociates.sharepoint.com/sites/109587/project files/5 technical work/spawning pad review memo/19122020-474-tm-awar-argrspawningpad-rev0.docx

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APPENDIX E

Arctic Grayling young-of-year stream occupancy analysis: Identification of potential offsetting locations (Ellenor, July 2020)

<u>Technical Memorandum</u>

Date: July 31, 2020

To: Leilan Baxter

From: Jared Ellenor

Re: Arctic Grayling young-of-year stream occupancy analysis: Identification of potential offsetting locations

1. Overview

This memo identifies streams in the Baker Lake and Meadowbank area where Arctic Grayling (*Thymallus arcticus*) are most likely to benefit from enhancement of spawning substrate or improvements to stream connectivity. Thirty-six streams were initially identified in suitable proximity (<500 m) to access roads. The likelihood that each of these streams supported Arctic Grayling young-of-year (YOY) was assessed using the probabilistic (occupancy) model developed in Ellenor 2020. Incorporating previously collected data on Arctic Grayling presence/absence and stream habitat variables (Cumberland Resources Ltd. 2005; C. Portt and Associates 2015; Ellenor 2020), the list of candidate streams was reduced and divided into three categories:

- Streams that are likely or known to support YOY Arctic Grayling, and that may benefit from spawning substrate enhancement;
- Streams that are likely or known to support YOY Arctic Grayling, and that may benefit from stream connectivity improvements; and
- Streams that are unlikely to support or previously found absent of YOY Arctic Grayling, and that may benefit from stream connectivity improvements.

This memo provides a brief description of the occupancy model developed in Ellenor 2020 and discusses in detail the streams that are most suitable for potential habitat enhancement and connectivity improvement.

2. Occupancy model

Research on the habitat use of YOY Arctic Grayling in Barrenland streams was conducted as a complementary offsetting measure for the Whale Tail Pit project. This research used occupancy modeling to identify variables that best explain the presence/absence of YOY Arctic Grayling in streams within the region. Visual surveys (5 replicates per stream) assessed the presence/absence of YOY Arctic Grayling at a total of 49 randomly selected streams within approximately 5 km of accessible road. Surveys were conducted between July 16 to August 7, 2019, during a period when YOY are known to be rearing in local streams, based on observed timing of spawning, incubation, and rearing during 2018 reconnaissance surveys. Habitat variables were collected at each stream (i.e., depth, velocity, wetted width, discharge, substrate, water temperature, *in situ* water quality) and landscape level variables (i.e., land cover, contributing upstream lake area) were calculated using QGIS (QGIS Development Team 2020). Occupancy modeling was used to assess the relationship (if any) between the habitat variables and the presence/absence of YOY Arctic Grayling. Single-season occupancy models were constructed in R (R Core Team 2019) using the RPresence package (MacKenzie, and Hines 2019). Models were assessed using Akaike's Information Criterion with a second order bias correction (AICc), to mitigate overparameterization as a result of the small sample size (Anderson 2008). Based on relative AICc scores, a clear top model was identified, which indicated that the presence/absence of YOY Arctic Grayling within study streams was best predicted using two landscape level variables:

- Contributing upstream lake area (the sum of the surface area of all upstream lakes within the chain lake system); and
- Land cover (upland vs. lowland, determined using Ecological Land Classification data).

These landscape-level variables and their influence on habitat suitability are described below.

2.1 Contributing upstream lake area

Contributing upstream lake area is the summation of the surface area of the lakes within the chain lake system that contribute to the flow of the stream, as depicted in Figure 1.

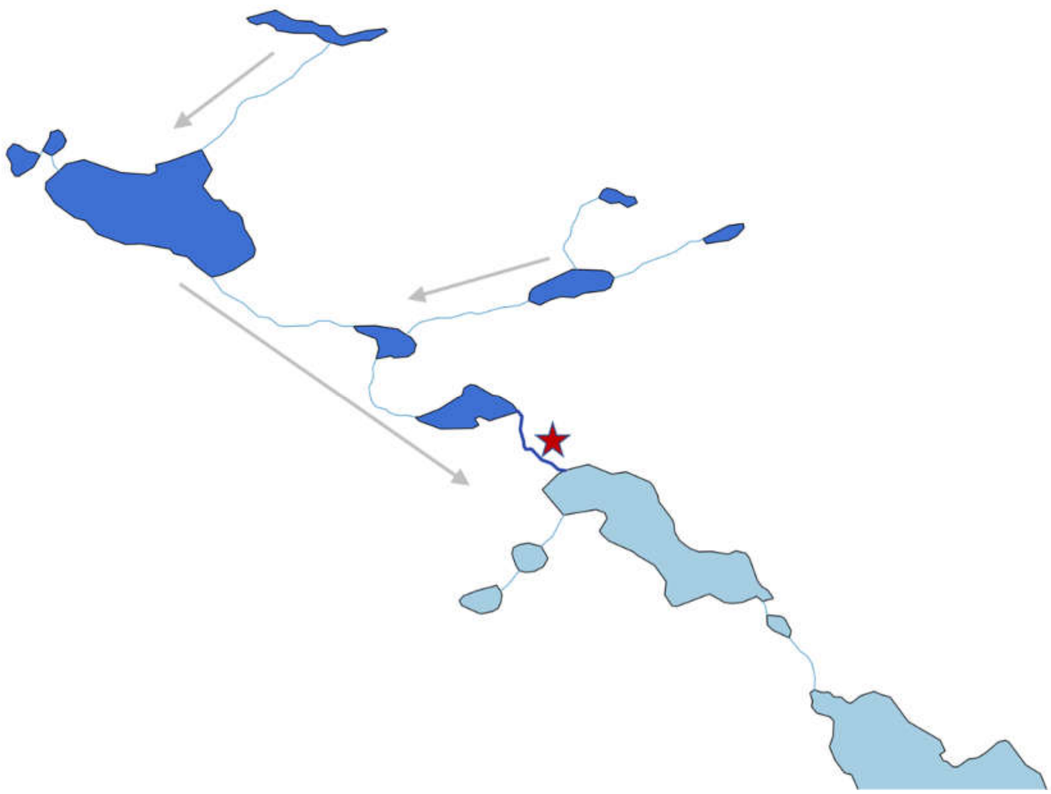

Figure 1. Sample process for identifying contributing upstream lake area. For the stream of interest (red star), contributing upstream lake area is calculated as the summation of the surface area of all upstream lakes (dark blue). Grey arrows indicate direction of flow.

Contributing upstream lake area was positively and significantly correlated with stream discharge (Pearson's r = 0.87), suggesting that upstream lakes provide an important source of water for streams (Ellenor 2020). Nearly all streams in the Barrenlands originate as lake outlets (Jones et al. 2003), and the position of the stream within the chain lake system determines the potential for upstream lakes to act as stable and moderating sources of flow. The probability that a stream is occupied increases as contributing upstream lake area increases, and therefore headwater streams or those that are located further upstream within a chain lake system have a lower likelihood of containing YOY Arctic Grayling

(Figure 2). In a landscape where summer evaporation typically exceeds precipitation, an increase in the number and/or size of upstream lakes increases the likelihood that stream flow and connectivity will be sustained throughout the ice-free season. For YOY Arctic Grayling, sustained flow and habitat connectivity is vital for migration to overwintering lakes prior to freeze-up.

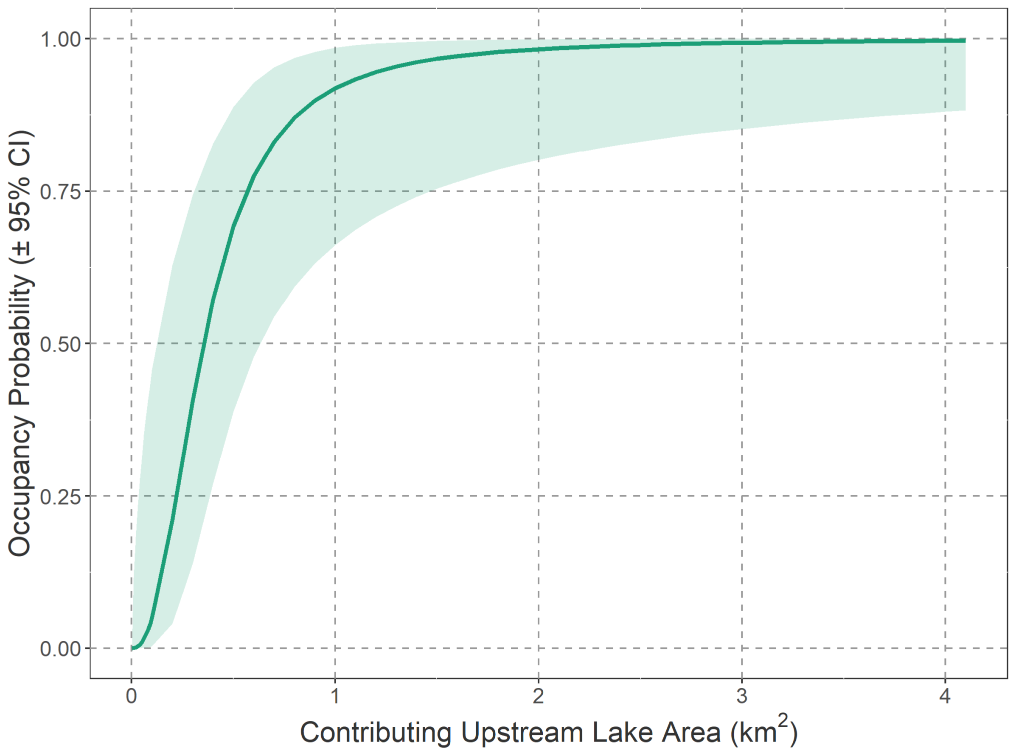

Figure 2. Relationship between contributing upstream lake area and the probability of Arctic Grayling young-of-year occupancy at a lowland land cover of 94.5% (median value for streams surveyed in Ellenor 2020).

2.2 Land Cover

Barrenland streams are largely colluvial, meaning fluvial processes are relatively ineffective at moving material and influencing channel morphology (Jones and Tonn 2004). This results in generally stable, poorly sorted streams, where attributes such as substrate and geomorphology are a product of the immediate surrounding landscape. The landscape can be surprisingly variable, with bedrock forming broad sloping uplands and lowlands. Soil characteristics and moisture regimes range from poorly drained graminoid peatlands, to moderately drained shrub tundra, to dry boulder lichen tundra (Campbell et al. 2012). These conditions not only drive vegetation communities, but also affect stream attributes. A landscape that is wet and poorly drained can promote hydrologic connectivity and allow stream flow to persist through summer, whereas well-drained boulder fields derived from glacial till can result in subsurface stream flow or isolation of streams. This is most prevalent later in the summer, when water levels are lower (Jones et al. 2003; Courtice et al. 2014).

Ecological land classification data for the region identifies twelve different vegetation communities (Figure 3a), and while the specific composition of vegetation communities adjacent to streams is not anticipated to influence habitat suitability for fish, the general moisture and substrate of the surrounding landscape is expected to have an impact. Therefore, the twelve vegetation communities were reduced to two land classes: 1) upland; and, 2) lowland (Figure 3b). The lowland land class includes poorly drained substrate dominated by organic material, whereas the upland land class includes well-drained inorganic substrates, such as gravel, boulder, and bedrock. Model results from Ellenor 2020 show that streams in predominantly upland areas have a lower likelihood of containing of YOY. The likelihood of occupancy increases as lowland landcover becomes increasingly dominant (Figure 4).

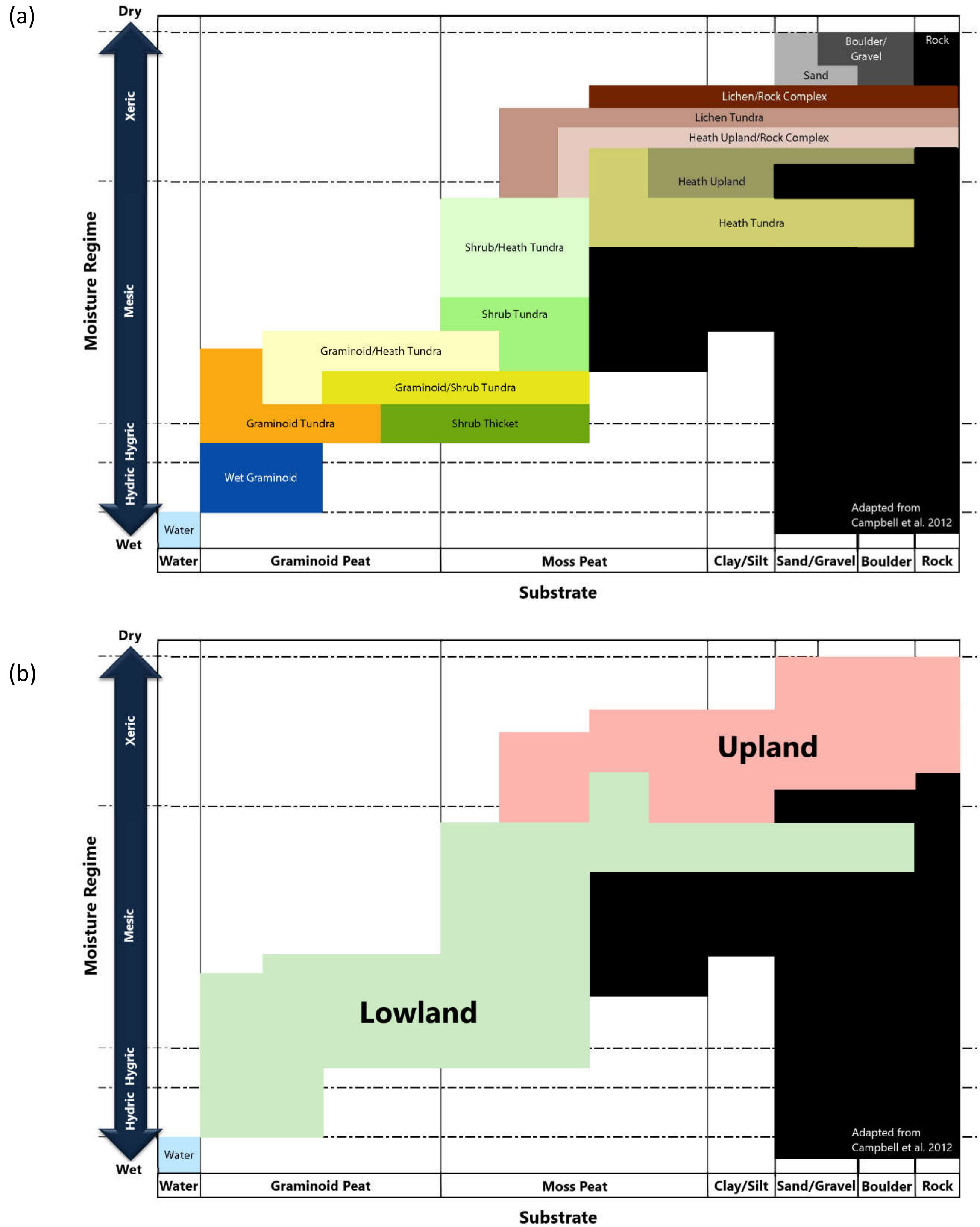

Figure 3. Relationship between moisture and substrate for (a) twelve ecological land cover classes identified in Campbell et al. (2012) and (b) simplified lowland and upland land cover classes to assess relationship with stream habitat suitability. Delineation of lowland and upland classes was based on moisture. Moist vegetation classes (i.e., mesic, hygric, and hydric) were classified as lowland, whereas dry vegetation classes (i.e., xeric) were classified as upland. Images adapted from Campbell et al. (2012).

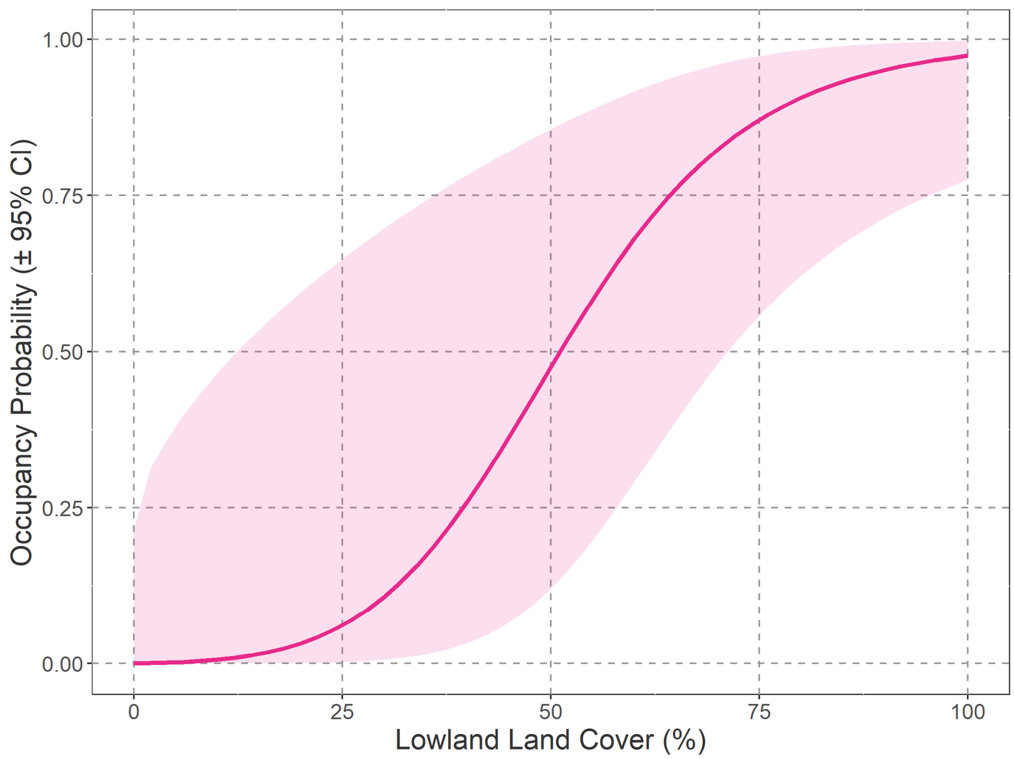

Figure 4. Relationship between land cover and probability of Arctic Grayling young-of-year occupancy at a contributing upstream lake area of 1.43 km² (median value for streams surveyed in Ellenor 2020). Land cover is presented as the percentage of lowland land cover.

2.3 Use of model results to identify offsetting potential

A bivariate plot facilitates understanding of how land cover and contributing upstream lake area jointly influence the probability that a stream is occupied (Figure 5). Dark shaded regions in Figure 5 indicate conditions where streams are unlikely to be occupied by YOY Arctic Grayling, while light shaded regions indicate conditions where streams are likely to be occupied by YOY Arctic Grayling.

For streams that are being considered for offsetting, those found in regions with sufficient lowland land cover and upstream lake area (e.g., black circles in Figure 5) could be considered for habitat enhancement (e.g., improved spawning substrate) to increase abundance. Streams found in regions with insufficient lowland land cover and upstream lake area (e.g., white circles in Figure 5) could be considered for stream connectivity improvements, to attempt to improve conditions to a point where the stream can support YOY Arctic Grayling. Connectivity improvements are likely to focus on instream modifications, such as removal of boulders and creation of a defined channel, which would increase the resemblance of the stream to well-connected lowland streams. The predicted minimum requirement for lowland land cover varies based on the contributing upstream lake area present, and therefore the level of enhancement required to create suitable habitat is dependent upon the starting conditions of the stream (e.g., white arrows in Figure 5). This relationship between starting conditions and required conditions is considered when identifying candidate streams that could benefit from connectivity enhancements.

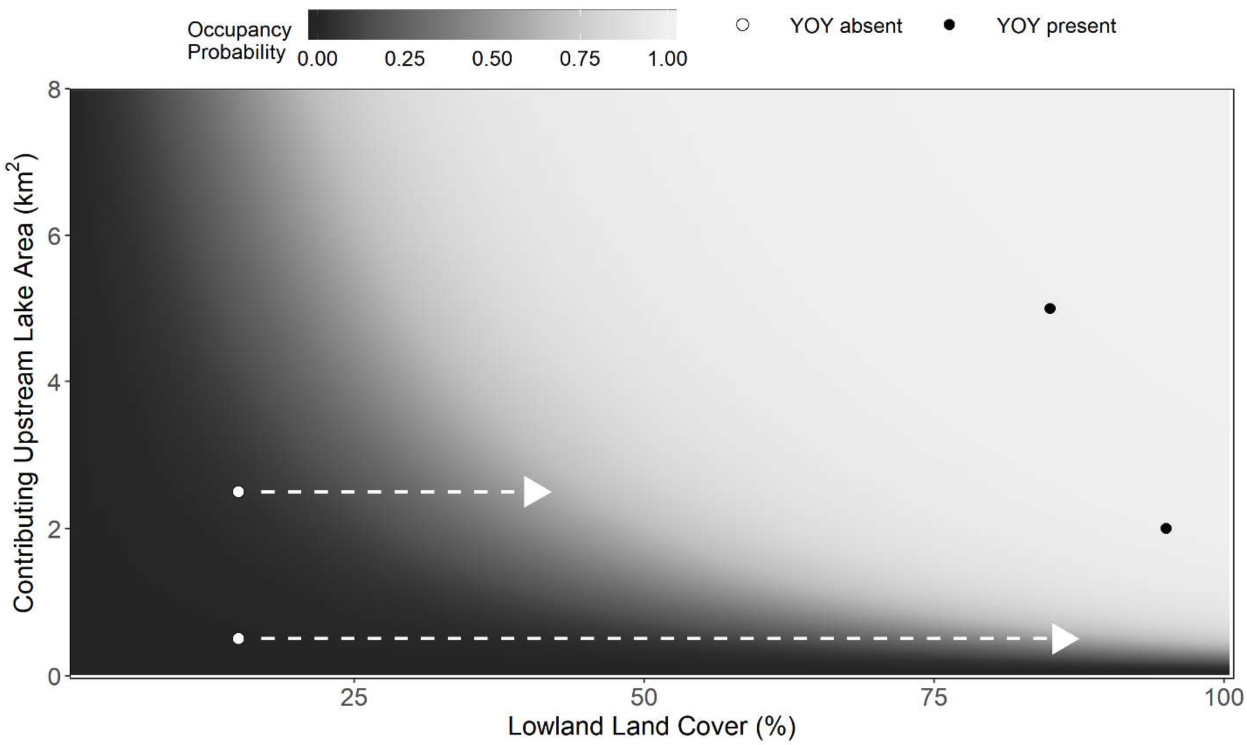

Figure 5. Bivariate plot of estimated occupancy of YOY Arctic Grayling as a function of percentage of lowland land cover and contributing upstream lake area. Shading represents the likelihood that a stream is occupied under the specific conditions. Black circles are hypothetical streams with suitable land cover and with sufficient upstream lake area, that are likely to contain YOY Arctic Grayling. White circles are hypothetical streams that are unlikely to be occupied based on unsuitable land cover and insufficient upstream lake area. Alterations in land cover through the removal of unembedded instream boulders, may increase the relative percentage of lowland land cover, improving connectivity. The level of enhancement or modification required to achieve a suitable percentage of lowland land cover varies based on the existing upstream lake area, as identified by the length of the white arrows.

3. Study Area

A total of 36 streams are within suitable proximity (<500 m) to a roadway (Figure 6). These streams were identified using watershed shapefiles (Natural Resources Canada 2016) and satellite imagery (publicly available (Google Earth 2019a, 2019b, 2019c) and supplied by Agnico Eagle).

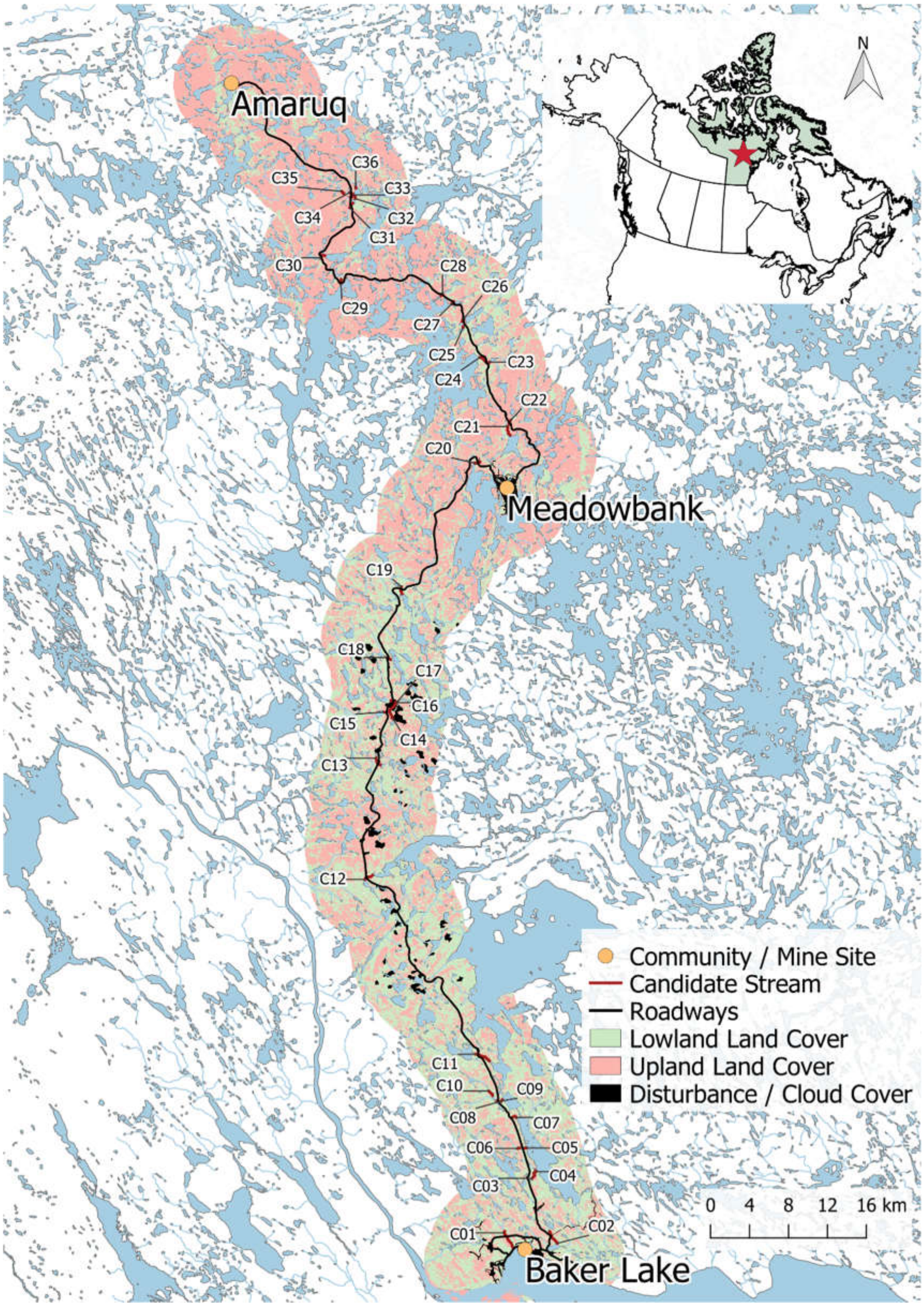

Figure 6. Map of region, with the 36 candidate streams indicated in red and labelled. There is a general trend of decreasing lowland land cover (increasing upland land cover) along the all-weather access road from Baker Lake to Amaruq.

4. Occupied Streams- Candidates for habitat enhancement

Of the 36 streams assessed, 13 are known to be occupied by YOY Arctic Grayling based on 2019 presence/absence surveys (or incidental observation), and an additional 7 streams have a reasonable likelihood of supporting YOY Arctic Grayling (i.e., probability of occupancy greater than 0.5). Modelled occupancy likelihood and 2019 visual survey results for these 20 streams are summarized in Table 1. These streams were each individually considered for habitat enhancement opportunities, including spawning substrate enhancements and connectivity improvements, incorporating historic stream data, where available.

Table 1. Summary of model input variables, occupancy likelihood and 2019 visual survey results for streams that are either known to be occupied, or have a reasonable likelihood of occupancy (i.e., probability of occupancy greater than 0.5).

Stream	Lowland Land Cover (%)	Upstream Lake Area (km^2)	Occupancy Probability (95% CI)	2019 YOY Survey Results	Notes
C01	94.9	0.33	0.46 (0.18 - 0.77)	Occupied	
C02	100.0	0.87	0.92 (0.66 - 0.99)	Occupied	
C03	98.7	45.21	1.00 (0.98 - 1.00)	Occupied	
C04	98.3	45.24	1.00 (0.98 - 1.00)	Occupied	
C08	100.0	4.98	1.00 (0.91 - 1.00)	Occupied	
C09	100.0	4.94	1.00 (0.91 - 1.00)	-	
C10	95.3	3.57	1.00 (0.87 - 1.00)	Occupied	
C11	99.3	11.38	1.00 (0.95 - 1.00)	Occupied	
C12	96.5	2.15	0.99 (0.82 - 1.00)	Occupied	
C13	92.7	0.55	0.71 (0.41 - 0.90)	-	
C15	74.2	0.79	0.62 (0.33 - 0.84)	-	Land cover (and therefore occupancy) is approximate, due to cloud cover over 37% of stream.
C16	NA	1.14	NA	-	Land cover could not be determined due to cloud cover, precluding occupancy estimation. Incidental observations of YOY Arctic Grayling in 2019.
C17	NA	8.08	NA	Occupied	Land cover could not be determined due to cloud cover, precluding occupancy estimation.
C18	96.8	1.38	0.97 (0.75 - 1.00)	Occupied	
C19	84.5	2.00	0.97 (0.74 - 1.00)	Occupied	
C25	30.1	4.77	0.67 (0.07 - 0.98)	-	
C26	38.3	4.59	0.82 (0.18 - 0.99)	-	
C28	93.0	0.76	0.84 (0.56 - 0.96)	Unoccupied	
C29	18.1	316.39	1.00 (0.63 - 1.00)	-	
C34	97.0	1.23	0.96 (0.73 - 0.99)	Occupied	

4.1 Spawning Habitat Enhancement

Arctic Grayling spawning occurs over a variety of substrates that range from silt to cobble and boulder (Scott and Crossman 1973; Northcote 1995; Stewart et al. 2007); however, spawning is typically observed over small, unembedded gravel (Stewart et al. 2007). Many Barrenland streams are dominated by coarse material (i.e., boulder and cobble) (Jones et al. 2003; Artym 2016; Ellenor 2020), and therefore Arctic Grayling populations within the study area could potentially benefit from spawning habitat enhancements, such as the creation of gravel spawning pads. Existing habitat conditions were examined (where data were available) for the 19 streams that are likely or known to support Arctic Grayling YOY, with the aim of identifying streams that would benefit most from spawning habitat enhancement. Based on the available data (see Table A-1 in Appendix A), three streams were identified as top candidates for spawning habitat enhancement.

4.1.1 Stream C11

Stream C11 is located approximately 25 km north of Baker Lake, along the all-weather access road (AWAR) (Figure 6). In 2005 this stream was identified as an excellent migratory route for Arctic Grayling, with good spawning habitat, as both adults and YOY were captured (Cumberland Resources Ltd. 2005). Habitat data collected in the upper reaches of the stream, near the AWAR crossing found that riffles are dominated by cobble (65%) then boulder (35%), while pools are more evenly mixed (50% cobble, 50% boulder, Table A-1 in Appendix A) (Cumberland Resources Ltd. 2005). Habitat data collected in 2019, in the lower reaches of this stream near the convergence with the Prince River, were dominated by boulder (92%) followed by cobble (8%) (Ellenor 2020). The large percentages of boulder substrate in the stream, particularly in the lower reaches (Figure 7), makes it a good candidate for spawning substrate enhancement.

Figure 7. Stream C11 on July 20, 2019, looking downstream at the convergence with the Prince River. The lower reach of this stream is dominated by boulders, and is a good candidate for spawning substrate enhancement.

4.1.2 Stream C29

Stream C29, also known as the Meadowbank River, is located approximately 32 km north of Meadowbank, along the AWAR (Figure 6). This river has a contributing upstream lake area of 316 km², which is considerably larger than any other stream assessed here or included in Ellenor 2020. Although there is adequate connectivity to sustain flow throughout the summer, the river is situated in an upland dominated region (lowland land cover of 38%), leading to lower confidence in the occupancy estimate (1.00, 95% CI of 0.63-1.00). The dominance of upland land cover suggests that river substrate is likely boulder dominant, potentially limiting spawning habitat for Arctic Grayling. Spawning substrate enhancement, similar to the spawning pads constructed at R02 (upstream of Bridge 1), may improve Arctic Grayling habitat in the river. This river was electrofished on one occasion in 2014, and although no Arctic Grayling were captured, it was identified as a likely migration route, and possible spawning location for the species (C. Portt and Associates 2015).

4.1.3 Stream C34

Stream C34, located approximately 42 km north of Meadowbank, was the only stream along the road from Meadowbank to Amaruq where Arctic Grayling were captured during baseline roadwork surveys in 2014 and 2015 (C. Portt and Associates 2015). Given the dominance of upland land cover in this area (Figure 6), which limits suitable stream habitat, stream C34 likely provides critical spawning habitat for the local Arctic Grayling population; the stream immediately upstream of C34 as well as two streams that discharge into same lake as C34 were not found to contain YOY during 2019 surveys (Ellenor 2020). Stream C34 originates as a gently sloping single channel at the inflow, and branches into slightly steeper braided channels near the road crossing. Substrate in this stream is variable (C. Portt and Associates 2015) and habitat surveys downstream of the road crossing in 2019 suggest that boulder dominates the braided portion of the stream (90%), followed by cobble (10%) (Ellenor 2020). The likely importance of this stream for spawning, and dominance of boulder substrate makes it a strong candidate for spawning substrate enhancement.

4.2 Stream Connectivity Improvements

Habitat enhancements for streams that currently support YOY Arctic Grayling may also include improvements to stream connectivity, increasing the likelihood of successful migration of YOY to suitable overwintering habitat. Three streams that are known, or likely to be occupied by Arctic Grayling, were identified for connectivity improvements, and are discussed below.

4.2.1 Stream C01

Stream C01 is a small stream located within the hamlet of Baker Lake to the west of the community (Figure 8). It is crossed by two roadways, including the road to the airport. This stream has a modeled occupancy probability of 0.46 with a 95% confidence interval (CI) ranging from 0.18-0.77; however, visual surveys conducted in 2019 confirmed the presence of YOY Arctic Grayling. This stream is in a lowland-dominated area (95% lowland), but has a relatively small contributing upstream lake area (0.33 km^2), which leads to its somewhat low likelihood of occupancy and large 95% CI. Because of the low contributing upstream lake area, it is expected that stream connectivity is limited late in the open water season. Since the stream is crossed by two roads, it is recommended that connectivity be assessed during low flow, as upgrades to the current culvert configuration for the downstream (airport) road (Figure 9) could improve connectivity in the late summer and facilitate migration of YOY to overwintering habitat.

Figure 8. Stream C01 on July 16, 2019 looking downstream towards Baker Lake. Visual surveys conducted on this day confirmed the presence of YOY within the stream.

Figure 9. Stream C01 on June 19, 2019, looking downstream at the current culvert configuration for the road to the airport. It is recommended that connectivity be assessed during the late summer to confirm YOY Arctic Grayling can migrate to overwintering habitat during periods of lower flow.

4.2.2 Streams C15, C16, and C17

These streams are all within the same chain lake system, approximately 75 km north of Baker Lake, along the AWAR (Figure 6). Unfortunately, cloud cover in the satellite imagery used for land classification prevents accurate estimation of land cover for these streams (Figure 10). As a result, there is uncertainty surrounding occupancy estimates. However, personal field observations and previously collected data (Cumberland Resources Ltd. 2005; Ellenor 2020), suggest that these streams may benefit from connectivity improvements.

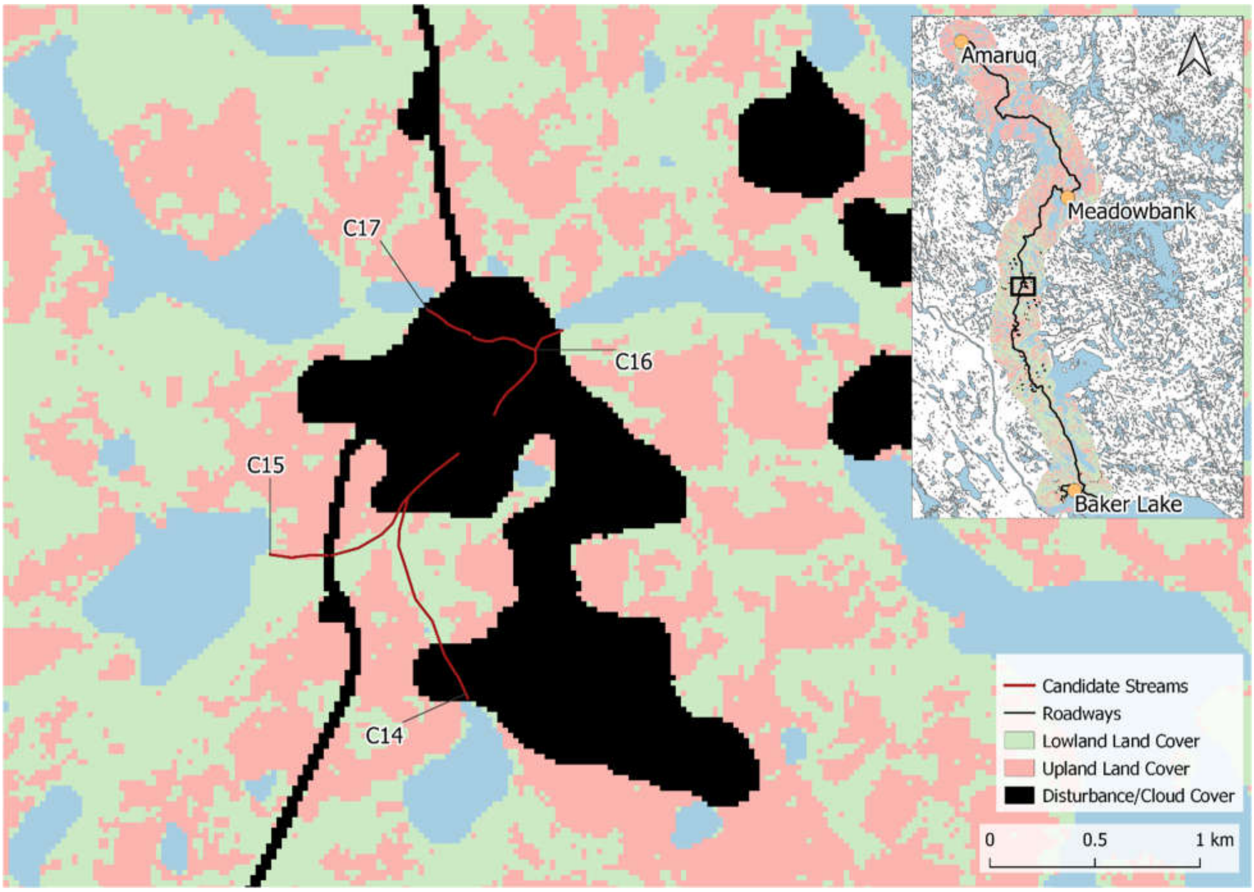

Figure 10. Chain lake system containing streams C14, C15, C16, and C17. Arctic Grayling YOY occupancy estimates could not be accurately modeled, as land cover is unknown due to cloud cover present within the satellite imagery. However, using previous field observations, offsetting opportunities within this system were identified.

4.2.3 Stream C17

This stream was assessed in 2005 and 2019, and in both instances was found to support Arctic Grayling. During 2019 visual surveys, YOY were detected in 2 of 5 replicates, resulting in a relatively low detection rate compared to other streams assessed in the same year. While the low detection rate may be a result of site-specific conditions influencing detectability, it may also be a result of low abundance in this stream. Low catches of Arctic Graying were also reported in this stream in 2005 by Cumberland Resources Ltd., as only two adult Arctic Grayling were captured migrating upstream during spring surveys. Late summer/fall fish sampling equipment could not be set in 2005 because of shallow water and limited connectivity. Similar habitat conditions were present on July 30, 2019, as the lower portion of the stream was shallow (average depth of 0.15m), wide (32.3 m), and dominated by a mix of boulder (48%) and cobble (44%). Overall stream characteristics may lead to limited connectivity during low flow (Figure 11), potentially limiting the suitability of this stream for Arctic Grayling, as suggested by Cumberland Resources Ltd. 2005, which stated:

> "Given the proximity and connectivity of bridge crossing 04 [stream C17] to Amarulik Lake, and possible upstream overwintering habitat, fish activity was less prominent than expected. It may be

that upstream and downstream boulder and cobble fields act as barriers throughout the majority of the open-water season…" [page 4-19].

Improvements to connectivity may increase migration potential for both YOY and adult Arctic Grayling, as suitable overwintering habitat likely exists both upstream and downstream (Cumberland Resources Ltd. 2005). In addition to connectivity improvements, enhanced spawning substrate may also increase YOY abundance in the stream.

Figure 11. Stream C17 looking upstream on July 30, 2019. This shallow, wide section of stream that is dominated by boulder and coble may have limited surface connectivity in the late summer/early fall, as flows decrease, limiting migration opportunities for Arctic Grayling.

4.2.4 Streams C16 and C15

Arctic Grayling YOY were observed incidentally in the lower portion of stream C16 during the summer of 2019, suggesting that suitable habitat is present. Stream C15, which is located immediately upstream of stream C16 (Figure 10), has a moderate likelihood of occupancy (0.62, 95% CI of 0.33-0.84); however, landcover data were only available for the upper portion of the stream, leading to greater uncertainty in this estimate. An assessment of stream C15 was completed in 2005 and noted that a wide boulder and cobble field resulted in subsurface flow, limiting the potential for fish habitat; no fish were observed during two visits in 2005 (Cumberland Resources Ltd. 2005). Given that fish are present in the lower reaches of C16, yet likely absent from C15, there is potential for connectivity/habitat improvements, either in the upper portion of C16 or the lower portion of C15, downstream of the confluence with C14 (see Figure 10). Field reconnaissance is recommended to assess if habitat limitations exist in the upper reaches of C16, or in the lower reaches of C15, and if instream modifications have the potential to improve habitat for Arctic Grayling.

5.Unoccupied streams- Candidates for connectivity improvements

Of the 36 streams assessed, 16 were deemed unlikely to be occupied, based on 2019 survey results or by having modeled occupancy likelihoods of less than 0.5 (Table 2). Since stream occupancy is predicted based on a combination of land cover and contributing upstream lake area, streams that are likely unoccupied as a result of unsuitable land cover rather than a result of insufficient upstream lake area were considered ideal candidates for offsetting (see Figure 5). While it is difficult to increase upstream lake area, which would require connecting an isolated headwater lake to the chain lake system, alterations to land cover within/immediately surrounding the stream are more feasible. For instance, the creation of a defined channel with appropriate substrate may improve connectivity throughout the summer and has the potential to provide new habitat for Arctic Grayling. Considering this, three likely unoccupied streams were identified as priority candidates for offsetting.

Table 2. Summary of model input variables, occupancy likelihood and 2019 visual survey results for streams that are likely unoccupied (i.e., probability of occupancy less than 0.5).

Stream	Lowland Land Cover (%)	Upstream Lake Area (km²)	Occupancy Probability (95% CI)	2019 YOY Survey Results	Notes
C05	82.9	0.29	0.22 (0.06 - 0.58)	-	
C06	100.0	0.29	0.47 (0.17 - 0.80)	-	
C07	79.6	0.06	0.01 (0.00 - 0.22)	-	
C14	98.4	0.20	0.26 (0.05 - 0.68)	-	Land cover is approximate, due to cloud cover over 36% of stream.
C20	64.6	0.02	0.00 (0.00 - 0.07)	-	
C21	52.2	0.48	0.08 (0.01 - 0.44)	-	
C22	2.9	0.38	0.00 (0.00 - 0.07)	-	
C23	7.1	2.64	0.01 (0.00 - 0.69)	-	
C24	14.7	2.69	0.06 (0.00 - 0.80)	Unoccupied	
C27	39.8	0.38	0.02 (0.00 - 0.28)	-	
C30	18.9	0.64	0.00 (0.00 - 0.27)	-	
C31	45.0	0.47	0.04 (0.00 - 0.38)	-	
C32	33.7	0.66	0.03 (0.00 - 0.40)	Unoccupied	
C33	98.6	0.23	0.32 (0.08 - 0.72)	Unoccupied	
C35	36.7	1.17	0.14 (0.01 - 0.67)	Unoccupied	
C36	100.0	0.16	0.19 (0.03 - 0.65)	-	

5.1 Stream C24

Stream C24 is located along the AWAR, approximately 10 km north of Meadowbank (Figure 6). This stream has a very low likelihood of occupancy, just 0.06, but this estimate is largely uncertain (95% CI of 0.00 – 0.80). This uncertainty in the likelihood estimate is a result of a moderate contributing upstream lake area (2.69 km²) that promotes suitable habitat, but a low percentage of lowland land cover (14.7%) that precludes suitable habitat. Visual surveys on August 01, 2019 did not detect Arctic Grayling YOY within this stream, and while stream connectivity was excellent in the upper portion of the stream (Figure 12), a boulder field further downstream resulted in low, predominantly subsurface flow (Figure 13). Stream enhancements within stream C24, such as the removal of boulders and the creation of a defined channel that maintains connectivity, may promote use of this stream by Arctic Grayling. However, prior to initiating enhancements, it is recommended that fish sampling be conducted in the large unnamed lake that stream C24 flows into. Many of the streams that flow into this lake are predicted to be unsuitable for YOY Arctic Grayling (visual surveys in 2019 failed to detect YOY in three streams that flow directly into the lake), and the presence of Arctic Grayling within the lake is unknown. The presence of Arctic Grayling within the lake would increase the likelihood that habitat improvements to this stream would be utilized.

Figure 12. Looking downstream at a well-connected portion of stream C24 on August 01, 2019.

Figure 13. Looking upstream at a poorly connected portion of stream C24 on August 01, 2019.

5.2 Stream C32

Stream C32 is located approximately 45 km north of Meadowbank, along the AWAR (Figure 6). This stream has an occupancy likelihood of 0.03 with a 95% CI of 0.00 - 0.40. This stream has a moderate contributing upstream lake area (0.66 km^2) and a low percentage of lowland land cover (33.7%).

Presence/absence surveys in 2019 did not detect YOY Arctic Grayling, and this stream is likely unsuitable for YOY rearing due to poor connectivity in the lower portion of the stream, where a boulder field causes predominantly subsurface flow in the late summer/early fall (Figure 14). Although this stream is likely unoccupied, the chain lake system is known to support Arctic Grayling, which were detected in stream C34 in 2014, 2015, and 2019 (C. Portt and Associates 2015; Ellenor 2020). Stream C34 is located less than 500 m northwest of stream C32 (Figure 15), and both streams discharge into the same lake. Stream C32 is therefore a good candidate for offsetting, as habitat improvements may promote spawning and rearing within the stream by the local population of Arctic Grayling. The creation of a more defined channel in the lower portion of the stream will improve surface connectivity throughout the summer and increase the likelihood of use by Arctic Grayling.

Figure 14. Looking downstream at stream C32 on September 03, 2019. A poorly defined stream channel through the boulder field leads to limited surface connectivity during the late summer and early fall, limiting habitat suitability for Arctic Grayling.

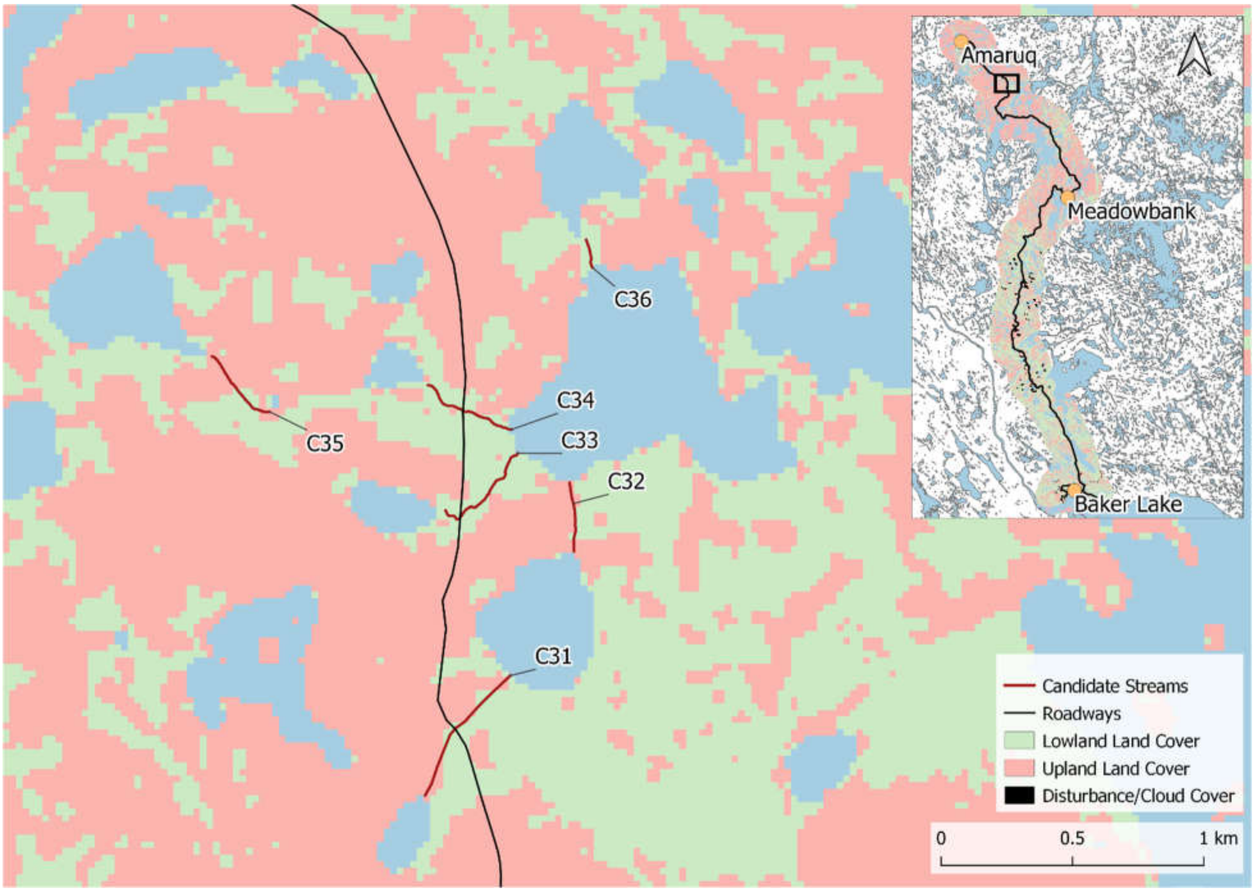

Figure 15. Chain lake system containing streams C31 to C36. Arctic Grayling have been observed in stream C34, but not detected in streams C31, C32, C33, or C35. Stream C36 was not visited in previous studies. The known presence of Arctic Grayling within the system presents an opportunity for habitat improvements in nearby, likely unoccupied streams.

5.3 Stream C35

Stream C35 is approximately 46 km north of Meadowbank, along the AWAR, and although this stream is 750 m from the road, it was included for consideration because of its high offsetting potential. Currently, stream C35 is unlikely to support Arctic Grayling, as visual surveys in 2019 failed to detect YOY, and the modeled occupancy likelihood is low (0.14, with a 95% CI of 0.01-0.67). The low percentage of lowland land cover at stream C35 (36.7%) largely contributes to the lack of suitable habitat, as boulder fields in the lower portion of the stream result in subsurface flow during the summer months (Figure 16). The contributing upstream lake area (1.16 km^2) is adequate, such that if connectivity was improved through the removal of boulders and the creation of a defined channel, the stream would likely provide habitat for Arctic Grayling. This stream is immediately upstream of stream C34 (Figure 15), which is known to support Arctic Grayling (C. Portt and Associates 2015; Ellenor 2020), increasing the likelihood of occupancy of C35 following habitat improvements. However, suitable habitat may still be limited following improvements, as a small, steep cascade in the upper portion of the stream would continue to deter fish migration to upstream lakes (Figure 17).

Figure 16. Stream C35, looking downstream, on August 03, 2019. A boulder field in the lower portion of the stream limits surface connectivity during the summer

Figure 17. Stream C35, looking upstream on August 03, 2019 towards a cascade that provides an additional migratory obstacle for fish.

6. Summary

Stream habitat enhancement and habitat creation opportunities were explored using the recently developed Arctic Grayling YOY stream occupancy model, incorporating previously collected stream data where available (Cumberland Resources Ltd. 2005; C. Portt and Associates 2015; Ellenor 2020). Of the 36 streams assessed, nine were identified as priority offsetting candidates, where instream work is likely to improve or create habitat for Arctic Grayling. Three streams are known to be used by Arctic Grayling, and have been identified as good candidates for spawning substrate enhancements. Three streams that are known, or likely to be occupied have also been identified for connectivity improvements. Finally, three priority streams are unlikely to be used by Arctic Grayling; however, improvements to stream connectivity may promote future stream use by this species. Field maps and recommended access points for these nine streams are provided in Appendix B. Further characterizing current habitat conditions at these streams, particularly in early spring, during spawning, and in late summer, when water levels are low, will help identify habitat limitations and determine the need for and likely success of the proposed enhancements.

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Appendix A. Detailed Occupancy Results

Table A-1. Summary of stream properties and substrate data for occupied, or likely occupied candidate streams.

Stream	Occupancy Probability (95% CI)	Data Source	Arctic Grayling Present	Stream Properties			Substrate					Notes
				Width† (m)	Depth (m)	Velocity (m/s)	Boulder	Cobble	Gravel	Fines	Organics	
C01	0.46 (0.18 - 0.77)	Ellenor 2020	Yes	2.0	0.18	0.23	45	40	15	0	0	
C02	0.92 (0.66 - 0.99)	Ellenor 2020	Yes	7.3	0.21	0.38	22	32	17	7	22	
C03	1.00 (0.98 - 1.00)	Ellenor 2020	Yes	42.0	0.30	0.45	60	36	4	0	0	
C04	1.00 (0.98 - 1.00)	Ellenor 2020	Yes	17.0	0.31	0.58	59	25	11	2	3	
C08	1.00 (0.91 - 1.00)	NA	-	-	-	-	-	-	-	-	-	
C09	1.00 (0.91 - 1.00)	Cumberland 2005	Yes	12.7	0.77	0.24	30	50	20	0	0	
		Ellenor 2020	Yes	16.1	0.20	0.27	36	31	33	0	0	
C10	1.00 (0.87 - 1.00)	Ellenor 2020	Yes	15.1	0.21	0.25	56	27	13	1	3	
C11	1.00 (0.95 - 1.00)	Cumberland 2005	Yes	84.0	0.62	0.05	35	65	0	0	0	Substrate is for riffle habitat. 50% boulder, 50% cobble in pools
		Ellenor 2020	Yes	56.8	0.15	0.19	92	8	0	0	0	
C12	0.99 (0.82 - 1.00)	Cumberland 2005	Yes	3.0	0.44	0.30	20	70	10	0	0	
		Ellenor 2020	Yes	8.1	0.25	0.40	31	46	21	0	2	
C13	0.71 (0.41 - 0.90)	Cumberland 2005	No	3.0	0.68	~0.65	30	20	10	10	30	
C15	0.62 (0.33 - 0.84)	Cumberland 2005	No	NA	NA	NA	60	40	0	0	0	
C16	NA	NA	-	-	-	-	-	-	-	-	-	YOY Arctic Grayling observed in stream in 2019
C17	NA	Cumberland 2005	Yes	25.0	0.38	0.45	40	50	10	0	0	
		Ellenor 2020	Yes	32.4	0.15	0.16	48	44	8	0	0	
C18	0.97 (0.75 - 1.00)	Cumberland 2005	No	1.3	0.28	~0.4	30	45	10	0	5	
		Ellenor 2020	Yes	2.9	0.28	0.13	16	25	19	10	30	
C19	0.97 (0.74 - 1.00)	Cumberland 2005	Yes	4.6	0.36	0.36	45	40	15	0	0	
		Ellenor 2020	Yes	3.2	0.21	0.31	50	34	16	0	0	
C25	0.67 (0.07 - 0.98)	NA	-	-	-	-	-	-	-	-	-	Connectivity to large downstream lake is limited by upland (boulderfield) stream lower in chain-lake system
C26	0.82 (0.18 - 0.99)	Portt 2015	No	71.0	shallow	-	-	-	-	-	-	Cobble/gravel/boulder substrate and graminoid patches Connectivity to large downstream lake limited by upland (boulderfield) stream lower in chain-lake system
C28	0.84 (0.56 - 0.96)	Portt 2015	No	18-50	-	-	-	-	-	-	-	Boulder/cobble/gravel
		Ellenor 2020	No	28.6	0.19	0.39	97	3	0	0	0	
C29	1.00 (0.63 - 1.00)	Portt 2015	No	13-25	-	-	-	-	-	-	-	Boulder/cobble/bedrock Limited fish sampling conducted due to stream conditions (slippery boulders/ high flow)
C34	0.96 (0.73 - 0.99)	Portt 2015	Yes	30.0	-	-	-	-	-	-	-	Variety of substrate sizes (gravel/cobble)
		Ellenor 2020	Yes	10.5	0.14	0.43	90	10	0	0	0	

† Cumberland 2005 and Ellenor 2020 recorded wetted width. Portt 2015 recorded flood plain width.

Appendix B. Field maps and recommended access points

Table B-1. UTM coordinates for recommended access points for priority candidate streams.

Stream	Zone	Easting	Northing
C01	14W	642,596	7,135,644
C11 Upstream	14W	638,074	7,155,828
C11 Downstream	14W	638,561	7,155,335
C15	14W	626,837	7,190,969
C16, C17	14W	627,469	7,192,028
C24	14W	634,980	7,228,466
C29	14W	620,005	7,235,337
C32, C34, C35	14W	620,611	7,244,659

Figure B-1. Stream C01 and recommended access point.

Figure B-2. Stream C11 and recommended access points.

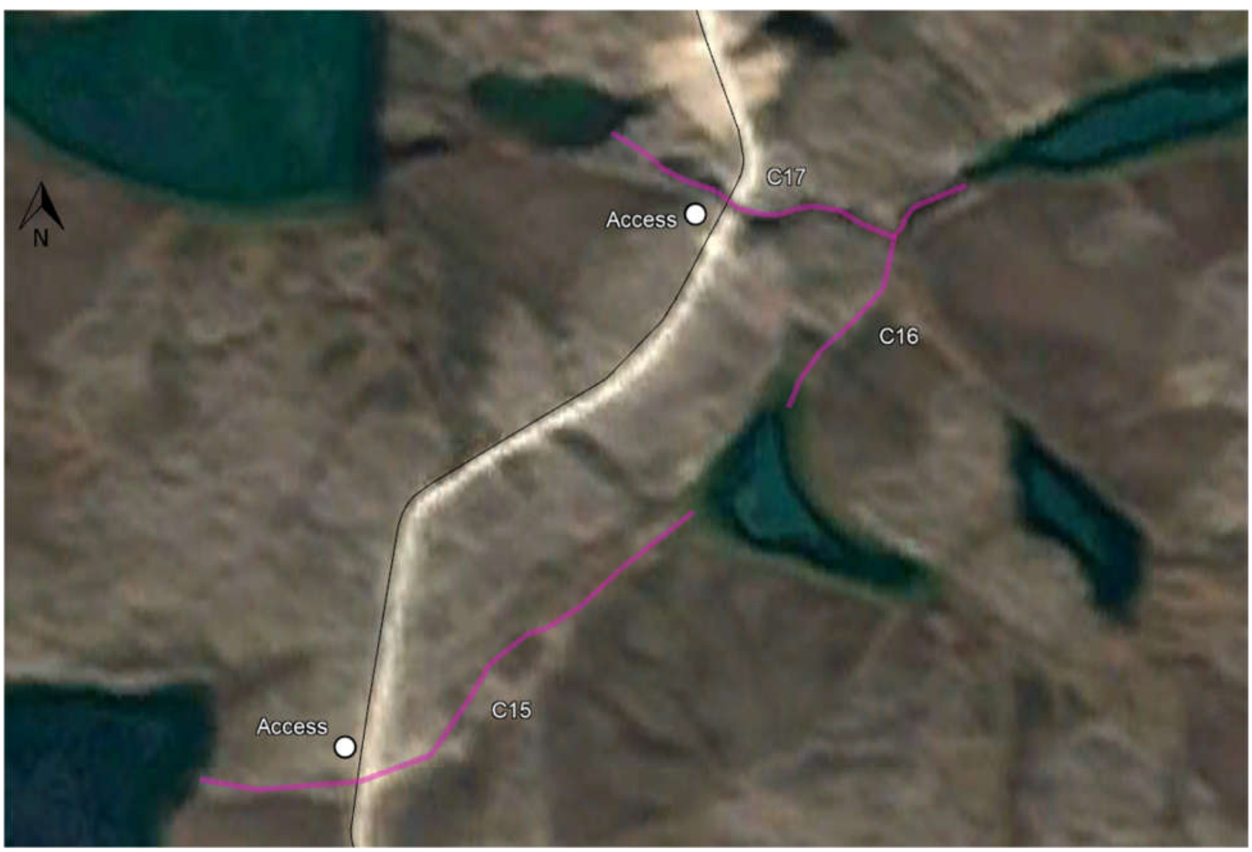

Figure B-3. Streams C15, C16, C17, and recommended access points.

Figure B-4. Stream C24 and recommended access point.

Figure B-5. Stream C29 and recommended access point.

Figure B-6. Streams C32, C34, C35 and recommended access point.

APPENDIX F

2020 Field Assessments for Potential Spawning Pad Construction Locations: Streams C11, C29, and C34

Conducted September 27, 2020

Station ID	C11-1	C11-2	C11-3	C11-4
Location description (distance from road, upstream/downstream of road, other identifiers)	76m from the road Upstream Cross-section between two habitat	79m from the road Downstream	216m from the road Downstream	218m from the road Downstream
UTM coordinates	14W 0638000 7155819	14W 0638138 7155683	14W 0638484 7155624	14W 0638497 7155618
Max. water depth	0.2 m	0.60m	.50m	0.35m
Water surface elevation	No instrument available	No instrument available	No instrument available	No instrument available
Max. water velocity	0.3	0.02	0.01	0.20
Water temperature	4.8°C	4.2°C	4.1	4.4
Air temperature	7.3°C	7.3°C	7.3°C	7.3°C
Wetted width	66.80 m	75.90 m	37.73	45.43
Substrate evaluation %Boulder %Cobble %Gravel %Sediment %Vegetated Estimate % each size or provide general description.	90% Boulder 5% 6 inch wide rock 5% Vegetated (algae on boulder)	40% Boulder 40% 6 inch wide rock 20% Sediment 0% Vegetated	88% Bolder 2% Gravel 10% Vegetation	75% Boulder 25% Vegetated

Station ID	C29-1	C29-2	C29-3	C39-4
Location description (distance from road, upstream/downstream of road, other identifiers)	68m from the road Upstream Start of the stream	42m from the road Downstream	140m from the road Downstream	250m from the road Downstream
UTM coordinates	14W 0620036 7235282	14W 0619987 7235378	14W 0619996 7235482	14W 0620019 7235590
Max. water depth	1m	0.80m	1.40m	1.1m
Water surface elevation	No instrument available	No instrument available	No instrument available	No instrument available
Max. water velocity	0.96	1.05	1.48	1.63
Water temperature	5.5°C	5.5°C	5.5°C	5.5°C
Air temperature	9°C	9°C	9°C	9°C
Wetted width	45m	50m	45m	35m
Substrate evaluation %Boulder %Cobble %Gravel %Sediment %Vegetated Estimate % each size or provide general description.	90% Boulder 5% Sediment 5% Vegetated (algae on boulder) Lots of boulders full of algae	90% Boulder 3% Cobble 2% Sediment 5% Vegetated	85% Boulder 5% Cobble 3% Gravel 2% Sediment 5% Vegetated	85% Boulder 5% Sediment 10% Vegetated

Station ID	C34-1	C34-2	C34-3
Location description (distance from road, upstream/downstream of road, other identifiers)	147m from the road Upstream Start of the stream	45m from the road Upstream Stream start to diverge into 3 smaller streams	47m from the road Downstream Stream is 3 smaller streams
UTM coordinates	14W 0620493 7244776	14W 0620580 7244708	14W 0620667 7244687
Max. water depth	0.55m	0.35m	0.32m
Water surface elevation	No instrument available	No instrument available	No instrument available
Max. water velocity	0.25	0.61	0.81
Water temperature	4.5°C	4.5°C	4.5°C
Air temperature	9°C	9°C	9°C
Wetted width	21m	16.5m	22m
Substrate evaluation %Boulder %Cobble %Gravel %Sediment %Vegetated Estimate % each size, or provide general description.	40% Boulder 30% Gravel 10% Sand 10% Sediment 10% Vegetated Lots of mud/vegetation in the stream	10% Boulder 5% Cobble 40% Sediment 45% Vegetated Lots of vegetation.	20% Boulder 80% Vegetated Mostly vegetation between the 3 streams. In the stream, it was only boulder