Appendix 34

Whale Tail 2025 Fish Habitat Offsets Monitoring Report

AGNICO EAGLE

MEADOWBANK COMPLEX

2025 FISH HABITAT OFFSETS MONITORING REPORT

In Accordance with

DFO Fisheries Act Authorization 16-HCAA-00370

and

DFO Fisheries Act Authorization 20-HCAA-00275

Prepared by:
Agnico Eagle Mines Limited – Meadowbank Complex

March, 2026

EXECUTIVE SUMMARY

In accordance with Fisheries Act Authorizations 16-HCAA-00370 and 20-HCAA-00275, Agnico Eagle maintains a Fish Habitat Offsets Monitoring Plan (FHOMP; Version 2, July, 2021) for the Whale Tail Mine. This Plan was developed to determine whether fish habitat offsetting described in the *Whale Tail Pit - Fish Habitat Offsetting Plan* (C. Portt and Associates, 2018) and the *Whale Tail Pit Expansion Project Fish Habitat Offsetting Plan* (ERM, 2020) is ultimately constructed and functioning as intended.

Fish habitat offsetting for the Whale Tail Mine will consist primarily of constructed sills to maintain increased water levels in some Whale Tail area lakes in perpetuity. Water levels were raised in 2019, and construction of the sills will occur prior to mine closure. Evaluation of existing Whale Tail flood zone conditions for fish under the FHOMP pre-offsetting monitoring program were complete and reported in 2024 (Agnico Eagle, 2024; C. Portt & Associates, 2024). Briefly, results of that analysis indicate a high degree of confidence that the predicted gains from habitat creation through flooding will be realized going forward.

Field assessments according to the FHOMP will resume after construction of the offsetting features. Water level monitoring and water quality monitoring in the Whale Tail area continue annually under other compliance programs. In brief, flood zone water levels remain similar to previous years and water quality within the flood zone remains suitable for aquatic life.

In addition to constructed habitat features, a portion of offsetting for Whale Tail Mine is provided through a suite of six complementary measures (research projects). Progress monitoring is conducted to document annual activities, and results are summarized here to demonstrate when criteria for success have been met. Timelines for these studies are indicated in Table 1 below. As of December, 2025, two studies are considered complete, three are nearing completion (est. 2026), and one is in re-development.

Table 1. Whale Tail Mine complementary measures (research projects).

Study	Lead Researcher	Est. Study Period
Study 1: Assessment of changes in aquatic productivity and fish populations due to flooding of Whale Tail South and downstream lakes during operations	H. Swanson	2018 – 2026
Study 2: Assessment of impacts of the Baker Lake wastewater outflow on aquatic systems including fish and fish habitat	H. Swanson, M. Hanson	2019 – 2026
Study 3: Literature review and field validation of northern lake fish habitat preferences	S. Doka	2018 – 2026
Study 4: Arctic Grayling occupancy modelling (COMPLETE)	H. Swanson	2018 – 2021
Study 5: End pit lake habitat use (IN RE-DEVELOPMENT)	TBD	TBD
Study 6: eDNA methods development (COMPLETE)	J. Stetefeld	2018 – 2025

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SECTION 1 • INTRODUCTION

1.1 BACKGROUND

In accordance with Fisheries Act Authorizations (FAAs) 16-HCAA-00370 and 20-HCAA-00275, Agnico Eagle maintains a Fish Habitat Offsets Monitoring Plan (FHOMP; Version 2, July, 2021) for the Whale Tail Mine. This Plan was developed to determine whether fish habitat offsetting described in the *Whale Tail Pit - Fish Habitat Offsetting Plan* (C. Portt and Associates, 2018) and the *Whale Tail Pit Expansion Project Fish Habitat Offsetting Plan* (ERM, 2020) is ultimately constructed and functioning as intended.

This monitoring program is organized to meet Conditions 4.3 and 5.1 of 16-HCAA-00370, and Conditions 4.3, 5.1, 5.2, and 5.3 of 20-HCAA-00275.

Further, in accordance with monitoring recommendations in DFO guidance documents (e.g. Smokoroski et al., 2015), two types of monitoring are specified:

1. "Compliance" monitoring assesses the physical structure and stability of offsetting features to verify that they were constructed as designed.

2. "Effectiveness" monitoring of biological and ecological endpoints (water quality, periphyton growth, fish use) to assess whether offsetting features are functioning effectively as fish habitat.

1.2 OBJECTIVES

To ensure that offsets are functioning as effective fish habitat, assessment of the structure, stability, and successful utilization of these features by fish are the primary goals of the monitoring program for habitat enhancement/creation offsets.

The overall objectives of FHOMP reporting are:

- To describe the compliance and effectiveness monitoring methods for assessments conducted in the preceding year according to the FHOMP and describe any deviations from the FHOMP.
- To present the results of data analyses conducted according to the FHOMP.
- Using those results, to determine whether criteria for success have been met.

In addition to the constructed habitat offsetting features, a portion of offsetting will be provided through a suite of complementary measures (research projects). Full progress reporting is completed for these programs under separate cover and provided to DFO by May 30 annually, according to conditions of the FAA. Study plans and success criteria for the complementary measures are described in the *Whale Tail Pit - Fish Habitat Offsetting Plan* – Appendix C (May

2018) and referred to minimally here. However, this report does include a summary of research study progress, along with annual activities of the oversight body (Meadowbank Fisheries Research Advisory Group; MFRAG) and indicates when criteria for success have been achieved.

1.3 SUMMARY OF OFFSETTING FEATURES

1.3.1 Constructed Offsets

1.3.1.1 Rock Shoals and Road Scarification

In the dewatered area of Whale Tail Lake (Figure 1), roads and jetties will be scarified or converted to coarse substrate as necessary to create shoal-like features. In addition, an 8.7 ha network of shoals (referred to as grid shoals based on their conceptual design pattern) will convert a portion of the North Basin to higher-value habitat. Works will be conducted prior to the start of reflooding of the Whale Tail Pit and be accessible to fish post-reflooding.

1.3.1.2 Water Retention Sills and Flooding

During the operations period for the Whale Tail Mine, flooding around the perimeter of Whale Tail Lake (South Basin) and additional lakes to the southwest is required for water management purposes (Figure 1). Flooding was initiated in 2019 and stabilized through construction of the South Whale Tail Channel (SWTC) in 2020, which is a temporary hydraulic connection to Kangislulik Lake for the purposes of passive water management. The majority of fish habitat offsets for the Whale Tail Mine will be obtained by constructing two permanent water control structures (sills) to maintain elevated water levels in some of these flooded areas long-term. Sills are designed to create approximately 46.6 ha of new aquatic habitat by expanding Whale Tail Lake, and 31.35 ha of new aquatic habitat by expanding Lake A18. Sill construction will occur prior to mine closure.

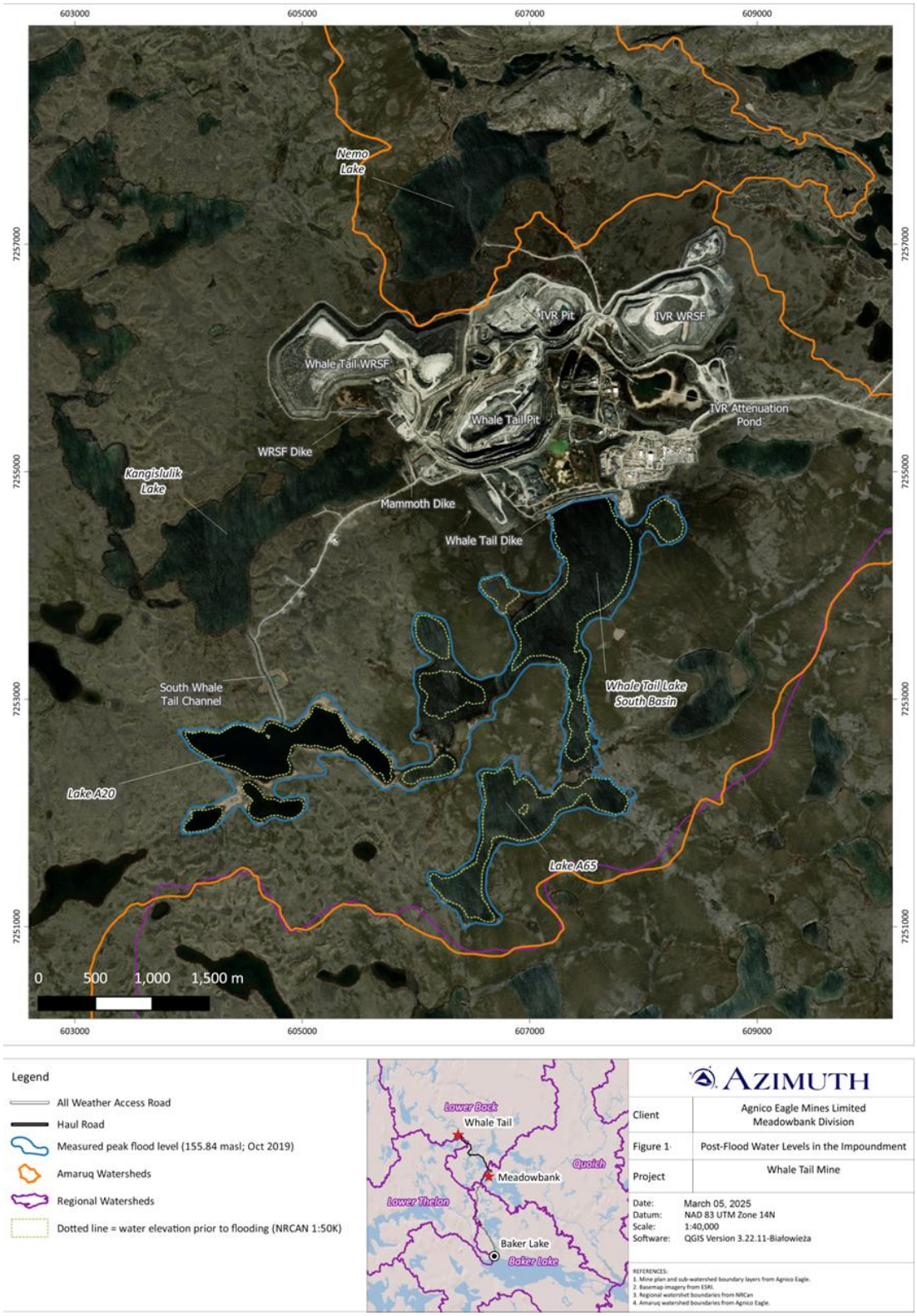

Figure 1. Post-flood water levels in the Whale Tail impoundment.

1.3.2 Complementary Measures

A suite of complementary measures (research projects) is included as offsetting for the Whale Tail Mine. These studies continue to inform Agnico Eagle's offset planning in Nunavut as well as fish and fish habitat monitoring techniques. The complete scope of these complementary measures including methods, timelines, deliverables, and budgets is provided in Appendix C (May, 2018) of the *Whale Tail Pit - Fish Habitat Offsetting Plan* (C. Portt and Associates, 2018).

Studies initially included:

1. Assessment of changes in aquatic productivity and fish populations due to flooding of Whale Tail South and downstream lakes during operations
2. Assessment of impacts of the Baker Lake wastewater outflow on aquatic systems including fish and fish habitat
3. Literature review and field validation of northern lake fish habitat preferences
4. Arctic Grayling occupancy modeling (complete)
5. Assessment of pit lake habitat and use by fish (topic under re-evaluation)
6. Development of methods for the collection and analysis of aquatic eDNA for fish community assessment (complete)

These programs were developed in collaboration with research partners at academic institutions, and were initiated in 2018 or 2019. The topic for one study (Study 5 - pit lake habitat use assessment) is being re-evaluated, as further discussed in Section 3.2.

1.4 SCHEDULE FOR MONITORING

The complete schedule for monitoring of offsets is described in the FHOMP. Generally, a pre-offsetting monitoring program occurred from 2021 – 2023, prior to construction of any permanent sills, to determine effectiveness of flooded terrestrial zones as fish habitat (Table 2). Results for that program were provided in the 2023 version of this report (Agnico Eagle, 2024), with additional analysis provided to DFO in 2024 under separate cover (*Impact Analysis of Fish Habitat from Flooding – C. Portt and Associates, 2024*), in fulfillment of Condition 5.3.1 of FAA 20-HCAA-00275.

No field assessment has been required under the FHOMP since 2023, but monitoring for water levels and water quality continued under other compliance programs and to preserve program continuity, results are summarized here.

Final monitoring for constructed offsets is planned to begin after construction of the permanent sills and other offsetting features.

Progress updates for complementary measures are provided annually.

Table 2. Schedule of assessments conducted under the pre-offsetting ecological monitoring program for the Whale Tail Mine.

Component	2021	2022	2023	2024, 2025**
Water levels	✓	✓	✓	✓
Water quality	✓	✓	✓	✓
Periphyton (visual and/or artificial substrate study)	✓*	✓	✓	-
Small-bodied fish – shoreline habitat	✓	✓	✓ **	-
Large-bodied fish - foraging and spawning habitat	-	-	✓	-
Report	Data report	Data report	Data report and Final analysis report	Data report

**Pilot study*

***Not required under the FHOMP but collected opportunistically or through other ongoing programs.*

SECTION 2 • MONITORING METHODS

2.1 CONSTRUCTED OFFSETS

A complete description of scheduled monitoring to assess physical structure and ecological function of the offsetting features is provided in the FHOMP, and methods for assessments completed in 2025 are described below.

2.1.1 Physical Structure Monitoring

Physical structure monitoring is intended to confirm and report compliance with requirements of the associated *Fisheries Act* Authorizations to construct a specific amount and type of habitat offsets.

Once permanent offsetting features are constructed, physical monitoring will include an assessment of flood zone area (hectares flooded, using measured water levels), shoal area, and stability of the features. No physical structure monitoring is specified in the FHOMP prior

to that time. However, a review of water levels in the flooded Whale Tail South area is provided here for reference and to support ongoing analysis of flood zone habitat suitability and area. Throughout the operations phase, water levels within the Whale Tail South flood zone are measured every 3 h by piezometers installed in the Whale Tail Dike.

2.1.2 Ecological Monitoring

Ecological monitoring will be conducted to assess the effectiveness of offsetting features in supporting fish.

No ecological monitoring was required in 2025, but water quality monitoring continued under the Core Receiving Environment Monitoring Program (CREMP). As part of the CREMP, mid-water column samples in areas > 5 m deep are collected at two sites from each of two formerly separate lakes in the flood zone (Whale Tail South and A20), as well as reference lakes Inuggugayualik Lake and Pipedream Lake, up to 5x/year. Complete methods are described in the 2025 CREMP Report (Azimuth, 2026), an Appendix of the Meadowbank Complex 2025 Annual Report to the NIRB.

2.2 COMPLEMENTARY MEASURES

As required by *Fisheries Act* Authorization 16-HCAA-00370, complete annual progress reports on complementary measures are provided to DFO by May 30 each year, including methods and preliminary results.

An interim update is provided in this report for each project, along with a description of activities of the MFRAG in the preceding year. These interim updates will focus on general activities and identifying progress towards study completion, and do not include specific methods and results.

SECTION 3 • RESULTS & DISCUSSION

3.1 CONSTRUCTED OFFSETS

3.1.1 Physical Structure Monitoring

Measured water levels for the Whale Tail flood zone through 2025 are shown in Figure 2.

To date, since construction of the South Whale Tail Channel (2020), water levels measured at the Whale Tail Dike have ranged between approximately 154.55 and 155.75 masl over the course of a year. Despite a reduction in operational water levels compared to FEIS predictions throughout the flood zone, measured elevations are in the range of those that will eventually be maintained permanently for offsetting purposes, following sill construction (mid-summer

levels of 154 masl in Whale Tail Lake, and 155.3 masl upstream of the A18 sill). Peak flood levels each year remain above 155.50 masl.

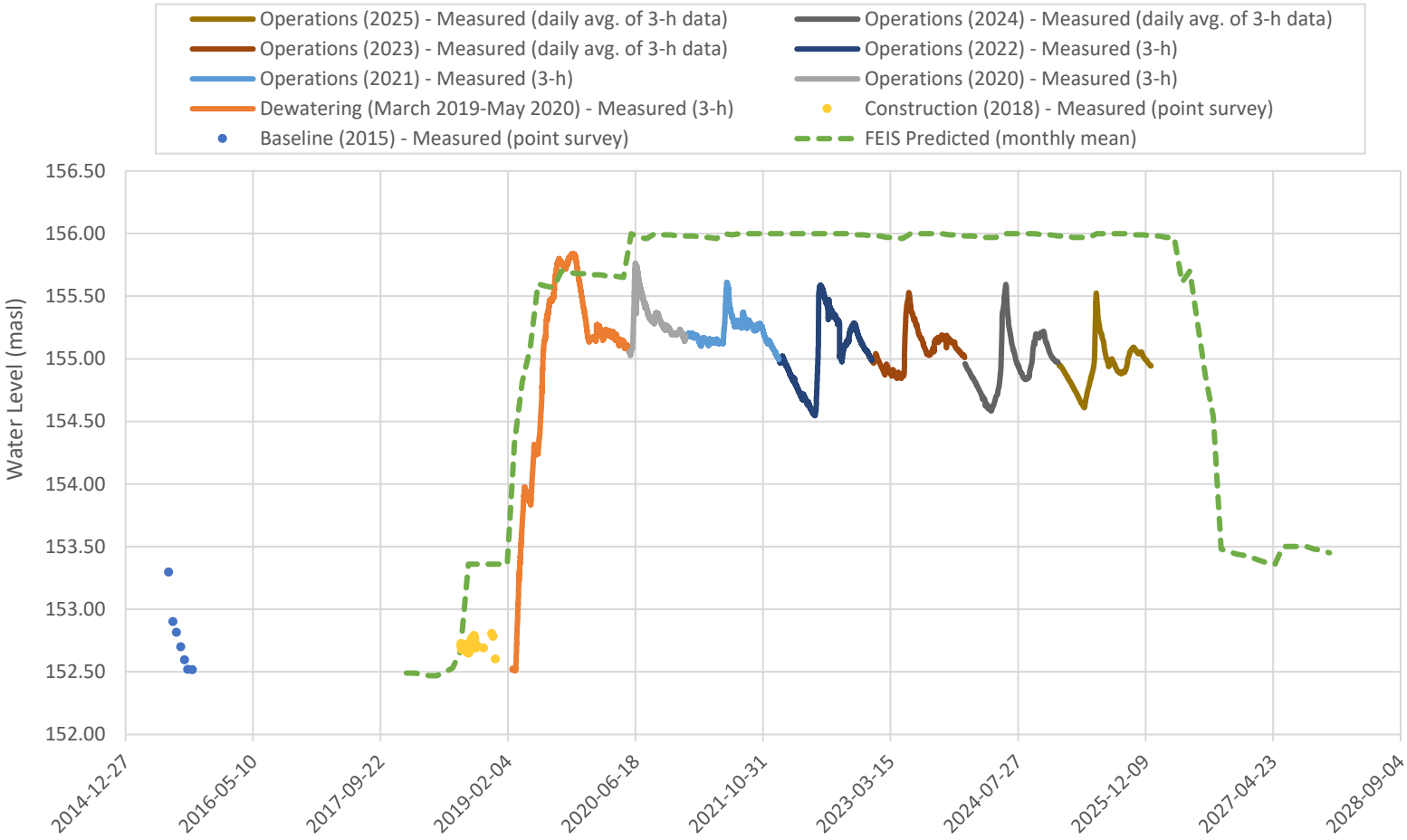

Figure 2. Measured and predicted water levels in the Whale Tail South flood zone.

Note: Point measurement by GPS survey, 3-h interval by piezometer, or modeled monthly mean, as indicated. Predicted water levels are for Whale Tail Lake from FEIS Addendum for the Whale Tail Pit Expansion Project, Appendix 6-O, Table D-14 (Agnico Eagle, 2018).

3.1.2 Ecological Monitoring

3.1.2.1 Flood Zone Water Quality

Complete results of annual CREMP water quality monitoring are presented in the 2025 CREMP Report (an appendix of the 2025 Meadowbank Complex Annual Report). The summary here focuses on CREMP results for flood zone lakes (WTS and/or A20), as compared statistically to baseline/reference conditions.

3.1.2.1.1 CREMP Summary

Briefly, in 2025, some exceedances of CREMP water quality triggers and statistically significant increases relative to baseline/reference conditions were observed in flood zone lakes for the following parameters.

- Conductivity, hardness, alkalinity, TDS, and constituent major ions (calcium, magnesium, potassium, and sodium)
- Nutrients (total Kjeldahl nitrogen, total organic carbon and dissolved organic carbon)
- Lithium

Similar to results seen over the years at the Meadowbank study lakes, these results represent increases above baseline/reference conditions only. None of the analytes exceeding CREMP triggers in 2025 (generally set at the 95th centile of baseline data) have effects-based thresholds (e.g. CCME Water Quality Guidelines for the Protection of Aquatic Life). For the flood-zone lakes of interest in the FHOMP, the observed changes are considered likely to be at least partially mine-related. However, the measured concentrations are not expected to result in adverse effects to aquatic life, as further described in the CREMP Report.

Notably, mean annual total phosphorus concentrations were found to have declined below the CREMP trigger for all impacted lakes in 2025. As predicted within the FEIS (Agnico Eagle, 2018), mean annual total phosphorus at WTS and A20 increased after mining began, and exceeded the CREMP trigger value (95th centile of baseline data) from 2019 or 2021, respectively, through 2024. FEIS-predicted and measured concentrations of total phosphorus to date are shown in Figure 3. According to the FEIS, phosphorus and nitrate levels are predicted to increase in WTS until 2026, after which time concentrations are predicted to decline.

Under the CREMP, phytoplankton community sampling is also conducted at the same time as the water chemistry program. In the first few years after mining began, phytoplankton biomass appeared to trend upwards (Figure 4), and statistically significant increases compared to baseline/reference were observed in some flood zone lakes in some years.

These trends were consistent with predictions made in the FEIS and generally correspond to observed changes in nutrients. Upward trends in phytoplankton biomass appear to have corrected and stabilized beginning in 2024, with no further statistically significant differences between flood zone lakes and baseline/reference conditions. In general, any observed changes in phytoplankton taxa richness have not been statistically significant and/or have not been attributed to mine activities.

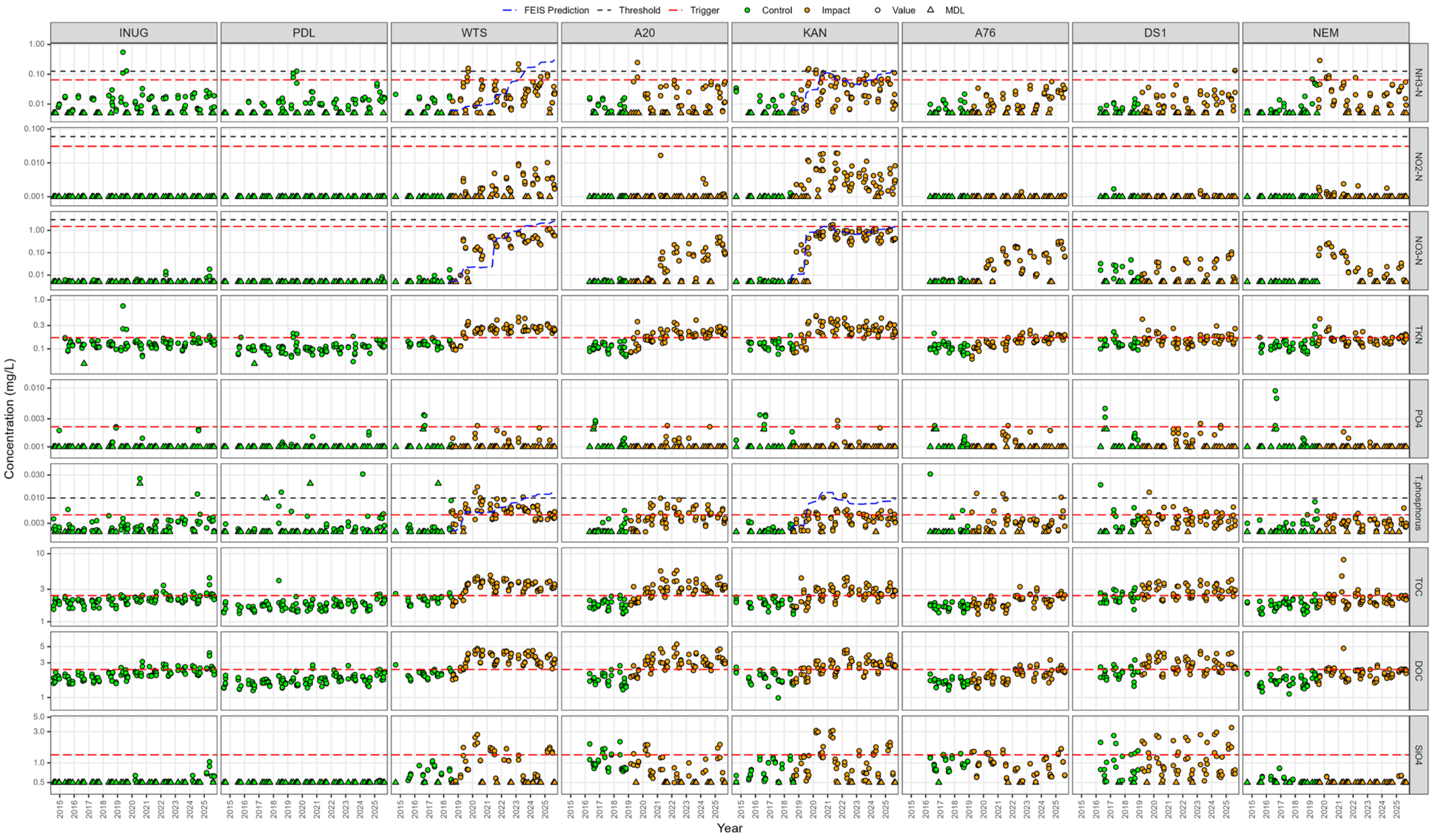

Figure 3. Nutrient concentrations measured in Whale Tail Mine area lakes since 2014.

Note: Figure from Azimuth (2026). Flood zone lakes are WTS and A20.

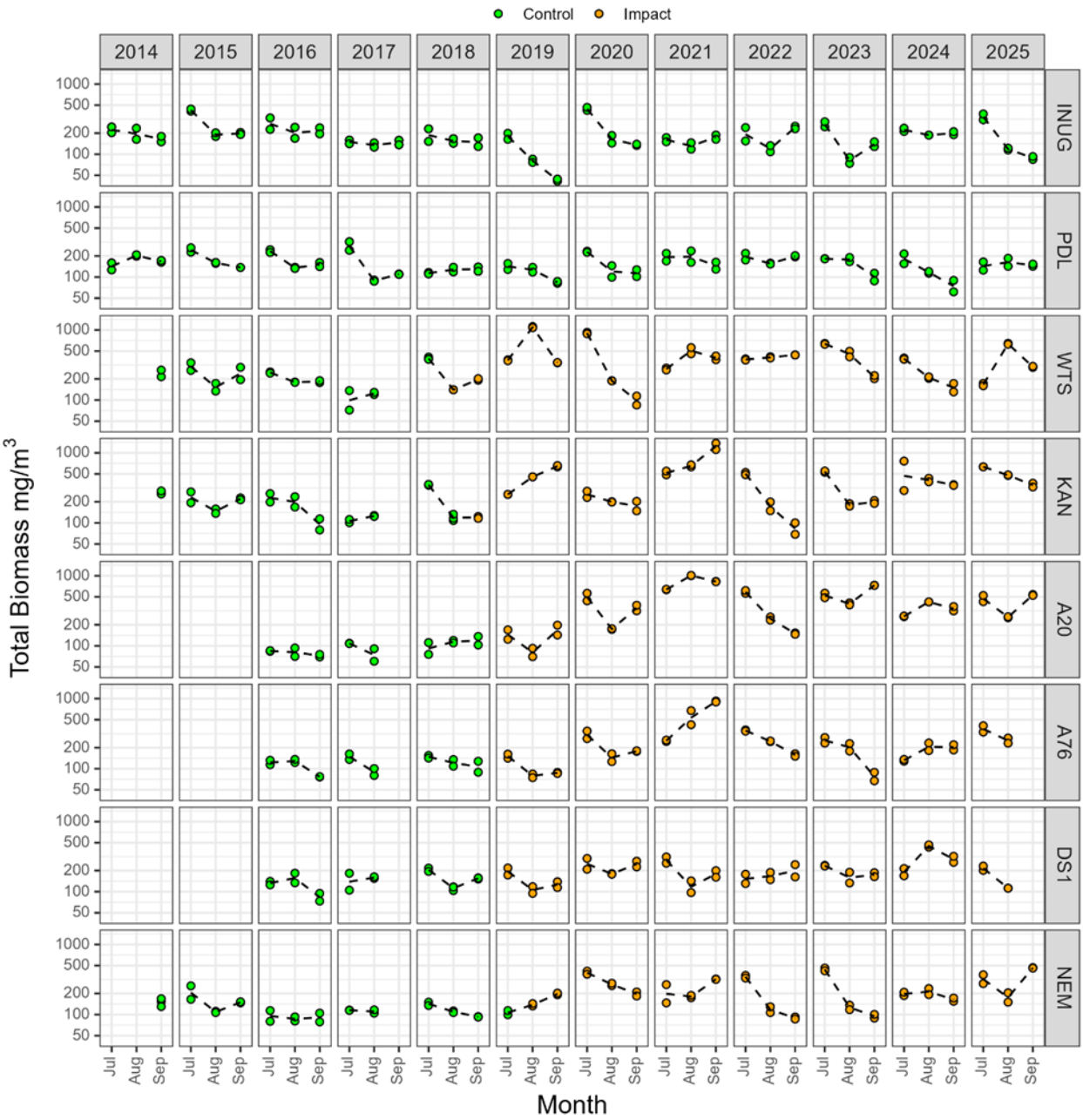

Figure 4. Total phytoplankton biomass (mg/m^3) from the Whale Tail Mine study lakes since 2014.

Note: Figure from Azimuth (2026). Flood zone lakes are WTS and A20.

3.2 COMPLEMENTARY MEASURES

An update is provided here on activities of the MFRAG along with a summary of progress for each research study in 2025. Full research methods are documented in annual progress reports provided to DFO by May 30 annually.

3.2.1 Activities of the MFRAG

As part of the Fish Habitat Offsetting Plan for Whale Tail Mine (C. Portt and Associates, 2018), the MFRAG was conceptualized to provide a forum for input from key stakeholders. The MFRAG has met annually since 2019 to review project progress reports, propose and approve or reject new projects or project components, and assess whether criteria for success have been met.

In 2025, the seventh MFRAG meeting was held by video conference on December 3rd, with all member groups participating. In advance of the meeting, all member groups received the previous year's Annual Progress Report, along with a non-technical summary in English and Inuktitut. Progress of each ongoing research study was presented by the lead researcher or designate, and MFRAG parties had the opportunity for questions, comments, and open discussion with the research teams. The presentation material and a summary of discussion notes was provided to all participants after the meeting. Each MFRAG member group agreed to provide written comments, if any, by January 30, 2026. Written comments were received from DFO and the external advisor, and will be distributed to all member groups and the research study leads for consideration.

3.2.2 Study 1 - Assessment of Changes in Aquatic Productivity and Fish Populations Due to Flooding (H. Swanson)

3.2.2.1 Research Objectives

This research study aims to understand changes in small-bodied fish metrics indicative of population productivity during and after flooding in the Whale Tail Lake area. Changes in productivity will be related to water quality variables and qualitatively related to habitat characteristics.

3.2.2.2 Research Methods & Summary of Activities

This study focused on the collection of baseline data (2018) and flooding year 1, 2, and 3 data (2019, 2020, 2021) for small-bodied fish species (Slimy Sculpin, Ninespine Stickleback) within the Whale Tail South area. Shoreline electrofishing was completed for small-bodied fish in up to 8 waterbodies in the area of Whale Tail Lake (Figure 5). Monitoring endpoints that were selected for analysis (statistical or visual) include catch per unit effort, proportional catch,

length, weight, condition, age, weight-at-age, and isotopes of carbon and nitrogen as indicators of carbon source and lipid content.

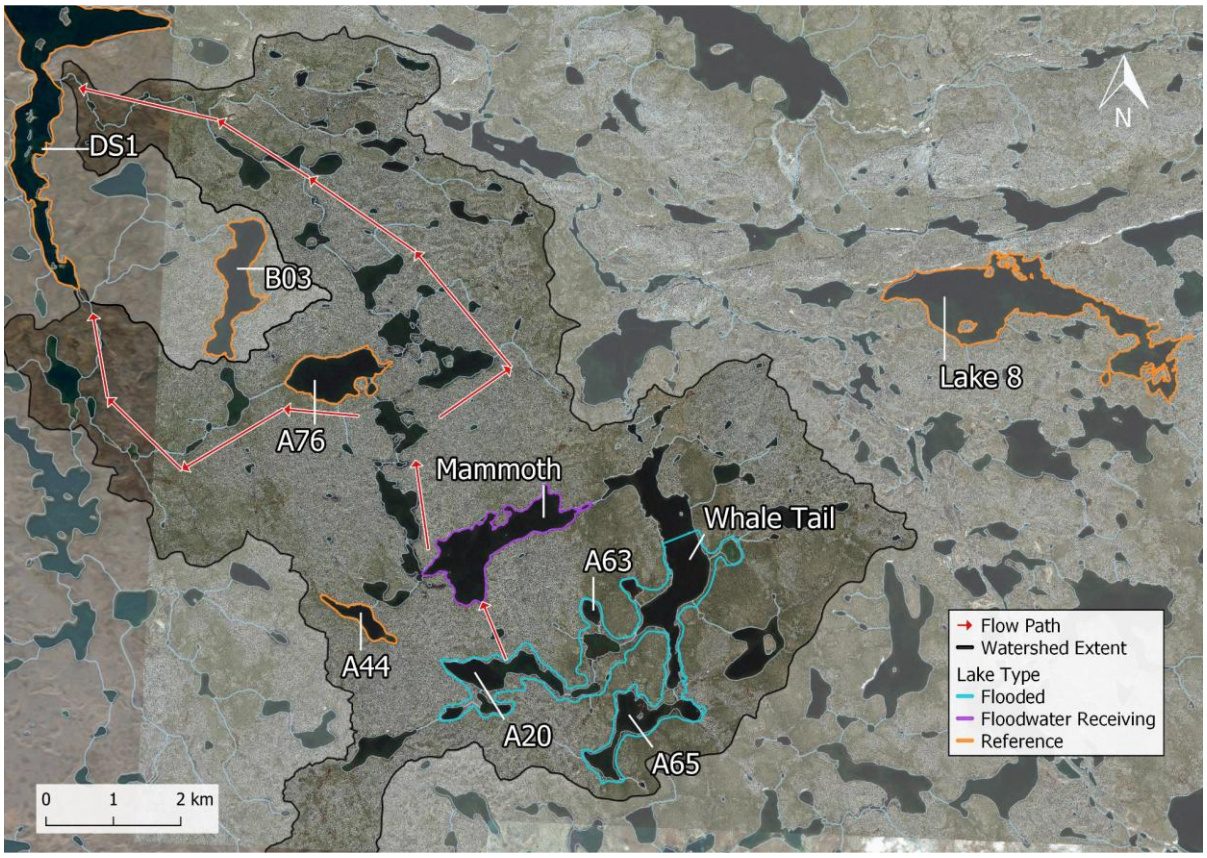

Figure 5. Whale Tail Productivity study area.

Note: Mammoth Lake is now referred to as Kangislulik Lake.

3.2.2.3 Study Completion

Completion of this study in 2026 is currently anticipated. The associated MSc thesis was successfully defended in 2025 (Soogrim et al., 2025), and finalization of a technical report and journal article submission are targeted for 2026. A plain-language summary will also be completed for distribution to the MFRAG members. Preliminary results have been presented annually at MFRAG meetings.

3.2.3 Study 2 – Assessment of Impacts of the Baker Lake Wastewater Outflow on Fish Productivity and Fish Habitat (H. Swanson)

3.2.3.1 Research Objectives

A research program lead by Dr. Rob Jamieson (Dalhousie University) is underway to assess the current status of the wastewater treatment system in the hamlet of Baker Lake and develop designs for upgrades. This study was awarded an NSERC Collaborative Research and Development grant (NSERC-CRD) in 2019 to supplement funding from Agnico Eagle. As part of this holistic assessment, key questions related to understanding fish and benthic invertebrate populations are included as offsetting for the Whale Tail Mine. The fish and fish habitat portion of the study is being conducted by Dr. Heidi Swanson (Laurier University, formerly the University of Waterloo) and Dr. Mark Hanson (University of Manitoba).

The following current project goals are specific to fish and fish habitat:

1. Quantify the current fish habitat, fish health and fish productivity in the Arctic wastewater system (extended pre-construction assessment).

2. Develop and delivery training activities to support community-lead environmental monitoring programs for the post-construction period, tailored to the interests of community organizations.

3.2.3.2 Research Methods & Summary of Activities

General study methods follow Environmental Effects Monitoring (EEM) protocols to assess large-bodied fish population health within the wastewater outflow pathway as compared to reference systems (Figure 6).

Figure 6. Baker Lake wastewater study lakes and reference lakes.

Since 2018, the team has conducted water quality, sediment, benthic invertebrate, and fish tissue sampling every 1 – 2 years. A visual sampling guidebook is also being developed to support potential future community-lead monitoring efforts.

3.2.3.3 Study Completion

An MSc thesis was defended in 2024 (McPhedran, 2024). Final manuscript submissions for peer-reviewed publication are anticipated for 2026 (fish and benthic invertebrate components), along with finalization of the visual sampling guidebook and final project reporting.

3.2.4 Study 3 – Literature Review and Field Validation of Northern Lake Fish Habitat Preferences (S. Doka)

3.2.4.1 Research Objectives

Habitat preferences of northern fish species are not well understood, which causes significant uncertainty in habitat-based offset calculations. This study aims to:

1 - Identify literature data gaps in habitat associations of Meadowbank-area lake fish such as Lake Trout, Arctic Char, and Round Whitefish,

2 - Field-test a variety of methods for filling data gaps.

3.2.4.2 Research Methods and Summary of Activities

This study was planned to be conducted over three years, from 2018 – 2020. Methods include a literature review, data gap analysis, and field programs to assess various sampling techniques for identifying fish habitat associations. Field surveys occurred in 2018 and 2019.

Literature Review and Gap Analysis - Following closely the Centre of Environmental Evidence guidelines for systematic literature review, a graduate student with Lakehead University under the co-supervision of Dr. Mike Rennie and Dr. Susan Doka reviewed primary and grey literature sources as well as unpublished data (e.g., Golder & Associates 2016, DFO FishOut database) on 11 northern species. The data extracted from the review has been analyzed using appropriate statistical methods to synthesize the information by life stage (3 stages: spawning, nursery, juvenile/adult habitats).

Field Programs - Fisheries and Oceans in partnership with Lakehead University conducted reconnaissance field studies in 2018 with a variety of equipment including a multi-probe water quality sonde (EXO), passive and active fish sampling gears in lakes and connecting channels (e.g., minnow traps, GoPro video footage, backpack electrofishing, drift nets) and hydroacoustic surveys (BioSonics MX) for physical habitat mapping (e.g., depth and substrate). The latter was conducted to complement hydroacoustic fish distribution data collected by Milne Technologies (mid-July 2018).

Field work in year two (2019) focussed on pilot testing methods to fill data gaps around habitat associations for small-bodied fishes, while assessing novel or alternative sampling approaches. The 2019 field program consisted of an analysis of Visible Implant Elastomer tagging methods for use in mark- recapture studies to evaluate stream habitat preferences, as well as deep water electrofishing, near-shore electrofishing, and netting techniques. Those programs were conducted over two study periods, in late June and August/September.

3.2.4.3 Study Completion

The MSc thesis fulfilling objective 1 of this study (literature data gap review) was completed in September, 2020 (Hancock, 2020). Target final reporting for this study including recommendations from field trials has now been extended to 2026. A plain-language newsletter-style summary (English and Inuktitut versions) was provided to the MFRAG for distribution to members in December, 2024.

3.2.5 Study 4 – Arctic Grayling Occupancy Modelling (H. Swanson)

The objectives of this study were the development of occupancy models for Arctic grayling in the Meadowbank region, and a comparison of habitat predictors in this area with those observed in the NWT. Understanding the potential for occupancy of fluvial systems by fish species based on readily measurable habitat characteristics could facilitate and improve the accuracy of environmental impact assessment and offset planning.

This study was conducted from 2018 – 2021, and final reports consist of an MSc thesis submitted to the University of Waterloo in April, 2020 (Ellenor, 2020), and a peer- reviewed manuscript published in November, 2021 (Ellenor et al., 2021). These documents contain the complete research objectives, methods, and results.

Publication of the peer-reviewed manuscript fulfills this study's criteria for success, and it is now considered complete.

3.2.6 Study 5 – End-Pit Lake Habitat Suitability Assessment

Since multiple pits of various sizes at the Meadowbank Complex were planned to be reflooded in the relatively near term (originally 2027 – 2029), an opportunity was identified in the 2018 offsetting plan to characterize fish use of pit lake habitat and population growth in re-flooded lakes through a research program.

With permitting of the Whale Tail Expansion Project in 2019 and changes to the Meadowbank life-of-mine and water management strategy in 2024, pits at the Meadowbank Complex are now planned to be accessible to fish beginning in 2040. Due to this extended timeline, Agnico Eagle, in consultation with the MFRAG, began exploring three options for this study at the end of 2024:

Option 1: No change to study plan, extend the timeline by approx. 10 years.

Option 2: Identify an alternate study site (partner site).

Option 3: Identify a new study goal.

These options were discussed at the December 2024 and 2025 MFRAG meetings. Agnico Eagle will review any further comments received by the January 30, 2026 deadline discussed at the last meeting, and will continue to evaluate and consult with the MFRAG parties on possible revisions to this study in 2026, with the goal of finalizing a new study direction this year.

3.2.7 Study 6 – eDNA Methods Development (J. Stetefeld)

3.2.7.1 Research Objectives

eDNA methods present a potentially useful tool for rapid and non-invasive assessments of fish communities but have not been significantly developed or validated for Arctic systems. The main goal of this project was to develop and optimize monitoring tools based on eDNA metabarcoding technology to assess fish species assemblages (presence/absence and relative abundance) in the Kivalliq region.

Objectives were:

1. Development and optimization of the eDNA metabarcoding technique adapted for the arctic environment as a substitute for current fish species determination approaches.

2. Producing guidelines for handling and analyzing of samples and deliver the method and provide training to the local community.

3. Produce long-term reliable and precise baseline data on the distribution of aquatic associated fish species in the Whale Tail mine site lakes using developed eDNA technology.

4. Producing data on the physiochemical properties of the lake water including dissolved mineral content to understand if any changes in stated parameters affect the eDNA/fish assemblage results.

5. Examine the impact of flooding Whale Tail Lake South Basin with the coincident changes in physiochemical properties of the aquatic area (e.g., increase in turbidity, dissolved solids) on the fish population using developed eDNA technique.

6. Collecting baseline eDNA and water quality data on lakes nearby Amaruq mine site outside the mining activity (potential candidates include B03 or DS1) and use them as a control for population changes.

3.2.7.2 Research Methods & Summary of Activities

This study planned to develop and utilize an eDNA metabarcoding approach to measure fish assemblages in the Whale Tail area. Environmental DNA metabarcoding technology was developed and optimized to detect fish species including Arctic Char, Arctic Grayling, Lake Trout, Round Whitefish, Burbot, Slimy Sculpin, Ninespine Stickleback, Hybridized Lake Trout/Arctic Char.

Field analyses (water sampling for eDNA and chemistry) occurred in 2017, 2018, 2019, and 2021 in the Meadowbank and Whale Tail areas. Data analyses are complete, and an MSc Thesis was completed (Johnson, 2024). A manuscript was submitted to the journal Arctic Science for peer-reviewed publication in November, 2025.

In furthering the training objectives of this project, eDNA sampling workshops were held at the University of Manitoba in February 2019 and 2020, with 4 and 7 members of the Kivalliq Inuit community in attendance, respectively. The 3-day workshops featured of number of lecturers in the eDNA community, as well as a hands-on DNA extraction laboratory, and a foundation for further involvement of the Inuit community in eDNA sampling was laid. In the 2019 season, two of the trainees from the program also assisted in sample collection.

3.2.7.3 Study Completion

This study was complete in 2025. With submission of the manuscript for peer-reviewed publication, FHOMP criteria for success of the Whale Tail Mine complementary measures were met for this study.

SECTION 4 • SUMMARY AND EVALUATION OF SUCCESS

4.1 CONSTRUCTED OFFSETS

Monitoring and reporting under the FHOMP's pre-offsetting monitoring program was complete in 2024. Overall, results of the final analysis (C. Portt & Associates, 2024) indicate a high degree of confidence that the predicted gains from habitat creation through flooding will be realized going forward.

No further monitoring or evaluation of success is planned under the FHOMP until construction of the offsetting features.

Water level monitoring and water quality monitoring in the Whale Tail area occurred under other compliance programs in 2025. Flood zone water levels remain similar to previous years and water quality within the flood zone remains suitable for aquatic life based on CREMP criteria. These programs will continue in 2026.

4.2 COMPLEMENTARY MEASURES

Criteria for success for each research project are focussed on submission of study results for publication in the peer-reviewed literature, or similar primary sources. In 2021, Study 4 – *Arctic Grayling Occupancy Modelling* was completed and met these criteria with manuscript submission (Ellenor et al. 2022). In 2025, a manuscript was also submitted for Study 6 – eDNA Methods Development (Johnson et al., 2025).

Timelines for completion of the remaining studies and all publications/presentations to date are shown in Table 3. Final reporting is anticipated in 2026 for Studies 1, 2, and 3. A new study direction for Study 5 (end pit lake habitat use) will be selected.

Table 3. Target study publication dates and publication or presentation references.

Study	**Study Initiation**	**Target Completion** (as of December, 2025)	**Publications and Presentations to Date**
Study 1: Changes in Aquatic Productivity (H. Swanson)	2018	2026	**Conference presentations**: Ellenor, J., Portt, C., and Swanson, H.K. 2019. Variation in Slimy Sculpin (*Cottus cognatus*) monitoring endpoints at six Barrenland lakes in central Nunavut. Poster presentation. Canadian Conference for Fisheries Research on January 3-6, 2019. **MSc Thesis**: Soogrim, N. 2025. Investigating Changes in Mercury Concentrations in Small-Bodied Fishes Following Mine-Related Flooding in the Canadian Arctic. Defended May 21, 2025. Online access pending. **Peer-reviewed publication**: To be submitted **Final plain-language summary**: To be completed **Technical report**: To be completed
Study 2: Wastewater (H. Swanson and M. Hanson)	2019	2026	**Conference presentations:** Bronte McPhedran presented preliminary findings and research methods at Young Environmental Scientists SETAC conference in Texas, on March 9-11, 2020. **MSc Thesis**: McPhedran, B. 2024. Metal Concentrations in an Arctic Wastewater Wetland: Insights and Innovations from Baker Lake, Nunavut, Canada. MSc Thesis presented to the University of Waterloo, Waterloo, Ontario. Available at: https://uwspace.uwaterloo.ca/items/67db0053-d7ac-4065-8183-dcdd19fdb546 **Visual Sampling Guidebook**: To be completed **Peer-reviewed publication**: To be submitted

Study	**Study Initiation**	**Target Completion** (as of December, 2025)	**Publications and Presentations to Date**
Study 3: Habitat Preferences (S. Doka)	2018	2026	**Conference presentations:** Two presentations have been given at scientific fora by the graduate student, Hannah Hancock of Lakehead University: at Canadian Conference for Fisheries Research in London ON in January, 2019 and at the American Fisheries Society -Ontario Chapter meeting in Orillia ON in February, 2019. **MSc Thesis**: Hancock H., 2020. Physical habitat associations of fish species in the Kivalliq region of Nunavut, Canada. MSc Thesis presented to Lakehead University, Orillia, Ontario. Available at: http://ceelab.ca/wpcontent/ uploads/2020/10/Hannah final- thesis-10132020.pdf **Plain-language summary**: Expanding our understanding of Arctic fish habitat associations. Doka, Rennie, & Kanavillil, (no date). Digital copies in English and Inuktitut was provided to the MFRAG for public distribution (December, 2024). **Technical report**: To be completed
Study 4: Arctic Grayling Occupancy (H. Swanson)	2018	**COMPLETE** 2021	**Conference presentation**: Ellenor J., Swanson, H. K., 2019. Factors influencing how Arctic Grayling (*Thymallus arcticus*) use Barrenland streams near Baker Lake, Nunavut. Platform presentation. ArcticNet Annual Scientific Meeting on December 2-5, 2019. **MSc Thesis**: Ellenor, J. 2020, June. Habitat use of young-of-year Arctic Grayling (*Thymallus arcticus*) in Barrenland streams of central Nunavut, Canada. MSc Thesis presented to the University of Waterloo, Waterloo, Ontario. Available from http://hdl.handle.net/10012/15969. **Peer-Reviewed Publication**: Ellenor, J.R., P.A. Cott and H.K. Swanson (2021). Occupancy of young-of-year Artic grayling (*Thymallus arcticus*) in Barrenland

Study	**Study Initiation**	**Target Completion** (as of December, 2025)	**Publications and Presentations to Date**
			streams. *Hydrobiologia* (published online 15 November 2021). Available at: https://link.springer.com/article/10.1007%2Fs10750-021-04742-3 **Plain-language summary:** Where are the fish? Studying which factors affect young Arctic Grayling presence in streams around Baker Lake. Swanson & Ellenor, November 2020. Digital copies in English, French, and Inuktitut were provided to the MFRAG member groups for distribution.
Study 5: End Pit Lake Habitat Use	TBD	TBD	Study topic under re-consideration.
Study 6: eDNA Study (J. Stetefeld)	2018	**COMPLETE** 2025	**MSc Thesis**: Johnson, W. 2024. Environmental DNA as an Ecological Monitoring Tool for the Canadian Arctic. MSc Thesis presented to the University of Manitoba, Winnipeg, Manitoba. Available by request from: https://mspace.lib.umanitoba.ca/items/0ad75b88-2df4-4405-ba2f-477ac0bb5e08 (Pending online publication) **Peer-Reviewed Publication (submitted):** Johnson, W., Gussakovsky, D., Schultz, S., Tomy, G., Stetefeld, J. Environmental DNA metabarcoding for monitoring fish populations near established and developing mines in the Canadian Arctic. Submitted November, 2025 to Arctic Science (ID: as-2025-0094)

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Johnson, W. 2024. Environmental DNA as an Ecological Monitoring Tool for the Canadian Arctic. MSc Thesis presented to the University of Manitoba, Winnipeg, Manitoba. (Not yet publicly available)

McPhedran, B. 2024. Metal Concentrations in an Arctic Wastewater Wetland: Insights and Innovations from Baker Lake, Nunavut, Canada MSc Thesis presented to the University of Waterloo, Waterloo, Ontario. Available online: https://dspacemainprd01.lib.uwaterloo.ca/server/api/core/bitstreams/89f6c66d-720a-4dd2-8dd5-53ef996db4cd/content

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