From: Tabatha LeBlanc <email address removed>
Sent: January 29, 2014 4:30 PM
To: Spagnuolo,Colette [CEAA]; Sewell,Jeff [CEAA]
Cc: Clark Gilbert
Subject: Fish Habitat Offset / Compensation Plan

Hello Colette and Jeff,

Enclosed is the proposed Fish Habitat Offset Strategy and Compensation Plan (Draft). We have also provided the plan to DFO, as well as Environment Canada and the Ministry of Natural Resources, and anticipate it will be further reviewed with DFO, MNR and EC prior to the hearings.

Thanks,
Tabatha

PROPOSED FISH HABITAT OFFSET STRATEGY AND COMPENSATION PLAN FOR THE MARATHON PGM-Cu PROJECT

Report prepared for:

STILLWATER CANADA INC.
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Report prepared by:

ECOMETRIX INCORPORATED
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PROPOSED FISH HABITAT OFFSET STRATEGY AND COMPENSATION PLAN FOR THE MARATHON PGM-Cu PROJECT

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EXECUTIVE SUMMARY

This document presents the proposed Fish Habitat Offset Strategy and Compensation Plan (FHOFCP) that addresses the predicted effects to fish and fish habitat associated with the development of Stillwater Canada Inc.'s proposed Marathon PGM-Cu Project (the Project). The Project envisions the development of an open-pit copper and platinum group metals (PGMs) mining and milling operation with an estimated ten to twelve year operating life.

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 reduced flow, as the result of water diversion on site. The primary potential effects of the Project on fish habitat will result from the diversion of existing surface water features and the removal of some small lakes and streams.

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. Potential offset/compensation opportunities are described that include both the development of new fish habitat and the enhancement of existing habitats, and recommendations are made on the proposed FHOFCP.

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1.0 INTRODUCTION

1.1 Marathon PGM-Cu Project

Stillwater Canada Inc. (SCI) proposes to develop a platinum group metals (PGMs), copper (Cu) and possibly iron (Fe) open-pit mine and milling operation (the Project) near Marathon, Ontario. The Project is located approximately 10 km north of the Town of Marathon, Ontario (Figure 1.1). The town, with a population of 3,353 (2011 Census), is situated adjacent to the Trans-Canada Highway 17 (Hwy 17) on the northeast shore of Lake Superior, about 300 km east and 400 km northwest (by highway) of Thunder Bay and Sault Ste. Marie, respectively. 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.

Figure 1.1: Location of the Proposed Marathon PGM-Cu Project Site near Marathon, Ontario

The Project envisions the development of an open pit mining and milling operation. The conceptual design associated with the proposed Project is described in detail in the Environmental Impact Statement (EIS) Report (Stillwater Canada Inc., 2012) and supporting technical studies, as updated in various responses to information, supplemental and additional information requests from the Joint Review Panel. This information is summarized in Section 4.0 of this report.

1.2 Purpose of Current Report

This document presents the conceptual Fish Habitat Offset / Compensation Plan Strategy (FHOFCP) that addresses regulatory requirements under the *Fisheries Act* associated with the development of SCI's proposed Marathon Project. 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. Potential fish habitat offset/compensation opportunities are described and recommendations on the "short list" of opportunities recommended by SCI and EcoMetrix Incorporated (EcoMetrix) to address Project effects are made. The FHOFCP is presented in consideration of and consistent with the requirements of the recent amendments to the *Fisheries Act*, which received Royal Assent on June 29, 2012.

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 SCI 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 SCI.

Section 8.0 provides the references consulted in the preparation of the report.

The Application Form for Paragraph 35(2) (b) *Fisheries Act* Authorization (Normal Circumstances) is provided in Appendix 1.

Appendix 2 provides a summary of the interactions between mine waste storage infrastructure and fish frequented waters and the requirements for Schedule 2 of the MMER.

2.0 CONTACT INFORMATION

Applications Name: Stillwater Canada Inc. c/o Tabatha LeBlanc	Authorization Representatives Name: Brian Fraser, EcoMetrix Incorporated (Consultant for Stillwater)
Address: 1127 Barton Street Thunder Bay, ON P7B 5N3	Address: 6800 Campobello Road Mississauga, ON L5N 2L8
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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 SCI 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.

3.2 Fisheries Act

Amendments to the fisheries protection provisions of the federal *Fisheries Act* (the *Act*) received Royal Assent on June 29, 2013 and subsequently came into force on November 25, 2013. The amended *Act* focuses Fisheries and Oceans Canada (DFOs) efforts on protecting the productivity of commercial, recreational and Aboriginal fisheries (DFO, 2013). Under the amended *Act* the three types of fisheries are defined as:

- commercial fishery - fish that are harvested under the authority of a license for the purpose of sale, trade or barter;
- recreational fishery - fish that are harvested under the authority of a license for personal use of the fish or for sport; and,
- aboriginal fishery - fish that are harvested by an Aboriginal organization or any of its members for the purpose of using the fish as food, for social or ceremonial purposes or for purposes set out in a land claims agreement entered into with the Aboriginal organization.

Subsection 35(1) of the amended *Act* states that "*no person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery*". Serious harm to

fish is defined as "*the death of fish or any permanent alteration to, or destruction of, fish habitat*". DFO's new Fisheries Protection Policy Statement (the Policy) interprets serious harm to fish as including the following:

- the death of fish;
- a permanent alteration to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes; and,
- the destruction of fish habitat of a spatial scale, duration or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes (DFO, 2013).

Under the Policy "*fish that are part of commercial, recreational or Aboriginal fisheries are interpreted to be those fish that fall within the scope of applicable federal or provincial fisheries regulations as well as those that can be fished by Aboriginal organizations or their members for food, social or ceremonial purposes or for purposes set out in a land claims agreement*". Further, "*Fish that support these fisheries are those fish that contribute to the productivity of a fishery (often, but not exclusively, as prey species)*". "*Fish that support" may reside in water bodies that contain the commercial, recreational or Aboriginal fisheries or in water bodies that are connected by a watercourse to such water bodies*" (DFO, 2013).

Under paragraph 35(2)(b) of the *Act*, the Minister can authorize works, undertakings or activities that are likely to cause serious harm to fish. The *Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations* (the Regulation), which describes the information that must be submitted by a proponent seeking an authorization under the amended *Act* also came into force on November 25, 2013.

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

The goal of the Fisheries Protection Policy is to provide for the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries (DFO, 2013). 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. Offsetting is interpreted through the Policy as follows:

> *"An offset measure is one that counterbalances unavoidable* serious harm to fish *resulting from a project with the goal of maintaining or improving the productivity of the commercial, recreational or Aboriginal fishery.*

> *Offset measures should support available fisheries management objectives and local restoration priorities"* (DFO, 2013).

Once it has been determined that a Subsection 35(2) Authorization is required in order for a project to proceed, the four factors in described in Section 6 of the *Act* must be considered by the Minister before an Authorization can be issued. These factors are:

1. the contribution of the relevant fish to the ongoing productivity of commercial, recreational or Aboriginal fisheries;
2. fisheries management objectives;
3. whether there are measures and standards to avoid, mitigate or offset serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or that support such a fishery; and,
4. the public interest.

An offset plan is intended to offset any residual impacts that will cause *serious harm to fish* that are part of or support commercial, recreational or Aboriginal fisheries. The offset plan should also demonstrate that the offsetting measures will maintain or improve the productivity of the impacted fishery.

Other factors to be considered in the offset plan include:

- Opportunities to mitigate existing impacts or constraints to fish and fish habitat in the watershed;
- First Nations 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, SCI 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; 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 Mining Effluent Regulations (MMER)

Pursuant to subsections 34(2), 36(5) and 38(9) of the *Fisheries Act*, Section 27.1 of the *Metal Mining Effluent Regulations* (MMER), requires a compensation plan and the Minister's approval of that plan 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 PGM-Cu Project

As indicated in Section 1.1, extensive Project-related details regarding the proposed conceptual design have been provided in the main EIS report and its supporting documents, as well as responses to information, supplemental information and additional information requests provided by SCI to the Joint Review Panel. Conceptual design information is summarized below.

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 Figures 4.1 and 4.2, respectively.

One primary pit and satellite pits to the south are proposed to be mined. Ore will be excavated by blasting. Ore will be processed (crushed, ground, concentrated) at an on-site processing facility. Final concentrates containing copper and platinum group metals will be transported off-site via road and/or rail directly or via ship to a smelter and refinery for subsequent metal extraction and separation. The total mineral reserve (proven and probable) is estimated to be approximately 120 million tonnes.

During the operations phase of the Project, ore will be fed to the mill at an average rate of approximately 25,000 to 28,000 tonnes per day. The operating life of the mine is estimated to be approximately 10 to 12 years.

Approximately 192 to 288 million tonnes of mine rock[1] will be excavated. Non-potentially acid generating (non-PAG) mine rock will be permanently stored in a purposefully built Mine Rock Storage Area (MRSA) located east of the primary pit. The non-PAG or so-called Type 1 mine rock will also be used in the construction of access roads, dams and other site infrastructure as needed. Drainage from the MRSA will be collected, stored, treated (as necessary) and discharged to the Pic River. As part of the strategy to manage potentially acid generating (PAG) mine rock, or Type 2 Mine Rock, that may be excavated from the pits, contingency for the management of approximately 20 million tonnes of mine rock has been accounted for in the mine design. The Type 2 mine rock will be managed on surface during mine operations in temporary stock piles with drainage directed into the open pits. This material will be relocated to the bottom of the primary and satellite pits and covered with water to prevent potential acid generation and covered with Type 1 materials.

[1] Mine rock is rock that has been excavated from active mining areas but does not have sufficient ore grades to process for mineral extraction.

Process solids[2] will be managed in the Process Solids Management Facility (PSMF), as well as in the open pit(s). The PSMF will be designed to hold approximately 108 million tonnes of material, and its creation will require the construction of dams. Two streams of process solids will be generated. An estimated 85 to 90% of the total amount of process solids produced will be non-acid generating, or so-called Type 1 process solids. The remaining ten to fifteen percent of the process solids could be potentially acid generating and are referred to as Type 2 process solids. The Type 2 process solids will be stored below the water table in the PSMF or below water in the pits to mitigate potential acid generation and covered with Type 1 materials. Water collected within the PSMF, as well as water collected around the mine, will be managed in the PSMF for eventual reclamation in the milling process. Excess water not needed in the mill will be discharged, following treatment as is necessary, to Hare Lake.

Access to the Project site is currently provided by the Camp 19 Road, opposite Peninsula Road at Hwy 17. The existing road runs east towards the Pic River before turning north along the river to the Project site (approximately 8 km). The existing road will be upgraded and utilized from its junction with Hwy 17 for approximately 2.0 km. At this point a new road running north will be constructed to the future plant site. The new section of road will link two sections of forest access roads located on the site. A site road network will also be developed to provide safe and ready access to all infrastructure.

A series of pipelines will be developed on the site to serve several different functions (e.g., potable water distribution and process solids pumping system). All pipelines with the exception of the potable water distribution and sewage system are anticipated to be above ground.

Power to the Project site will be provided via a new 115 kV transmission line that will be constructed from a junction point on the Terrace Bay-Manitouwadge transmission line (M2W Line) located to the northwest of the primary pit. The new transmission line will run approximately 4.1 km to a substation at the mill site. The width of the transmission corridor will be approximately 30 m. A pole line will follow the main Camp #19 access corridor to provide supplemental power, or approximately 25kV, at start up and for communications to site.

[2] Process solids are solids generated during the ore milling process following extraction of the ore (minerals) from the host material.

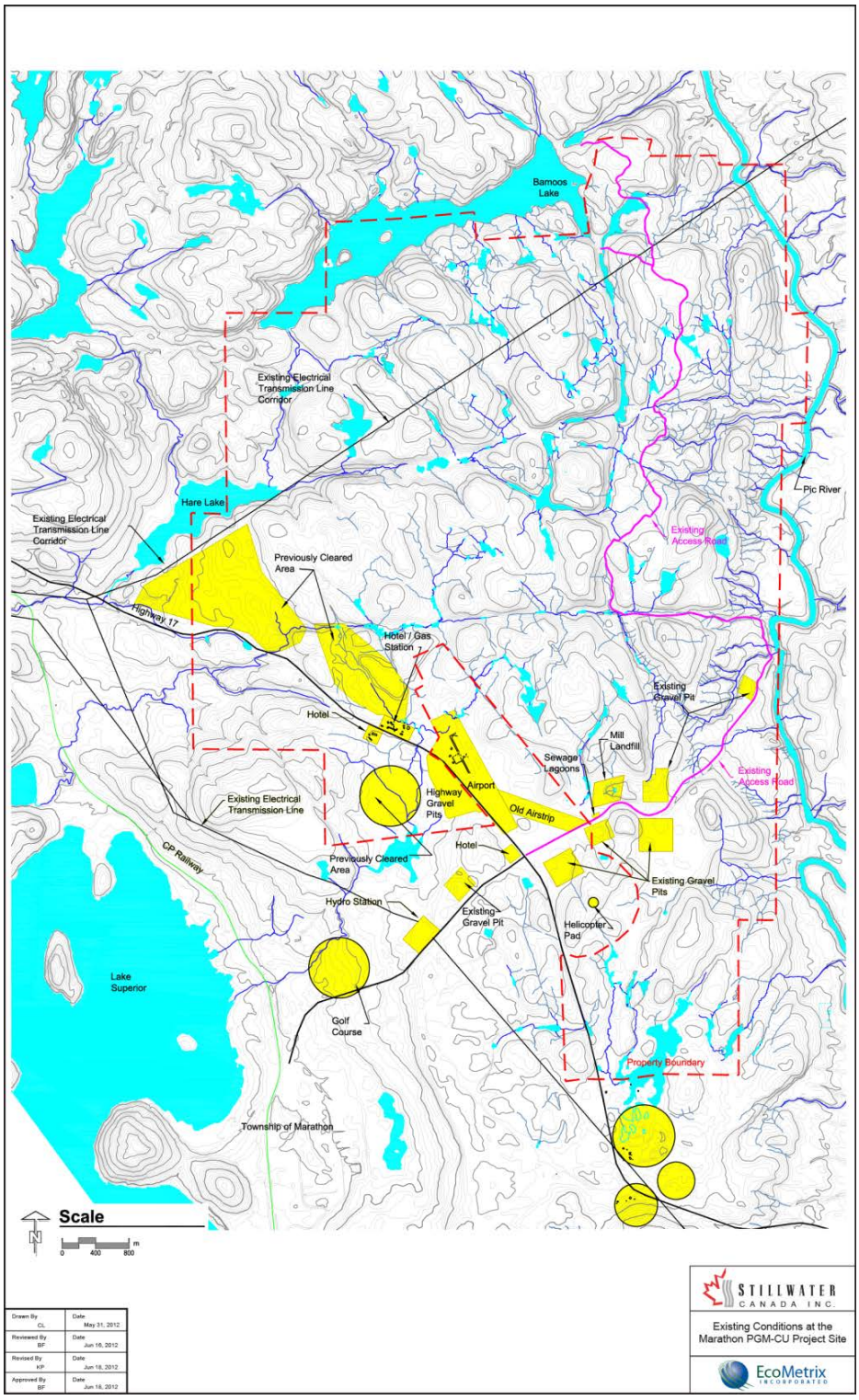

Figure 4.1: Existing Conditions at the Marathon PGM-Cu Project Site

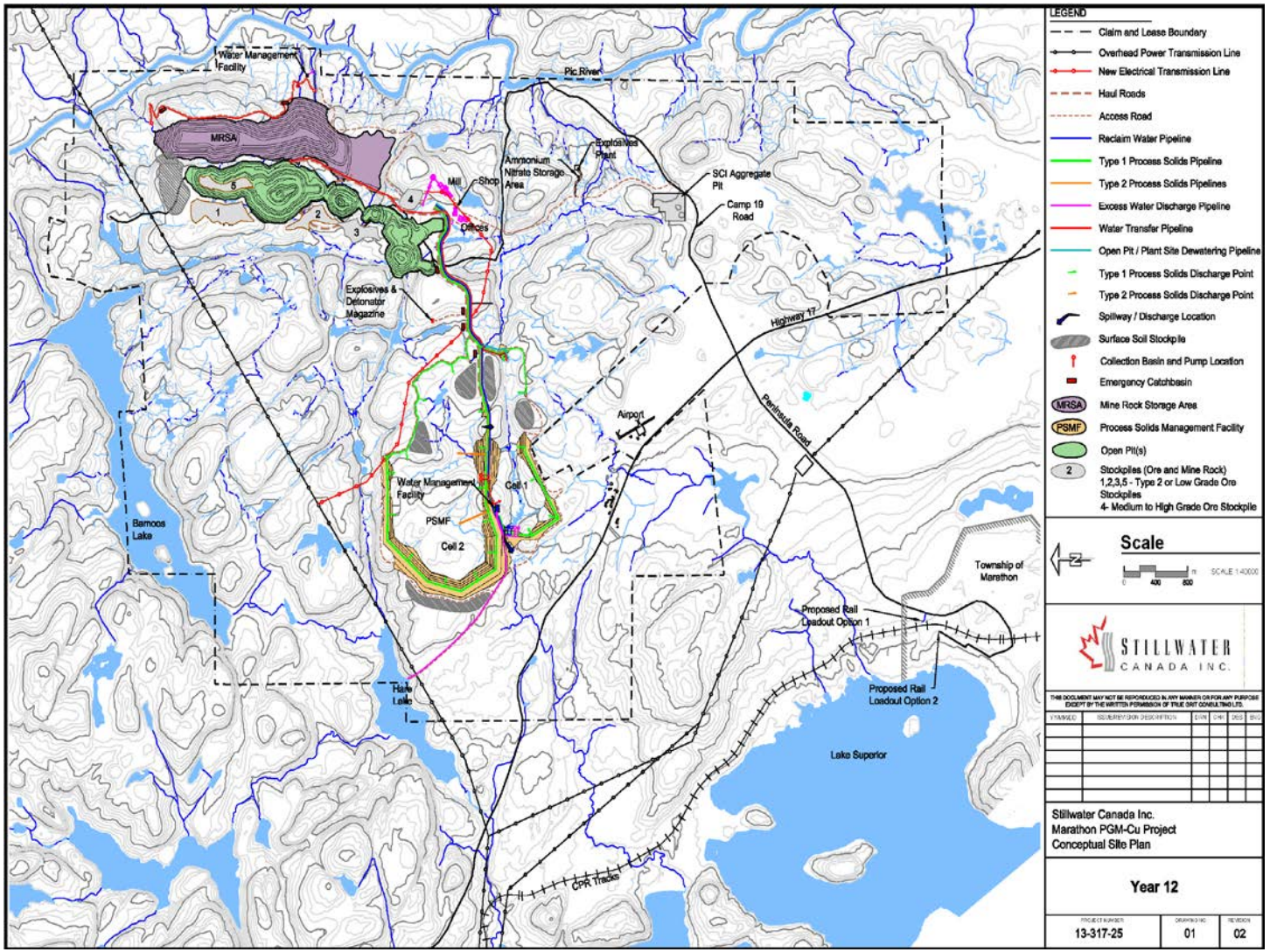

Figure 4.2: Marathon PGM-Cu Project Conceptual General Site Layout

4.2 Timeline

The proposed Project will be completed in four phases: site preparation; construction; operations; and, decommissioning/closure. Site preparation and construction are estimated to be completed over an 18 month period. The operations phase is estimated to be 10 to 12 years. The decommissioning/closure phase will commence once operations have ceased. A relatively intensive period of decommissioning/reclamation is anticipated to last approximately two years and thereafter the site will be monitored as appropriate for safety purposes and to verify the success of reclamation and decommissioning activities.

4.3 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 4.2 provides a depiction of the site infrastructure and layout. Figure 4.3 shows the general site layout with reference to local subwatershed boundaries.

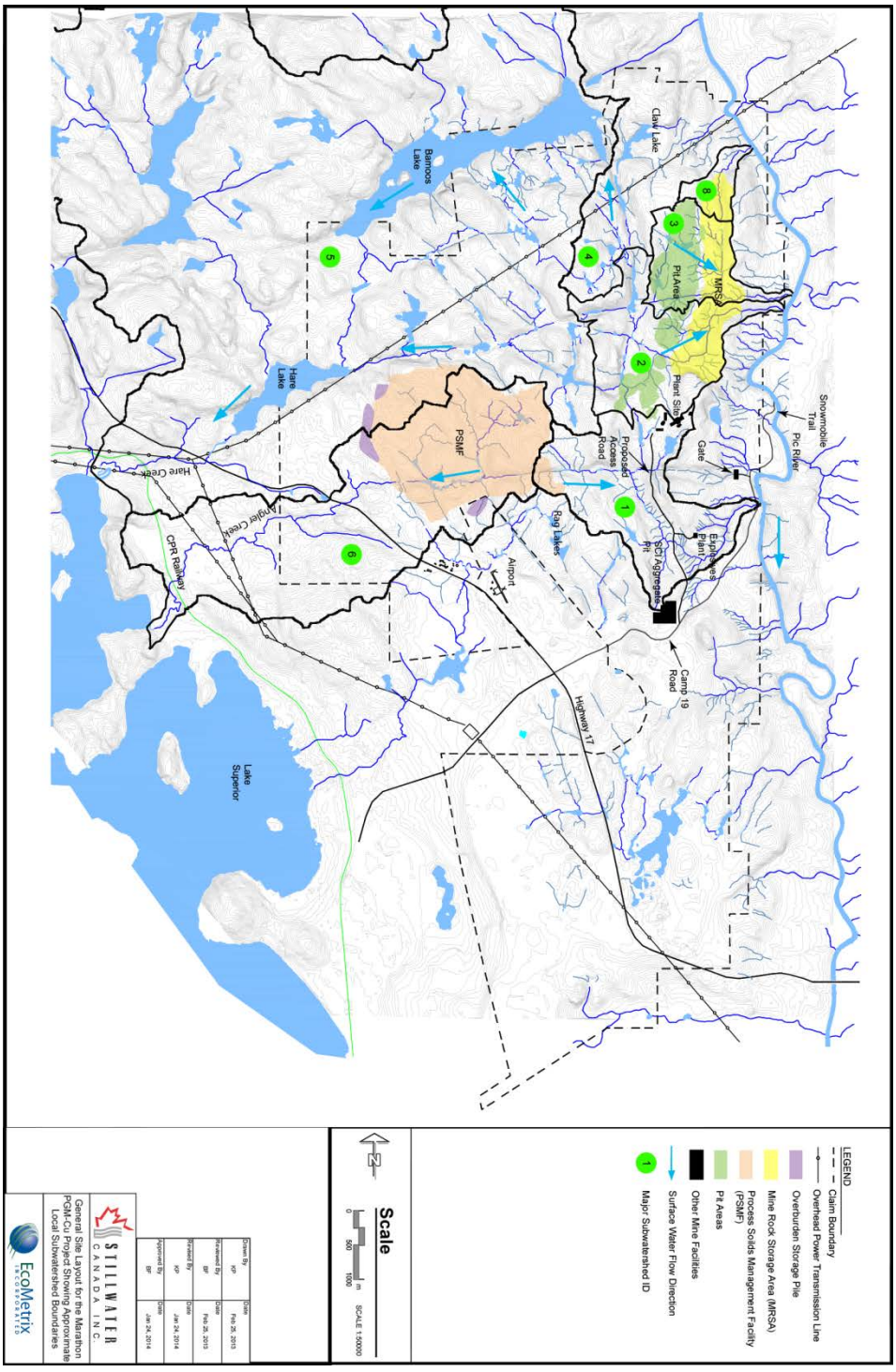

Figure 4.3: General Site Layout for the Marathon PGM-Cu Project Showing Approximate Local Subwatershed Boundaries

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) and its supporting documentation (SID #1; EcoMetrix, 2012), as well as in various responses to information requests (IRs) supplemental information requests (SIRs) and additional information request (AIRs) provided to the Joint Review Panel.

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 (MNR) 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.

5.1.1 Stream 1 Watershed

Multi-season passive and active fishing effort in the headwater lakes (i.e., L1, L2 and L29) within the Stream 1 watershed 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.

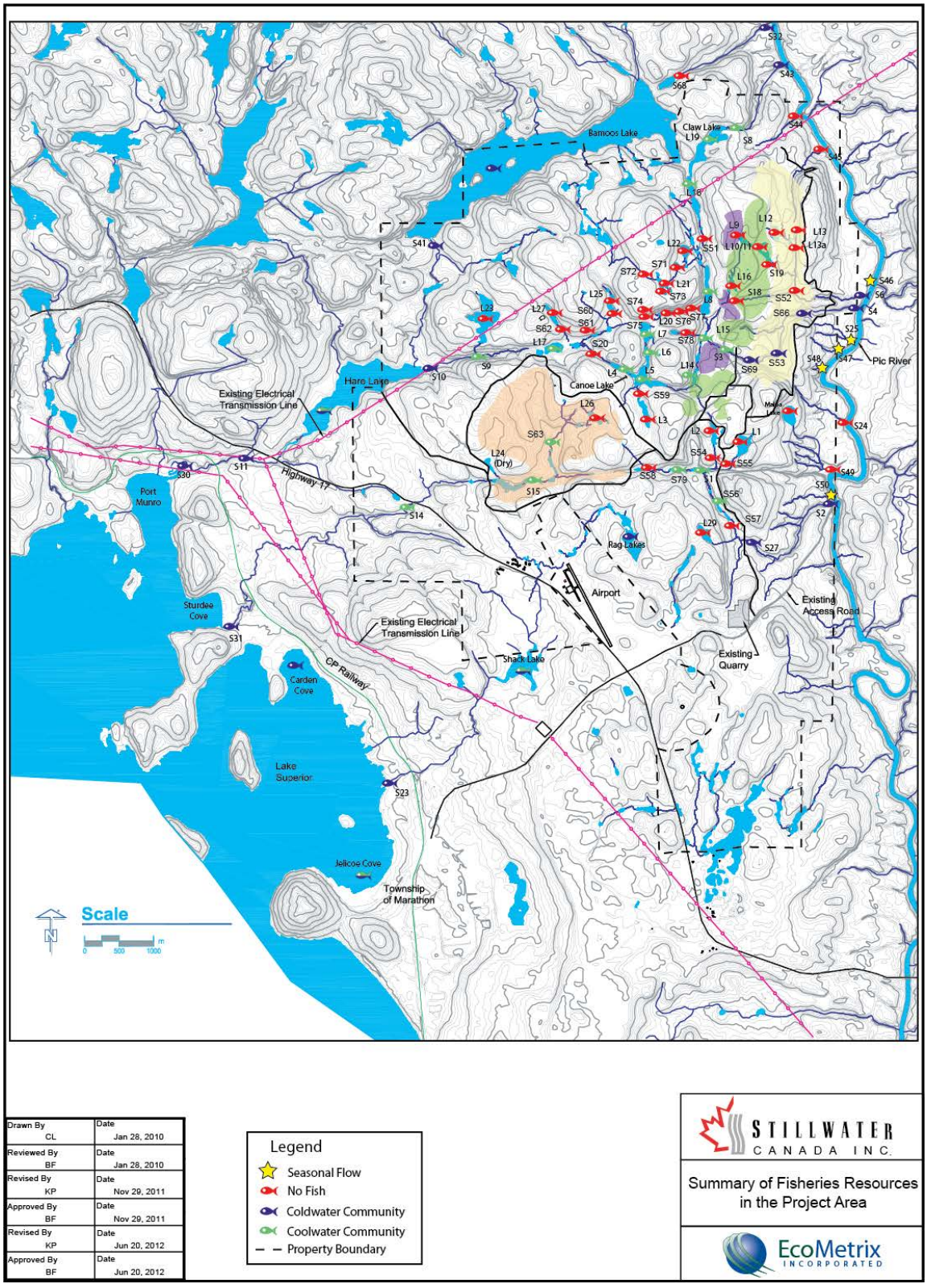

Figure 5.1: Summary of Fish Distribution in the Project Area

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.

5.1.2 Stream 2 Watershed

Two of the three headwater areas (i.e., Stations L3 and Terru Lake) within the Stream 2 watershed were fishless, 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., Canoe Lake and Stations L6, L8, L14 and L15) only one or two species were captured at each water body. Canoe Lake and L6 appear to only support Lake Chub, whereas at Stations L8 and L15 only Brook Stickleback were present. Both species were collected in L14; however only a single Lake Chub was captured suggesting that chub are likely only downstream migrants at that location.

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, Coho 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 yielded no fish. 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 Watershed

No fish were captured upstream of a waterfall located at Station S51a (i.e., Stations S51, L21, L22 and all connecting tributaries). 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 within the Hare Lake watershed support no fish or sustain only a very limited community. 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 areas 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. 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 OMNR 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 affords 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

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	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 limits 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 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 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 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.

5.3 Commercial, Recreational and Aboriginal Fisheries

Recreational fisheries occur in Bamoos Lake and Hare Creek, as well as in Lake Superior (near shore area) and the Pic River. There is also recreational use of Hare Lake, though it is thought to be limited based on information collected by SCI during the EA process. A limited recreational fishery for Rainbow Trout (Steelhead) also occurs in the lower reach of Stream 6, below the bedrock cascade waterfall, as a number of fish migrate into the stream during high freshet flows.

Reported use for fishing by Aboriginal peoples is largely focused on Bamoos Lake and the lower reaches of Hare Creek, as well as Lake Superior (near shore area) and the Pic River. Some use of Hare Lake is also reported.

The lower reaches of Streams 2 and 3 provide some habitat for migratory fish species that also utilize the Pic River.

There is no commercial food fishery in lakes in or around the Project site, or in the near shore area of Lake Superior in the vicinity of the streams draining the Project site. A

commercial bait fish license holder collects forage fish periodically at a single location in the LSA (L19 or Claw Lake).

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). 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 and the release of excess water from the Process Solids Management Facility (PSMF) and Mine Rock Storage Area (MRSA) into their respective receiving environments.

Below, a description of the measures to avoid serious harm to fish, of the measures and standards to mitigate serious harm to fish 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 35(2) the Fisheries Act and/or MMER Section 27.1.

6.1 Measures to Avoid Serious Harm to Fish

Due to the nature of the proposed development the primary means by which serious harm 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, especially as it concerns water bodies and water courses that provide or support recreational, aboriginal and/or commercial fisheries. Examples of instances where mine design has been tailored or altered to minimize interaction with aquatic resources include the following:

- Removing Bamoos Lake from consideration as a process solids storage option – Bamoos Lake was presented as an option for process solids storage in the original Project Description Report (February 2010). Following discussion with government agencies, FNs, the public and other stakeholders it was decided that Bamoos Lake would not be considered further; primarily in recognition of the concern for the recreational/aboriginal fishery in the lake. This decision was communicated to all concerned parties on July 5, 2010. Bamoos Lake, a local destination (principally ice fishing) for Lake Trout and Brook Trout, will not be affected by the Project footprint or site drainage, however access from the south through the mine site will be temporarily affected for the general public.

- Reduction in the footprint of the mine rock storage area – 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

primary pit, which is used for commercial purposes from time-to-time by a local baitfish license holder.

- Reduction of the footprint of the PSMF – Initial mine designs included a PSMF with a larger surface area than is currently envisioned. The original PSMF design encroached on several subwatersheds on the mine site whereas the current design is largely restricted to the Stream 6 subwatershed. The reduction in footprint has been achieved while still adhering to the design principal of managing Type 2 process solids for the purpose of preventing potential acid generation.

- 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 Serious Harm to Fish

Examples of measures and standards that will be implemented to mitigate serious harm to fish 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 MNR operational statements, guidance and protocols for working around water. Important considerations include the following:

- avoiding where possible or maintaining setbacks from sensitive features where necessary;

- 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 MNR operational statements, 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 operations, excess water from the PSMF will be discharged to Hare Lake. MRSA drainage will ultimately report to the Pic River. Potential impacts to water quality in Hare Lake (and areas downstream) and the Pic River can be mitigated by ensuring discharge meets applicable standards. Modelling of project-related discharge to these receiving waters predicts no adverse effects on water quality or aquatic biota.

To the extent possible natural surface water drainage patterns will be restored after mine closure. The PSMF will be reclaimed (covered and re-vegetated) and surface water features re-created to restore the natural drainage patterns in the Stream 6 subwatershed. Following closure, it is expected that surface water draining the reclaimed PSMF area will be of similar quality to background conditions across the Project site. 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. 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:

- 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 MNR operational statements, 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 Serious Harm to Fish after Implementation of Avoidance and Mitigation Standards

6.3.1 Direct Footprint-related Effects

The Project footprint will not affect any water bodies or watercourses that contain fish that are part of or support a commercial, recreational or Aboriginal fishery and therefore no offset is required under Subsection 35(2) of the *Fisheries Act* in that regard. Although some mine infrastructure such as the open pits will alter surface water features, these features do not contain or support a fishery as defined in the *Act* – in this instance no offset is required.

However, watercourses within subwatersheds 2, 3, and 6 that are frequented by fish, although not fish that are part of, or supportive of a fishery, will be directly affected by the footprint of the Project. Portions of fish frequented water courses within these subwatersheds fall within the proposed conceptual boundaries of the MSRA, PSMF and Temporary Type 2 Mine Rock Storage Areas – that is, areas that will be used to store unprocessed rock excavated from a pit (mine rock) or the portion of the ore body that is processed in the mill that is not concentrate (process solids). Under the *Fisheries Act* these water courses and/or water bodies (or the portions thereof) that fall within the boundaries of "tailings impoundment area" must be added to Schedule 2 of the *MMER*. 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 description of each of the areas within Subwatersheds 2, 3 and 6 that are frequented by fish and require compensation under *MMER* Section 27.1 is provided in Table 6.1. The information is organized on a mine component basis. These areas are shown in Figure 6.1. The specific locations (latitude and longitude), stream lengths and descriptions of the sections of water courses that are proposed for inclusion on MMER Schedule 2 based on the analysis of potential effects provided in Appendix 2.

Table 6.1: Direct Interactions between Major Mine Components and Project Site Subwatersheds for the Stillwater Canada Inc. Marathon PGM-Cu Project

Mine Component	Name	Area	Description	Nature of effect	Offset/Compensation requirement
MRSA	Main stem Stream 3 below confluence of L16 outlet stream and L13A outlet stream to Pic River	0.075 ha (500 m long * 1.5 m wide)	Main stem of Stream 3 includes cold water fish species. This portion of Stream 3 provides 7.5 HU of 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.	Section 27.1 of the MMER.
	Main stem of Stream 2	0.21 ha (1,370 m long * 1.5 m wide)	Main stem of Stream 2 includes cold water fish species. This portion of Stream 2 provides 21 HU of 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.	Section 27.1 of the MMER.
PSMF	Stream 6 (main channel between headwater and east side of PSMF)	0.84 ha (1,200 m long * 2 m wide, plus ponded areas of 0.6 ha)	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.	Section 27.1 of the MMER.
	L26 outlet stream (tributary of Stream 6)	0.15 ha (440 m long * 3.4 m wide)	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 15 HU of Class 3^3 salmonid habitat.	This portion of the outlet stream of L26 is in the footprint of the PSMF	Section 27.1 of the MMER.
Temporary Type 2 Rock Storage Areas	Stream 2 main stem (portion)	0.07 ha (350 m long * 2 m wide)	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 7 HU of Class 3^3 salmonid habitat.	This portion of the Stream 2 channel will be in the footprint of the storage pile	Section 27.1 of the MMER

- [1] Channel widths are given as the average 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.

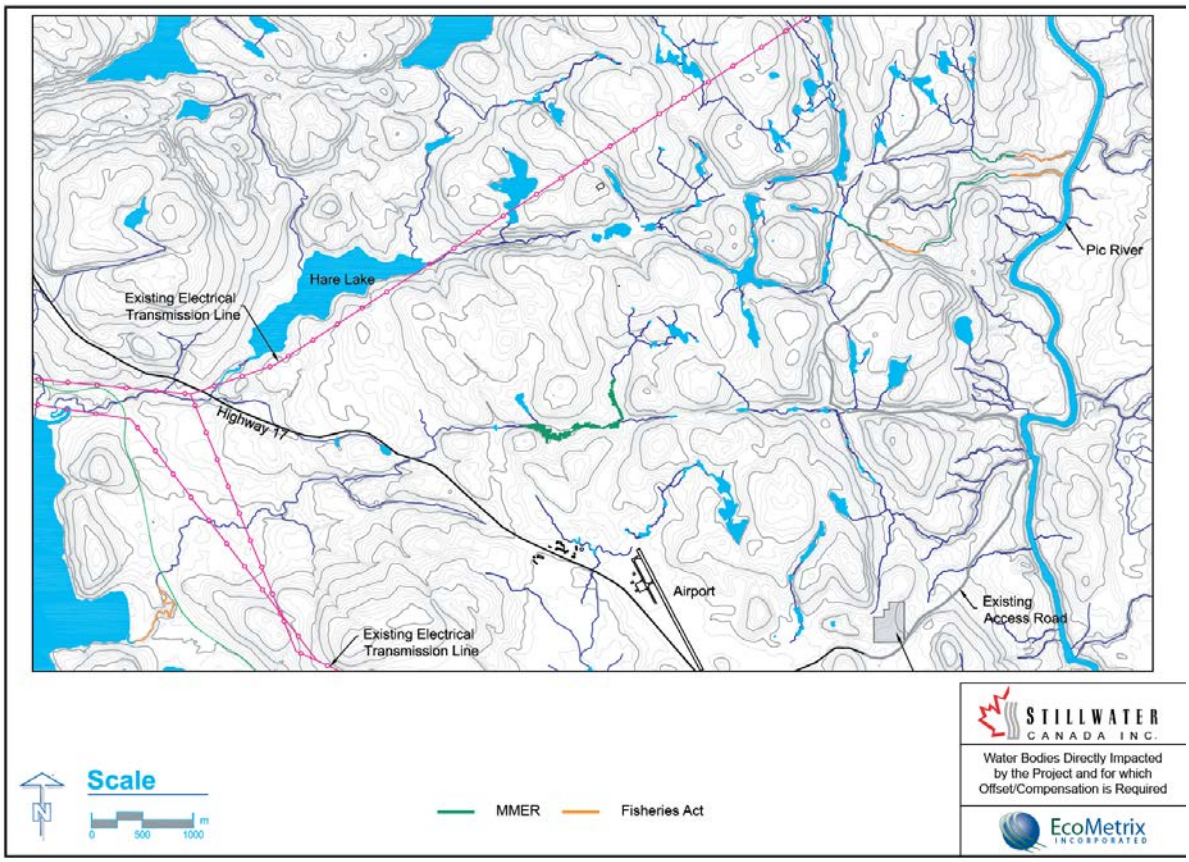

Figure 6.1: Map of the Project site depicting water bodies and water courses that will be directly impacted by the Project and for which offset/compensation is required

6.3.2 Indirect Effects

The re-direction of surface water features required for water management within the Project site during operations will indirectly affect the lower reaches of Streams 2, 3 and 6 (see Figure 6.1). There is no recreational fishery in the Stream 2 or 3 subwatersheds, though these tributaries do provide some nursery habitat for migratory salmonids. As such, the lower reaches of both Streams 2 and 3 contain fish that support a recreational and Aboriginal fishery in the Pic River and therefore impacts to these watercourses will require offsetting under Subsection 35(2) of the *Fisheries Act*. A limited recreational fishery for Rainbow Trout (Steelhead) occurs in the lower reach of Stream 6 below the bedrock cascade falls, as fish can migrate into the stream during high freshet flows. 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*.

A summary of the nature of the indirect effects in subwatersheds 2, 3 and 6 is as follows:

- Pic River tributary Streams 2 and 3 will experience reduced flows during mine operation as the water draining the MRSA in these watersheds will be collected. Following mine closure, natural drainage patterns will be restored to these streams when it has been demonstrated that water quality is sufficient to support biota; and,

- Stream 6 (Angler Creek) will experience reduced flows during mine operation as the water from the upper part of the watershed, in which the PSMF is located, will be diverted. Natural drainage patterns and flow will be restored after mine closure.

Together Streams 2 and 3 comprise approximately 0.1% of the total Pic River watershed drainage area. Stream 3 in particular often runs dry during annual low flow periods. The lower reaches of both Streams 2 and 3 (see Figure 6.1) will be affected by the reduced flows during the mine operating period. Water draining the MRSA in the upper portions of these watersheds will be collected during mine operation. A reduction in watershed area as a result of construction of the Project will reduce flows in both Streams 2 and 3 such that the habitat in the lower reaches (approximately 0.27 ha) will be lost during operations. The lower reach of Stream 2 provides approximately 15.4 and 1.6 Habitat Units (HU)[3] of Class 2[4]and 3 salmonid habitat respectively. The lower reach of Stream 3 provides approximately 10.3 HU of Class 2 salmonid habitat.

The recreational Steelhead fishery in the lower reach of the Stream 6 subwatershed (see Figure 6.1) will be affected as a result of reduced flows during the mine operating period. The upper portion of the Stream 6 subwatershed will be diverted via the PSMF to Hare Lake during operations, effectively reducing the Stream 6 subwatershed by 50%. It is assumed that this level of reduction in watershed area will reduce flows in Stream 6 such that the habitat in the lower reach of Stream 6 (approximately 0.76 ha) will be lost once flow diversion begins. Though flows will be restored after mine closure it will take additional time for this restored habitat to be utilized. The lower reach of Stream 6 provides approximately 5, 44 and 27 HU of Class 1, 2 and 3 salmonid habitat, respectively.

6.3.3 Summary of Direct and Indirect Effects

The Project will result in a residual impact to approximately 1.03 ha of habitat that contain fish that are and/or support a recreational or Aboriginal fishery and will need to be offset under Subsection 35(2) of the *Fisheries Act*. An additional 1.35 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, MRSA and temporary mine rock stockpiles. As indicated above the location of habitat that requires offsetting/compensation under the *Fisheries Act* and the *MMER* is presented in Figure 6.1.

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[3] Habitat unit = 100 m^2. Habitat units were calculated using the length of stream that will be affected multiplied by the average stream width over that reach for each habitat class identified.
[4] Class 1 = spawning, rearing, migrating; Class 2 = limited spawning, rearing, migrating; Class 3 = limited rearing, migrating.

Table 6.2 provides a summary of the amount of habitat by subwatershed that will be residually impacted (directly and indirectly) by the Project.

Table 6.2: Summary of Habitat Directly and Indirectly Affected by the Stillwater Canada Inc. Marathon PGM-Cu Project Requiring Offset/Compensation under the *Fisheries Act* or MMER

Watershed	Stream Habitat (ha) Offset/Compensation Required under *Fisheries Act* or *MMER*	
	Direct Impacts	Indirect Impacts
Stream 2	0.28	0.17
Stream 3	0.075	0.096
Stream 6	0.990	0.76
Total	**1.35**	**1.03**

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 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 (Section 6.3.2) and habitat gained through offset/compensation opportunities (Section 7.2.2), habitat units (i.e., 1 habitat unit = 100 m^2) have been used. The design of this FHOFCP takes into account the goals of DFO's (2013) Fisheries Protection Policy Statement, as well as the guiding principles articulated in Section 3.2.1 above and considerations of the requirements of MMER 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 and MNR 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 MMER 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 PGM-Cu 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 SCI'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.

Fisheries Protection Policy Statement

The FHOFCP maintains (and in fact increases) the productivity of the recreational and Aboriginal fisheries 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, Fishery Use, 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 migrating salmonids.

FN Traditional Use

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 FN 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.

Use of the Area for Fishing

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.

***Species at Risk Act* (SARA) Listed Species**

No freshwater fish species on Schedules 1 or 2 of *SARA* are present on the Project site. Therefore no *SARA* listed species or their habitat will be directly affected by the Project. Lake Sturgeon are known to utilize the Pic River during spawning migration, and foraging habitat is reported downstream (Ecclestone, 2012). The Great Lakes - Upper St. Lawrence population of Lake Sturgeon is designated as *Threatened* by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2013). 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

Total proposed habitat gains 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.

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 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.

Success should be Measurable

Offset/compensation opportunities under consideration provide a meaningful opportunity to provide a positive, measurable and meaningful contribution to local recreational and Aboriginal fisheries. 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. 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:
    - Fish passage barrier removal near the Stream 1 – Pic River confluence;
    - Stabilization of the bank of the Pic River near Stream 1;
    - Fish passage improvement and habitat enhancements in Hare Creek;
    - Fish habitat enhancement at the Harvey Creek-Aguasabon River confluence, west of the Project near Terrace Bay;
    - Re-establishment of a self-sustaining Lake Trout population in Hare Lake; and,
    - 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 flow and habitat enhancement in Streams 2 and 3; and,
    - Naturalization of drainage channels within the Site and Local Study Areas

Each of the opportunities listed above is described below.

7.2.2 Independent FHOFCP Opportunities

7.2.2.1 Camp 19 Road Crossing Replacement

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.

Replacement of the perched culvert would result in increasing access to approximately 47.5 HU of Class 2 salmonid habitat for migratory species.

7.2.2.2 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.

7.2.2.3 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 182.7 HU (17.2 Class 1, 70.1 Class 2 and 95.4 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%). In addition Hare Lake and its upstream tributaries do not provide additional habitat for migratory salmonids. It is believed that together these works would increase cold water fish production in Hare Creek in a meaningful way.

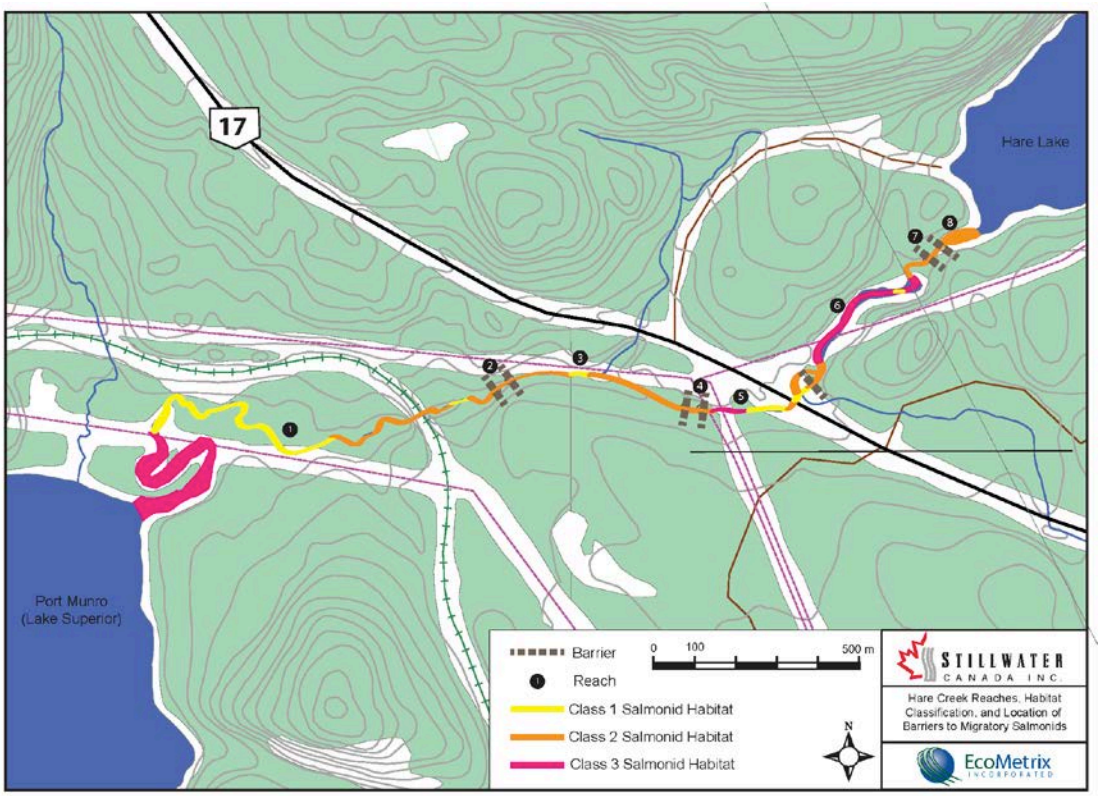

Figure 7.1: Hare Creek Reaches, Habitat Classification and Location of Barriers to Migratory Salmonids

7.2.2.4 Fish 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.

7.2.2.5 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.

7.2.2.6 Re-establishment of Lake Trout in Hare Lake

It has been suggested by the Ontario MNR that the re-introduction of Lake Trout to Hare Lake may be a potential suitable offset/compensation opportunity. Though Hare Lake does not currently support a Lake Trout population, it reportedly did at one time and the presence

of cold water species in the lake (dwarf Cisco, Burbot) suggest that appropriate habitat is available.

The introduction of Lake Trout would include the stocking of juvenile fish. Considerable study would be required prior to initiating such an undertaking. A clear understanding would have to be developed as to what the limiting factors associated with the establishment of a self-sustaining Lake Trout population are and whether it is necessary or feasible to mitigate these limiting factors.

7.2.3 Reclamation FHOFCP Opportunities

7.2.3.1 Stream 2 and 3 Watersheds

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.

7.2.3.2 Stream 6 Watershed

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.

7.2.3.3 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 (2013) *Fisheries Protection Policy Statement*, SCI'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 Options	SCI's Principles			Recommended	Rational for Recommendation
	1	2	3		
Fish Passage Barrier Removal on Stream 1	✓	✓	✓	Yes	Offsets losses in Strteams 2 and 3 which support similar fish communities
Bank Stabilization on Pic River	✓	✓	×	No	Does not directly benefit impacted fish communities and difficult to measure benefits
Fish Passage Improvement on Hare Creek	✓	✓	✓	Yes	Offsets losses in Stream 6 which supports similar fish communities, has a high probability of success and benefits are measurable
Fish Habitat Enhancement on Harvey Creek	×	✓	✓	Yes	Fits with Fisheries Management Objectives
Re-establishment of Lake Trout in Hare Lake	✓	✓	×	No	High level of uncertainty and low probability of success
Fish Passage Improvement on Camp 14 Creek	×	✓	✓	No	Fish passage barrier removal on Stream 1 provides the same benefits but is located within the project area

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:

- Fish passage barrier removal near the Stream 1 – Pic River confluence;
- Fish passage improvement and habitat enhancements in Hare Creek; and
- Fish habitat enhancement at the Harvey Creek-Aguasabon River confluence, west of the Project near Terrace Bay.

In addition, the reclamation-related activities identified above will also be implemented, specifically:

- Stream 2 and Stream 3 reclamation;
- Stream 6 reclamation; and,
- On site drainage naturalization.

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 MNR 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 MNR 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 $0.75 to $1.5 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

SCI 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 SCI 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 Aboriginal peoples. The Hare Creek opportunity in particular we believe is very significant and compelling in terms of benefits.

8.0 REFERENCES

COSEWIC. 2013. Canadian species at risk. Committee on the Status of Endangered Wildlife in Canada. Gatineau, Quebec. May 2013. iii + 105 pp

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Fisheries and Oceans Canada (DFO), 2013. Fisheries Protection Policy Statement accessed at http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html on November 25, 2013.

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APPENDIX 1 - Application Form for Paragraph 35(2) (b) *Fisheries Act* Authorization (Normal Circumstances)

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

Application Form for Paragraph 35(2)(*b*) *Fisheries Act* Authorization (Normal Circumstances)

I, the undersigned, hereby request authorization to carry on a work, undertaking or activity which will result in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. I understand that the *Fisheries Act* Authorization, if granted, is only from the standpoint of the Minister of Fisheries and Oceans and does not release me from my obligation to obtain permission from other concerned regulatory agencies.

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

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)
Letter of Credit			

Description of Proposed work, undertaking or activity			
Project engineering specifications, scale drawings and dimensional drawings (for physical works)			
Timeline information			
Location information			
Description of Fish and Fish Habitat (Aquatic Environment)			
Description of Effects on Fish and Fish Habitat			
Description of Measures and Standards to Avoid or Mitigate Serious Harm to Fish			
Description of the Residual Serious Harm to Fish			
Offsetting Plan			

3. Public and Aboriginal Engagement

Have you engaged the public or Aboriginal group(s) who may be affected by your proposed work, undertaking or activity?

○ Yes ○ No

If yes, provide details including the groups engaged, type of engagement, dates, outcomes, etc.

If providing (attaching) supporting documentation to describe your engagement activities (e.g., meeting log, summary of meetings, etc.), include the title of each document.

4. 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 a Paragraph 35(2)(b) *Fisheries Act* Authorization.

Applicant's signature (and corporate seal): _____

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 Fisheries 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.

APPENDIX 2 - Description of MMER Schedule 2 Requirements associated with the Project

Description of water courses (sections therein) that will require approval under MMER S. 27.1 and addtion to MMER Schedule 2

Mine Component	Subwatershed	Name	Start		End		Length (m)	Average Width (m)	Area (ha)	Propsosed Description for MMER Schedule 2
			Latitude	Longitude	Latitude	Longitude				
MSRA	2	A portion of an unnamed tributary of the Pic River	48°47'42.13"N	86°18'1.22"W	48°47'18.43"N	86°18'42.21"W	1400	1.5	0.21	A portion of an unnamed tributary stream to the Pic River, Ontario. More precisely, an area extending from 48°47'42.13" north latitude, 86°18'1.22" west longitude for a distance of 1,400 m to 48°47'18.43" north latitude, 86°18'42.21" west latitude.
Temporary Type 2 Rock	2	A portion of an unnamed tributary of the Pic River	48°47'22.05"N	86°18'59.17"W	48°47'26.93"N	86°19'13.11"W	350	2	0.07	A portion of an unnamed tributary stream to the Pic River, Ontario. More precisely, an area extending from 48°47'22.05" north latitude, 86°18'59.17" west longitude for a distance of 350 m to 48°47'26.93" north latitude, 86°19'13.11" west latitude.
MSRA	3	A portion of an unnamed tributary of the Pic River	48°47'50.08"N	86°17'58.14"W	48°47'51.87"N	86°18'17.58"W	500	1.5	0.075	A portion of an unnamed tributary stream to the Pic River, Ontario. More precisely, an area extending from 48°47'50.08" north latitude, 86°17'58.14" west longitude for a distance of 500 m to 48°47'51.87" north latitude, 86°18'17.58" west latitude.
PSMF	6	A portion of an unnamed tributary of Lake Superior	48°46'24.85"N	86°21'52.51"W	48°46'26.62"N	86°21'7.92"W	1200	7	0.84	A portion of an unnamed tributary stream to Lake Superior, Ontario. More precisely, an area extending from 48°46'24.85" north latitude, 86°21'52.51" west longitude for a distance of 1,200 m to 48°46'26.62" north latitude, 86°21'7.92" west latitude.
PSMF	6	A portion of an unnamed tributary of Lake Superior	48°46'26.62"N	86°21'7.92"W	48°46'38.16"N	86°21'11.22"W	440	3.4	0.15	A portion of an unnamed tributary stream to Lake Superior, Ontario. More precisely, an area extending from 48°46'26.62" north latitude, 86°21'7.92" west longitude for a distance of 440 m to 48°46'38.16" north latitude, 86°21'11.22" west latitude.