D6 FISH AND FISH HABITAT OFFSETTING PLAN UPDATE

PRELIMINARY PROPOSED FISH HABITAT OFFSET STRATEGY AND COMPENSATION PLAN FOR THE MARATHON PALLADIUM PROJECT

Report prepared for:

Generation PGM Inc.
100 King Street West
Suite 7010, PO Box 70
Toronto, ON M5X 1B1

Report prepared by:

ECOMETRIX INCORPORATED
6800 Campobello Road
Mississauga, Ontario
L5N 2L8

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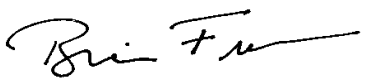
PRELIMINARY PROPOSED FISH HABITAT OFFSET STRATEGY AND COMPENSATION PLAN FOR THE MARATHON PALLADIUM PROJECT

Jason P. Dietrich, M.Sc., RPBio, EP, CPESC-IT
Senior Aquatic Ecologist



Brian Fraser, M.Sc.
Principal, Senior Consultant

EXECUTIVE SUMMARY

This document presents a preliminary conceptual proposal for the Fish Habitat Offset Strategy and Compensation Plan (FHOFCP) that addresses the predicted effects to fish and fish habitat associated with the development of Generation PGM Inc.'s proposed Marathon Palladium Project (the Project).

The Project will interact both directly and indirectly with fish and fish habitat. In this context direct interactions are associated with the Project development footprint; whereas indirect interactions concern a watercourse or water body outside the Project footprint that may be affected by Project activities such as for example reduced flow, as the result of water diversion on site.

Offsets and compensation will be required in relation to *Fisheries Act* subsection 35(2) and Section 27.1 of the *Metal Mining Effluent Regulations,* respectively. Offset/compensation objectives are identified and potential offset/compensation elements are described. This document is meant to provide the foundation for the full FHOFCP that will be developed collaboratively with input from local Indigenous communities and people, federal and provincial agency staff and other interested parties.

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1.0 INTRODUCTION

1.1 Marathon Palladium Project

Generation PGM Inc. (GenPGM) proposes to develop the Marathon Palladium Project (the "Project near the Town of Marathon, Ontario, about 300 km east and 400 km northwest (by highway) of Thunder Bay and Sault Ste. Marie, respectively (Figure 1.1).

The Project envisions the development of an open pit mining and milling operation for copper and platinum group metals. Ore will be mined from the pits and processed (crushed, ground, concentrated) at an on-site processing facility. Final concentrates containing copper and platinum group metals will be transported off-site via existing roadways and/or rail to a smelter and refinery for subsequent metal extraction and separation. Iron sulfide magnetite and vanadium concentrates may also be produced, depending upon the results of further metallurgical testing and market conditions at that time. Process solids and mine rock will be deposited and stored on site in purposefully-built storage areas.

The Project site is in an area characterized by white birch and balsam fir dominated mixed wood forest. The terrain is moderate to steep, with frequent bedrock outcrops and prominent east to west oriented valleys. The climate of this area is typical of northern areas within the Canadian Shield, with long winters and short, warm summers.

Stillwater Canada Inc. (Stillwater), the original Proponent of the Project, had prepared and submitted an Environmental Impact Statement (EIS) and supporting documents in 2012 (Stillwater Canada Inc. 2012) to assess the potential effects of the Project. Following a review of this information and subsequent responses to information requests, the Panel (in 2013) determined that sufficient information was available to proceed to a public hearing. However, prior to the hearing, the process was put on hold by Stillwater and ultimately postponed in 2014. Since 2014, the Project has been acquired by GenPGM and the Panel review process to assess the potential effects of the Project has resumed. An EIS Addendum has been prepared that verifies and/or updates the original assessment of environmental effects for the Project, as input to the Panel process. The EIS Addendum is inclusive of an assessment of potential impacts of the proposed Project on fish and fish habitat as identified as a valued environmental component (VEC).

The EIS Addendum provides an update to the assessment of residual environmental effects of the Project, including a determination of their significance based on the following:

- Updated environmental conditions within the SSA, LSA and RSA, as appropriate.
- Recognition of updated standards, criteria, guidelines, or other thresholds that inform the determination of significance.

- Consideration and recognition of project refinements, including changes to the project components and project activities, that may affect potential project interactions, mitigation measures and residual effects.

The above were specifically considered within the context of the assessment for the fish and fish habitat VEC.

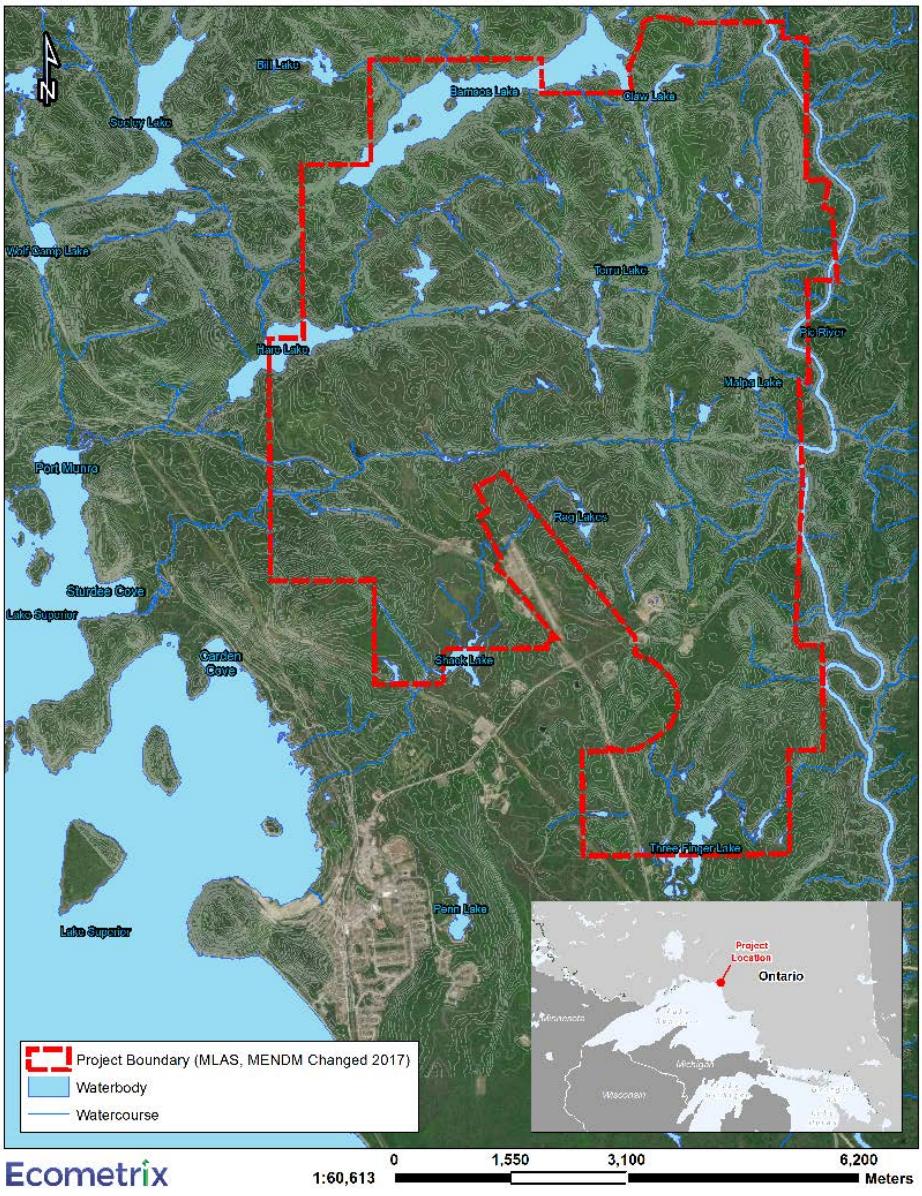

Figure 1-1: Location of the Proposed Marathon Palladium Project Site near Marathon, Ontario

1.2 Purpose of Current Report

This document presents the preliminary conceptual Fish Habitat Offset / Compensation Plan Strategy (FHOFCP) that addresses regulatory requirements under the *Fisheries Act* associated with the development of GenPGM's proposed Marathon Palladium Project. Offsets and compensation will be required in relation to both *Fisheries Act* (or Act) subsections 35(2) and Section 27.1 of the Metal and Diamond Mining Effluent Regulations (MDMER). Potential fish habitat offset/compensation opportunities are described and recommendations on the "short list" of opportunities recommended by GenPGM to address Project effects are made. The FHOFCP is presented in consideration of and consistent with the requirements of the modernized Fisheries Act which came into force on August 28th, 2019. The FHOFCP is also consistent with the MDMER as developed under Section 36 of the Fisheries Act and as amended in 2018.

1.3 Report Format

Following this introductory section, the remainder of this report is structured as follows.

- Section 2.0 provides relevant contact information for GenPGM in relation to the FHOFCP.
- Section 3.0 describes the regulatory framework under which the FHOFCP has been developed.
- Section 4.0 provides a description of the proposed project, including timeline and location.
- Section 5.0 describes the distribution of fish and fish habitat across the project site and in downstream areas of subwatersheds potentially affected by the Project.
- Section 6.0 describes the potential effects to fish and fish habitat associated with project development.
- Section 7.0 provides the offset/compensation strategy proposed by GenPGM.
- Section 8.0 provides the references consulted in the preparation of the report.

The Application Form for the Issuance of an Authorization under Paragraphs (34.4(2)(b) and 35(2) (b) of the *Fisheries Act* (Non-Emergency Situations) is provided in Appendix A.

2.0 CONTACT INFORMATION

Applications Name: Generation PGM Inc. c/o Tabatha LeBlanc	Authorization Representatives Name: Jason Dietrich, Ecometrix Incorporated (Consultant for GenPGM)
Address: P.O. Box 1508, 90 Peninsula Rd., Marathon ON P0T 2E0	Address: 6800 Campobello Road Mississauga, ON L5N 2L8
Telephone Number: (807) 229-9193 ext.3	Telephone Number: 905-794-2325
Fax Number: (807) 229-9696	Fax Number: (905) 794-2338
Email: TLeblanc@genpgm.com	Email: jdietrich@ecometrix.ca

3.0 REGULATORY FRAMEWORK

3.1 Environmental Assessment Framework

A Notice of Commencement (NoC) of an environmental assessment (EA) in relation to the proposed Marathon PGM-Cu Project (the "Project") was filed by the Canadian Environmental Assessment Agency (CEA Agency) under Section 5 of the *Canadian Environmental Assessment Act* on April 29, 2010 (updated July 19, 2010).

The EA was referred to an independent Review Panel by the Federal Minister of the Environment on October 7, 2010. On March 23, 2011 Stillwater entered into a Voluntary Agreement (VA) with the Province of Ontario to have the Project subject to the Ontario Environmental Assessment Act (OEA Act). This agreement was the instrument that permitted the provincial government to issue a Harmonization Order (HO) under Section 18(2) of the Canada-Ontario Agreement on Environmental Assessment Cooperation to establish a Joint Review Panel for the Project between the Minister of the Environment, Canada and the Minister of the Environment, Ontario.

The HO was issued on March 25, 2011. The Terms of Reference (ToR) for the Project Environmental Impact Statement (EIS) and the agreement establishing the Joint Review Panel (JRP) were issued on August 8, 2011.

Stillwater, the original Proponent of the Project, had prepared and submitted an Environmental Impact Statement (EIS) and supporting documents in 2012 (Stillwater Canada Inc. 2012) to assess the potential effects of the Project. Following a review of this information and subsequent responses to information requests, the Panel (in 2013) determined that sufficient information was available to proceed to a public hearing. However, prior to the hearing, the process was put on hold by Stillwater and ultimately postponed in 2014. Since 2014, the Project has been acquired by GenPGM and the Panel review process to assess the potential effects of the Project has resumed. An EIS Addendum has been prepared that verifies and/or updates the original assessment of environmental effects for the Project, as input to the Panel process.

3.2 Fisheries Act

In 2015, the Government of Canada began the process of updating and modernizing the *Fisheries Act*. On June 21, 2019, Bill C-68 received Royal Assent and became law. On August 28th, 2019 provisions of the modernized *Fisheries Act* came into force. The purpose of the Act is to provide a framework for: The proper management and control of fisheries and the conservation and protection of fish and fish habitat, including by preventing pollution.

The modernized Act provides two core prohibitions against persons carrying on works, undertakings or activities that result in the "death of fish by means other than fishing"

(subsection 34.4(1)), and the "harmful alteration, disruption or destruction of fish habitat" (subsection 35(1)). A more comprehensive definition of fish habitat under subsection 2(1) of the modernized *Fisheries Act* includes all waters frequented by fish and any other areas upon which fish depend directly or indirectly to carry out their life processes. The types of areas that can directly or indirectly support life processes include, but are not limited to: spawning grounds and nursery, rearing, food supply and migration areas.

The previous prohibition under the 2012 Act against works, undertakings or activities causing "serious harm to fish" that are part of, or support a commercial, recreational or Aboriginal fishery was rescinded.

The modernized *Fisheries Act* also includes prohibition of the deposit of deleterious substances of any type in water frequented by fish (Section 36(3)), which is administered by Environment and Climate Change Canada (ECCC). When death to fish or a harmful alteration, disruption or destruction of fish habitat cannot be avoided or mitigated, authorizations under subsections 34.4(2) and 35(2), respectively, maybe provided by the Minister of Fisheries and Oceans with the provision of appropriate offsetting of residual adverse effects.

In support of the modernized *Fisheries Act*, the Department of Fisheries and Oceans (DFO) has published updated policy statement and guidance documents and interim standards and codes of practice. These include but are not limited to:

- Fish and Fish Habitat Protection Policy Statement (DFO, 2019a);
- Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the Fisheries Act (DFO, 2019b);
- Science Advice on the Determination of Offset Requirements for the Fisheries Protection Program (DFO, 2017); and,
- Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada (DFO, 2013b).

The first of the above-referenced documents replace previous policy with regards to fish and fish habitat protection and offsetting measures associated with the former version of the *Fisheries Act*.

3.2.1 Subsection 34.4(2)

The goal of the Fish and Fish Habitat Protection Policy is to provide a framework for the conservation and protection of fish and fish habitat (DFO, 2019a). The policy is guided by the principle of conserve and protect fish and fish habitat by avoiding harmful impacts to fish and fish habitat. Section 34.4(1) states that:

No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish.

When it is not possible to avoid death to fish, DFO requires efforts to be made to minimize (i.e., mitigate) impacts that will be caused by a project ("work, undertaking, or activity"). Any residual impacts that cannot be completely avoided or mitigated require a Subsection 34.4(2) Authorization and can be addressed by offsetting. Offsetting is interpreted through the Policy as follows:

> *"After efforts have been made to avoid and mitigate harmful impacts to fish and fish habitat, any residual impact must be addressed by offsetting. An offsetting measure is one that counterbalances unavoidable death of fish and harmful alteration, disruption or destruction of fish habitat resulting from a work, undertaking or activity with the goal of protecting and conserving fish and fish habitat. Offsetting measures should support available fisheries management objectives and local restoration priorities and be conducted in a manner consistent with the department's offsetting policy".* (DFO, 2019a).

Once it has been determined that a Subsection 34.4(2) Authorization is required in order for the project to proceed, DFO will apply a risk-based approach in evaluating impacts of the Project on fish. Where death of fish is likely as a result of the works, undertakings or activities, they will consider the relative contribution of the potentially affected fish and their habitat to the productivity of the relevant fisheries. In doing so, DFO may consider issues such as which species are likely to be affected, at what stage of their life the impacts may occur, and which life-cycle functions may be affected. Such considerations are not inconsistent with those considered for Authorization under Section 35(2) described in more detail below.

3.2.2 Subsection 35(2) of the *Fisheries Act*

When it is not possible to avoid impacts to fish and fish habitat, DFO requires efforts to be made to minimize (i.e., mitigate) impacts that will be caused by a project ("work, undertaking, or activity"). Any residual impacts that cannot be completely avoided or mitigated require a Subsection 35(2) Authorization and can be addressed by offsetting.

Once it has been determined that a Subsection 35(2) Authorization is required in order for a project to proceed, factors that may be taken into account by the Minister when considering approval of an authorization include (but are not limited to):

- the contribution to the productivity of relevant fisheries by the fish or fish habitat that is likely to be affected.
- fisheries management objectives.

- whether there are measures and standards to avoid the death of fish or to mitigate the extent of their death or offset their death, or to avoid, mitigate or offset the harmful alteration, disruption or destruction of fish habitat.
- whether any measures and standards to offset the harmful alteration, disruption or destruction of fish habitat give priority to the restoration of degraded fish habitat.
- Indigenous knowledge of the Indigenous peoples of Canada that has been provided to the Minister.
- any other factor that the Minister considers relevant.

An offset plan is intended to offset any residual impacts that will result in the death of fish or cause a harmful alteration, disruption or deletion (HADD) of fish habitat. The offset plan should also demonstrate that the offsetting measures will maintain or improve the productivity of the impacted fishery.

Other factors consistent with DFO policy to be considered in the offset plan include:

- Opportunities to mitigate existing impacts or constraints to fish and fish habitat in the watershed;
- Indigenous peoples traditional access to fish in the area, traditional uses and ecological knowledge;
- Compliance of offsetting plans with recovery planning for species listed under the *Species at Risk Act* (SARA);
- Risk of failure and the time lag until offsetting habitats become fully functional;
- Potential for the proposed project to adversely affect the offsetting works in the future;
- Intrinsic value of habitat to be enhanced compared with the productive capacity gained through habitat enhancement; and,
- Perpetuity of offsetting works.

Beyond those factors identified above, GenPGM considered the following guiding principles in the development of this FHOFCP:

- site specificity – to the extent possible the offset measures should be implemented within the subwatersheds that are within the local study area;
- locally valued fish species– the offset measures selected for implementation should consider the interests of local fisheries use;

- fish species/habitats that have been identified by local Indigenous communities and people as having high value; and,
- high probability of success with measurable results – the offset measures selected for implementation should be associated with a high likelihood of success to make a meaningful contribution to the local fishery, and should be measurable.

3.3 Section 27.1 of the Metal and Diamond Mining Effluent Regulations (MDMER)

Pursuant to subsections 34(2), 36(5) and 38(9) of the *Fisheries Act*, Section 27.1 of the *Metal and Diamond Mining Effluent Regulations*, a compensation plan and the Minister's approval of that plan are required before a deleterious substance can be deposited into a tailings impoundment area that is added to Schedule 2. The purpose of the compensation plan is to compensate for the loss of fish habitat resulting from the deposit of a deleterious substance into the tailings impoundment area. The compensation plan requires several specific elements as outlined in the regulation including:

(a) a description of the location of the tailings impoundment area and the fish habitat affected by the deposit;

(b) a quantitative impact assessment of the deposit on the fish habitat;

(c) a description of the measures to be taken to offset the loss of fish habitat caused by the deposit;

(d) a description of the measures to be taken during the planning and implementation of the compensation plan to mitigate any potential adverse effect on the fish habitat that could result from the plan's implementation;

(e) a description of measures to be taken to monitor the plan's implementation;

(f) a description of the measures to be taken to verify the extent to which the plan's purpose has been achieved;

(g) a description of the time schedule for the plan's implementation, which time schedule shall provide for achievement of the plan's purpose within a reasonable time; and

(h) an estimate of the cost of implementing each element of the plan.

The conceptual approach to satisfying items (a) through (h) above is described herein. The cost estimate provided (see Section 7.4) is a preliminary, order-of-magnitude estimate and will be refined as part of the design process.

4.0 DESCRIPTION OF THE PROPOSED WORK, UNDERTAKING OR ACTIVITY

4.1 Marathon Palladium Project

As indicated in Section 1.1, extensive Project-related details regarding the original proposed conceptual design for the Project were provided in the original EIS report and its supporting documents, as well as responses to information, supplemental information and additional information requests provided by GenPGM to the Joint Review Panel. Conceptual design information is summarized below. Updated details, specific to the conceptual design of the Project are provided in the EIS Addendum.

The Project envisions the development of an open pit mining and milling operation. Existing conditions on and around the site and the conceptual general layout of the components of the mine site, the transmission line corridor and access road are provided in Figure 4.1.

Three open pits (i.e., North, Central and South) are proposed to be mined. Ore will be extracted from the pits and processed (crushed, ground, concentrated) at an on-site processing facility (Process Plant). Ore will be transported from the pits to the Process Plant via haul trucks and a conveyor system. A series of internal roads will be established to facilitate the movement of mine rock and other materials around the site. Final concentrates will be moved from the mine site to an off-site third-party facility for subsequent metal extraction and separation.

The operations phase includes the production of copper, PGM and other concentrates through extraction and processing of selected minerals from the ore body. Process Plant throughput during operations will average 25,200 tonnes per day. The operating life of the mine is estimated to be 12.7 years

Major Project infrastructure components associated with the mining operation are provided in Table 4.1. While not an exhaustive list of project components, this list identifies and describes the purpose of the key areas, facilities and structures proposed as part of the Project for the extraction and processing of the ore body.

Table 4.1: Major Project Infrastructure for Mining Operations

Facility	Purpose
Open Pits	Areas from which the PGM-copper ore is excavated
Ore Stockpile	Area to provide a storage area for ore that is to be processed in the Process Plant
Crusher	Facility to reduce the large pieces of rock excavated from the open pits to a size that can be sent to the Process Plant
Mine Rock Storage Area (MRSA)	Area to provide a location in which mine rock, which is rock that has been excavated from active mining areas but does not have sufficient ore grades to permit economically viable extraction, can be stored safely in perpetuity following extraction from the open pits
Process Plant	Facility to generate a marketable mineral product (i.e., a concentrate) from crushed ore
Process Solids Management Facility (PSMF)	Facility to store the non-marketable solids generated following the extraction of the economic minerals from the ore
Water Management System	System to collect and manage contact water at the site, including water from the open pits, MRSA, PSMF, and SWM Pond
Water Treatment Plant	Facility to remove contaminants of concern to meet applicable water quality criteria
Explosives Magazine and SME Facility	Facilities to store boosters, detonators and site mix emulsion (SME) products used to blast (fragment) ore and mine rock in the open pits
Aggregate Plant	Facility to reduce excavated mine rock into aggregate material for construction of site facilities and to support operating activities
Site Access Road	Road to provide safe and direct access between the Project site and public road network
Transmission Line	Infrastructure to provide electrical power to the Project site from the existing power grid
Ancillary Structures and Facilities	Other facilities and structures required to support mining and ore processing activities
Concentrate Rail Load-Out Facility	To facilitate the shipment of concentrate to a third-party mineral processor

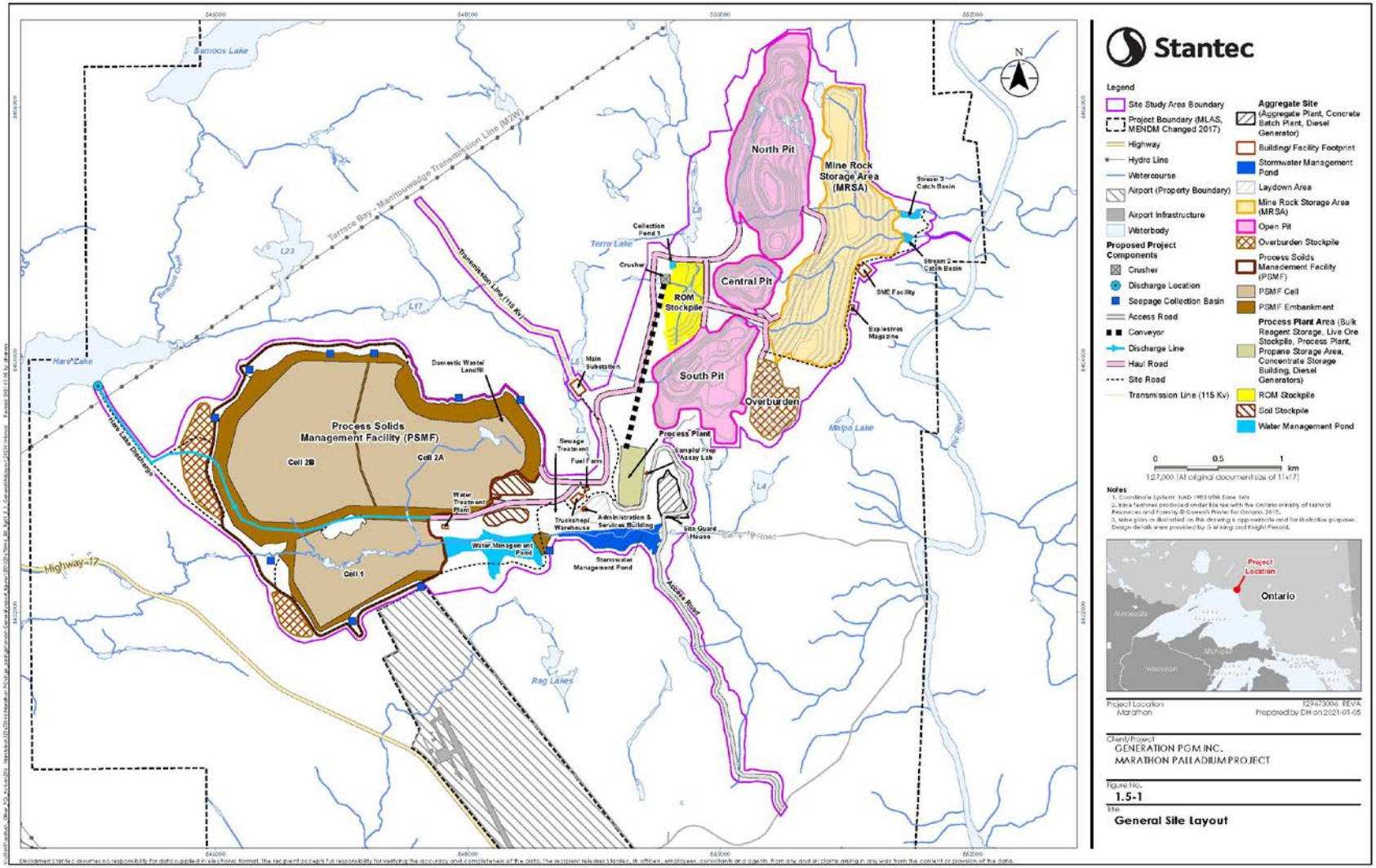

Figure 4-1: Marathon Palladium Project Conceptual General Site Layout

4.2 Phases

The timing of activities and installation of Project components will occur in sequence to allow for the efficient extraction of materials. The Project will be implemented in three phases, as follows:

Phase I – Site Preparation and Construction

Phase II – Operations

Phase III – Decommissioning and Closure

The phasing of Project activities is generally consistent with the project phases described in the original EIS (2012), although the site preparation and construction activities have been grouped together in this EIS Addendum since many of these activities may occur simultaneously.

4.2.1 Phase I – Site Preparation and Construction

In order to bring the mine into operation and production, a number of activities are necessary to prepare the Project site. The commencement of Phase 1 is the site preparation, which consists of the following key activities: clearing, grubbing and stripping; grading; drilling and blasting; excavating; development of the road network (including potential upgrades to the Highway 17 and Camp 19 Road intersection); development of the electrical power transmission corridor; preparation of construction surfaces; installation of concrete batch plant; development of the MRSA; water management system; development of the PSMF; waste management; and environmental management and monitoring. The phase of the mine life is expected to be 18 to 24 months in duration.

4.2.2 Phase II – Operations

The operations phase includes the production of copper, PGM and other concentrates through extraction and processing of selected minerals from the ore body. Process Plant throughput during operations will average 25,200 tonnes per day. The operating life of the mine is estimated to be approximately 12.7 years.

4.2.3 Phase III – Decommissioning and Closure

While the site will be reclaimed on an on-going basis to the extent practical during all previous phases, the most intense period of decommissioning of site infrastructure will occur immediately following the cessation of operations. At this time, as much of the site infrastructure will be removed as possible, while still providing sufficient resources to engage in ongoing closure and post-closure activities. The specific activities that will occur during this phase of the Project include:

- decommissioning/removal of maintenance, administration and on-site support facilities;
- decommissioning/removal of off-site support infrastructure;
- decommissioning/removal of the Process Plant and associated ore processing equipment and facilities (pipelines, crushers, conveyors);
- decommissioning/removal of the explosive magazine facilities;
- removal of transmission lines and electrical equipment;
- decommissioning of parts of the site road network;
- decommissioning of the potable water and sewage treatment systems;
- placement of any Type 2 material still on surface into the pits for permanent storage;
- regrading and stabilization of any stockpiles that are left on surface for the long term; and,
- reclamation of the PSMF, MRSA, Process Plant area and other developed areas.

Details on specific elements of the closure activities listed above are provided in the EIS Addendum.

4.3 Schedule

Through refinements to the Project, the timing and duration of these phases have been revised, as follows:

- Phase I – Site Preparation and Construction: This phase consists of pre-operation activities to prepare the site for extraction activities, which includes site preparation and construction activities to be completed concurrently over a period of 18 to 24 months (previously 18 months).
    - Phase IA Site Preparation: This phase consists of site clearing, grading and excavation to permit the subsequent construction.
    - Phase IB Construction: This phase consists of the building of the physical infrastructure and structures necessary to bring the Project into production.
- Phase II – Operations: This phase consists of the extraction and processing of selected minerals and will last for approximately 12.7 years (previously 11.5 years).
- Phase III – Decommissioning and Closure: While the site will be reclaimed on an on-going basis to the extent practical during all previous phases, this phase consists of the relatively intense period of reclamation and decommissioning upon cessation

of mine operations and the duration of time required for the mine site to be stabilized following implementation of the closure plan.

- Phase IIIA – Decommissioning / Closure: This phase will occur throughout the life of the project but the most intensive part (i.e., decommissioning activities), which will occur post-operation, will last for approximately 2 years (no change, previously 2 years).
- Phase IIIB – Post-Closure: This phase will occur following substantial completion of all on-site decommissioning activities and will consist primarily of follow-up and monitoring programs and the subsequent stabilization of existing environmental conditions (i.e., regeneration of vegetative cover, stabilization of water levels in the pits). For the purposes of the effects assessment, this phase is anticipated to last for up to approximately 45 years (to be confirmed based on the results of the EIS assessment).

4.4 Location

The proposed Project is located approximately 10 km north of the Town of Marathon, Ontario. The approximate centre of the Project footprint (that is, the land area that will be disturbed to implement the proposed Project) sits at approximately 48° 47’ N latitude, 86° 19’ W longitude. Figure 1.1 shows the location of the Project on a regional scale. Figure 4.1 provides a depiction of the site infrastructure and layout. Figure 4.2 shows the general site layout with reference to local subwatershed boundaries.

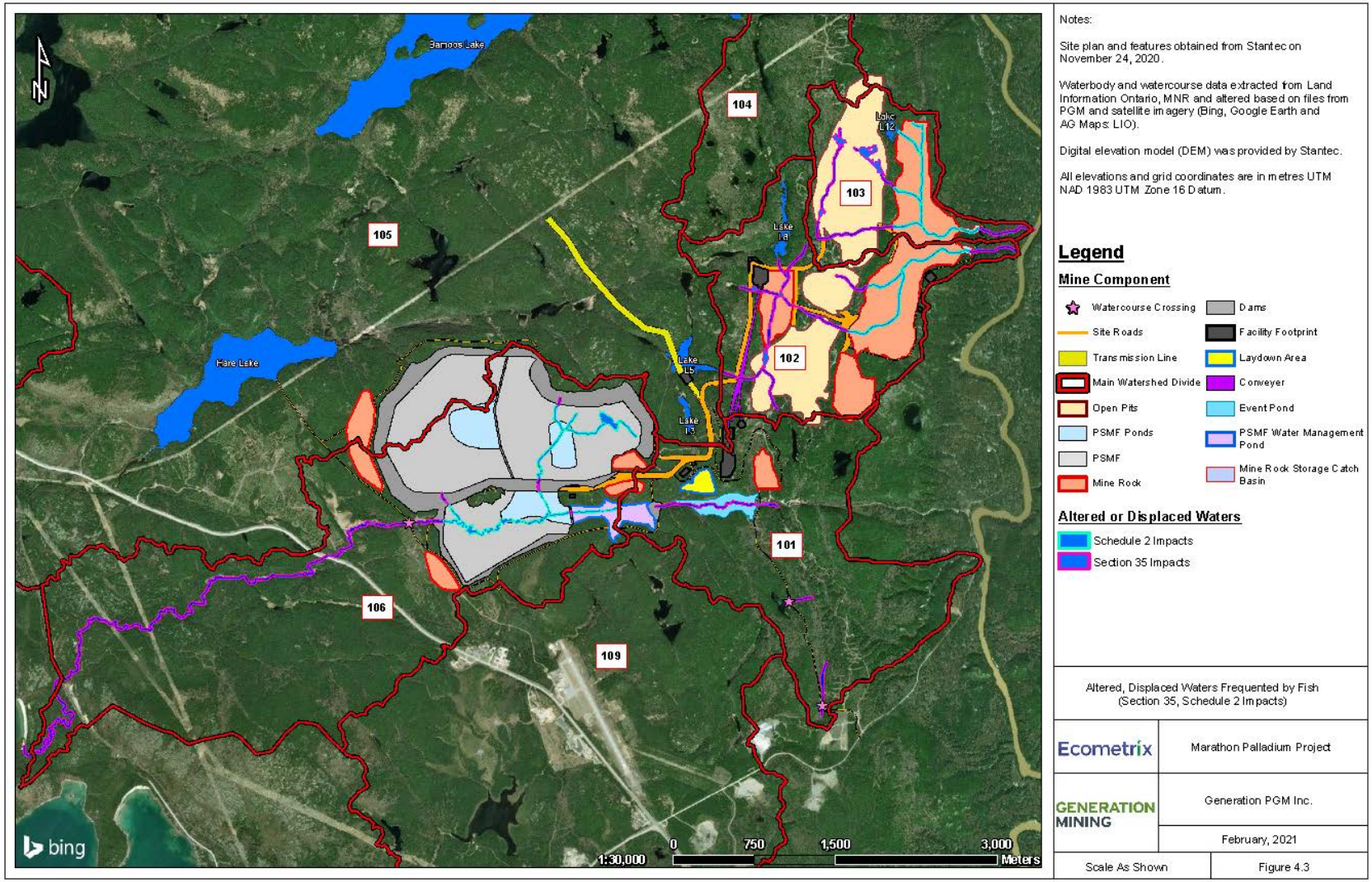

Figure 4-2: Altered, Displaced Waters Frequented by Fish by Mine Components by Subwatershed

5.0 DESCRIPTION OF FISH AND FISH HABITAT

Existing conditions pertaining to fish distribution and fish habitat on and around the Project site have been described in detail previously in

- the EIS (Stillwater Canada Inc., 2012),
- Supporting Information Document 3: Aquatic Resources Baseline Report for the Marathon PGM-Cu Project prepared by Ecometrix (July 2012) (CIAR #227).
- Responses to IRs 13.2.1-13.2.2 (CIAR #430), 13.3-13.5.6 (CIAR #409), 13.7-13.8 (CIAR #397), SIR 5, AIRs 10 (CIAR #430), 11 (CIAR #430), 19 (CIAR #430), and an additional agency information request dated April 24, 2013 (CIAR #417).
- An additional summary of the information collected to date is provided in the Project aquatic environment baseline report update (Ecometrix 2020).

Fish community and fish habitat characterization studies were conducted within the Project area and water bodies into which on-site watercourses drain (e.g., Pic River, Lake Superior) in 2006 (NAR, 2007), 2007 (Golder, 2009) and 2009 to 2013 (EcoMetrix, 2012; EcoMetrix, 2013). The distribution of fish across the study area is summarized in Figure 5-1. Significant effort has been expended within each of the water bodies (lakes, ponds, streams) within the Project footprint and was completed on a seasonal basis (where appropriate) to reflect potential differences in habitat utilization relating to high and low flow conditions, as well as seasonal differences in fish activity (e.g., spawning). The fish communities have been surveyed using a wide variety of gear types (trap nets, gill nets, minnow traps, electrofisher), as appropriate to the habitat characteristics and the expected species composition of the fish community. On-site data collected as part of field collections between 2006 and 2013 have been supplemented by records, where available, from local Ministry of Natural Resources and Forestry (MNRF) offices (Terrace Bay, Manitouwadge).

5.1 Fish Distribution by Subwatershed

A summary of the results from the aquatic baseline studies are discussed below on a watershed basis. The sampling locations referred to below are shown on Figure 5-1. “S” stations denote sampling that occurred at stream or flowing water locations. “L” stations denote sampling that occurred at lentic (lake, pond) habitat locations. The presence/absence of fish and community types (thermal guilds) for the subwatershed segments is provided in Figure 5.2.

5.1.1 Stream 1 Subwatershed

Multi-season passive and active fishing effort in the headwater lakes (i.e., L1, L2 and L29) within the Stream 1 subwatershed (Tributary 101; Figure 5.1) resulted in the capture of no

fish. There are several possible reasons for the absence of fish within these lakes. There is likely limited overwintering habitat in these lakes and in L2 and L29 in particular. In addition, oxygen depletion measured in the hypolimnion of L1 during August 2009, suggests that suitable fish habitat may be limited to the littoral zone of the epilimnion during much of the summer months. All three lakes are situated at the top of fairly steep gradients, which impedes fish colonization from downstream source populations. Overall, it is probable that a lack overwintering habitat, combined with downstream barriers (to upstream fish movement) in the form of natural topography likely account for the absence of fish in these lakes.

No fish were collected within the uppermost reaches of Stream 1 (Stations S54, S55, and S58). Fish were present in the upper mid-reaches (S1, S56) and the extent of upstream fish inhabitation was documented in June 2011 at S79. The fish community within these upper 1st and 2nd order mid-reaches was comprised of small baitfish species including Northern Redbelly Dace (*Chrosomus eos*), Finescale Dace (*C. neogaeus*) and Brook Stickleback (*Culaea inconstans*). Progressing downstream within the watershed, viable habitat for resident coldwater salmonids (i.e., Brook Trout [*Salvelinus fontinalis*]) occurred in the mid-reaches (S27), while a more diverse coldwater community including both resident and migratory salmonids was present within the lower reach (S2). Additional species observed in this reach include Rainbow Trout (*Oncorhynchus mykiss*), Coho Salmon (*O. kisutch*), Slimy Sculpin (*Cottus cognatus*) and Longnose Dace (*Rhinichthys cataractae*).

It is probable that natural barriers (e.g., low or intermittent flow, beaver dams, bedrock cascades) to migration, partition the fish communities within this watercourse, among the middle and upper, and lower and middle reaches. For example, a bedrock cascade falls that occurs downstream of Station S27 is a significant obstacle and likely represents the extent of upstream migratory fish passage. Stream 1 provides spawning and rearing habitat for both resident and migratory salmonids within its lower reaches. However, a perched culvert at the outlet of Stream 1 to the Pic River impedes the upstream movement of fish during non-freshet flows.

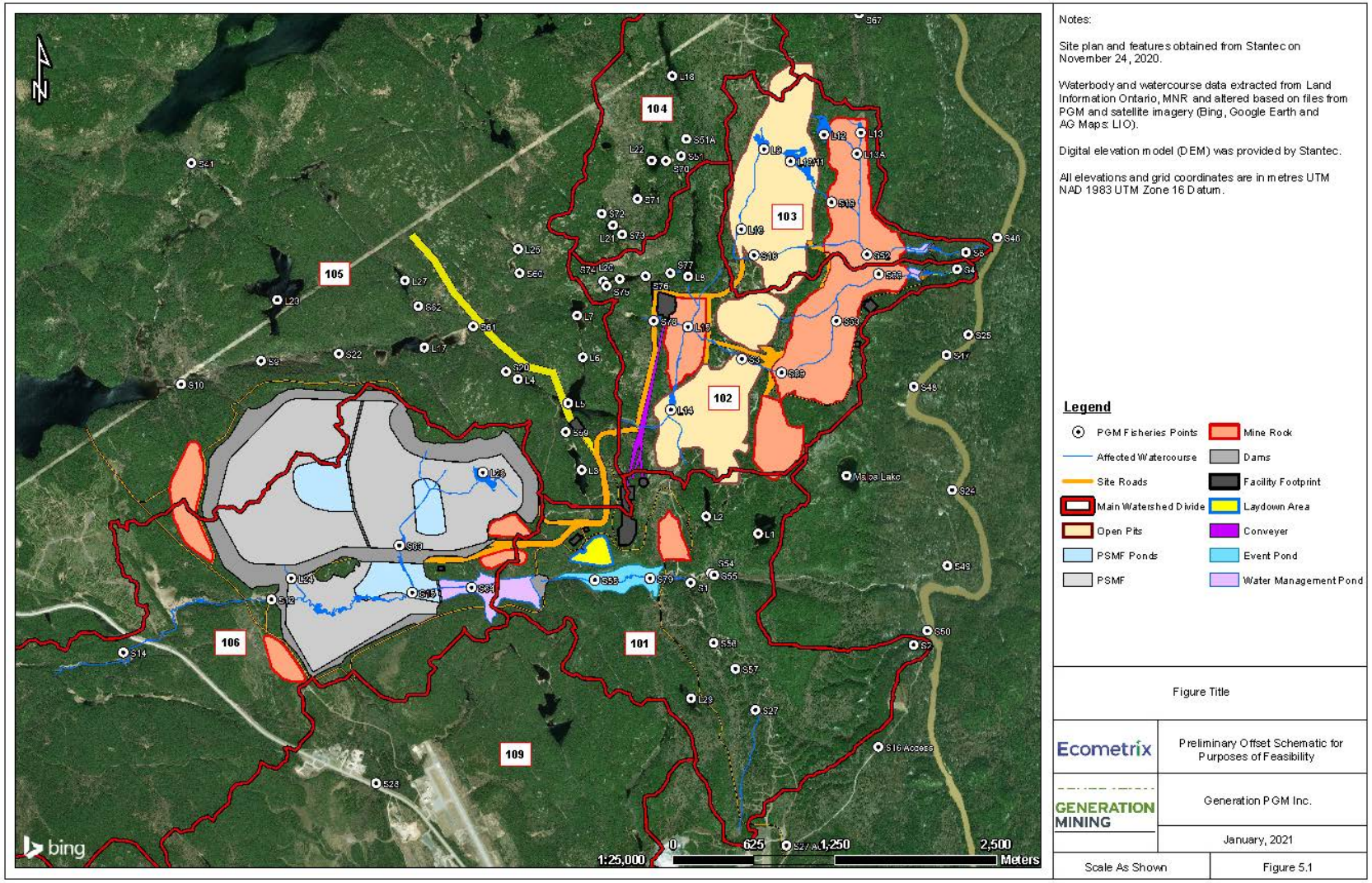

Figure 5-1: Summary of Fish Sampling Locations in the Project Area

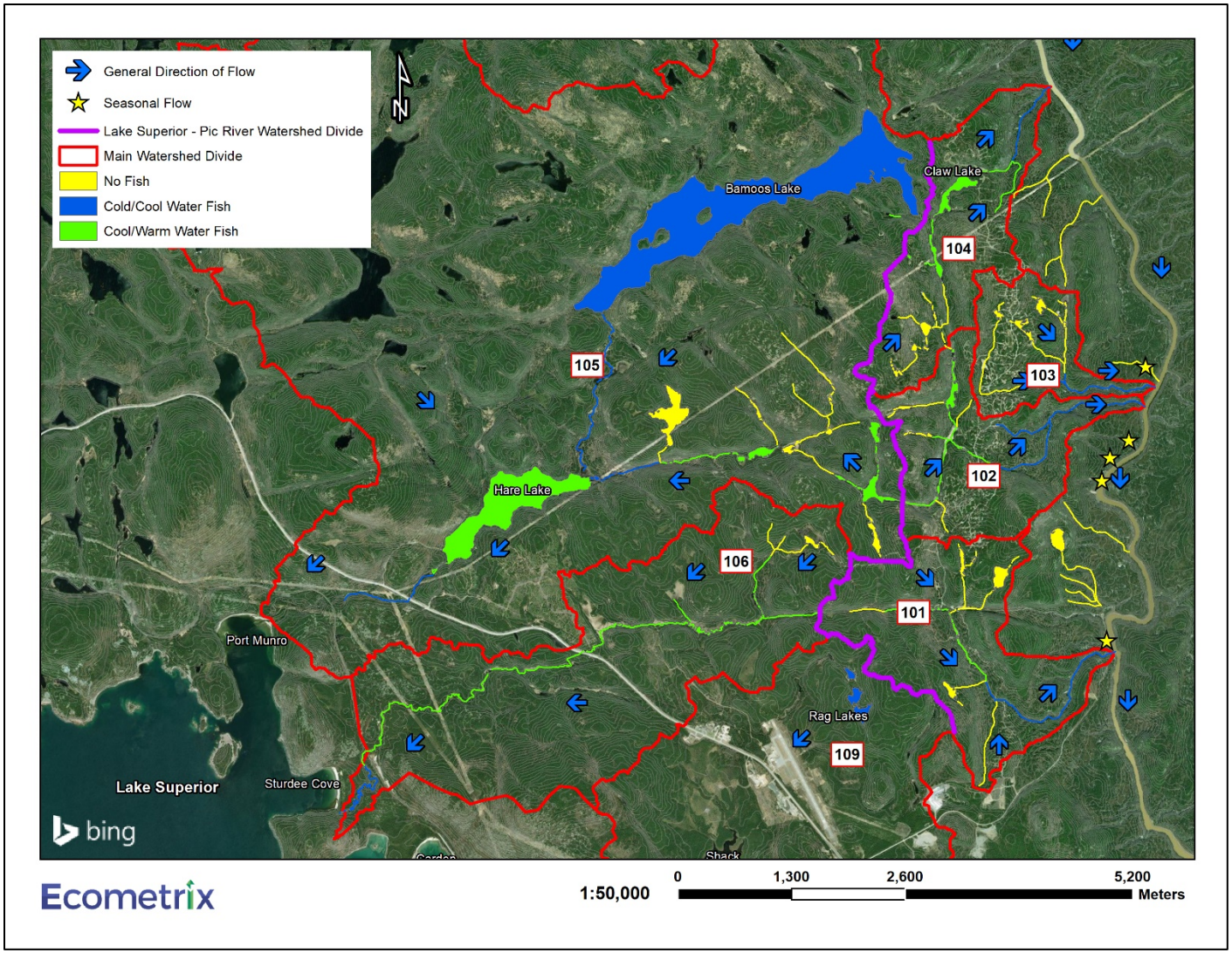

Figure 5.2: Fish Distribution in the Project Area

5.1.2 Stream 2 Subwatershed

Two of the three headwater areas (i.e., Stations L3 and Terru Lake) within the Stream 2 watershed (Tributary 102; Figure 5.1) were fishless (Figure 5.2), whereas L7 contained a large number of Lake Chub (*Couesius plumbeus*). The pH in L3 and Terru Lake were relatively low (in the 4 to 5.5 range) in 2009, and may in part explain the absence of fish. Additional pH measures taken in 2011 confirmed the low pH in L3 but Terru Lake had an acceptable pH at that time. These lakes are relatively deep and may provide overwintering habitat, though reduced oxygen at depth and below winter ice was measured in both, which may indicate at least the possibility of winter-kill due to oxygen deprivation. Beaver activity, topography and low flows in connecting channels also likely impede upstream migration of fish into these water bodies.

In the middle portion of the watershed (i.e., Stations L14 and L15) only one or two species were captured. L15 contained only Brook Stickleback. Both Lake Chub and Brook Stickleback were collected in L14; however, only a single Lake Chub was captured.

All stream stations downstream of L15 supported fish. Station S3, the most upstream location, only contained Brook Stickleback. At the downstream end of this station (S3) there was a significant natural barrier to upstream migration in the form of a bedrock cascade and waterfall. This barrier, likely accounts for the lack of species diversity encountered in the upstream reaches of the watershed compared to the downstream reaches. The middle reaches of Stream 2 (Station S53, S66 and S69) support resident Brook Trout, Rainbow Trout and Slimy Sculpin. Within the lowest reaches, upstream of the confluence with the Pic River (S4), Stream 2 supports a more diverse fishery. Four surveys (September 2007, May 2009, August 2009, and August 2013) have been undertaken at this location and eleven species of fish have been collected including Rainbow Trout, Coho Salmon, Brook Trout, Lake Chub, Finescale Dace, Longnose Dace, White Sucker (*Catostomus commersonii*), Trout-perch (*Percopsis omiscomaycus*), Brook Stickleback, Northern Pike (*Esox lucius*) and Slimy Sculpin. This tributary affords spawning and nursery habitats for resident species (i.e., Brook Trout, Slimy Sculpin), as well as nursery or rearing habitat for migratory species (i.e., Rainbow Trout, Chinook Salmon), within its middle and lower reaches.

5.1.3 Stream 3 Watershed

Despite relatively intensive fish surveys, including increased efforts in 2009, 2010 and 2011, all streams, lakes and ponds surveyed within upper and mid-reaches of the Stream 3 watershed (Tributary 103; Figure 5.1) yielded no fish (Figure 5.2). The potential for re-population of this area from downstream reaches is unlikely due to topographic barriers afforded by the steep relief as the watershed drains to the east towards the Pic River

Within the lower reaches, upstream of the confluence with the Pic River, Stream 3 (Station S6) supports a few fish species. Four surveys (September 2007, May 2009, August 2009

and August, 2013) have occurred at this location and five species of fish have been collected including Rainbow Trout, Brook Trout, Longnose Dace, Slimy Sculpin and Johnny Darter (*Etheostoma nigrum*). This lower reach of the tributary affords some nursery habitat for migratory salmonids but is subject to intermittent flow during low flow periods.

5.1.4 Stream 4 Subwatershed

No fish were captured in the Stream 4 subwatershed (Tributary 104; Figure 5.1) upstream of a waterfall located at Station S51a (i.e., Stations S51, L21, L22 and all connecting tributaries) (Figure 5.2). This could possibly be a result of low pH in some of the areas of the upper watershed (i.e., pH of 4.4 in L21). However, water quality was suitable in L22 at the time of the survey suggesting that a lack of overwintering habitat, combined with downstream barriers in the form of beaver dams and/or natural topography likely account for the absence of fish in the upper reaches of the watershed. Stations L18 and L19 and the mid-reach of Stream 4 (S8) supported a variety of fish species including Blacknose Shiner (*Notropis heterolepis*), Finescale Dace, Fathead Minnow (*Pimephales promelas*), Longnose Sucker (*Catostomus catostomus*), Brook Stickleback, Lake Chub, and Northern Redbelly Dace. Extremely steep cascades within the mid-reaches of Stream 4 likely impede upstream migration of fish from the lower reaches.

Within the lower reaches, upstream of the confluence with the Pic River, Stream 4 (S43) supports a number of fish species. Two surveys (May 2009, August 2009) have resulted in the capture of nine species including Rainbow Trout, Brook Trout, Coho Salmon, Finescale Dace, White Sucker, Trout-Perch, Brook Stickleback, Slimy Sculpin and Johnny Darter. This lower reach of the tributary affords potential nursery habitat for migratory salmonids, but as with Stream 3 the lower reach of stream 4 sees intermittent flows during low flow periods.

5.1.5 Stream 5 (Hare Creek) Watershed

The small headwater basins (Tributary 105; Figure 5.1) within the Hare Lake watershed support no fish or sustain only a very limited community (Figure 5.2). Proceeding downstream Canoe Lake and Station L6 appear to only support Lake Chub, whereas Station L4 and L17 contained Lake Chub and Brook Stickleback. Stations L23, L25 and L27 were fishless, as were their downstream tributaries (Stations S60, S61 and S62). These headwater basins and tributaries are probably fishless due to a lack of overwintering habitat, combined with barriers in the form of beaver dams and steep gradients, which impede re-colonization from downstream. L3 and L7 are both relatively deep and may provide overwintering habitat, though reduced oxygen at depth and below winter ice was measured at both, which may indicate at least the possibility of winter-kill due to oxygen deprivation.

Within the mid-reach of Stream 5, only Brook Stickleback has been collected (i.e., S22 and S9). Within the lower reach (S10), just upstream of Hare Lake, a resident coldwater fishery

existed including Brook Trout and Brook Stickleback. Bamoos Creek between Bamoos Lake and Hare Lake (S41) also supported a resident coldwater fish community including Slimy Sculpin and Brook Trout.

Bamoos Lake supports a diverse coldwater community. Twelve species were captured during the 2009 survey including Lake Trout (*Salvelinus namaycush*), Brook Trout, Cisco (*Coregonus artedi*), Slimy Sculpin, Longnose Sucker, White Sucker, Trout-perch, Brook Stickleback, Ninespine Stickleback (*Pungitius pungitius*), Lake Chub, Finescale Dace and Fathead Minnow. Two additional species, Lake Whitefish (*Coregonus clupeaformis*) and Burbot (*Lota lota*) are also reported for the lake according to MNRF records.

Extensive surveys of Hare Lake in 2009, 2011 and 2013 indicated that the fish community is largely comprised of coolwater species. Fish species captured in 2009 included Northern Pike, Yellow Perch (*Perca flavescens*), Spottail Shiner (*Notropis hudsonius*), Logperch (*Percina caprodes*), Cisco and Burbot. In 2011, a single Lake Trout and low numbers of Trout-Perch, Spoonhead Sculpin (*Cottus ricei*) and Longnose Sucker were also captured in Hare Lake. The Lake Trout that was captured was a hatchery fish (fin-clipped) and its origin is unknown – it does not represent a population of Lake Trout in Hare Lake. In 2013, one Slimy Sculpin was captured increasing the total species captured in Hare Lake to eleven. Historic records also report Fathead Minnow inhabiting the lake. Walleye (*Sander vitreus*) and Splake (*Salvelinus namaycush* x *S. fontinalis* hybrid) were stocked in the past but have not persisted. Extensive fishing efforts in 2009, 2011 and 2013 did not result in the capture of either of these species.

Hare Creek downstream of Hare Lake was surveyed at two locations, below the Highway No. 17 crossing (S11) and upstream of the outlet to Lake Superior (S30), on two occasions (May 2009 and August 2013). A visual fall spawning survey was also undertaken between Hare Lake and Lake Superior during October 2013. All surveys indicated that the lower portions of Hare Creek support a relatively diverse coldwater fish community including both migratory and resident salmonid species. The fish community in lower Hare Creek included: Rainbow Trout, Coho Salmon, Pink Salmon (*Oncorhynchus gorbuscha*), Brook Trout, Brook Stickleback, Slimy Sculpin, Rainbow Smelt (*Osmerus mordax*), Longnose Dace, Longnose Sucker, Ninespine Stickleback and Mottled Sculpin (*Cottus bairdii*). The lower reaches of Hare Creek afford spawning and nursery habitat for both migratory and resident coldwater fishes. However, several obstacles to fish passage occur both upstream and downstream of the Highway No. 17 crossing that limit upstream fish passage under certain flow conditions. These impediments result in an underutilization of habitats and reduced productivity in reaches upstream of the barriers.

5.1.6 Stream 6 Watershed

Multiple surveys of the headwaters of Stream 6 (L26) during 2009, 2010 and 2011 have resulted in no fish being collected. Backpack electrofishing at L24 in 2010 and 2011 indicated that this area does not support fish either. Only Brook Stickleback have been

collected at Stream 6 Stations upstream, as well as immediately downstream (S14), of the Highway No. 17 crossing. Possible explanations for such a limited fish community in the upstream reaches and headwater lakes include a lack of overwintering habitat, low flow and barriers (including beaver dams and cascades). For example, at Station S14 there are a number of cascades that would be impediments to upstream fish passage. In addition, there is a large bedrock cascade and waterfall in the lower reach of Stream 6, downstream of the CP Rail crossing, which prevents Lake Superior species from migrating further upstream.

A fish community survey undertaken within the reach below the cascade falls during August 2013, identified six species including Brook Trout, Rainbow Trout, Coho Salmon, Lake Chub, Longnose Dace and Slimy Sculpin.

Within the lowest reaches, upstream of the outlet to Lake Superior (S31), a limited number of salmonids were captured in May 2009 and August 2013. During both surveys, a total four species were collected including Rainbow Trout, Coho Salmon, Longnose Dace and Mottled Sculpin. This reach of Stream 6 provides a limited amount of nursery habitat for migratory coldwater species from Lake Superior. The quality of this lower reach for nursery is reduced compared to other tributaries in the area primarily due to the predominantly sandy substrates compared to more productive habitats which are typically comprised of courser substrates (i.e., gravel, cobble). A short reach just below the cascade waterfall, has coarser substrate and does provide limited spawning habitat for migratory salmonids including Rainbow Trout and Coho Salmon.

5.1.7 Pic River

The fish community of the Pic River in the general vicinity of the Project is diverse, with a variety of primarily coolwater fish species reported including Lake Sturgeon (*Acipenser fulvescens*), Walleye, Northern Pike, Muskellunge (*Esox masquinongy*), Trout-perch, Spottail Shiner, Northern Redbelly Dace, Rainbow Smelt, Longnose Sucker, White Sucker, Silver Redhorse (*Moxostoma anisurum*), and Shorthead Redhorse (*M. macrolepidotum*). The Pic River also provides seasonal habitat for migratory salmonids including Rainbow Trout and Coho Salmon.

5.1.8 Lake Superior

The near shore embayments of Lake Superior provide habitat for a variety of fishes, including both coldwater and coolwater species. These embayments offer nursery habitats for many species including whitefish, salmon, trout and suckers. Spawning habitat for species such as whitefish is also likely present. In addition, many Lake Superior species migrate through the embayments to spawning tributaries which outlet to the lake, including Hare Creek.

5.2 Fish Habitat Utilization

Figure 5.2, Table 5.1 and Table 5.2 provide a summary of fish habitat utilization in streams and lakes within the Project area.

Table 5.1: Fish Habitat Utilization of Stream Habitat within the Project Area

Stream Name	Habitat		
	Upper Reach	**Mid Reach**	**Lower Reach**
Stream 1 Watershed			
Stream 1	Headwater areas none; downstream N, F, S for small bodied fish species	N, F, M, S for resident trout; N, F, S for small bodied fish species	N, F, M, S for trout and salmon is present but fish access may be limited due to perched culvert); N, F, S for small bodied fish species
Stream 2 Watershed			
Stream 2	Headwater areas none; N, F, S for small bodied fish species	N, F, M, S for resident trout; N, F, S for small bodied fish species	N, F, M, S for resident fish - trout, sucker; N, M for migratory salmonids; N, F, S for small bodied fish species
Stream 3 Watershed			
Stream 3	None	None	N, M for migratory fish - trout, salmon
Stream 4 Watershed			
Stream 4	None	N, F, S for small bodied fish species	N, M for migratory fish - trout, salmon; N, F, S for small bodied fish species
Hare Creek Watershed (Stream 5)			
Stream 5	None	N, F, S for small bodied fish	N, F, M, S for resident trout; N, F, S for small bodied fish species
Bamoos Creek	N, F, M, S for resident trout; N, F, S for small bodied fish species		
Hare Creek	N, M, F, S for resident and migratory fish - trout, salmon and other species. Existing barriers to fish passage limit upstream movement of fish under some flow conditions		
Stream 6 Watershed			
Stream 6	Headwater areas none; downstream N, F, S for small bodied fish	N, F, S for small bodied fish	limited N, F, M, S for migratory fish - trout, salmon; natural barrier at upstream end of reach

Notes: S=spawning habitat, N=nursery habitat, F=foraging habitat, M=migratory habitat.

Table 5.2: Fish Habitat Utilization of Lake Habitat within the Project Area

Lakes/Pond Name	Habitat
Stream 2 Watershed	
Station L14	N, F, S for small bodied fish species
Station L8	N, F, S for small bodied fish species
Station L15	N, F, S for small bodied fish species
Stream 4 Watershed	
Station L18	S for small bodied fish species; N, F for suckers
Station L19	S for small bodied fish; N, F for suckers
Hare Creek Watershed	
Station L7	N, F for small bodied fish species
Station L6	N, F for small bodied fish species
Canoe Lake (L5)	N, F, O for small bodied fish species
Station L4	N, F, S for small bodied fish
Station L17	N, F, S for small bodied fish
Bamoos Lake	S for Lake Trout, inlet and outlet streams for Brook Trout and White Sucker; N, F, M, O for trout, cisco, sucker and small bodied fish
Hare Lake	S for Northern Pike, Yellow Perch, N, F, M, O for all fish species

Notes: S=spawning habitat, N=nursery habitat, F=foraging habitat, M=migratory habitat and O=overwintering habitat.

6.0 DESCRIPTION OF EFFECTS ON FISH AND FISH HABITAT

Potential Project-related effects on fish and fish habitat were assessed in detail in the main EIS Report (EcoMetrix, 2012b) and the EIS Addendum. The assessment included the evaluation of both direct and indirect effects. The assessment of potential direct effects considered footprint-associated interactions such as the removal of some small lakes and streams to facilitate the development of site infrastructure and road and pipeline crossings. The assessment of potential indirect effects considered factors such as alterations to flow regimes in local water courses, the release of suspended sediment into water courses as the result of land disturbance.

Below, a description of the measures to protect fish and fish habitat, and of the predicted residual effects associated with implementation of the Project in consideration of these is provided. The predicted residual effects are described within the context of the offset/compensation required under subsection 34.4(2), 35(2) of the Fisheries Act and/or MDMER Section 27.1.

6.1 Measures to Protect Fish and Fish Habitat

Due to the nature of the proposed development the primary means by which death of fish or a HADD to fish, as defined in the *Act*, can be avoided are largely design-related and include reducing the mine development footprint to the extent possible and placing mine related infrastructure so as to avoid disrupting aquatic habitat. Examples of instances where mine design has been tailored or altered to minimize interaction with aquatic resources include the following:

- Siting of mine waste storage infrastructure was completed via a multiple accounts analysis to develop the preferred locations of the PSMF and MRSA that explicitly considered input from local Indigenous peoples and other interested parties as it concerned important local aquatic resources and their protection. Reconsideration of some aspects of the original analysis has reduced the level of interaction between the Project and aquatic resources further.
    - With respect to the PSMF, the preferred location rated highest for the evaluation criteria that included consideration of the protection of the aquatic environment. The original PSMF design encroached on several subwatersheds on the mine site. The current updated design is largely restricted to the subwatershed 106.
    - With respect to the MRSA, the original mine designs suggested mine rock storage would occur both east and west of the primary pit. The aerial extent of the storage area that was to be west of the open pit was first reduced specifically to avoid fish-bearing water bodies in that area. This included re-shaping the storage area so as not to encroach on Claw Lake, north of the

north pit and has been used for commercial purposes from time-to-time by a local baitfish license holder. The mine rock footprint has also been augmented further by using the mined-out open pits for storage to avoid L12 located to the east of the north pit, as well as subwatersheds to the east. The northern extent of the mine rock stockpile has been limited to the subwatershed 103 area to ensure that subwatersheds 104 and 108 are not impacted.

- Despite the overprinting of segments Stream 2 (subwatershed 102) downstream of Lake 8, located west of the north pit, will be maintained at a sustained water level to provide the lake's fish community with continued wetted habitat and overwintering opportunities. This lake will be maintained as a refugia for fish prior to re-connectivity of watercourses during closure.

- Realignment of the discharge pipe from the PSMF to Hare Lake to the upstream side of the PSMF perimeter road located in subwatershed 105 to protect subwatershed 106, if an unplanned event was to occur.

- Realignment of the proposed access road to increase separation from the Pic River, based on feedback received from Indigenous communities. The realignment has also been sited to cross the upper reaches of subwatershed 101 rather than lower segments. The upper reach crossing is in an area that will involve less significant instream and riparian works than the more downstream reach crossing. In addition, the more upstream reach is in an area in which where fish have not been identified; whereas the more original downstream crossing is in an area that includes more sensitive cold-water fish habitat.

- Routing the proposed power line to the site so as to minimize the number of water crossings required.

- Creating as few linear corridors as possible around the mine site, while maintaining the serviceability of the site and using linear corridors for multiple purposes.

6.2 Measures and Standards to Mitigate Impacts to Fish and Fish Habitat

Examples of measures and standards that will be implemented to mitigate death to fish and/or HADD to fish and fish habitat are provided below. These are described within the context of the type of effects that could result from the implementation of the Project.

The potential effects of sediment releases to surface water features due to erosion and the subsequent effect on fish and fish habitat will be mitigated by implementing best management practices and following appropriate DFO and MNRF standards, codes of practice, guidance and protocols. Important considerations include the following:

- avoiding where possible or maintaining setbacks from sensitive features where necessary;
- maintaining riparian vegetation wherever possible;
- isolating work areas via temporary berms;
- providing for the collection of drainage from disturbed areas in channels and settling basins; and,
- the restoration of disturbed areas as soon as is practical following disturbance.

The installation of road crossing structures including culverts has been identified as potentially affecting fish habitat. These effects will be mitigated through design and best management practices. Roads and pipelines will use the same corridors to minimize the spatial extent of disturbance to aquatic and terrestrial habitat. Crossing design, installation and maintenance will follow and conform to appropriate DFO and MNRF standards, codes of practice, guidance and protocols. Important considerations include:

- sizing the culverts to ensure conveyance of water under high flow conditions at all locations;
- maintaining fish passage and downstream flows under low flow conditions where appropriate; and,
- embedding the culverts, where appropriate, to allow the creation of natural substrates or the use of open bottom structures to minimize effects to sensitive fish habitat features (e.g., areas of upwellings).

During site preparation/construction all contact water will be collected and stored in early water management/storage works. There is no plan for discharge from the site during this phase – water that is collected and stored will be used to commission the Process Plant to begin operations. During operations water management infrastructure will collect and divert site aspect influenced water, as well as water associated with the PSMF, through the water management pond. Water quantities that exceed the needs of the Process Plant, and that cannot be stored within the operational limits of water management system, will be treated and released to Hare Lake. Hare Lake will be the only point of routine discharge to the environment during operations and will cease once operations are complete. Following mine closure, and when it has been safe to do so based on the quality of site aspect drainage, pre-mining drainage patterns will be restored. In all mine phases, potential impacts to water quality in downstream receivers will be mitigated by ensuring discharge meets applicable standards and downstream water quality meets relevant water quality benchmarks that are protective of aquatic life. Modelling of project-related discharge to these receiving waters predicts no adverse effects on water quality or aquatic biota are expected.

Further to, and as indicated above natural surface water drainage patterns will be restored after mine closure to the extent possible. The PSMF will be reclaimed (covered and re-vegetated) and surface water features re-created to restore the natural drainage patterns in the subwatershed 106. Following closure, it is expected that surface water draining the reclaimed PSMF area will not adversely affect water quality in subwatershed 106 (i.e., constituent concentrations will meet relevant water quality benchmarks). Runoff from the area of the water management ponds associated with the PSMF will be directed to the Stream 101 subwatershed. Following closure, these ponds will be rehabilitated (e.g., dredged of deposited solids) such that the chemistry of any surface runoff from this area will reflect uninfluenced con-contact water. It is expected therefore that water quality will be similar to existing baseline conditions once the natural flow regime in subwatershed 101 has been restored. Portions of the MRSA will be reclaimed and surfaces re-graded as necessary to improve drainage. The natural surface water drainages for Streams 2 and 3 will be restored once it has been demonstrated that water quality would be protective of aquatic biota therein and in the Pic River. The ability to control water leaving the site will be maintained after closure to confirm that any potential effects on aquatic biota are mitigated.

The other mitigation measures and standards that have been or will be implemented during appropriate phases of the Project to eliminate or reduce potential impacts to fish and fish habitat related to the Project implementation include the following:

- Salvage and/or relocation of fish that are located within water bodies that will be overprinted will be undertaken to the extend reasonable;
- avoid wetlands, aquatic habitat and other environmentally sensitive areas (listed ecosystems, or habitat for species at risk) to the extent possible or schedule construction activities during low flow conditions;
- adhere to DFO and Ontario in-stream work windows and implement standards and best practices for in-stream work;
- adhere to DFO and MNRF standards, codes of practice, guidance and protocols pertaining to aquatic protection where appropriate for the works or undertakings;
- minimize vegetation removal and maintain vegetated buffer zones around surface water features where possible;
- minimize length of time between vegetation removal and development;
- stabilize (e.g., re-vegetation or covering) disturbed areas as soon as possible to reduce erosion potential;
- implement, inspect and maintain appropriate sediment and erosion control measures;
- prevent or limit erosion and contamination of overburden stockpiles;

- set and maintain appropriate work area setbacks from surface water features;
- redirect runoff from surrounding areas around work areas and erosion sensitive features;
- capture and discharge construction runoff into polishing ponds to settle out suspended sediments prior to release to the receiving environment;
- minimize dust generation through use of dust suppression measures;
- design the capacity of surface drainage facilities to handle peak flow conditions so as to maintain the control of water quality and quantity;
- design fuel and chemical storage with secondary containment and at a minimum of 100 m from surface water features;
- identify snow disposal areas that are away from lakes, streams, ice covered waterbodies, groundwater recharge areas, wetlands and sensitive vegetation;
- site-specific chemical management procedures for the safe transportation, handling, use and disposal of chemical, fuels and lubricants;
- design all inflow pipes to ensure no fish entrainment or impingement;
- isolate aquatic habitats during in-water work using sediment barriers or similar structures and salvage any fish;
- maintain and operate all equipment in good working order, free of leaks and re-fueling will take place well away from aquatic areas;
- monitor all discharges routinely to ensure water leaving the Project site meets all Provincial and/or site-specific guidelines;
- conduct all blasting near Canadian fisheries waters in accordance with DFO's *Guidelines for the Use of Explosives in or near Canadian Fisheries Waters* (Wright and Hopky, 1998) and all applicable Provincial requirements;
- monitor water quality in receiving waters routinely; and,
- incorporate progressive reclamation throughout the life cycle of the Project to the extent possible.

6.3 Residual Effects to Fish after Implementation of Avoidance and Mitigation Standards

6.3.1 Direct Footprint-related Effects

Watercourses within subwatersheds 101, 102, 103, and 106 that are frequented by fish, will be directly affected by the footprint of the Project.

6.3.1.1 Sections 34.4(2) and 35(2)

The Project related lethal effects to fish and HADD associated with overprinting of existing fish habitat will require Authorization under Section 34.4(2) and Section 35(2) of the *Fisheries Act.* The conditions of the authorization will include offsetting to account for potential death of fish and HADD of fish habitat. The direct overprinting of fish habitat is estimated to be 9.22 ha as this represents the total area of fish bearing habitat as identified through baseline study and for which will be overprinted by the updated Project layout. The total amount of habitat offset required will be no less than 9.22 ha. In consideration of the above, a summary of the area within each subwatersheds that are frequented by fish and require compensation under these sections of the *Fisheries Act* is provided in Table 6.1 and Figure 4.3. An accounting of the fish community and habitat that will be overprinted by major mine components is provided in Table 6.2.

6.3.1.1.1 Indirect Effects

An indirect HADD to fish and fish habitat is expected as a result of overprinting portions of sub-watersheds in the SSA. Due to the loss and redirection of the water from the upper portions of these system, a reduction in the flow at more downstream reaches of the tributary will occur. The overprinting and/or re-direction of surface water features required for water management within the Project site during operations will indirectly affect the lower reaches of Streams 1, 2, 3 and 6 (see Figure 4.3).

Flows in Stream 1 (101) will be diminished for the operational life of the mine, but will be returned a similar Mean Annual Flow (MAF) (+8%) following closure and report to the Pic River. During construction and operations, the flow in each of sub-watersheds102 and 103 will essentially be lost due to their overprinting by the open pit and mine rock stockpile footprints. Flows in Stream 6 will be reduced during construction and operation by 36%.

Despite the reduction in flow reporting to the Pic River from sub-watersheds 101, 102 and 103, the impact to the Pic River is negligible, with the change in river MAF, for any phase of the Project, reported as less than or equal to 0.15% (Appendix D3 of this EIS Addendum).

Under closure conditions and during the PSMF contribution to pit filling, the watershed of Stream 6 will remain the same as operations with 6.54 km^2 contributing to the natural watershed area. Following the acceptability of water quality in the rehabilitated PSMF to discharge to the environment. The total contributing watershed area will be increased to

10.15 km^2, leaving a reduction of 4% in MAF from the baseline in Stream 6, during post-closure.

Downstream of the CP Rail Crossing, below a large bedrock cascade and waterfall, the lower reach of Stream 6 provides limited nursery and spawning habitat for migratory salmonids and therefore impacts to the lower reach of Stream 6 will also require offsetting under Subsection 35(2) of the *Fisheries Act*. No further indirect effects related to the Project have been identified. The areas identified above are the only ones that are part of or support a fishery as defined in the *Act*.

6.3.1.2 Section 27.1 (Schedule 2)

Portions of fish frequented water bodies within these subwatersheds fall within the proposed conceptual boundaries of the MSRA and PSMF and under the *Fisheries Act* these water bodies (or the portions thereof) that fall within the boundaries of "tailings impoundment area" must be added to Schedule 2 of the *MDMER*. In order to add a water body or water course (or portions thereof) to Schedule 2 of the *MMER* compensation for the loss of the fish frequented habitat resulting from the deposition of a deleterious substance (i.e., mine rock or process solids) into a tailings impoundment area under Section 27.1 is necessary.

In consideration of the above, a summary of the area within each subwatersheds that are frequented by fish and require compensation under *MDMER* Section 27.1 is provided in Table 6.1. The information is organized on a mine component basis. These areas are shown in Figure 4.3. An accounting of the fish community and habitat that will be overprinted by Schedule 2 mine components is provided in Table 6.2.

Table 6.1: Overprinted Area (Hectares) of Fish-Bearing and Non-Fish-Bearing Waters in Each Watershed by Project Component

Project Component	Watershed	Fish Bearing			Non Fish Bearing			Total Aquatic Habitat		
		Section 35	Schedule 2	Sub-Total	Section 35	Schedule 2	Sub-Total	Section 35	Schedule 2	Total
		1	2	= 1+2	3	4	= 3+4	= 1+3	= 1+3	= 1+2+3+4
Transmission Line	none	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Open Pits	102	0.67	0.00	0.67	0.03	0.00	0.03	0.70	0.00	0.70
	103	0.00	0.00	0.00	3.30	0.00	3.30	3.30	0.00	3.30
Mine Rock Storage Area	102	0.00	0.43	0.43	0.00	0.00	0.00	0.00	0.43	0.43
	103	0.00	0.23	0.23	0.00	0.58	0.58	0.00	0.81	0.81
Mine Rock Storage Catch Basins	102	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.02	0.02
	103	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.06	0.06
Spillways	102	0.04	0.00	0.04	0.00	0.00	0.00	0.04	0.00	0.04
	103	0.04	0.00	0.04	0.00	0.00	0.00	0.04	0.00	0.04
Aggregate Site	None	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Roads / Crossings	101	0.26	0.00	0.26	0.10	0.00	0.10	0.36	0.00	0.36
	102	0.05	0.00	0.05	0.27	0.00	0.27	0.32	0.00	0.32
Conveyor	102	0.03	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.03
Overburden Stockpiles	None	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROM Stockpile	102	0.88	0.00	0.88	0.00	0.00	0.00	0.88	0.00	0.88
PSMF Including Water Management Pond	106	0.00	2.60	2.60	0.00	1.49	1.49	0.00	4.09	4.09
PSMF Embankments	101	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01
	106	0.27	0.00	0.27	0.01	0.00	0.01	0.28	0.00	0.28
SWM Pond (Event Pond)	101	0.18	0.00	0.18	0.06	0.00	0.06	0.24	0.00	0.24
Laydown Area	None	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Reduction (Indirect Effect)	101	0.68	0.00	0.68	0.00	0.00	0.00	0.68	0.00	0.68
	102	0.11	0.00	0.11	0.00	0.00	0.00	0.11	0.00	0.11
	103	0.16	0.00	0.16	0.00	0.00	0.00	0.16	0.00	0.16
	106	2.51	0.00	2.51	0.00	0.00	0.00	2.51	0.00	2.51
Total	All	5.87	3.35	9.22	3.78	2.07	5.85	9.65	5.42	15.07

Table 6-2: Direct and Indirect Interactions between Project Components and Site Subwatersheds (Section 34.4 and Section 35)

Mine Component	Name	Description	Nature of effect
Open Pit	Main stem Stream 2 from upstream (60 m) and downstream (150 m) of S3	Main stem of Stream 2 in this reach is characterized by beaver activity and was only identified as providing habitat for Brook Stickleback.	This portion of the main stem of Stream 2 will be partially within the footprint of the south open pit. Drainage in the Stream 2 watershed will be collected and pumped back to the mine site during operations. It will be dewatered and fish salvaged prior to the creation of the Open Pit.
Road / Pipeline Crossings	Mainstem of Stream 2 upstream and downstream of S3, headwater segments of Stream 2 (DS of L8, US of L14, US of S78); Headwater segments of Stream 1 at access road crossings (DS S79 and lower reach first order tributaries Crossing of Stream 6 directly downstream of S12 by access road and mine discharge pipeline	Main stem of Stream 2 in this reach is characterized by beaver activity and was only identified as providing habitat for Brook Stickleback. Stream 2 headwater segments either not fish bearing or providing spawning, nursery and foraging habitat for small-bodied cool water species Stream 1 headwater segments either not fish bearing or providing spawning, nursery and foraging habitat for small-bodied cool water species Stream 6 (Angler Creek) within the mid-reach of the system provides nursery, foraging and spawning habitat for small bodied coolwater fish.	Short term alteration of stream flow may be applicable to allow for culvert placement and backfilling to meet specifications of design. Work at crossings will be completed within appropriate timing windows (preferably during dry conditions) and meet applicable guidelines to convey adequate flow and therefore the continued movement of fish through the crossing locations.

Mine Component	Name	Description	Nature of effect
Conveyor	Reaches of Stream 2 upstream of S78 and upstream of L14;	Stream 2 headwater segments either not fish bearing or providing spawning, nursery and foraging habitat for small-bodied cool water species.	This portion of the main stem of Stream 2 will be partially within the footprint of the conveyor. Drainage in the Stream 2 watershed will be collected and pumped back to the mine site during operations. It will be dewatered and fish salvaged prior to the creation of the conveyor.
ROM Stockpile	Reaches of Stream 2 directly upstream and downstream of L15	Stream 2 headwater segments either not fish bearing or providing spawning, nursery and foraging habitat for small-bodied cool water species	This portion of the main stem of Stream 2 will be partially within the footprint of the ROM stockpile. Drainage in the Stream 2 watershed will be collected and pumped back to the mine site during operations. It will be dewatered and fish salvaged prior to the creation of the ROM stockpile. This stockpile will be removed prior to closure.
Stormwater Management Pond	Headwaters of Stream 1 upstream of S58 to 70 m downstream of S79	Stream 1 headwater segments either not fish bearing or providing spawning, nursery and foraging habitat for small-bodied cool water species	This portion of the Stream 1 headwaters to be impounded for the purposes of stormwater management and water collection. During operation the SWM pond will report back to the PSFM WMP. Following closure water from the SWM pond will be discharged directly to the environment. The pond will account for up to 10.4 ha of offset habitat.
PSFM Embankments	Headwaters of Stream 6 as characterized by fish and fish habitat at L24 and S63	Stream 6 headwater segments either not fish bearing or providing spawning, nursery and foraging habitat for small-bodied cool water species	This portion of Stream 6 is in the footprint of the PSMF embankments and will be overprinted. It will be dewatered and fish salvaged prior to infilling as part of construction.

Mine Component	Name	Description	Nature of effect
Hare Lake Discharge	Nearshore environment of Hare Lake offshore (within 3-5 m depth contour) bottom discharge with diffuser	Discharge pipe on substrate to depth of 3-5 m with diffuser. Overall footprint will be small and designed to achieve criteria for mixing efficiency while minimizing potential effects to fish.	• Discharge diffuser will be designed to meet DFO guidelines for protection of fish. Pipe alignment – Parallel to shore • Port orientation – horizontal, perpendicular to shore • Number of ports – 10 (port diameter: 0.051 m (2 inch)) • Diffuser length – 10 m • Removal at closure
Flow Reduction (Indirect)	Stream 1	Lower reaches of Stream 1 provide opportunity for salmonid habitat (limited by perched culvert) and habitat for small-bodied coolwater species.	Overprinting and re-direction of surface drainage will reduce flows through construction and operation, yet flows will be restored to near background conditions at closure
	Stream 2	Mid to lower reaches of Stream 2 provide nursery, foraging, migration and spawning habitat for resident trout, and nursery, foraging and spawning habitat for small-bodied coolwater species. Lower reaches also provide nursery and spawning habitat for migratory salmonids.	Permanent overprinting will cause permanent flow reduction post closure
	Stream 3	Mid reached of Stream are not fish bearing, while lower reaches provide nursery and spawning habitat for migratory salmonids	Permanent overprinting will cause permanent flow reduction post closure

Mine Component	Name	Description	Nature of effect
	Stream 6	Stream 6 (Angler Creek) at mid reaches provides habitat for resident small-bodied fish species. The extreme lower reach of the tributary provides limited nursery, foraging, migratory and spawning habitat for salmonids, due to a natural barrier at waterfall downstream of the CP Rail crossing (near S31A), which prevents Lake Superior species from migrating further upstream	Overprinting and re-direction of surface drainage will reduce flows through construction, operation, and phase 1 of closure. Following the acceptability of water quality in the rehabilitated PSMF to discharge to the environment, the total contributing watershed area will be increased and flows will be restored to near background conditions post-closure.

- [1] Channel widths are given as the average bankfull width over the given stream reach.
- [2] As per the *Metal Mining Effluent Regulations* (MMER) water bodies frequented by fish into which process solids or mine rock is deposited will be scheduled on MMER Schedule 2 and require compensation under Section 27.1 under the MMER
- [3] Class 1 = spawning, rearing, migrating; Class 2 = limited spawning, rearing, migrating; Class 3 = limited rearing, migrating.
- ROM – Run of Mill Stockpile

Table 6-3: Direct Interactions between Mine Components and Project Site Subwatersheds (Schedule 2)

Mine Component	Name	Description	Nature of effect
MRSA	Main stem Stream 3 below confluence of L16 outlet stream and L13A outlet stream to Pic River	Main stem of Stream 3 includes cold water fish species. This portion of Stream 3 provides Class 2^3 salmonid habitat.	This portion of the main stem of Stream 3 will be partially within the footprint of the MRSA. Drainage in the Stream 3 watershed will be collected and pumped back to the mine site during operations. It will be dewatered prior to the creation of the MRSA.
	Main stem of Stream 2	Main stem of Stream 2 includes cold water fish species. This portion of Stream 2 provides Class 2^3 salmonid habitat.	This portion of the main stem of Stream 2 will be partially within the footprint of the MRSA. Drainage in the Stream 2 watershed will be collected and pumped back to the site during operations. It will be dewatered prior to the creation of the MRSA.
	Stream 2 main stem (portion)	Brook Stickleback collected. Beaver ponded areas upstream may provide overwintering refuge for fish. Although this portion of Stream 2 is not frequented by salmonid species it would provide Class 3^3 salmonid habitat.	This portion of the Stream 2 channel will be in the footprint of the storage pile
PSMF	Stream 6 (main channel between headwater and east side of PSMF)	Brook Stickleback collected. Beaver ponded areas may provide overwintering refuge for fish. Although this portion of Stream 6 is not frequented by salmonid species it would provide 84 HU of Class 3^3 salmonid habitat.	This portion of Stream 6 is in the footprint of the PSMF.
	L26 outlet stream (tributary of Stream 6)	Brook Stickleback collected. Beaver ponded areas may provide overwintering refuge for fish. Although the L26 outlet stream is not frequented by salmonid species it would provide Class 3^3 salmonid habitat.	This portion of the outlet stream of L26 is in the footprint of the PSMF

- [1] Channel widths are given as the average bankfull width over the given stream reach.
- [2] As per the *Metal Mining Effluent Regulations* (MMER) water bodies frequented by fish into which process solids or mine rock is deposited will be scheduled on MMER Schedule 2 and require compensation under Section 27.1 under the MMER
- [3] Class 1 = spawning, rearing, migrating; Class 2 = limited spawning, rearing, migrating; Class 3 = limited rearing, migrating.
- ROM – Run of Mill Stockpile

6.3.2 Summary of Direct and Indirect Effects

The Project will result in a residual impact to approximately 9.22 ha of habitat that contain fish that and will need to be offset under Subsections 34.4(2) and 35(2) of the *Fisheries Act*. An additional 3.35 ha will also require compensation under Section 27.1 of the *Metal Mining Effluent Regulations* to balance the loss of fish frequented habitat associated with the footprint of PSMF and MRSA. As indicated above the location of habitat that requires offsetting/compensation under the *Fisheries Act* and the *MDMER* is presented in Figure 4.3. Table 6.1 provides a summary of the amount of habitat by subwatershed that will be residually impacted (directly and indirectly) by the Project.

7.0 OFFSET / COMPENSATION STRATEGY

As the Marathon Project is likely to cause impacts to the quantity of fish habitat in the lower reaches of Streams 1, 2, 3 and 6 (i.e., reduced flows resulting in the loss of habitat) the FHOFCP focuses on habitat area as the metric of productivity as this is most relevant to the type of impact predicted. To provide an appropriate scale of measure to compare habitat lost due to Project impacts and habitat gained through offset/compensation opportunities, habitat units (area) and/or weighted usable area (WUA) which incorporates a calculation of weighted habitat suitability for select species will be used. These are consistent with guidance provided by DFO for equivalency metrics that can be used to determine offset requirements (DFO, 2017). The preferred equivalency metrics for the FHOFCP will be identified through further consultation with DFO.

The design of this FHOFCP takes into account the goals of DFO's (2019a) Fish and Fish Habitat Protection Policy Statement, as well as the guiding principles articulated in Section 3.2.1 above and considerations of the requirements of MDMER Section 27.1.

Potential FHOFCP opportunities are described in the following subsections, followed by our recommendations for the "short list" of such opportunities. The opportunities are presented at a conceptual level. Details associated with the FHOFCP opportunities that are selected for implementation will be confirmed in consultation with DFO, MNRF and Indigenous groups as part of the *Fisheries Act* approvals process. Separate approvals will be required under subsection 35(2) of the *Fisheries Act* and Section 27.1 of MDMER and therefore the opportunities selected for implementation will be apportioned between the two approvals accordingly. This will be determined during the approvals process.

7.1 Marathon Palladium Project Offset and Compensation Opportunities

7.1.1 Offset and Compensation Objectives

The development of the range of potential FHOFCP opportunities described herein considered a number of factors including: legislative requirements and policy, as well as GENPGM's own guiding principles as detailed in Section 3.0; timeframes of the various project stages; and specific characteristics of existing habitat within the Project area and compensating for direct footprint effects of the MRSA and PSMF in accordance with the MMER. The overall objectives of the FHOFCP include increasing the productivity of the potential recreational and Aboriginal fisheries in the Project area. No effect on a commercial fishery is associated with the development of the Project.

The following describes how the factors and principles identified in Section 3.0 have been considered within the framework of this FHOFCP.

- the contribution to the productivity of relevant fisheries by the fish or fish habitat that is likely to be affected.

- fisheries management objectives.
- whether there are measures and standards to avoid the death of fish or to mitigate the extent of their death or offset their death, or to avoid, mitigate or offset the harmful alteration, disruption or destruction of fish habitat.
- whether any measures and standards to offset the harmful alteration, disruption or destruction of fish habitat give priority to the restoration of degraded fish habitat.
- Indigenous knowledge of the Indigenous peoples of Canada that has been provided to the Minister.
- any other factor that the Minister considers relevant.

Fisheries Protection Policy Statement

The FHOFCP maintains (and aims to increase) the productivity of the relevant fisheries (fish and fish habitat) within the subwatersheds affected by the Project.

Site Specificity

Opportunities for offset/compensation are proposed in watercourses situated within watersheds directly affected by the Project, or are proposed in watercourses that are within the general vicinity of the Project and contribute therefore to productivity within a relevant regional landscape perspective.

Targeted Fish Species/Stocks, Fisheries Management Objectives

The FHOFCP objectives include increasing the productivity of the affected fisheries in the watersheds affected by the Project. The FHOFCP proposes to provide offsets/compensation targeted at coldwater fish species, including resident and migrating salmonids.

For the most part, areas affected by the Project are either fishless or support a very limited number of forage fish species, and are not capable of providing a recreational, commercial or Aboriginal fishery. Stream 6 has a limited Steelhead fishery below the bedrock cascade falls in the lowest reach of the subwatershed. Current stream flow patterns will be restored in this subwatershed during the closure phase, thereby providing the opportunity for the return of migrating salmonids to the lower reaches. Other offset/compensation opportunities proposed are meant to address the temporary loss of productivity associated with the Project effects (reduced flows) on Stream 6 in a pre-emptive manner

Indigenous Traditional Use and Value

The FHOFCP proposes to provide offsets/compensation targeted at coldwater fish species, including migratory salmonids, which have been identified as of high value with respect to Indigenous traditional use.

Locally Valued

The FHOFCP proposes to provide offsets/compensation targeted at coldwater fish species, including migratory salmonids, which have been identified as having high value by local users.

Fish Species

The FHOFCP proposes to provide offsets/compensation targeted at coldwater fish species, including both resident and migratory salmonids.

Improve Existing Impacts or Address Existing Constraints to Fish Habitat

The FHOFCP includes the remediation of existing constraints, including the removal of the obstacles to fish passage and fish habitat enhancements in areas that are limiting to fish productivity within local watercourses.

Species at Risk (SAR) Listed Species

No freshwater fish species are present within the Project site that are listed under Schedule 1 or 2 the federal *Species at Risk Act* (SARA) or Schedule 1 of the provincial *Endangered Species Act* (ESA). Therefore, no SAR listed species or their habitat will be directly affected by the Project.

Lake Sturgeon are known to utilize the Pic River during their spawning migration and foraging habitat has been reported to be located downstream of the Project site (Ecclestone, 2012). Under Schedule 1 of the ESA, the Great Lakes - Upper St. Lawrence population of Lake Sturgeon is designated as *Endangered* and as such has a recovery plan which has been published by the province (Golder Associates, 2011).

The same population was designated as *Threatened* by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2017). However, to date the Great Lakes – Upper St. Lawrence population has not been designated under Schedule 1 of the SARA. The habitat offsetting/compensation strategy includes a bank stabilization of the Pic River in the vicinity of the Stream 1 confluence that is aimed at preventing erosion from impacting upon important Lake Sturgeon foraging habitat downstream.

Type, Amount, and Supply of Fish Habitat

It is the intention of the FHOFCP proposed offsetting works to exceed predicted habitat losses for all habitat types. A discussion of impacted habitat is provided in Section 6.0 and offsetting/compensation elements are provided below in Section 7.2. Preliminary estimates of offset element area (ha) are provided for context and will be further refined through consultation with DFO, MNRF and Indigenous groups.

Temporal Nature of Impacts

All Project-related impacts involving the removal of aquatic resources have been treated as permanent in nature and the offset/compensation opportunities proposed are meant to fully address (offset) potential impacts. The restoration of watershed flows back to their natural course and/or volume at closure (as applicable) will further offset/compensate for some of the losses associated with the Project, in addition to those FHOFCP opportunities proposed.

Low Risk of Failure (or High Probability of Success)

Generally, the options considered pose a minimal risk that offset will not function as planned. A ratio of offsetting habitat to lost habitat of greater than 1:1 is proposed to further mitigate potential risk. It is understood that in identifying offset measures and an offsetting ratio, that the inherent uncertainty associated with the outcomes of offsetting even for well designed and implemented offsetting measures must be considered. This will be further discussed with DFO, MNRF and Indigenous groups.

Success should be Measurable

Offset/compensation opportunities under consideration provide a meaningful opportunity to provide a positive, measurable and meaningful contribution to the productivity of fish and fish habitat within the Project area. In most cases the benefits gained by the offset/compensation opportunities proposed can be measured by comparing measures of habitat use and productivity before and after implementation.

Time Lag Associated with Offsetting Habitat

The timing of the implementation of offsetting/compensation elements is dictated by the design, construction, operation and closure phases of the Project. Offset/compensation development will occur concurrently with, or as soon as possible after, habitat losses, minimizing the time lag between loss of habitat productivity and the time when offsetting habitat becomes functional. Some elements will not be implemented until the mine closure phase. (An overview of the timing and schedule of offsetting/compensation works, including the lag time between impacts to fish habitat and the creation of functioning offset/compensation habitat, is provided in Section 7.3).

7.2 Range of Potential Offset / Compensation Elements

7.2.1 Overview

The following opportunities have been identified as possible offset/compensation options to address the residual impacts resulting from the Project development. These preliminary concepts for offset opportunities are presented with the intention of initiating further consultation with agencies, Indigenous communities and interested parties. The options

are divided between those that are independent of mine closure/reclamation and those that would be implemented on the Project site as part of site reclamation:

- Independent FHOFCP opportunities:
    - Camp 19 Road Crossing Replacement and Habitat Enhancement
    - Habitat enhancement in Hare Lake within the general area associated with the mine effluent discharge;
    - Fish passage improvement and habitat enhancements in Hare Creek;
    - Fish Passage Improvement and Habitat Enhancement in Angler Creek.
    - Stabilization of the bank of the Pic River near Stream 1;
    - Fish passage barrier removal near the Stream 1 – Pic River confluence;
    - Fish habitat enhancement at the Harvey Creek-Aguasabon River confluence, west of the Project near Terrace Bay;
    - Fish passage improvement in Camp 14 Creek, a Pic River tributary south of Marathon.
- Reclamation FHOFCP opportunities:
    - Restoration of natural drainage patterns in the upper portion of the Stream 6 subwatershed that will be part of the PSMF and the creation of fish habitat therein;
    - Restoration of the natural drainage patterns in the upper portion of the Stream 1 subwatershed including the SWM Pond and creation of fish habitat therein;
    - Restoration of flow and habitat enhancement in Streams 2 and 3;
    - Naturalization of drainage channels within the Site and Local Study Areas; and,
    - Naturalization of open pits following filling of them by surface contact water and prior to reconnection of Streams 2 and 3.

Each of the opportunities listed above is described below.

7.2.2 Independent FHOFCP Opportunities

7.2.2.1 Camp 19 Road Crossing Replacement and Habitat Enhancement

Previous studies have identified the culvert beneath the existing access road crossing near the outlet of Stream 1 to the Pic River as a barrier to fish passage. With exception of very

high flow conditions, this structure presents an impassable barrier to upstream fish passage. As a result, habitat in Stream 1 is underutilized. Stream 1 presently affords limited spawning and nursery habitat for migratory salmonids due to the restricted access from the Pic River. Removal of this barrier would increase the productive capacity of the Stream 1 watershed, as it would permit more regular upstream movement of migrating salmonids from the Pic River. Replacement of the perched culvert would allow unrestricted access for fish from the Pic River to the Stream 1 watershed. This would be accomplished by lowering the culvert and creating a series of step pools to allow fish passage between Stream 1 and the Pic River in low flow conditions. Additional habitat enhancements within Stream 1 would also be considered in conjunction with the culvert enhancement to enhance productivity; though candidate sites for such works would need to be confirmed. One such opportunity includes the creation of a gravel bed in the area near the proposed step pools that could provide spawning habitat for Steelhead when Stream 1 flows are relatively high. It has been estimated that this option has the potential to open approximately 1.5 km of functional habitat upstream from the confluence of the Pic River to the bedrock cascade falls barrier.

7.2.2.2 Habitat enhancement in Hare Lake

The siting of the mine water discharge to Hare Lake has been undertaken with the following criteria:

- Offshore discharge is preferred over an onshore based discharge since it provides greater protection to nearshore habitats; and,
- A surface layer (within 5 m of lake surface) discharge is preferred to a deep-water discharge will then be positioned in the area of relatively higher current and therefore associated mixing.

To meet these criteria, the length of pipe that will have to be laid on the substrate of the lake is less than 60 m. The diffuser infrastructure has been conceptualized to meet DFO guidelines for protection of fish. Pipe alignment will be parallel to shore with horizontal port orientation (perpendicular to shore). The number of ports has been estimated to be 10 (port diameter: 0.051 m (2 inch)).

Within the vicinity of the pipeline discharge (embayment) opportunities to enhance habitat availability for keystone species may be available that would help to enhance the overall productivity of the Hare Creek system including supporting productivity for the downstream salmonid populations.

7.2.2.3 Fish Passage Improvement and Habitat Enhancement in Hare Creek

Hare Creek links Hare Lake to Lake Superior, flowing over a distance of approximately 2.5 km. Hare Creek supports a resident cold water fish community and provides rearing and spawning habitat for migratory salmonid species such as Rainbow Trout and Coho Salmon that reside in Lake Superior.

Quantitative estimates of fish density have been derived for different reaches of Hare Creek (see AIR 10). In addition, a detailed habitat assessment of Hare Creek was completed in the fall of 2013, which delineated possible impediments and barriers to fish movement and classified habitat. Habitat types were categorized according to potential use by migratory salmonids (Class 1 = spawning, rearing, migrating; Class 2 = limited spawning, rearing, migrating; Class 3 = limited rearing, migrating). A total of eight individual impediments were identified along Hare Creek between Lake Superior and Hare Lake.

Data collected within Hare Creek to date indicate that the total available habitat within Hare Creek is underutilized. This assessment is based on the identification of several stream-flow related barriers/impediments to fish movement and the relatively low densities of juvenile migratory salmonids in the upper/middle reaches of the creek, despite the presence of suitable rearing habitat. The impediments/barriers that have been identified appear to restrict upstream fish passage under both low and high flow conditions, as they generally can be characterized as being bedrock out-crop or shelf areas where flow in the creek becomes dispersed or constricted. At times of low flow, insufficient water is present to allow fish passage across the bedrock; whereas during high peak flow periods it is believed that the velocity of water across the bedrock exceeds the velocity that fish can overcome to swim upstream. In addition, these same factors likely influence (negatively) the ability of juvenile fish that were spawned downstream to disperse and utilize available rearing habitat within upstream reaches of the creek.

A significant offset/compensation opportunity is therefore to undertake instream works at the locations that have been identified as constraints to fish passage to improve passage and facilitate unfettered movement under all flow conditions. It is envisioned that these workings would likely be relatively straight-forward in nature and would focus on relieving the flow restriction at these locations. This could include for example, notching an existing bedrock shelf to provide a step-like passage channel that would provide sufficient water for passage under low flow conditions, as well as mitigating the velocity barrier that exists under peak flows.

Consideration of in-stream habitat enhancement works would also be part of this opportunity. At present, much of the available spawning habitat in Hare Creek upstream of the CP Rail crossing is comprised of cobble substrate and the amount of gravel substrate available is limiting. Gravel substrate is the preferred spawning habitat for Brook Trout, as well as Rainbow Trout and Coho Salmon, all of which are currently known to spawn in Hare Creek. Hare Creek is situated below Hare Lake and there is no upstream supply of gravel to replenish gravel that is eroded from the stream bed during peak stream flow periods. Consequently, it is believed that spawning potential and therefore production of these fish species is likely habitat limited. With this in mind gravel beds suitable for migrating salmonid species, as well resident Brook Trout, could be created within appropriate reaches/locations in Hare Creek. The gravel placement is intended to be a one-time initiative that will be monitored to determine the effectiveness.

The removal of the first five migration obstacles upstream of Lake Superior (Figure 7.1), would make a total of approximately 1.8 ha (0.17 ha Class 1, 0.7 ha Class 2 and 0.95 ha Class 3) of salmonid habitat more accessible to all life stages of migratory salmonids within the creek between Lake Superior and Hare Lake. This would represent a 78% increase in the total accessible habitat (31% Class 1, 195% Class 2, 67% Class 3) relative to currently accessible habitat, and comprises 97% of the total available habitat within the creek. Removal of the remaining barriers on Hare Creek to allow upstream fish passage to Hare Lake would allow access to very little additional stream habitat (3%). It is believed that together these works would increase cold water fish production in Hare Creek in a meaningful way.

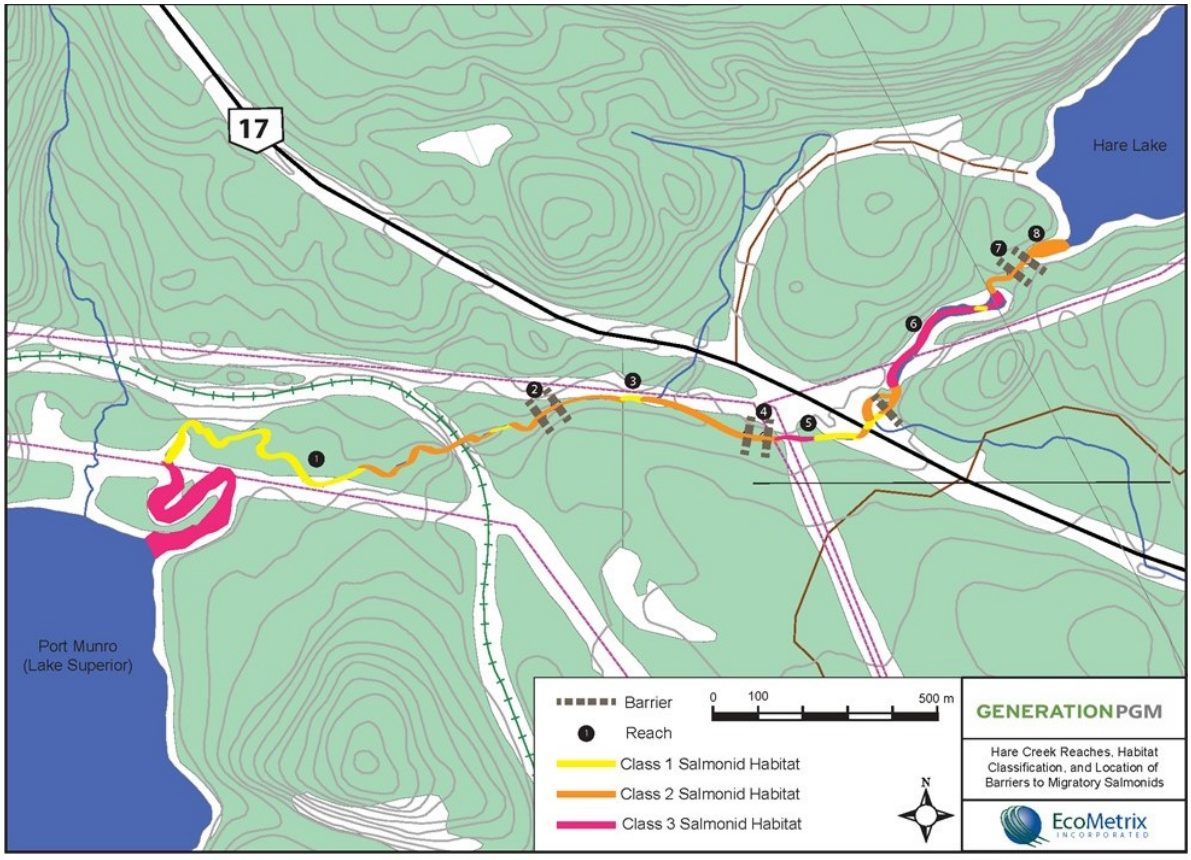

Figure 7-1: Hare Creek Reaches, Habitat Classification and Location of Barriers to Migratory Salmonids

7.2.2.4 Fish Passage Improvement and Habitat Enhancement in Angler Creek

There is a waterfall which occurs in the lower reach of Angler Creek, S31A. This cascade is at an elevation which is likely restrictive to fish passage. Brook Trout, Rainbow Trout, Coho Salmon and other cool/cold water small-bodied species were identified as utilizing the plunge pool and reach below the cascade. An area of substrate below the cascade provides courser substrates and therefore some limited potential for spawning of salmonids.

Despite salmonid species not being present in Angler Creek upstream of S31A, the habitat available in reaches upstream of this point is characteristic of spawning, nursery and foraging habitat for salmonids (most specifically Brook Trout). Substrates at S12 which will become the upstream terminus of the watercourse during operation was characterized by boulder, and coarse sand substrates. Further downstream at Station S14 (downstream of the Hwy 17 Crossing) the culvert on the downstream side of the highway crossing is perched well above the normal water level in the creek and likely provides a year-round barrier to upstream fish passage. However, the substrates at this location are bedrock, boulder, cobble with gravel, silt and sand within a riffle/flat/pool sequences. The creek transitions to a slightly wider and more depositional character at S42 (near the hydro line corridor) but provides a high level of instream cover in the form of undercut banks, aquatic macrophytes, large woody structure (logs/trees) and flat/run/pool morphology. Substrates were finer with an increase in silt, but representation of sand as well.

The removal/enhancement of these two migration obstacles to fish passage upstream of Lake Superior (Figure 7.2), would make a total of approximately 0.16 ha (0.10 ha Class 1, 0.3 ha Class 2 and 0.3 ha Class 3) of salmonid habitat more accessible to all life stages of migratory salmonids within the creek between Lake Superior and S12. This would represent an 89% increase in the total accessible habitat (53% Class 1, 18% Class 2, 18% Class 3). It is believed that together these works would increase cold water fish production in Angler Creek in a meaningful way.

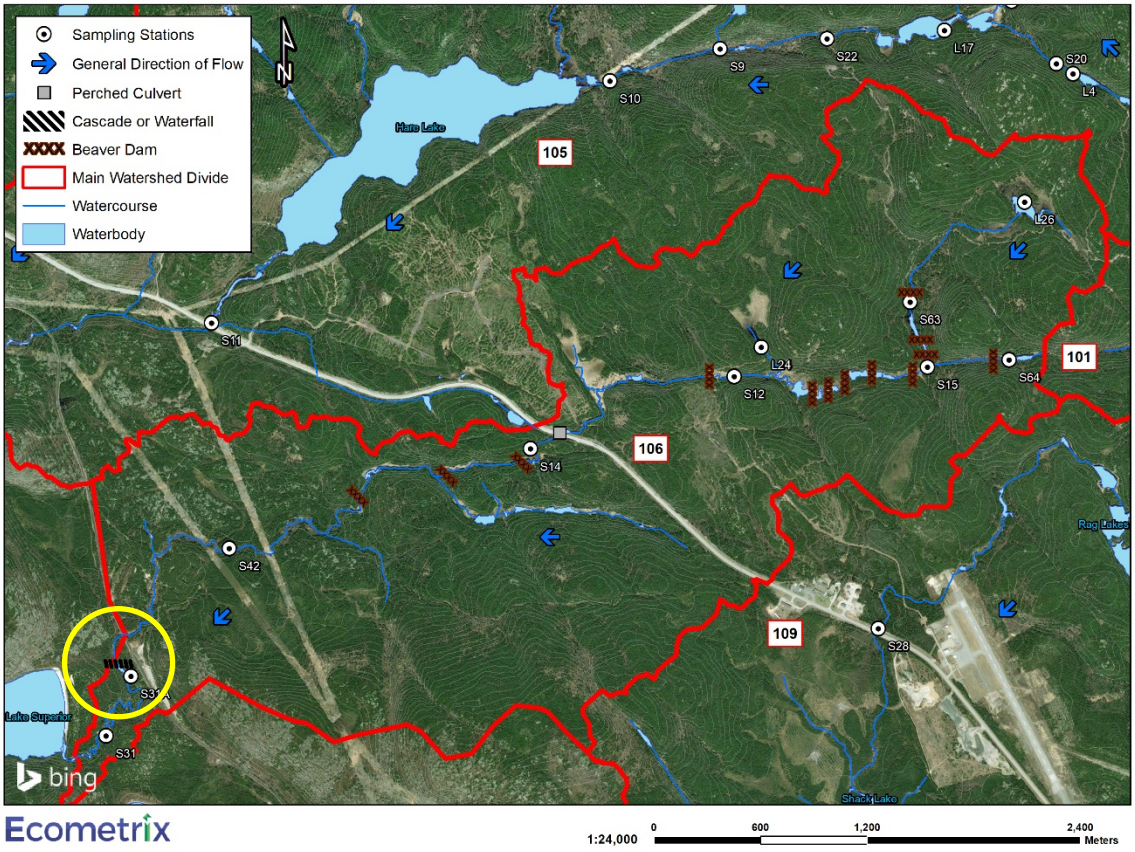

Figure 7-2: Angler Creek Reaches, Habitat Classification and Location of Barriers to Migratory Salmonids (Yellow Circle Indicates Main Barrier Location)

7.2.2.5 Pic River

A recent study of the utilization of Pic River by Lake Sturgeon recognized a site on the Pic River downstream of the Stream 1 outlet as important foraging habitat (Ecclestone, 2012). The access road near the Stream 1 crossing is adjacent to the Pic River and exhibits evidence of erosion during high river flows. To protect the Lake Sturgeon foraging habitat downstream, the river bank in the vicinity of the culvert could be stabilized with an armour stone or similar structure to prevent future erosion and potential washouts of the road onto the Lake Sturgeon foraging habitat.

7.2.2.6 Fish Habitat Enhancement at the Harvey Creek-Aguasabon River Confluence

Harvey Creek is a tributary of the Aguasabon River, which is itself a Lake Superior tributary that outlets near Terrace Bay. Harvey Creek provides spawning (and rearing) habitat for Brook Trout, including those fish that migrate from the Aguasabon River into the creek.

Significant deposits of gravel/cobble have accumulated at the confluence of Harvey Creek and the Aguasabon River, the result of repeated washouts that have occurred in upstream areas. These accumulations currently restrict fish movement between Harvey Creek and the Aguasabon River, particularly during periods of low flow. Notably, the fish passage issues have resulted in decreased numbers of Brook Trout migrating from the Aguasabon River to spawning areas in Harvey Creek during the fall, thereby reducing Brook Trout productivity in this portion of the watershed.

This offset/compensation opportunity therefore includes the re-establishment of unrestricted fish passage between the Aguasabon River and Harvey Creek. Conceptually this would involve instream works at the Harvey Creek-Aguasabon River confluence to clear the gravel/cobble accumulations so as to facilitate the creation of a channel that would provide year-round connectivity. Further assessment to determine the best engineering options for in-stream works or bank stabilization will be required to ensure that the removal of gravels is likely to result in the creation of a permanent open channel. This would ensure that the habitat in Harvey Creek could again be used for spawning by Brook Trout under any flow conditions. It would also improve non flow-regulated dispersal of younger age class Brook Trout (e.g., young-of-the-year) at other times of the year (spring, summer). Currently dispersal may be limited by a lack of connectivity due to low flows.

7.2.2.7 Fish Passage Improvement in Camp 14 Creek

Camp 14 Creek is a Pic River tributary located south of Marathon in relatively close proximity to the Pic River First Nation Reserve. The Camp 14 Creek and a first-order tributary of the creek were assessed in October 2008 (Northern Bioscience, 2008). The headwater areas of the Camp 14 Creek provide spawning and rearing habitat for resident cold water fish species (including Brook Trout), whereas downstream reaches can provide rearing habitat for migratory salmonids that spawn elsewhere (e.g., Rainbow Trout, Coho Salmon).

Upstream fish movement from the Pic River to the middle and upper reaches of Camp 14 Creek is potentially limited, in particular at times of low flow, by a culvert where Camp 14 Creek passes beneath Hwy 627. The Hwy 627 crossing is situated approximately 450 m upstream of the confluence of Camp 14 Creek and the Pic River. Replacing this culvert to ensure fish passage under low flow conditions would permit access to available salmonid spawning and rearing habitats within a 1.5 km length of Camp 14 Creek upstream of the Hwy 627 crossing.

7.2.3 Reclamation FHOFCP Opportunities

7.2.3.1 Stream 1 Subwatershed

Watershed 101 is expected to reclaim the 1.55 km^2 of watershed area during closure and post-closure conditions that was redirected during the construction and operation phases to encompass the SWM pond, process plant, and ancillary buildings. Demolition and removal of the process plant and ancillary buildings will allow for reclamation of the land, while the SWM pond will have a spillway constructed to allow discharge to the existing watercourses in subwatershed 101. The site access road will also be regraded, removed, and reclaimed, returning the runoff coefficient to the baseline value. Reclamation of the water management pond in watershed 106 during closure and post-closure will permanently add 0.244 km^2 of watershed area to watershed 101, for a total watershed area increase from 4.438 km^2 to 4.782 km^2 (5%) from baseline conditions.

The permanent increase in watershed area, considering changes to surface water and groundwater, is expected to increase the baseline MAF from 0.074 m^3/s to 0.080 m^3/s during closure and post-closure for an overall increase of 8%. The increase of 8% is lower than the 10% threshold to be considered a significant residual effect and, therefore, watershed 101 is screened out from further assessment.

In addition to the overall increase in baseflow to the system, the SWM pond may be further enhanced to provide opportunities to increase productivity of keystone species. This may include the addition of cover (vegetation wads, boulder, woody debris), optimal spawning and/or nursery substrates and contouring to allow for heterogeneity of depths for overwintering. The total area of the SWM pond that may be considered as offset will be 10.4 ha of lake habitat.

7.2.3.2 Stream 2 and 3 Subwatersheds

Once water quality draining the MRSA is suitable, drainage to the lower reaches of the Stream 2 and 3 watersheds will be restored. The MRSA drainage collection basins within each watershed will be removed. Native trees and shrubs will be planted in riparian areas and are expected to form functioning riparian habitat within a few years. Offset/compensation measures would include the re-establishment of the stream channels. It is assumed that, although there will be some flow in these streams during the mine life, the natural stream channels will need some rehabilitation. This would include removing terrestrial vegetation that has grown into the natural stream channels and some minor

channel re-alignment after stabilization. The exact nature of the offset/compensation works would be determined at the time of implementation but should restore approximately 0.2 ha of habitat.

7.2.3.3 Stream 6 Subwatershed

The upper reaches of the Stream 6 watershed will be re-graded to restore the pre-Project drainage to downstream reaches, after Project completion. The upper reaches will be restored (rechanneled) to provide the same quality of habitat that currently exists. Wetlands and other pond-like structures will be created to provide over wintering habitat. A new outlet structure will be created in the southwest corner of the PSMF which will link the upper and lower portions of the watershed. Native trees and shrubs will be planted in riparian areas and are expected to form functioning riparian habitat within a few years. Forage fish will be re-introduced from an onsite population into the newly created habitat. Restoration and enhancement will occur downstream of the PSMF to reconnect drainage to Stream 6. This will create approximately 2.0 ha of habitat.

7.2.3.4 Naturalization of Open Pits

Once the open pits are filled by surface contact water (closure) and water quality criteria are met, they will be reconnected to Streams 2 and 3 through realignment and surface drainage direction/facilitation. The pits will then represent the headwater water body features for these systems which will ultimately discharge to the Pic River. As such, there is opportunity to naturalize the nearshore environments (first bench) of the drowned pits to increase productivity potential for the realigned Stream 2 and 3 subwatersheds. This may include further placement of substrates of optimal particle sizes for target species at nearshore depths and establishment of riparian and aquatic vegetation. Such enhancements may account for up to 30 ha of offset.

7.2.3.5 Naturalization of Site Drainage

Following mine closure natural drainage patterns will be restored on site to the extent possible. This will include restoration of existing of existing surface water features, as well as the creation of new channels. Any new channels that are created will be naturalized so as to provide useable fish habitat.

7.3 Recommendations for Offsets / Compensation

The potential offset/compensation opportunities identified above were considered in relation to DFO's (2019a) *Fish and Fish Habitat Protection Policy Statement*, GenPGM's own offset planning guiding principles described in Section 3.0 and the requirements under the MMER to develop a "short list" of recommended opportunities to advance to the next phase of planning. The rationale for those options that have been "short listed" is summarized in Table 7.1.

Table 7.1: Assessment of the comparison of the full range of offset/compensation opportunities (see note below)

Offsetting Option	SCI's Principles			Recommended	Rational for Recommendation
	1	2	3		
Independent Opportunities					
Camp 19 Road Crossing Replacement and Habitat Enhancement	✓	✓	✓	No	Not recommended as direct offset due the need to undertake upgrade of crossings associated with Camp 19 road access during early construction phase.
Habitat enhancement in Hare Lake	✓	✓	✓	Yes	Fits with fisheries management objectives
Fish Passage Improvement and Habitat Enhancement in Hare Creek	✓	✓	✓	Yes	Offsets losses in lower reaches of streams 2, 3 and 6 which support similar species
Fish Passage Improvement and Habitat Enhancement in Angler Creek	✓	✓	✓	Yes	Offsets losses in lower reaches of streams 2, 3 and 6 which support similar species
Pic River	✓	✓	×	No	High level of uncertainty and difficult the measure success
Fish Habitat Enhancement at the Harvey Creek-Aguasabon River Confluence	×	✓	✓	No	Is located outside the Project area.
Fish Passage Improvement in Camp 14 Creek	×	✓	✓	No	Is located outside the Project area.
Reclamation Opportunities					
Stream 1 Subwatershed Enhancements	✓	✓	✓	Yes	Offsets losses to Stream 1 and increases same stream productivity post closure
Stream 2 and 3 Subwatersheds Enhancements	✓	✓	✓	Yes	Offsets losses to Stream 2 and 3 and increases same stream productivity post closure
Stream 6 Subwatershed Enhancements	✓	✓	✓	Yes	Offsets losses to Stream 6 and increases same stream productivity post closure
Naturalization of Open Pits	✓	✓	✓	Yes	Offsets losses to Stream 2 and 3 and increases same stream productivity post closure
Naturalization of Site Drainage	✓	✓	✓	Yes	Offsets losses to Streams 1, 2, 3 and 6 and increases productivity potential post closure.

Note: Principle 1 = site specificity; Principle 2 = locally valued fish species focus; Principle 3 = high probability of success and with measurable results

As can be seen from Table 7.1 the proposed “short listed” opportunities are focussed on improvement of fish passability in the earlier period of the Project (i.e., removal of barriers and enhancement of habitats associated with remaining segments of watercourses and water bodies to increase the availability and/or productivity of salmonid habitat. These measures are focussed on streams 5 and 6 (Hare Lake and Angler Creek systems). The second phase of offset would be associated with reclamation where rerouted and impounded water features are naturalized or enhanced to provide productive habitat for target species.

The following sections provide an overview of planning aspects associated with implementing the offset/compensation plan, including timing, and monitoring and adaptive management. Site specific work plans developed in consultation with DFO and MNRF will be included as an appendix to the final fish habitat offset/compensation plan.

7.3.1 Timing

Physical works associated with the independent FHOFCP opportunities will be completed within the first three years of mine operation. Physical works associated with the reclamation FHOFCP opportunities will be completed during the initial stages of the decommissioning/closure phase of the Project.

7.3.2 Monitoring and Adaptive Management

A monitoring program including a schedule of activities is proposed. Appropriate timing windows for instream or near-stream construction and works will be respected in all cases. Monitoring is completed for two purposes.

First, construction monitoring is competed to confirm that the offset/compensation elements have been constructed in a manner that is consistent with the proposed design and associated work plans. Construction progress will be evaluated based on the adherence to engineering design specifications and associated work plans and will occur at appropriate and regular intervals during the construction period. Construction monitoring will also be completed to ensure that appropriate environmental protection measures are implemented as part of the construction process – that is, to ensure that no adverse effects will accrue to fish and fish habitat as the result of implementation of the offset/compensation elements. To this end, a protection plan will be developed prior to construction that outlines considerations such as sediment and erosion control measures, spill response, waste management, measures to isolate instream work areas (as may be appropriate). The protection plan will be developed to be consistent with DFO and MNRF guidance regarding working in and near water.

Secondly, monitoring is completed subsequent to completion of the offset/compensation opportunities to confirm that they are functioning as designed/intended. This follow-up monitoring will focus on the measurement of physical and biological endpoints to assess the effectiveness of the offset/compensation elements (i.e., to assess the efficacy of EA-related mitigation measures). The physical and biological endpoints used to measure

efficacy will be developed on an element-specific basis. Physical endpoints could include among others such measures as the quantification of habitat gains, stream discharge and efficacy of fish passage. Biological measures could include among others such measures as fish habitat use (e.g., spawning assessment), juvenile salmonid population estimates and salmonids fry recruitment. Follow-up monitoring will take place on a schedule that is appropriate to the expectations/objectives of the individual offset/compensation elements and will extend over a long enough period to demonstrate success (or lack thereof).

The results of the follow-up monitoring program will be used to determine the need for refinement of individual offset/compensation elements within an adaptive management framework. The use of an adaptive management framework will help to ensure that the goals for the offset/compensation elements are met.

7.4 Costs

A preliminary, order-of-magnitude cost range estimate has been developed for the recommended offset/compensation elements. It has been estimated that the cost of implementation of the offset/compensation elements proposed is in the range of $2.0 to $3.5 M, including engineering and a contingency allowance. As indicated this estimate is considered preliminary and will be refined as part of the design process.

7.5 Conclusion

GenPGM believes that the recommended and planned offset/compensation opportunities presented herein satisfy regulatory requirements and objectives for offset/compensation and more than offset and compensate for any fish habitat losses associated with the Project. Implementing and monitoring these opportunities also is consistent with the guiding principles used by GenPGM in developing this offset strategy and compensation plan. The recommended and planned opportunities focus on opening up underutilized habitats above existing (natural) and man-made barriers and envision habitat enhancement to further increase productive capacity. The opportunities provided are local in nature and are directed towards increasing fish productivity for species valued by the local public and Indigenous peoples.

8.0 REFERENCES

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Appendix A - Application Form for Issuance of an Authorization under Paragraphs 34.3(2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations)

Note: A blank application has been provided for reference purposes. The Project-specific application will be filed with DFO separately.

Application Form for the Issuance of an Authorization under Paragraphs 34.4(2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations)

I, the undersigned, hereby request an authorization for the purpose of paragraphs 34.4(2)(b) and 35(2)(b) of the *Fisheries Act* . I understand that this authorization, if granted, is only from the standpoint of the Minister of Fisheries and Oceans in regards to the above named provisions and does not release me from my obligation to obtain permission from other concerned regulatory agencies or from other act or regulations such as *Species at Risk Act* or the *Aquatic Invasive Species Regulations*.

Texts in brackets refer to the provisions of the *Authorizations Concerning Fish and Fish Habitat Protection Regulations* (hereafter "the Regulations") or of their Schedules.

1. Applicant Contact Information

Applicant's Name:

If applicable:
Authorized Representative's Name:

Address:

Address:

Telephone No.:

Telephone No.:

Fax No.:

Fax No.:

E-mail:

E-mail:

DFO File Referral No. (if known):

2. Checklist for Prescribed Information [schedule 1]

An applicant does not need to re-submit documents that have already been submitted to DFO for review. An applicant may reference documents such as Environmental Impact Statements, technical supplements, etc. in their application but must provide the appropriate reference to any document cited, including the chapter, section, page reference and date of submission.

Type of Information/ Documentation	Have you submitted the following? (Yes/No)	Identify the appropriate reference document: Title, Chapter, Section, Page Number and Date of Submission	DFO Comments (For official use only)
Financial Guarantee **[paragraph 2(1)(b)]**			
Description of Proposed work, undertaking or activity **[schedule 1, section 2]**			

Project engineering specifications, scale drawings and dimensional drawings (for physical works) **[schedule 1, section 3]**			
Phases and schedule information **[schedule 1, section 4]**			
Location information **[schedule 1, sections 5& 6]**			
Descriptions of any consultations undertaken prior to application (if any) **[schedule 1, section 7]**			
Description of Fish and Fish Habitat (Aquatic Environment) **[schedule 1, section 8]**			
Description of Effects on Fish and Fish Habitat **[schedule 1, section 9]**			
Description of Measures and Standards to Avoid or Mitigate death of fish or harmful alteration, disruption or destruction of fish habitat **[schedule 1, section 10]**			
Description of monitoring measures to assess effectiveness of measures and standards described in section 10 **[schedule 1, section 11]**			
Description of contingency measures that will be implemented if measures and standards (section 10) do not meet their objectives **[schedule 1, section 12]**			
Description of the death of fish after measures and standards are implemented **[schedule 1, section 13]**			
Description of the Residual harmful alternation, disruption or destruction of fish habitat after measures and standards are implemented **[schedule 1, section 14]**			
Habitat Credits **[schedule 1, section 15]**			
Offsetting Plan (including geographic coordinates and small scale site plan) **[schedule 1, section 16]**			

3. Fisheries Management Objectives

Did you consider local Fisheries Management Objectives in your planning process? ○ Yes ○ No

If yes, please identify the Fisheries Management Objective(s)/Plan considered and, if applicable, reference the relevant sections.

Please identify any effects that the proposed work, undertaking or activity may have on achieving these objectives.

Applicant Declaration

I solemnly declare the that information provided for this application are true, complete and correct, and I make this declaration conscientiously believing it to be true knowing that it is of the same force and effect as if made under oath. This declaration applies to all material submitted as part of this application for paragraphs 34.4(2)(b) and 35(2)(b) *Fisheries Act* Authorization.

Applicant's signature (and corporate seal):

MM/DD/YYYY

Date

Information about the above-noted proposed work, undertaking or activity is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fish and Fish Habitat Protection Provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank number DFO PPU 680. Under the provisions of the *Privacy Act*, individuals have a right to, and on request shall be given access to, any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than “personal” information may be accessible or protected as required by the provision of the *Access to Information Act*.

If you require additional space to provide relevant information, please attach that information and indicate the title of the form being used and the section to which you are responding.