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Your file Votre référence
2AM-MEA1525

Our file Notre référence
16-HCAA-00370

Karen Kharatyan - A/Manager of Licensing
Nunavut Water Board (NWB)
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Dear Karen Kharatyan,

Subject: Type "A" Water Licence Application 2AM-WTP---- and Amendments to the Type "A" Water Licence 2AM-MEA1525 – Fisheries and Oceans Canada (DFO) Final Written Submission

Fisheries and Oceans Canada (DFO) has conducted a final review of the Type A Water Licence Application, associated documentation and management plans submitted by Agnico Eagle Mines Ltd. to the NWB.

Our final assessment and recommendations are contained in the attached submission. The Technical Review Comments provided to the Nunavut Water Board and the Nunavut Impact Review Board will be identical submissions due to the similarities in comments to both boards.

Fisheries and Oceans Canada will be attending the Public Hearing scheduled in Baker Lake, NU during the week of September 25, 2017 (September 26-27, 2017), and will be available to answer further questions regarding our final written submission at that time.

If you have any questions, please contact Mark D'Aguair at (867) 669-4911 or by email at Mark.D'Aguair@dfo-mpo.gc.ca. Please refer to our file number referenced above when corresponding with the Program.

Sincerely,

Scott Gilbert
A/Regional Director General
Central & Arctic Region
Fisheries and Oceans Canada

ATTACHMENT: (TAB 1) FINAL WRITTEN SUBMISSION

Fisheries and Oceans Canada | Pêches et Océans Canada

FISHERIES AND OCEANS CANADA
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PÊCHES ET OCÉANS CANADA

Final Written Submission to the

Nunavut Water Board (NWB)

Whale Tail Pit Project

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Projet de la fosse Whale Tail

August 2017

DFO File No/ᑎᑎᕐᖃᓗᒪᔪᓂᑦ ᓇᓴᐅᑎᖏᑦ/ N° de référence du MPO:16-HCAA-00370

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Executive Summary

The Fisheries Protection Program (The Program) of Fisheries and Oceans Canada (DFO-FPP) is responsible on behalf of the department for regulatory review of proposed developments occurring in or near Canadian fisheries waters. The Program (DFO-FPP) has reviewed the Whale Tail Pit project and is providing DFO's comments based on our mandate under the *Fisheries Act* to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries, including marine mammals and their habitat. The primary focus of the technical review is to ensure that works, undertakings and activities of proposed developments are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act.*

The fisheries protection provisions of the *Fisheries Act*, Sub-Section 35(1) states that "*No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery or to fish that support such a fishery*.". However, under Paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries, Oceans and the Canadian Coast Guard may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in *serious harm* to fish. *Serious harm* to fish is defined in Section (2) as the death of fish, or permanent alteration to or destruction of fish habitat.

DFO-FPP is providing the following technical review submission to the Nunavut Water Board (NWB) for their consideration. The technical review comments in this submission are categorized under the following general topics: Freshwater Environment, Monitoring, Mitigation and Management Plans.

Executive Summary- Inuktitut

Executive Summary French

1 Introduction

This technical review submission summarizes Fisheries and Oceans Canada– Fisheries Protection Program's (DFO-FPP) assessment and recommendations concerning the proposed Whale Tail Pit Project (the Project). The purpose of this submission is to provide expert advice to the Nunavut Water Board (NWB) regarding the identification of potential environmental impacts associated with the project proposed.

As directed by the NWB in their letter dated July 17, 2017, this submission focuses on detailed analysis of the Type A Water Licence application, responses to the information requests and supplementary information provided since the technical session. The objective is to assess the updated plans in support of the water licence, presented by the Proponent in support of the Project proposal, and reflects DFO-FPP's mandate.

2 Mandate, Relevant Legislation and Policy

The *Constitution Act* (1982) provides the Federal Government with exclusive authority for coastal and inland fisheries within Canada's territorial boundaries. DFO exercises this power through, the administration of the *Fisheries Act* and some aspects of the *Species at Risk Act*. Under the *Fisheries Act*, DFO is responsible for the management, protection and conservation of fish (which include marine mammals as defined by the *Fisheries Act*) and their habitats. The Minister of Fisheries, Oceans and the Canadian Coast Guard is one of the competent ministers under the *Species at Risk Act* (SARA).

In general, DFO-FPP undertakes the review of proposed project in and around fisheries waters to ensure that works, activities and undertakings are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act.*

The mandate of DFO-FPP is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. Sub-section 35 (1) of the *Fisheries Act* states that "No person shall carry on any work, undertaking or activity that results in *serious harm to fish* that are part of a commercial, recreational, or Aboriginal fishery or to fish that support such a fishery."

Fisheries and Oceans Canada interprets *serious harm to fish* as:

- the **death of fish**;
- a **permanent alteration** to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery,

rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;

- the **destruction of fish habitat** of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of these life processes.

However, under Paragraph 35 (2) (b) of the *Fisheries Act*, the Minister of Fisheries, Oceans and the Canadian Coast Guard may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish. Subject to the consideration of the four factors in Section 6 of the *Fisheries Act*:

1. The contribution of the relevant fish to the ongoing productivity of commercial, recreational or Aboriginal fisheries;

2. Fisheries management objectives;

3. Whether there are measures and standards to avoid, mitigate or offset serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or that support such a fishery; and

4. The public interest.

DFO-FPP is guided by the "Fisheries Protection Policy Statement (2013)", which is intended to provide guidance to Canadians and ensure compliance with the *Fisheries Act*. The *Fisheries Protection Policy Statement* strengthens the Federal Government's ability to address key threats to the productivity and sustainability of our fisheries, through standards and guidelines to avoid, mitigate, and offset impacts to fisheries.

The "Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting (2013)" provides guidance on undertaking effective measures to offset serious harm to fish that are part of or that support a commercial, recreational or Aboriginal fishery, consistent with the fisheries protection provisions of the *Fisheries Act*. The objective of offsetting is to counterbalance unavoidable *serious harm to fish* and the loss of fisheries productivity resulting from a project. For more information, see: http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html.

The *Species at Risk Act* (SARA) is intended to prevent Canadian indigenous species, subspecies and distinct populations of wildlife from being extirpated or becoming extinct. SARA facilitates

the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and manage species of special concern (to prevent them from becoming endangered or threatened). The Minister of Fisheries, Oceans and the Canadian Coast Guard is the competent minister for listed aquatic species that are fish as defined in the *Fisheries Act* Section (2) and for marine plants as defined in the *Fisheries Act*, Section 47.

Environmental and Climate Change Canada (ECCC) is responsible for the administration and enforcement of the pollution prevention provisions of the *Fisheries Act*, Sections 34 and 36-42 on behalf of DFO.

3 Technical Review Comments

3.1 Habitat Losses

Review Comment Number	3.1 Habitat Losses
Subject/Topic	**Freshwater Environment – Habitat Losses**
References	Volume 6, Section 6.5.3.2.2, p.6-80 Agnico Eagle Information Request Response #1 January 2017, p.44 and 45. Agnico-Eagle Conceptual Fish Habitat Offsetting Plan: Whale Tail Pit June 2017 <u>References for end pit lake</u> Gammons, C.H., Harris, L.N., Castro J.M., Cott, P.A., and Hanna, B.W. 2009. Creating lakes from open pit mines: processes and considerations – with emphasis on northern environments. Can. Tech. Rep. Fish. Aquat. Sci. 2826: ix + 106p. Pieters, R., Coedy, W., Ashley K.I., and Lawrence, G.A. 2015. Artificial circulation of a mine pit lake. Can. J. Civ. Eng. 42:33-43 Pieters, R. and Lawrence, G.A. 2014. Physical processes and meromixis in pit lakes subject to ice cover. Can. J. Civ. Eng. 41: 569-578
Summary	**1.** "Any negative effects on littoral habitat and lake productivity at post-closure are expected to be minor, in part because the pit will extend the surface area of Whale Tail Lake by 13%, and the pit is expected to represent only a small proportion (i.e. approximately 23%) of the area of Whale Tail Lake at post-closure, such that most of the littoral habitat in the lake will remain intact." (AEM's IR Response, p.44) **2.** "Agnico Eagle will continue to evaluate the actual interaction between the two water types (water within the pit versus the water above the pit in Whale Tail Lake) as well as possible chemical stratification of the flooded pit. . . Uncertainty in the water quality predictions and subsequent predictions of habitat conditions will also be evaluated using results from the CREMP and Water Quality and Flow Monitoring Plan." (AEM's IR Response, p. 45) **3.** "If meromictic conditions prevail at post-closure, the top mixolimnion layer of the flooded pit is expected to provide water quality conditions similar to shallow waters of unaltered areas of Whale Tail Lake . . . consistent with other studies that have demonstrated that populations of fish can persist within end pit lakes." (AEM's IR

	Response, p. 45)
Importance of issue to the impact assessment process	It is important to understand potential negative impacts that may persist into mine closure and reclamation and that permanent impacts are effectively offset.
Detailed Review Comment **1. Gap/Issue** **2. Disagreement with EIS conclusion** **3. Reasons for disagreement with EIS conclusion**	**1.** DFO requested in the Technical submission (Technical Comment 1, Request 2) on March 28, 2017, that "AEM provide better illustrations to demonstrate the proposed increased surface area of Whale Tail Lake and its viability as newly created littoral habitat." This request was because DFO is uncertain as to whether the proposed increased surface area of Whale Tail Lake will be a viable offset. Based on the images provided it cannot be determined if there is enough room along the narrow edge of the pit to provide enough shallow habitat to function as a literal zone. In AEM's Response to DFO's Technical Submission (Technical Comment 1), DFO did not receive the requested illustration. Through a past meeting with DFO and AEM on March 23, 2017, AEM agreed to provide better illustrations (i.e., 3-D images) to demonstrate the proposed increased surface area of Whale Tail Lake. **2.** DFO requested in the Technical submission (Technical Comment 1, Request 3), on March 28, 2017, that AEM "provide additional details outlining how they intend to evaluate the potential mixing or non-mixing situation in the pit portion of Whale Tail Lake as the information adopted from Meadowbank's CREMP and Water Quality Monitoring Plan would seem insufficient to do so. If AEM is unable to demonstrate sustainable water quality and habitat suitable for fish in the post-closure scenario, AEM should provide DFO with contingency offsetting options located outside the Whale Tail Lake basin." DFO is uncertain how AEM will effectively monitor the mixing or non-mixing in the pit. DFO is also concerned that water quality from the pit could negatively affect the remainder of the lake and fish habitat. There was only one monitoring station proposed and monitoring is to be conducted years 1, 2, 4 and 11. AEM also concluded in its FEIS that there will be no mixing between the pit water and the overlying water, though no rationale for this key conclusion is provided (either based on other locations, wind impact analysis, or temperature induced mixing). **3.** In DFO's Technical Submission (Technical Comment 1) from March, 2017: "DFO could not locate information within the FEIS or conceptual offsetting plan for which to base an agreement or disagreement with AEM's conclusions. AEM cites Gammons et al. 2009 as supporting their confidence that the Whale Tail end pit will support fish in the post closure scenario. However, DFO disagrees that there is sufficient evidence to make that conclusion confidently. In Gammons et al. 2009, DFO also notes multiple statements that provide a significant level of uncertainty associated with end pit lakes: "projects have had

	mixed success. A common consensus is that manipulation of pit lake chemistry is difficult, expensive, and takes many years to achieve remediation goals. For this reason, it is prudent to take steps throughout mine operation to reduce the likelihood of future water quality problems upon closure." p.viii "Many pit lakes from former gold mines contain elevated concentrations of heavy metals . . . [and] elevated turbidity [which] can block sunlight, resulting in reduced rates of photosynthesis." P.17 "In many cases, immediately after pit lake formation, these habitat conditions (e.g. light availability, metal concentrations, nutrient levels and pH) are quite stressful resulting in biological diversity that is low or event absent. Additionally, littoral zones and associated habitat are often scarce or absent due to the steep-sided contour of these pits." P.30 "Early monitoring showed . . . thiocyanate concentrations remained elevated. . . The main reason for the lower removal efficiency in the latter case was that the much deeper pit lake was meromictic during this time period so that thiocyanate was eliminate only in the upper 20m of the lake. To get around this problem, the operators constructed an aeration circuit . . . Although the combination of ENR and aeration have been successful for eliminating cyanide, ammonia and thiocyanate from the Colomac lakes, there are lingering concerns over elevated phosphate and nitrate concentrations. . . Projected to the future, it is possible that most of the nitrate in the lake will be gone in 3 to 5 winter seasons (2007). However, this assumes that the water column will continue to become anoxic during the winter months, a prerequisite for denitrification to occur. Seasonal anoxia may not occur now that the major sources of chemical oxygen demand (ammonia, cyanide, and thiocyanate) have been removed. The removal of P also presents a challenge." P.70. AEM concludes that there will be no mixing between the pit water and the overlying water, though no rationale for this key conclusion is provided (either based on other locations, wind impact analysis, or temperature induced mixing).
Recommendation/Request	**3.1.1 Request:** DFO re-iterates our request that AEM provide the requested illustrations as agreed to by AEM, which DFO would like to receive prior to the commencement of the regulatory phase. **3.1.2 Request:** DFO re-iterates our request that AEM provide additional details outlining how they intend to evaluate the potential mixing or non-mixing situation in the pit portion of Whale Tail Lake as the information adopted from Meadowbank's CREMP and Water Quality Monitoring Plan would seem insufficient to do so. If AEM is unable to demonstrate sustainable water quality and habitat suitable for fish in the post-closure scenario, AEM should provide DFO with contingency offsetting options located outside the Whale Tail Lake basin." **3.1.3 Request:** DFO re-iterates our requests that AEM provide additional and updated information on the evaluation of end pit lake scenarios, with

	references, to address the above listed concerns regarding the end pit lake scenario. AEM has noted Gammons et al 2009 which does evaluate the Colomac Gold Mine in NWT. There have been several documents written that would provide a beneficial overview with lessons learned. This information would aid DFO and the proponent in subsequent reviews of the conceptual offsetting plan and monitoring reports. In addition to the monitoring data available for the Colomac Gold Mine (e.g. Colomac Mine site surveillance network program and enhanced natural removal program annual reports), DFO is providing AEM with the following documents to aid in their evaluation: Pieters, R., Coedy, W., Ashley K.I., and Lawrence, G.A. 2015. Artificial circulation of a mine pit lake. Can. J. Civ. Eng. 42:33-43 and Pieters, R. and Lawrence, G.A. 2014. Physical processes and meromixis in pit lakes subject to ice cover. Can. J. Civ. Eng. 41: 569-578.

3.2 Valued Components

Review Comment Number	3.2 Valued Components
Subject/Topic	**Freshwater Environment – Valued Components**
References	Volume 6, Section 6.12, Table 6.1-2, p.6-2 Whale Tail - FEIS and Type A Information Request Response 3, January 2017, p. 48 Agnico-Eagle Conceptual Fish Habitat Offsetting Plan: Whale Tail Pit June 2017, p. 14 Final Technical Meeting Commitments FT2E, May 2017. Commitment #31
Summary	1. DFO requested AEM consider that all fish species are weighted equally when evaluating fishery losses and gains. This was noted to AEM in DFO's Technical Submission (Technical Comment 3) as the "Importance of the issue to the impact assessment process". It stated that "[it] is important that all fish species are weighted equally when DFO is evaluating potential fishery losses and gains in AEM's offsetting plans. All fish as listed in the Local Study Area are species of fishery and fishery support value in Nunavut."
Importance of issue to the impact assessment process	It is important that all fish species are weighted equally when DFO is evaluating potential fishery losses and gains in AEM's offsetting plans. All fish as listed in the Local Study Area are species of fishery and fishery support value in Nunavut.
Detailed Review Comment 1. **Gap/Issue** 2. **Disagreement with EIS conclusion**	1. DFO disagrees with AEM in using biomass, fishery and cultural contributions in calculating species weights. In AEM's Conceptual Fish Habitat Offsetting Plan, AEM stated that "DFO has indicated a preference for all species to be weighted equally. Therefore, each of the six species that are present in the study area has a weight of 0.165 in the calculations presented in this document." p. 14. Although DFO

3. Reasons for disagreement with EIS conclusion	acknowledges that AEM has agreed to assign a weighting for each species, DFO disagrees with AEM on the equal weighting calculation, as AEM uses other contribution factors such as biomass, fishery and cultural contributions in their calculations. Instead, species presence/absence should be given equal weighting. This advice was previously provided in DFO's 2016 - Review of Habitat Evaluation Procedure (HEP) input parameters and model results for the Meadowbank Gold Mine Project. DFO Can. Sci. Advis. Sec. Sci. Resp. 2016/038.
Recommendation/Request	**3.2.1 Request:** DFO requests that AEM give equal weights to species based on presence/absence in the offsetting calculation. DFO also recommends that AEM continue to work with DFO to resolve the equal weighting discrepancy as part of the offsetting plan finalizations. DFO notes that the request to assign equal value to all fish species was part of Commitment #31 from the Technical Meeting in April 2017.

3.3 Habitat Alteration

Review Comment Number	3.3 Habitat Alteration
Subject/Topic	**Freshwater Environment – Habitat Alteration**
References to the EIS (i.e., volume/document, Section/sub-section, page number, etc.)	Volume 6, Section Habitat Alteration, p.6-82 & 6-83 & 6-87. Whale Tail – FEIS and Type A Information Request Response 4, January 2017, p. 49 Conceptual Offsetting Plan, Table 3.2, p.30 Fisheries and Oceans Canada Technical Submission to the NIRB, Technical Comments 4&5, March 28, 2017 Fish Habitat Offsetting Plan: Whale Tail Pit, Draft - June 2017 DFO. 2014. Science Advice on Offsetting Techniques for Managing the Productivity of Freshwater Fisheries. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/074.
Summary (include Proponent's conclusion if relevant and conclusions of commenting party)	As per DFO's Technical Submission (Technical Comment 4) on March 28, 2017, "DFO requests AEM re-evaluate the conceptual offsetting plan to remove potential gains associated with flooding activities" and "AEM did not acknowledge the 24 hectares of loss associated with impacted waterbodies". "DFO requests AEM re-evaluate the conceptual offsetting plan to remove potential gains associated with flooding activities." DFO's Technical Submission (Technical Comment 5, Request 5). As part of the Technical Meeting and Pre-Hearing Conference held April 28-

	29 and May 1-2, 2017, DFO acknowledges that AEM committed to work with DFO to resolve this issue during offsetting discussions. In the draft Fish Habitat Offsetting Plan, it is unclear whether habitat units associated with the flooding activities are still being considered as functional habitat 'gains'. This issue is currently still unresolved; however, DFO acknowledges that AEM has continued to engage DFO in an effort to resolve this issue.
Importance of issue to the impact assessment process	It is important to understand all impacts associated with flooding extending over multiple waterbodies in order to properly evaluate and calculate fishery losses and create offsetting plans.
Detailed Review Comment **1. Gap/Issue** **2. Disagreement with EIS conclusion** **3. Reasons for disagreement with EIS conclusion**	1. From DFO's Technical Submission (Technical Comment 4): "DFO originally requested AEM provide additional information, with references, regarding the disruptive impacts of flooding extending over multiple waterbodies, eliminating streams and the impacts to the fish, while simultaneously lowering the water level in an equally important lake (Mammoth) and reducing available habitat elsewhere. And, that those losses should also be evaluated in the Offsetting Plan." "As described in the conceptual offsetting plan, AEM proposes a loss of approximately 24 hectares of waterbodies and 3390 linear metres of watercourses." While DFO requested the 24 hectares and 3390 linear metres be considered as losses due to flooding be included in offsetting calculations, it is not clear whether they have been accounted for in the recent offsetting plan from June 2017. Tables 3-2 through 5-1. 2. From DFO's Technical Submission (Technical Comment 4): "The construction and operation of the Northeast Dike and Whale Tail Dike and their associated diversions will result in the flooding of five streams from the Northeast Dike and Diversion, and 17 streams as a result of the diversion into and flooding of Whale Tail Lake (South Basin) for a total of approximately 2,402 m of stream habitat altered. Species that use these streams include Arctic Char, Lake Trout, Round Whitefish, Burbot, Slimy Sculpin, and Ninespine Stickleback. With flooding, most of the stream habitat would be eliminated with the increase in elevation (and area) of Whale Tail Lake (South Basin). Species distributions also have the potential to shift (i.e., expand distributions) as piscivorous fish (e.g., Lake Trout) gain access to forage fish populations in small lakes and ponds." The alteration of these streams due to flooding may have negative effects on the fishery and as such would not be considered as productivity gains or habitat gains, but rather a loss in current functional stream habitat. DFO's position as stated in the Technical session, during a deferred response was "Fisheries and Oceans Canadas position remains unchanged, at this time that any potential gains as a result of temporary flooding activities will not be considered as part of the offsetting calculations.".

The updated information provided by AEM in the Fish Habitat Offsetting Plan shows the net changes of habitat area and habitat units; the operational phase is shown below as an example - Whale Tail Pit, Draft - June 2017 Table 3-2 :

Table 3-2. Changes in habitat area and habitat units between preconstruction phase and operations phase, by feature/habitat type.

	Change from pre-construction phase to operations phase	
Feature/habitat type	**Hectares**	**Habitat Units**
Nemo Lake	-0.2	0.0
Mammoth Lake	-1.2	-0.5
Whale Tail Lake (expanded during operations)	240.6	122.3
Other Lakes and Ponds	-183.6	-77.0
Connecting channels	-8.0	-2.4
Streams	-0.3	-0.1
Diversion Channel A17-A45	1.8	0.5
Net change	49.2	42.9

In addition, as an example, Table 3-3 on pg. 32 of the draft offsetting plan shows the details of habitat changes during the operational phase:

	Table 3-3. Area of habitat that is lost, isolated in the north-east pond, unaltered, modified and created during the operations phase.

Changes to habitat	Area in hectares
Habitat lost during operations	
Nemo Lake filled	0.2
Whale Tail Lake dewatered	69.5
Mammoth Lake dewatered	1.1
Streams dewatered	0.4
Whale Tail Lake covered by dike and dry during operations	2.5
Mammoth Lake covered by dike and dry during operations	0.1
Total habitat lost during operations	73.7
Habitat isolated in north-east pond during operations	
Existing lake and pond habitat	7.4
Existing stream habitat	0.1
Total isolated in north-east pond (assumed not to be fish habitat)	7.6
Habitat not altered during operations	
Mammoth Lake	150.5
Portion of connecting channel A23-A22	1.4
Portion of watercourse A53-A17	0.4
Total habitat not altered during operations	152.3
Existing Habitat modified during operations	
Existing Nemo Lake covered by freshwater jetty	0.4
Existing Mammoth Lake covered by Mammoth dike	0.0
Existing Whale Tail Lake (water level increased)	94.8
Existing Whale Tail Lake covered by dike (wetted portion)	0.4
Other existing lakes in expanded Whale Tail Lake (water levels increased)	177.8
Lake A45 water levels increased	2.9
Existing connecting channels converted to lake habitat	7.1
Existing streams converted to lake habitat	0.3
Total existing habitat modified during operations	283.8
Habitat created during operations	
Land flooded around expanded Whale Tail Lake	127.4
New channel alignment for stream A53-A17	0.2
Connecting channel constructed between A17 and A45	1.8
Land flooded around Lake A45	1.6
Total habitat created during operations	130.9

DFO notes the updated calculations of the hectares and habitat units during all phases of the project. Flooding activities appear to result in a positive net change rather than a negative as indicated in Table 3-2 for Whale Tail Lake (expanded during operations). Both the hectares and habitat unit values are given a positive value of 240.6 hectares and 122.3 habitat units. DFO notes that this still demonstrates AEM's assertion that flooding activities will result in habitat gains in such a way that the increased surface area will counterbalance losses in other areas. DFO also notes that, while these habitat unit and hectare changes are displayed in the tables for the operational phase (tables 3-3), they are not reflected in the post-closure table(s). This suggests that temporary changes are not considered as a loss. DFO is concerned that only a temporal loss factor has been applied.

DFO also notes that the "modification during operations" in Table 3-3,

	"Existing Mammoth Lake covered by Mammoth dike" exhibits a 'change' of 0.0. It is unclear to DFO why a value of 0.0 has been assigned. DFO notes that there is a channel that currently exists between Whale Tail and Mammoth Lakes which likely provides passage for fishes, and as such, fish passage may be impacted by the dike. Many of the habitat changes during operations and due to flooding are captured in the "Existing habitat modified during operations" section of Table 3-3 of the offsetting plan as shown above. It is also unclear to DFO how these numbers are reflected in the final net change in table 3-2 and in the final Table 5-1, and how the project impacts are reflected in the provided tables. **3.** DFO notes that in section 3.2.2 Proposed Offsetting Measures, "A portion of the top of the Mammoth Dike will be reconfigured to create a surface connection between Whale Tail and Mammoth Lake but raises the elevation of Whale Tail Lake by 0.5 m". DFO is unclear on what mechanisms will be used to ensure the lake will remain at this increased water level in perpetuity and requires more information on the plans to make this permanent increase happen. In addition, DFO is not confident that this type of flooding and associated increase in lake surface area will result in a productive habitat gain, thus our request to not include these items in the list of potential offsetting gains.
Recommendation/Request	**3.3.1 Request:** DFO requests AEM provide more information regarding the 24 hectares and 3390 linear metres of habitat loss associated with impacted waterbodies in the post-closure scenario that was discussed in the conceptual offsetting plan and how it is captured in the recent fisheries offsetting plan. **3.3.2 Request:** DFO requests AEM clarify the calculated numbers for all phases of the project, providing rationale, and request AEM provide the calculations (including the raw data used in the calculations) to determine how these numbers are being reached. DFO continues to reiterate previous comments that AEM omit any habitat gains associated with temporary flooding activities during the operations. **3.3.3 Request:** DFO requests AEM provide more information regarding their plan to permanently flood Whale Tail Lake by raising the water level by 0.5m, including the rationale, and ability to sustain this condition so as to provide measurable increases in fisheries productivity. Similar to DFO's concerns respecting the potential losses in fisheries productivity associated with the flooding of the Whale Tail Lake South Basin and surrounding waterbodies, DFO requests this proposed flooding is not included as a gain in the Conceptual Offsetting Plan.

3.4 Changes to the Lake Ecosystem Productivity

Review Comment Number	3.4 Changes to the Lake Ecosystem Productivity
Subject/Topic	**Freshwater Environment – Changes to Lake Ecosystem Productivity**
References to the EIS (i.e., volume/document, Section/sub-section, page number, etc.)	Volume 6, Section Changes to Lake Ecosystem Productivity, p.6-88 Whale Tail – FEIS and Type A Information Request Response 5, January 2017, p. 50 Fisheries and Oceans Canada Technical Submission to the NIRB, Technical Comment 5, March 28, 2017 Technical Memorandum: Addendum to Agnico Eagle Mines Whale Tail FEIS Appendix 6-H. Sensitivity Analyses on water quality modelling in support of responses to technical commitments 30, 36, 37 and 42 and intervenor comments ECCC #15 and INAC-TRC #3 and #5, on the Water Licence A Application to the Nunavut Water Board, section 3.1.2 and section 5.0. DRAFT Fisheries Offsetting and Monitoring Plan, Section 3.1, pg. 5
Summary (include Proponent's conclusion if relevant and conclusions of commenting party)	In the initial plan by AEM, a change in the lake ecosystem from oligotrophic to eutrophic and back again was expected to occur due to the increase in nutrients from mining activities. During the Technical Meeting and Pre-Hearing Conference, this topic was brought forth and AEM committed to investigating Phosphorus treatment options, which would change the original plan. From the Technical Memorandum dated July 10, section 3.1.2, Phosphorus Results: "The predicted maximum concentrations may slightly exceed the Canadian Water Quality Guideline (CWQG) for oligotrophic waters during operations, but drop below the guideline to a maximum 0.0085 mg/L at post-closure" "Average and maximum concentrations of phosphorus are predicted to remain above the oligotrophic to mesotrophic trigger in Mammoth Lake, Lake A15 and Lake A12, but with a decrease in concentrations after closure." "Although a change in trophic status was also predicted in the EIS in relation to effluent discharge into Mammoth Lake, mitigative options are now being investigated to minimize those impacts, so research projects will focus on the flooded zone south of the Whale Tail dike."
Importance of issue to the impact assessment	It is important to understand the changes to lake ecosystem productivity when altering the lakes natural condition.

process	A sudden change from an oligotrophic lake with the disruptions of habitat fragmentation and water quality changes will result in fishery losses.
Detailed Review Comment	According to the original plan, nutrients would be added to the lake due to operational activities and discharge. AEM "intends to treat, test and verify the phosphorus predictions through ongoing monitoring" and "will commit to the implementation of water treatment of other mitigation options if phosphorus concentrations are observed to increase to unacceptable levels that may affect the local fishery". AEM had deemed the change from an oligotrophic lake to a eutrophic lake and back again will be a positive impact to productivity. DFO did not agree that enough information had been provided that can support that conclusion. In a Technical Memorandum dated July 10, 2017, AEM discusses sensitivity analysis based on different treatment methods and updated predicted concentrations of Arsenic and Phosphorus. DFO is unclear about the overall resulting predictions from this investigation. AEM states that the average and maximum concentrations will remain above the oligotrophic to mesotrophic trigger which suggests that despite phosphorus treatment and attempts at mitigation, the nutrient loading will still be high enough to trigger a trophic change to the lake ecosystem. If this is the case, this kind of ecosystem change will have detrimental effects to the fishery. In addition, due to the short timeframe predicted for this change to occur (2-3 years), monitoring this change and losses associated with the fishery productivity, would be difficult. DFO notes that a change from the oligotrophic state of the lake to a eutrophic state, if it occurs, will likely be a loss in productivity and should be treated as a loss in offsetting calculations. On May 18, 2017, when discussing proposed research studies for complementary offsetting, AEM proposed completing a study on the proposed change from an oligotrophic lake to a eutrophic lake and back again. DFO is unclear if AEM is still planning to complete this study since the proposed changes.
Recommendation/Request	**3.4.1 Request:** DFO requests clarification on whether the newly proposed changes to the project, specifically in the form of the phosphorus treatment, will still result in a change to the trophic status of the lake. **3.4.2 Request:** DFO reiterates the previous comments made in DFO's Technical Submission (Technical Comment 5) submitted in March, 2017. If the trophic status is predicted to change from an oligotrophic state and return again in a few years' time, this would harm fishery productivity and should be considered a loss. DFO requests that the losses caused by a trophic change in the lake ecosystem from nutrient overloading be considered as losses in the calculations for offsetting. **3.4.3 Request:** DFO requests clarification on whether AEM is planning on conducting a study in conjunction with University of Manitoba on the change in fisheries productivity due to a change in the lake ecosystem from

	oligotrophic to eutrophic and back again.

3.5 Water Quality and Flow Monitoring Plan

Review Comment Number	3.5 Water Quality and Flow Monitoring
Subject/Topic	**Monitoring, Mitigation and Management Plans – Water Quality and Flow Monitoring**
References to the EIS (i.e., volume/document, Section/sub-section, page number, etc.)	Habitat Compensation Monitoring Plan Version 4 February 2017 Volume 8, Appendix 8-E.2: Core Receiving Environment Monitoring Program Whale Tail Pit Water Quality and Flow Monitoring Plan Version 2 May 2017 Fisheries and Oceans Canada Technical Submission to the NIRB, Technical Comment 9, March 28, 2017 Agnico Eagle, Whale Tail – FEIS and Type A Technical Comment Response, DFO 9 - Response 2 & Table DFO 9-1: Summary of Water Quality Monitoring Stations Final Technical Meeting Commitments FT2E, May 2017. Commitment #2
Summary (include Proponent's conclusion if relevant and conclusions of commenting party)	"DFO does not see any stations proposed to monitor water quality in Nemo, Mammoth or any of the other surrounding water bodies. Table 3-1 p.9" "DFO requests AEM place a monitoring station in Mammoth Lake, add a station in the pit portion of Whale Tail's North Basin as well as the South Basin, and have a least 2 control lake monitoring stations identified." DFO's Technical Submission (Technical Comment 9, Request 2). It is noted that AEM has changed the Water Quality and Flow Monitoring Plan after the Pre-Hearing Conference to include a monitoring station in the end pit lake portion of the North Basin of Whale Tail Lake though it did not resolve the original request made by DFO in the Technical Submission in March 2017. In addition, since studies are proposed to be undertaken for offsetting measures, more rigorous monitoring will be required for these studies to produce effective results.
Importance of issue to the impact assessment process	It is important for AEM to have an appropriate number of monitoring stations to assess impacts to water quality during operations and post-closure in order to validate their assumptions in the environmental assessment
Detailed Review Comment	1. DFO acknowledges that during the Technical Meeting AEM agreed to add 2 monitoring stations in Whale Tail Lake North Basin during post closure; one in the pit and one in the attenuation pond area (refer to Commitments #2). Our original request was that "AEM place a monitoring station in Mammoth Lake, add a station in the pit portion

of Whale Tail's North Basin as well as the South Basin, and have a least 2 control lake monitoring stations identified." DFO's Technical Submission (Technical Comment 9, Request 2). These monitoring stations are important to assess impacts to water quality during operations and post-closure. DFO notes that AEM has referenced the CREMP in discussing planned monitoring stations in past conversations. However, the CREMP is a different plan focused on measuring different parameters. It is important to DFO and the future offsetting requirements that appropriate monitoring stations are captured in the Water Quality and Flow Monitoring Plan.

Figures 2-1 through 2-4 from the updated Water Quality and Flow Monitoring Plan V2, provided in May 2017 show the locations of stations proposed throughout the mining phases. Figures 2-2 and 2-3 show station ST-WT-8 in the South Basin of Whale Tail Lake. However, the station is only utilized during the operational phase and is placed at the water intake location. DFO notes that this is the only monitoring station proposed for the entirety of Whale Tail Lake South Basin. Figures 2-1, 2-2 and 2-3 show station ST-WT-14 as a monitoring station in Mammoth Lake, and only in Figure 2-2 is there a secondary station for Mammoth Lake: ST-WT-2. DFO notes that ST-WT-14 is at the opposite end of the lake from the dike, and ST-WT-2 is monitoring water quality at an intake pipe. DFO also notes that neither station is monitoring Mammoth Lake post-closure. In addition, ST-WT-2 is labelled as "Attenuation Pond, post-treatment; last point of control before discharge" in Table 3-1, pg. 9 of the WQ Flow and Monitoring Plan V2 which seems contradictory to the location provided in Figure 2-2.

AEM has discussed potential research studies with DFO as complementary measures for offsetting including a study in trophic changes, a study reviewing the effects of temporary flooding and a study on the end pit lake scenario. Considering the inconsistencies in monitoring station locations discussed above and in line with the mentioned offsetting efforts, DFO is not convinced that the proposed monitoring program outlined in the Water Quality and Flow Monitoring Plan from May 2017 will adequately support these research efforts. Recently (July 2017), in-kind support was given in conjunction with academia to collect baseline data from Whale Tail Lake, Mammoth Lake and Nemo Lake. The following table outlines the locations and depths in which samples were taken:

Whale Tail Lake			Nemo Lake		
Station ID	Coords (N)	Coords (W)	Station ID	Coords (N)	Coords (W)
1	65° 24.5131'	96° 41.7233'	1	65° 25.5715	96° 41.3640
2	65° 24.3384'	96° 41.9502'	2	65° 25.6477	96° 42.3052
3	65° 24.2908'	96° 42.4516'	3	65° 25.4422	96° 42.6127

6	65° 24.1268'	96° 41.4955'	4	65° 25.0923	96° 42.9617
7	65° 24.1268'	96° 41.4955'	5	65° 25.4422	96° 42.6127
8	65° 23.8409'	96 41.0972'	6	65° 25.0923	96° 42.9617
9	65° 23.7398'	96° 41.3407'	Mammoth Lake		
10	65° 23.7398'	96° 41.3407'	Station ID	Coords (N)	Coords (W)
11	65° 23.6238'	96° 41.1474'	1	65° 23.7136	96° 45.5224
12	65° 23.6238'	96° 41.1474'	2	65° 23.3797	96° 45.1736
13	65° 23.4605'	96° 41.2273'	3	65° 24.0454	96° 43.4129
14	65° 23.4605'	96° 41.2273'	4	65° 23.9393	96° 44.6161
15	65° 23.3908	96° 41.5974			
16	65° 23.2184	96° 41.8156			
17	65° 22.8006	96° 41.3229			

For consistency and for support of the proposed offsetting efforts, DFO prefers a monitoring program that includes the above locations, or similar locations. Consistency in the locations of monitoring samples will provide adequate data for fluctuations in water quality due to mining operations throughout the project and after closure. DFO would like to ensure that in addition to any other parameters being tested at a given station, the following parameters are consistently taken: Temperature, Pressure, Dissolved Oxygen, pH, Salinity and Conductivity. In addition, when the above stations were sampled, multiple samples were taken at different depths at 1, 5 and 10 m depth, location permitting.

2. DFO requested that reference lakes be included in the monitoring program. AEM responded by showing reference stations outlined in the CREMP (Table DFO 9-1). It is important that reference lakes are included in the separate Water Quality and Flow Monitoring Plan to adequately compare to data from the monitoring stations in this plan.

3. DFO is concerned about frequency of sampling that will occur throughout operations, closure and post-closure at monitoring stations and requests that a consistent frequency is considered for sampling at all monitoring locations throughout the project to acquire an ample amount of data to inform future monitoring related studies.

Recommendation/Request

3.5.1 Request: DFO requests that AEM place monitoring stations in Whale Tail South Basin, Mammoth Lake and Nemo Lake in the locations or similar to the locations described in the above table. DFO also requests that when sampling at these locations, that multiple depths be sampled at 1, 5 and 10 m, if the location permits, ensuring to always measure for Temperature, Pressure, Dissolved Oxygen, pH, Salinity and Conductivity.

3.5.2 Request: DFO requests that AEM include at least 2 control lake monitoring stations in the Water Quality and Flow Monitoring Plan and

	include rationale to why the reference lakes that are chosen are appropriate. **3.5.3 Request:** DFO requests AEM ensure consistency in sampling frequency i.e. all stations as suggested by DFO are sampled each monitoring year rather than 1 station in year 4 and a different one in year 11 as is currently the case in AEM's Water Quality and Flow Monitoring Plan.

4 Summary of Recommendations

Freshwater Environment		
1. Habitat Losses		
1	Ref. 3.1.1	DFO re-iterates our request that AEM provide the requested illustrations as agreed to by AEM, which DFO would like to receive prior to the commencement of the regulatory phase.
2	Ref. 3.1.2	DFO re-iterates our request that AEM provide additional details outlining how they intend to evaluate the provide additional details outlining the potential mixing or non-mixing situation in the pit portion of Whale Tail Lake as the information adopted from Meadowbank's CREMP and Water Quality Monitoring Plan would seem insufficient to do so. If AEM is unable to demonstrate sustainable water quality and habitat suitable for fish in the post-closure scenario, AEM should provide DFO with contingency offsetting options located outside the Whale Tail Lake basin."
3	Ref. 3.1.3	DFO re-iterates our requests that AEM provide additional and updated information on the evaluation of end pit lake scenarios, with references, to address the above listed concerns regarding the end pit lake scenario. AEM has noted Gammons et al 2009 which does evaluate the Colomac Gold Mine in NWT. There have been several documents written that would provide a beneficial overview with lessons learned. This information would aid DFO and the proponent in subsequent reviews of the conceptual offsetting plan and monitoring reports. In addition to the monitoring data available for the Colomac Gold Mine (e.g. Colomac Mine site surveillance network program and enhanced natural removal program annual reports), DFO is providing AEM with the following documents to aid in their evaluation: Pieters, R., Coedy, W., Ashley K.I., and Lawrence, G.A. 2015. Artificial circulation of a mine pit lake. Can. J. Civ. Eng. 42:33-43 and Pieters, R. and Lawrence, G.A. 2014. Physical processes and meromixis in pit lakes subject to ice cover. Can. J. Civ. Eng. 41: 569-578.
2. Valued Components		
4	Ref. 3.2.1	DFO requests that AEM give equal weights to species based on presence/absence in the offsetting calculation. DFO also recommends that AEM continue to work with DFO to resolve the equal weighting discrepancy as part of the offsetting plan finalizations. DFO notes that the request to assign equal value to all fish species was part of Commitment #31 from the Technical Meeting in April 2017.
3. Habitat Alteration		
5	Ref. 3.3.1	DFO requests AEM provide more information regarding the 24 hectares and 3390 linear metres of habitat loss associated with impacted waterbodies in the post-

		closure scenario that was discussed in the conceptual offsetting plan and how it is captured in the recent fisheries offsetting plan.
6	Ref. 3.3.2	DFO requests AEM clarify the calculated numbers for all phases of the project, providing rationale, and request AEM provide the calculations (including the raw data used in the calculations) to determine how these numbers are being reached. DFO continues to reiterate previous comments that AEM omit any habitat gains associated with temporary flooding activities during the operations.
7	Ref. 3.3.3	DFO requests AEM provide more information regarding their plan to permanently flood Whale Tail Lake by raising the water level by 0.5m, including the rationale, and ability to sustain this condition so as to provide measurable increases in fisheries productivity. Similar to DFO's concerns respecting the potential losses in fisheries productivity associated with the flooding of the Whale Tail Lake South Basin and surrounding waterbodies, DFO requests this proposed flooding is not included as a gain in the Conceptual Offsetting Plan.
4. Changes to Lake Ecosystem Productivity		
8	Ref. 3.4.1	DFO requests clarification on whether the newly proposed changes to the project, specifically in the form of the phosphorus treatment, will still result in a change to the trophic status of the lake.
9	Ref. 3.4.2	DFO reiterates the previous comments made in DFO's Technical Submission (Technical Comment 5) submitted in March, 2017. If the trophic status is predicted to change from an oligotrophic state and return again in a few years' time, this would harm fishery productivity and should be considered a loss. DFO requests that the losses caused by a trophic change in the lake ecosystem from nutrient overloading be considered as losses in the calculations for offsetting.
10	Ref. 3.4.3	DFO requests clarification on whether AEM is planning on conducting a study in conjunction with University of Manitoba on the change in fisheries productivity due to a change in the lake ecosystem from oligotrophic to eutrophic and back again.
Monitoring, Mitigation and Management Plans		
5. Water Quality and Flow Monitoring Plan		
11	Ref. 3.5.1	DFO requests that AEM place monitoring stations in Whale Tail South Basin, Mammoth Lake and Nemo Lake in the locations or similar to the locations described in the above table. DFO also requests that when sampling at these locations, that multiple depths be sampled at 1, 5 and 10 m, if the location permits, ensuring to always measure for Temperature, Pressure, Dissolved Oxygen, pH, Salinity and Conductivity.
12	Ref. 3.5.2	DFO requests that AEM include at least 2 control lake monitoring stations in the Water Quality and Flow Monitoring Plan and include rationale to why the reference lakes that are chosen are appropriate.
13	Ref. 3.5.3	DFO requests AEM ensure consistency in sampling frequency i.e. all stations as suggested by DFO are sampled each monitoring year rather than 1 station in year 4 and a different one in year 11 as is currently the case in AEM's Water Quality and Flow Monitoring Plan.