

**HARDROCK PROJECT
Final Environmental Impact
Statement / Environmental
Assessment**

Chapter 16.0:
Assessment of Potential
Environmental Effects on Land
and Resource Use

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16.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS ON LAND AND RESOURCE USE

Land and resource use includes activities and associated infrastructure related to the use of land and resources (including waterways) for recreational, commercial, and navigation purposes. Land and resource use is included as a valued component (VC) for assessment because of its contribution to the quality of life and the livelihoods of local stakeholders.

Land and resource use activities are as follows:

- recreation
 - recreational hunting
 - recreational fishing
 - use of trails for snowmobiling and/or hiking
 - camping
 - boating/canoeing
- commercial
 - trapping
 - guide outfitting
 - bait harvesting
 - forestry
 - mining and aggregate extraction
- navigation

The assessment of environmental effects on land and resource use is informed by the conclusions of the environmental effects assessment for the following VCs:

- atmospheric environment (Chapter 7.0) – Project-related activities may result in an increase in dust and lighting which may cause a disturbance to land and resource users
- acoustic environment (Chapter 8.0) – Project-related activities may result in an increase in sound and vibration levels which may cause a disturbance to land and resource users
- surface water (Chapter 10.0) – due to importance of water quantity to navigation and water-based activities

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- fish and fish habitat (Chapter 11.0) – due to the linkages with recreational fishing, guide outfitting and bait harvesting
- vegetation communities (Chapter 12.0) – due to the removal or alteration of vegetation communities supporting plant based resource activities (i.e., forestry)
- wildlife and wildlife habitat (Chapter 13.0) – due to the linkages with hunting, trapping and guide outfitting
- traditional land and resource use (Chapter 18.0) - due to linkages with shared use of the land
- human and ecological health (Chapter 19.0) – due to linkages with human health through direct consumption of vegetation, fish and wildlife gathered, hunted or caught during recreational or commercially-based land and resource use.

16.1 SCOPE OF ASSESSMENT

Given the potential for overlap in the assessment of effects by labour and economy, community services and infrastructure, and traditional land and resource use (TLRU), the following effects are scoped to be assessed by the VCs listed below:

- Effects on tourism and forestry are discussed under land and resource use as well as in Chapter 14.0 (labour and economy VC). Whereas the assessment of land and resource use considers potential effects on tenures and areas used for forestry management as well as recreational areas and guide outfitting, the assessment of labour and economy considers the potential economic effects on these sectors.
- While recreational uses are discussed under land and resource use, the effects on recreational facilities and associated infrastructure within the Municipality of Greenstone, including sport facilities, community centres, the Kenogamisis Golf Club, municipal parks, and visitor centres, are assessed in Chapter 15.0 (community services and infrastructure VC).
- Land and resource use by Aboriginal communities for traditional purposes is outside the scope of the land and resource use VC. It is discussed in Chapter 18.0 (TLRU VC).
- Where applicable, reference is made to these other chapters.

16.1.1 Regulatory and Policy Setting

16.1.1.1 Environmental Impact Statement Guidelines and Terms of Reference Requirements

The environmental effects assessment for land and resource use has been prepared in accordance with the requirements of the federal Environmental Impact Statement (EIS) Guidelines (Appendix A1) and provincial Terms of Reference (ToR) (Appendix A2). Concordance tables, indicating where EIS Guidelines and ToR requirements have been addressed, are provided in Appendix B.

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16.1.1.2 Federal

Navigation

Potential effects of Project activities on navigation are subject to the Common Law right to navigation. In addition, the *Navigation Protection Act* (NPA), administered by Transport Canada, applies to the construction of works that affect the navigability of waters. Approval from the Minister of Transport is required for construction of any structure in, over, under or through navigable water (e.g., a bridge, boom, pipeline, outfall, diffuser or dam) that would interfere with navigation.

16.1.1.3 Provincial and Local

The activities considered in this assessment are undertaken within the regulatory and legal framework governing both recreational and commercial fish and wildlife harvesting (e.g., *Fish and Wildlife Conservation Act* and *Fisheries Act*), and use of Crown land and resources (e.g., *Public Lands Act*; *Crown Forest Sustainability Act*; *Crown Timber Act*; *Mining Act*; *Aggregate Resources Act*).

The Project and its potential effects overlap a number of local jurisdictions and management units within the regional assessment area (RAA), including:

- Municipality of Greenstone
- Thunder Bay North District Unorganized Area
- MacLeod Provincial Park
- Thunder Bay North Mining District
- Kenogami and Lake Nipigon Forest Management Units (FMUs)
- Wildlife Management Units (WMUs) (19 and 21A)
- Bear Management Areas (BMAs) (Table 16-4)
- Registered Trapline Areas (Table 16-5)
- Registered Bait Harvesting Areas (Table 16-6)
- Fisheries Management Zone (FMZ) 7

Local land and resource management plans and policies associated with these administrative areas also contribute to the framework for assessing the compatibility between land and resource use types. Examples of such plans and policies include the General Use Area G2697 Land Use Policy, Municipality of Greenstone Official Plan (Tunnock Consulting Ltd. 2010), MacLeod Provincial Park Management Plan (1987) and Kenogami Forest Management Plan (Terrace Bay Pulp 2011b).

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16.1.2 Influence of Consultation on the Identification of Issues and the Assessment Process

Consultation has been ongoing prior to and throughout the environmental assessment (EA) process, and will continue with government agencies, local Aboriginal communities, and stakeholders through the life of the Project. Chapter 3.0 (community and stakeholder consultation) provides more detail on the consultation process covering open houses, site visits, targeted meetings, newsletters, questionnaires, presentations, and capacity funding for technical reviews and community-based studies among other areas. The Record of Consultation (RoC; Appendix C) includes detailed comments received during the development of the Draft Environmental Impact Statement/Environmental Assessment (EIS/EA). As part of information sharing throughout the consultation process, Project-related information was provided by Aboriginal communities in the form of traditional knowledge (TK) and TLRU studies and other forms of information sharing. This information was considered in the environmental effects assessment as described in Section 16.4.

Consultation feedback related to land and resource use has been addressed through direct responses (in writing and follow-up meetings), updates to baseline information, and in the Final EIS/EA, as appropriate. An overview of the key comments that influenced the land and resource use effects assessment between the Draft and Final EIS/EA is provided below.

MacLeod Provincial Park and Park Users

The Ministry of Natural Resources and Forestry (MNRF) and the Ministry of the Environment and Climate Change (MOECC) requested additional information be included in the Final EIS/EA to assess potential effects on MacLeod Provincial Park.

In response, Greenstone Gold Mines GP Inc. (GGM) conducted a survey of MacLeod Provincial Park users consisting of a Project overview and 15 questions to determine:

- why MacLeod Provincial Park was chosen as a destination
- length of a typical stay
- planned activities and location
- existing visual, traffic and acoustic environment
- awareness of the Project and request for comments.

GGM received 24 completed surveys. A detailed description of the survey and summary of responses is included in Section 16.2.2.8. Information from the survey was used to assist in the identification and qualification of potential effects on Park users in Section 16.4.2.

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In addition to the surveys, two of the vantage points were specifically selected to evaluate the potential changes to the viewscape for Park users. From the entrance to the Park on Highway 11, looking west toward the Project, the image (in Visual Simulations; Appendix N) illustrates the existing, active closure and post-closure conditions. A second vantage point from Kenogamis Lake looking west toward the Project also illustrates the existing, active closure and post-closure conditions.

Information from the atmospheric environment and acoustic environment VCs (Chapters 7.0 and 8.0, respectively) was carried forward to Section 16.4.2 to evaluate the potential for noise, concentrations of particulate matter, criteria air contaminants and other parameters of potential concern, and light trespass to affect users of MacLeod Provincial Park.

Results of the MacLeod Provincial Park visitor survey indicated that 92 percent (%) of respondents were aware of the Project. Respondents were asked the following three questions related to the Project:

- Do you foresee any impacts on your enjoyment of the park should the Hardrock Mine proceed?
- If you foresee impacts do you have any suggestions on how to avoid or minimize those impacts?
- Do you have any additional comments?

Complete responses are provided in the RoC (Appendix C9). Overall, key comments from the survey are summarized below:

- increased noise, dust and changes in viewscape from the Project affecting visitor experience at the Park
- overuse or lack of use of the Park
- changes to water quality for drinking, swimming, boating and fishing
- increased traffic along Highway 11
- beneficial for the Greenstone economy.

GGM prepared a visual simulation showing the Project progression through construction, operation and closure phases, with four specific vantage points established to assess changes in viewscape (Visual Simulations; Appendix N). The visual simulation is referred to in the effects assessment (Section 16.4.2).

Information regarding the potential atmospheric effects on MacLeod Provincial Park was included in the "Technical Data Report – Hardrock Project: Atmospheric Environment" (Atmospheric Environment TDR; Appendix F1) as a result of consultation input. The Project's effect on ambient lighting is predicted to be below the relevant International Commission on

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Illumination (CIE) Guideline levels at all the assessed receptors, including MacLeod Provincial Park (Section 16.4.2). The waste rock storage areas (WRSAs) will act as a barrier to light from the process plant and mobile equipment. Forested areas are also predicted to reduce the effect of process plant lighting and lights from mobile equipment. The maximum predicted Project alone concentrations of all parameters of potential concern were below applicable criteria for all MacLeod Provincial Park receptors for both Mill Phases 1 and 2 of the Project (Section 16.4.2). Particulate matter (dust) emissions are predicted to meet regulated requirements for all Project phases at MacLeod Provincial Park.

Predicted increases in Project-related noise and vibration will comply with applicable regulations at all points of reception including the points of interest located within MacLeod Provincial Park (Section 16.4.2).

Changes in Viewscape

GGM presented visual simulation video during consultation on the Draft EIS/EA as well as an updated video to address Project refinements for the Final EIS/EA, to illustrate changes in the viewscape as a result of the Project, and to consider changes in viewscape on recreational activities on Kenogamisis Lake. The MNRF and the Canadian Environmental Assessment Agency (CEA Agency) requested clarification on how this would be incorporated into the Final EIS/EA. To clarify how and where this information was incorporated, a new section was added to the Existing Conditions section (Section 16.2.2.7) to provide a description of current conditions within the Project development area (PDA). For the effects assessment, changes to the viewscape were considered as part of sensory disturbance to recreational and commercial users. A visual simulation was prepared showing the Project progression through construction, operation and closure phases, with four specific vantage points established to assess changes in viewscape (Visual Simulations; Appendix N). The visual simulation is referred to in the effects assessment (Sections 16.4.2 and 16.4.3).

Commercial Licence Holders

The MNRF requested additional information related to GGM's discussions with commercial land and resource use licence holders be included in the Final EIS/EA, specifically discussions with trapline and baitfish licence holders. Aroland First Nation (AFN) and stakeholders also provided comments regarding potential effects on commercial trapline licences.

In response, GGM met with a number of licence holders (i.e., trapline, baitfish and BMA licence holders) to discuss and to receive feedback on the Project. The following feedback was received:

- Representatives of Timberwolf Camps, licence holder for BMA GE-19-023, did not identify concerns with the Project and did not foresee access constraints for its BMA due to the Project.

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- The operators of Kenogamisis Lake Resort noted the following:
 - The operators do not anticipate issues with accessing their BMA (GE-21A-027).
 - Existing fishing in Kenogamisis Lake is a concern due to already elevated arsenic levels. Future fishing is a concern as a result of disturbance of historical tailings.
 - Disturbance of historical tailings may result affect water quality.
 - The clientele come to the resort for quiet and beauty of surroundings. Existing clientele have already commented on the potential change in view/sunsets and the possible effects on water and dust.
 - Part of the BMA will be lost as a result of the Project.
 - Expressed the need for economic development like the Project for the community but still concerned about the effects on their business and future opportunities for sale of the business.
- Gathering Lake Outfitters, licence holders for BMA GE-021A-032 and NG-21A-009, noted that a reduction in the size of the BMA reflects the number of bait areas permitted which can affect the bear quota.
- The owners of Wildlife Goose Lake Resort, licence holders for BMAs GE-21A-026 and GE-19-039 identified and commented on the following topics:
 - Changes to access and local fish populations.
 - Considering the nomadic lifestyle of bears, their BMA may be affected as a result of the Project.
 - Potential for changes to the fish populations as a result of changes in water quality from the tailings management facility (TMF).
- The licence holder for trapline area GE021 questioned if access will be granted to the trapline once the Project is operational. GGM will provide the licence holder with further details related to access and trapping once a production decision is made.
- The licence holder for trapline areas GE065 and GE022 provided the following comments:
 - With the closure of Lahtis Road, the trapper advised that they will require new access. Lahtis Road will be closed during construction and operation due to safety reasons. At closure, Lahtis Road is anticipated to be re-opened to the Goldfield Creek diversion. GGM is committed to maintaining alternate access within the PDA to the Southwest Arm of Kenogamisis Lake during construction and operation.
 - The trapper uses Half Way Road off of Goldfield Road to access GE065; however, this road is not open in the winter.
- The license holder for bait harvest area NI5035 does not anticipate issues as a result of the Project, assuming good access remains and there are no changes to fish spawning.

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- The licence holder for bait harvest areas NI5027, NI5028, NI5029, NI5036, NI5050 and NI5054 indicated there are no issues with access, and further stated that having a locked gate is very helpful as it reduces the number of bait trap thefts.

Additional information provided by the licence holders has been incorporated into Sections 16.2.2.3, 16.2.2.4 and 16.2.2.5. The effects assessment for commercially-based land and resource use is provided in Section 16.4.3. Mitigation measures and commitments aligning with the comments received from licence holders are provided in Section 16.4.3.2.

The Project will result in the loss of area associated with some licenced areas (i.e., trapline, baitfish and BMA licence holders), loss or change of access, and the potential for a change in the availability of wildlife resources. GGM has and will continue to work with affected licence holders to discuss and resolve the effects on their individual licenced areas.

The MNRF and CEA Agency identified commercial trapline areas held by Aboriginal peoples. These include GE021, GE023, GE034, GE035, GE008, GE009, GE120, NG089 which are located within and beyond the RAA. GGM has confirmed, as part of consultation activities, that GE021 is held by a member of Animiigoo Zaagi'igan Anishinaabek (AZA) and GE009, GE023 and GE034 are held by members of Long Lake #58 First Nation (LLFN).

Pic Moberg First Nation identified that they have a trapline on Caramat Road. Caramat Road falls outside of the RAA. Given the location of the commercial trapline (i.e., outside of the boundaries applied for the assessment of potential environmental effects on land and resource use), this trapline was not considered in the assessment.

The CEA Agency identified commercial baitfish licence areas held by Aboriginal peoples. These include NI5007, NI5013, NI5019, NI5020, NI5034, NI5035, and NI5055.

Existing Land and Resource Use

The MNRF, the Ministry of Tourism, Culture and Sport (MTCS), Environment Canada and Climate Change (ECCC), Bingwi Neyaashi Anishinaabek, stakeholders, the CEA Agency, and Ginoogaming First Nation (GFN) requested additional baseline information be added to the chapter to provide a better understanding of existing land and resource use. AFN confirmed they use snowmobile trails along Highway 11 and Lahtis Road.

In response, GGM undertook further consultation with MacLeod Provincial Park users, Ne-Daa-Kii-Me-Naan Inc., Greenstone Snowmobile Club, commercial licence holders (including Aboriginal commercial licence holders) and guide outfitters, in the form of meetings and surveys. The information obtained through this consultation process informed the understanding of what land use is like today and aligned with the potential Project interactions considered in Sections 16.4.2 and 16.4.3. Change in access to harvesting areas as a result of snowmobile trail use is addressed in Chapter 18.0 (TLRU VC) of the Final EIS/EA. The Geraldton Snowmobile Club has confirmed that the snowmobile trail along Lahtis Road is no longer maintained.

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Forestry

The MNRF requested additional information regarding how approved Forest Management Plans were considered in the assessment.

In response, GGM undertook consultation with the MNRF and Ne-Daa-Kii-Me-Naan Inc., the enhanced Forest Resource Licence (eFRL) holder, to discuss potential implications to the eFRL as a result of timber removal in the PDA. The assessment for forestry in Section 16.4.3 was updated to reflect the discussions held with MNRF and Ne-Daa-Kii-Me-Naan Inc. GGM will obtain the appropriate licences and authorizations required to remove timber and will work with Ne-Daa-Kii-Me-Naan Inc. to obtain an Overlapping Agreement for timber removal within the PDA. With regard to timber harvesting, GGM will discuss with the MNRF and Ne-Daa-Kii-Me-Naan Inc. the establishment of a forested buffer along the alignment of the Goldfield Creek diversion to the Southwest Arm Tributary and wetland B136.

Land Tenure and Access Restrictions

AFN, CEA Agency, GFN, LLFN, Métis Nation of Ontario (MNO) and stakeholders requested clarification on access restrictions to the PDA. LLFN and MNO confirmed that they currently use Lahtis Road for hunting, recreation and access to the Southwest Arm of Kenogamisis Lake for fishing.

Clarification regarding access is provided in Section 16.4.2 and 16.4.3. Lahtis Road will be closed during construction and operation due to safety reasons. At closure, Lahtis Road is anticipated to be re-opened to the Goldfield Creek diversion. GGM is committed to maintaining alternate access within the PDA to the Southwest Arm of Kenogamisis Lake during construction and operation.

A baitfish licence holder also requested clarification if access would be maintained to Mosher Lake. Based on the layout of the PDA, access to areas of Mosher Lake used for bait harvesting and trapping are being maintained.

MNRF requested clarification on land tenure for the aggregate sources. In response, additional information was added to Section 16.2.2.9 to identify the existing conditions for aggregate resources.

16.1.3 Consideration of Aboriginal Information and Traditional Knowledge

GGM understands the importance of land and resource use to Aboriginal communities through information sharing during the consultation process (Chapter 3.0). Project-specific TK and TLRU studies (Appendix J) have been considered in Project planning including, baseline studies, alternatives, assessment approach, mitigation and monitoring where appropriate. However, only non-confidential TK and TLRU information is presented in the Final EIS/EA, where applicable to the Project, to respect the preferences of Aboriginal communities. An overview of the key Aboriginal information that influenced the land and resource use effects assessment between the Draft and Final EIS/EA is summarized below.

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Information provided in the Project-specific TK studies from AFN, Eabametoong First Nation, GFN, LLFN, MNO and Pays Plat First Nation as well as information obtained through secondary sources and the consultation process has been used to verify and enhance the baseline conditions including access to TLRU areas via Lahtis Road and a travelway used by Pays Plat First Nation (i.e., “there is a canoe route that goes from Pays Plat First Nation to Dickison Lake and eventually to Geraldton”). In particular, additional information has been included on the commercial trapping licences held by Aboriginal community members (Section 16.2.2.3) as well as the forestry management company Ne-Daa-Kii-me-Naan Inc. that provides forest management services in the Kenogami Forest (Ne-Daa-Kii-me-Naan Inc. 2015). Aboriginal communities noted that increase in the development-related regional population may lead to an increase in non-Aboriginal recreational users of the area and increased pressure on resources. Changes to regional population and pressure on services and are discussed in Chapters 14.0 (labour and economy VC) and 15.0 (community services and infrastructure VC). Changes in resource use are discussed in this chapter and changes in TLRU is discussed further in Chapter 18.0.

16.1.4 Selection of Potential Environmental Effects and Measurable Parameters

Table 16-1 summarizes the potential environmental effects of the Project on land and resource use, the measurable parameters, and the rationale for their selection. These potential environmental effects and measurable parameters are selected based on professional judgment, recent EAs for mining projects in Ontario, and comments provided during consultation.

Table 16-1: Potential Environmental Effects and Measurable Parameters for Land and Resource Use

Potential Effect	Measurable Parameter(s) and Units of Measurement	Notes or Rationale for Selection of the Measurable Parameter
Change in recreational land and resource use	<ul style="list-style-type: none"> change in areas of recreational use that would be restricted or lost (hectares [ha]) change in length of recreational trails that would be restricted or lost (kilometres [km]) change in access to recreational land and resource use areas change in the availability of fish and wildlife resources sensory disturbance to users including changes to visual setting 	<ul style="list-style-type: none"> The Project overlaps areas used for recreational harvesting activities (e.g., fishing, hunting), recreational trails (e.g., hiking, snowmobiling), and recreational features on Crown land, that may be restricted or lost due to the Project. Access to recreational areas may be restricted or altered by the Project. Effects on fish and wildlife and their habitats have the potential to change the availability of fish and wildlife resources (e.g., change in population). The Project may affect recreational land and resource use by creating sensory disturbance to users (e.g., increased dust, noise vibration or lighting) and changes in viewscape.

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Table 16-1: Potential Environmental Effects and Measurable Parameters for Land and Resource Use

Potential Effect	Measurable Parameter(s) and Units of Measurement	Notes or Rationale for Selection of the Measurable Parameter
Change in commercially-based land and resource use	<ul style="list-style-type: none"> change in area of trapline areas that would be restricted or lost (ha) change in area of guide outfitting areas that would be restricted or lost (ha) change in area of bait harvesting areas that would be restricted or lost (ha) change in access to harvesting areas change in the availability of fish and wildlife resources sensory disturbance to users change in timber harvesting land base affected by the Project (ha) change in mineral tenure and aggregate extraction locations and area affected by the Project (ha) 	<ul style="list-style-type: none"> Traplines and guide outfitting are both area based, and reduction in the area accessible for trapping and guide outfitting can reduce the economic potential of the harvesting/hunting activity. The area (ha) of trapline, guide outfitter and bait harvesting areas that will be affected by the Project can be quantified. Integration with wildlife and wildlife habitat VC and fish and fish habitat VC can identify additional areas removed from commercial harvesting activities. Access to trapline, guide outfitting, and bait harvesting areas may be restricted or altered by the Project. The Project may overlap resource and aggregate extraction areas, or affect access to these use areas. Mineral tenure and aggregate resource locations can be represented using spatial data in order to demonstrate proximity and interaction with the Project. The Project may affect the quality of the experience of commercially-based land and resource users by creating sensory disturbance to users (e.g., increased dust, noise and lighting) and changes to views and vistas (visual setting).
Change in navigation	<ul style="list-style-type: none"> change in navigation on watercourses affected by the Project 	<ul style="list-style-type: none"> The Project intersects watercourses that may be used for navigation, either for recreational purposes or as a means of participating in associated activities such as fishing, hunting, trapping, guide outfitting and bait harvesting.

16.1.5 Boundaries

16.1.5.1 Spatial Boundaries

The areas applied for the assessment of potential environmental effects on land and resources are described below and shown in Figure 16-1.

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Project Development Area

The PDA encompasses the Project footprint and is the anticipated area of physical disturbance associated with the construction, operation and closure of the Project. The PDA is approximately 2,200 ha in size.

Local Assessment Area

The local assessment area (LAA) applied for land and resource use comprise the area within which Project-related effects on land and resource use that may reasonably be expected to occur and can be predicted or measured with a reasonable degree of accuracy and confidence. The LAA for land and resource use contains those established for surface water, fish and fish habitat, wildlife and wildlife habitat and TLRU. The LAA encompasses the area where potential wildlife and fisheries environmental effects can be predicted or measured with a level of confidence; wildlife and fish resources which are the focus of many commercial and recreational land and resource use activities. The LAA is approximately 14,460 ha and includes the PDA.

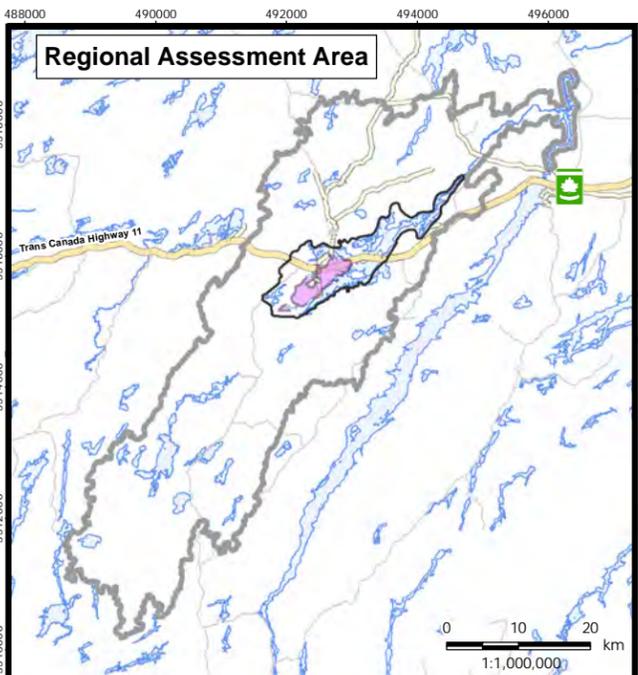
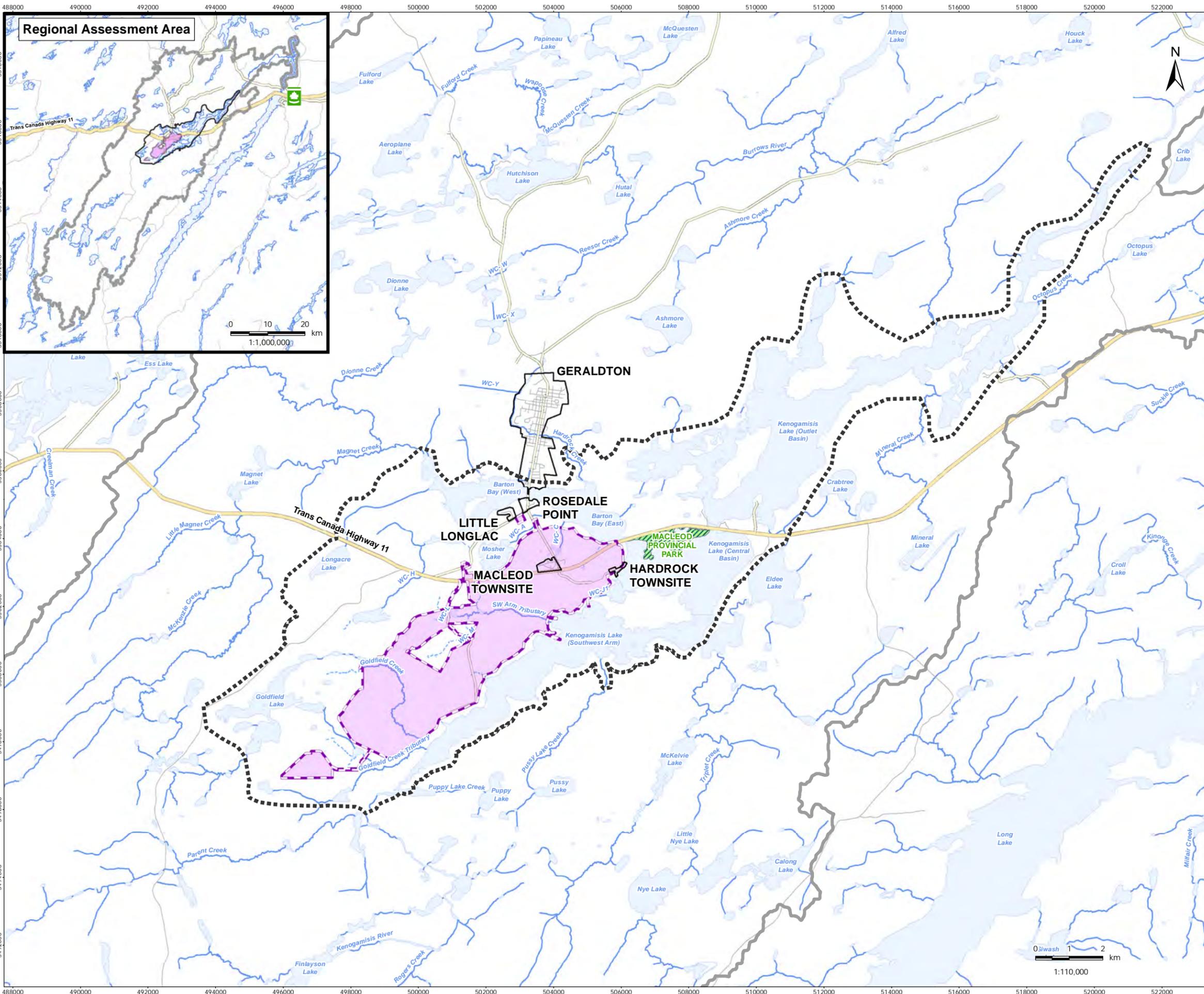
Regional Assessment Area

The RAA encompasses the LAA, and includes the RAA for surface water, fish and fish habitat, wildlife and wildlife habitat, and traditional land use and resource use. The RAA is used to provide regional context for the significance of residual effects and is also the area within which potential for cumulative effects of the Project in combination with other past, present or reasonably foreseeable projects or activities are considered. The RAA is approximately 170,990 ha.

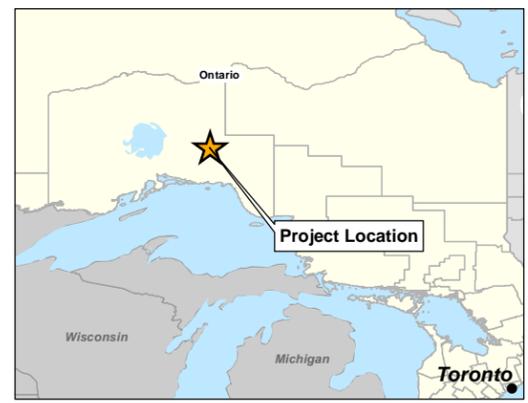
16.1.5.2 Temporal Boundaries

The temporal boundaries for the assessment of land and resource use are:

- Construction:
 - Years -3 to -1 with early ore stockpiling commencing after the first year of construction.
- Operation:
 - Years 1 to 15, with the first year representing a partial year as the Project transitions from construction to operation.
- Closure:
 - Active Closure: Years 16 to 20, corresponding to the period when primary decommissioning and rehabilitation activities are carried out.
 - Post-Closure: Years 21 to 36, corresponding to a semi-passive period when the Project is monitored and the open pit is allowed to fill, creating a pit lake.



- Legend**
- Regional Assessment Area
 - Local Assessment Area
 - Project Development Area
 - Highway
 - Major Road
 - Local Road
 - Provincial Park
 - Urban Settlement Area
 - Watercourse - Permanent
 - Watercourse - Intermittent
 - Waterbody



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 16N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.

Client/Project
Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
16-1

Title
Spatial Boundaries for Land
and Resource Use



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 Revised: 2017-04-24 By: dhanvey 5492000

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16.1.6 Residual Environmental Effects Description Criteria

Table 16-2 summarizes how residual environmental effects are characterized in terms of direction, magnitude, geographic extent, timing, duration, frequency, reversibility and ecological and socio-economic context. Quantitative measures or definitions for qualitative categories are provided.

Table 16-2: Characterization of Residual Effects on Land and Resource Use

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The relative change compared to baseline conditions.	Positive — an increase in the number or extent (ha) of the areas associated with the given land and resource use. Adverse — a decrease in the number or extent (ha) of the areas associated with the given land and resource use.
Magnitude	The amount of change in either the measurable parameter or the VC relative to baseline conditions.	Low — the residual environmental effect will not reduce the ability to undertake the activities. Moderate — the residual environmental effect will reduce the ability to undertake the activities. High — the residual environmental effect will eliminate the ability to undertake the activities.
Geographic Extent	The geographic area in which the residual environmental effect occurs.	PDA — the residual environmental effect is restricted to the PDA. LAA — the residual environmental effect extends into the LAA. RAA — the residual environmental effect extends into the RAA.
Timing	Considers when the residual environmental effect is expected to occur. Timing considerations are noted in the evaluation of the residual environmental effect, where applicable or relevant.	Not applicable (N/A) — seasonal aspects are unlikely to alter the residual environmental effect on land and resource use. Applicable — seasonal aspects may affect the residual effect on land and resource use.
Duration	The length of time required until the residual environmental effect can no longer be measured or otherwise perceived.	Short-term — the residual environmental effect is limited to construction or active closure. Medium-term — the residual environmental effect extends throughout construction, operation, and active closure. Long-term — the residual environmental effect extends beyond active closure.

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Table 16-2: Characterization of Residual Effects on Land and Resource Use

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Frequency	Identifies how often the residual environmental effect occurs within a given time.	<p>Single event — the residual environmental effect occurs once during the Project.</p> <p>Multiple irregular event (no set schedule) — the residual environmental effect occurs sporadically, at irregular intervals, without a predictable pattern.</p> <p>Multiple regular event — the residual environmental effect occurs on a regular basis, and at regular intervals.</p> <p>Continuous — the residual environmental effect occurs continuously.</p>
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the Project activity ceases.	<p>Reversible — the residual environmental effect is likely to be reversed after activity ceases.</p> <p>Irreversible — the residual environmental effect is permanent and either the measurable parameter or the VC is unlikely to return to existing conditions after the activity ceases.</p>
Ecological and Socio-economic Context	Considers uncommon characteristics or value of the area, a community and/or ecosystems that may be affected by the Project and/or whether the VC is important to the functioning of an ecosystem or community of people.	<p>Typical — the VC or measurable parameter is considered common and widely available to the community.</p> <p>Atypical — the VC or measurable parameter is considered rare and is considered important to the community.</p>

16.1.7 Significance Thresholds for Residual Environmental Effects

A significant residual adverse environmental effect on land and resource use is one that threatens the long-term viability of the recreational and commercial land use or navigation.

This significance threshold considers all of the characterizations described in Table 16-2 when making a determination of significance. The direction of the residual environmental effect is considered because only adverse effects threaten the long-term viability of recreational and commercial land use or navigation. Magnitude is considered with respect to whether or not the residual environmental effect might threaten the long-term viability of a land and resource activity. Geographic extent is considered in this significance threshold by predicting and measuring Project-related residual environmental effects beyond the PDA. Duration and reversibility are considered in that, in general, only long-term irreversible residual environmental effects threaten the long-term viability of a land or resource use.

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The remaining characterizations (i.e., timing, frequency and ecological and socio-economic context) inform the determination of significance in terms of understanding when and how often the residual effect is anticipated to occur. The existing socio-economic context informs the determination of significance because it considers the context within which a change in land and resource use may occur.

16.2 EXISTING CONDITIONS

This section provides a summary of existing conditions for land and resource use and the methods used to characterize baseline conditions.

16.2.1 Methods

Information on existing conditions for land and resource uses was collected through:

- targeted consultation with recreational and commercial users.
- desktop research.
- surveys and interviews.

In addition to the above, the characterization of existing conditions is supplemented with information contained in the “Environmental Baseline Data Report – Hardrock Project: Socio-Economic (Baseline Report - Socio-Economic; Appendix E10), the Environmental Baseline Data Reports – Hardrock Project: Fish and Fish Habitat (Baseline Reports – Fish and Fish Habitat; Appendix E7), Environmental Baseline Data Reports – Hardrock Project: Terrestrial (Baseline Reports - Terrestrial; Appendix E8), Project-specific TK studies (Appendix J), and the Visual Simulations (Appendix N). Information regarding the existing lighting and the acoustic environment is supplemented with information from Chapter 7.0 (atmospheric environment VC) and Chapter 8.0 (acoustic environment VC).

As discussed in Section 16.1.2 (influence of consultation), additional surveys and interviews were conducted in response to agency and stakeholder comments on the Draft EIS/EA. The results of the interviews were used to supplement and verify the existing conditions for the PDA and LAA and to confirm the conclusions of the assessment of residual environmental effects of the Project.

16.2.1.1 Desktop Data Compilation

Data sources for the land and resource use existing characterization and effects assessment included:

- government websites (e.g., Government of Ontario, MNRF, Ministry of Northern Development and Mines [MNDM], MTCS, Municipality of Greenstone)
- government reports (e.g., forest management activity annual reports, various reports from MNDM, Ontario Parks, MNR MTCS)

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- government databases (e.g., mining claims dispositions, Land Information Ontario [LIO] data warehouse)
- interactive maps (e.g., MNDM's CLAIMaps, MNRF's Crown land Use Atlas, Ontario Federation of Snowmobile Clubs mapping)
- acts and regulations with respect to hunting and fishing seasons and licensing requirements (e.g., *Fish and Wildlife Conservation Act*, Hunting Regulations Summary, Recreational Fishing Regulations)
- fish and wildlife field studies conducted for the Project and contained in the Baseline Reports – Fish and Fish Habitat (Appendix E7) (bait harvesting species observations) and Baseline Reports - Terrestrial (Appendix E8) (wildlife species observations)
- Visual Simulations (Appendix N) regarding visual setting as represented by four vantage points
- local websites (e.g., tourism association websites, outfitter websites, Greenstone Economic Development Corporation website)
- Project-specific TK Studies/Information (Appendix J)
- planning documents (e.g., Municipality of Greenstone Official Plan, MacLeod Provincial Park Management Plan, Kenogami Forest Management Plan).

16.2.1.2 Surveys and Interviews

Recreational land use surveys were developed to better understand recreational land use within the PDA and LAA. The following three surveys were conducted:

- Recreational Land and Resource Use survey of the PDA and LAA made available at open houses and the GGM Project office
- MacLeod Provincial Park visitor survey
- Kenogamisis Fish and Game Conservation Campground visitor survey

The recreational land and resource use surveys included a map of the PDA, a general overview of the Project, and a brief description of predicted Project-related environmental effects on water and air quality and the acoustic and lighting environment. The survey noted that comments and questions provided will form part of the EIS/EA report to be submitted to both the federal and provincial environmental regulatory agencies. Copies of the completed surveys and tabulated results of the telephone survey are provided in the RoC (Appendix C9).

The recreational land and resource use survey was provided to attendees of Project open houses held as part of consultation associated with the Draft ToR (October 2014) and visitors to GGM's office in Geraldton. Completed surveys were received from five respondents.

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The survey of MacLeod Provincial Park users consisted of a Project overview and 15 questions covering four topic areas: park visitation, park use, Highway 11 traffic and noise, and the Hardrock Project. Participants were asked about frequency and duration of park visits, recreational activities they participate in at the park, the acoustic environment of the park, effects on their enjoyment of the park that they foresee as a result of the Project, and suggested mitigation measures to limit effects. A total of 24 surveys were submitted to GGM.

In September 2016, GGM provided the Kenogamisis Fish and Game Conservation Campground President with visitor surveys to be provided to seasonal users of the campground. The surveys were mailed to 20 of the campgrounds seasonal users. The survey aimed to capture information regarding characteristics of camp users, frequency and duration of visits, campground activities engaged in during their stay, acoustic environment of the campground. The survey also provided campground users with an opportunity to provide comments regarding whether they foresee effects on enjoyment of the campground should the Project proceed and suggested mitigation. As of March 2017, GGM had received four responses to this survey.

In addition to the land use surveys, telephone interviews were conducted as follows:

- Telephone and in-person interviews of surface rights owners and residents situated near the PDA, focusing on the areas of Rosedale Point, Little Longlac, Sakamoto Road (off Old Arena Road) and east of the Ministry of Transportation (MTO) bridge.
- A telephone interview with the MNRF Nipigon District Office.

GGM's outreach to adjacent property owners surrounding the PDA consisted of correspondence including Project information and the draft site plan sent on September 9, 2016 for review, seeking comments and questions from nearby land owners and residents about the Project. A total of 48 surface right owners and residents were identified of whom 35 were interviewed by phone or in person as of December 15, 2016. GGM attempted to contact the remaining property owners with further phone calls and correspondence sent via registered mail on February 2, 2017 seeking property owner comments and questions on the Project. GGM will continue efforts to survey the remaining property owners and incorporate the additional data into Project planning. Interview questions focused on potential concerns the property owners may have with the Project-related to noise, air quality, visual, land disturbance, water, wildlife, vegetation, health, cultural resources, economic and other potential topics of interest to them. Information about hunting, fishing, trapping, guide outfitting, and bait harvesting in the PDA and RAA was provided by MNRF Nipigon District Office via telephone interview on February 27, 2015.

16.2.1.3 Stakeholder Meetings

Due to restrictions under the *Freedom of Information and Protection of Privacy Act*, the MNRF could not release the contact information for licence holders (i.e., traplines, BMAs, baitfish harvest areas) directly to GGM. In response, GGM provided MNRF with a letter to licence holders and MNRF circulated the letter on GGM's behalf. The letter requested that licence holders contact GGM directly. Four licence holders contacted GGM to arrange for a meeting.

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GGM held additional meetings with the MNRF, and other stakeholders. Key land and resource use stakeholders include the Greenstone Snowmobile Club, Ne-Daa-Kii-Me-Naan Inc. (i.e., the eFRL holder that manages the Kenogami FMU within which the PDA is located), Kenogamisis Recreation Corporation, Kenogamisis Lake Resort, Wild Goose Lake Resort, and Kenogamisis Fish and Game. Details of these meetings are provided in Chapter 3.0 (community and stakeholder consultation) and in the RoC (Appendix C).

16.2.2 Overview of Existing Conditions

16.2.2.1 Hunting

Hunting activity in Ontario is managed by the MNRF under the *Fish and Wildlife Conservation Act*, which divides the province into WMUs. The PDA, LAA and RAA overlap WMUs 19 and 21A, and Highway 11 forms the boundary between the two WMUs (Figure 16-2). Due to development within the PDA (i.e., urban settlement areas, golf course), approximately 250 ha of the PDA is conservatively estimated to be either impractical or unlawful for hunting.

Every year, the Government of Ontario publishes the *Hunting Regulations Summary* (MNRF 2015; MNRF 2016; MNRF 2017), which outlines open seasons, bag limits, licence requirements and hunting tag application procedures for resident and non-Ontario resident (non-resident) hunters. To hunt in Ontario, residents and non-residents require Outdoors Cards (i.e., an identification card issued by the MNRF to prove eligibility to purchase hunting licence tags) and all applicable licence tags and/or seals for the species being hunted. Hunting may be conducted individually, in a group or through a registered guide outfitter.

Non-resident hunters who wish to hunt black bear or moose may only hunt these species if accompanying an immediate relative or using the services of a registered guide outfitter. For other species besides moose and black bear, non-residents are not required to hire a guide outfitter. Guide outfitting is discussed in Section 16.2.2.2.

Hunting seasons for most species begin between mid-August to mid-September and last between one and ten months. Hunting season dates for wildlife species in WMU 19 and 21A are presented in the Baseline Report - Socio-Economic (Appendix E10) and are available in the Fall 2016-Spring 2017 2016 Hunting Regulations Summary (Government of Ontario 2016a).

To hunt migratory birds (e.g., Canada goose, cackling goose, Wilson's snipe, American woodcock), a federal Migratory Bird Hunting Permit with a Canadian Wildlife Habitat Conservation Stamp is required under the Migratory Birds Convention Act (ECCC 2016). Migratory Bird Hunting Permits are administered by the ECCC. Hunting seasons vary depending on the species of migratory bird; however, in the RAA (which falls within the Northern District) the hunting season is generally from September to December.

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A number of wildlife species of potential interest to hunters were identified in the PDA and LAA through direct observation during fieldwork or from historical wildlife surveys, and are described in the Baseline Reports - Terrestrial (Appendix E8). According to responses to the land and resource use questionnaire and information from MNRF-Nipigon (MNRF pers. comm. 2015), wildlife species that may be hunted in the PDA, LAA and RAA include:

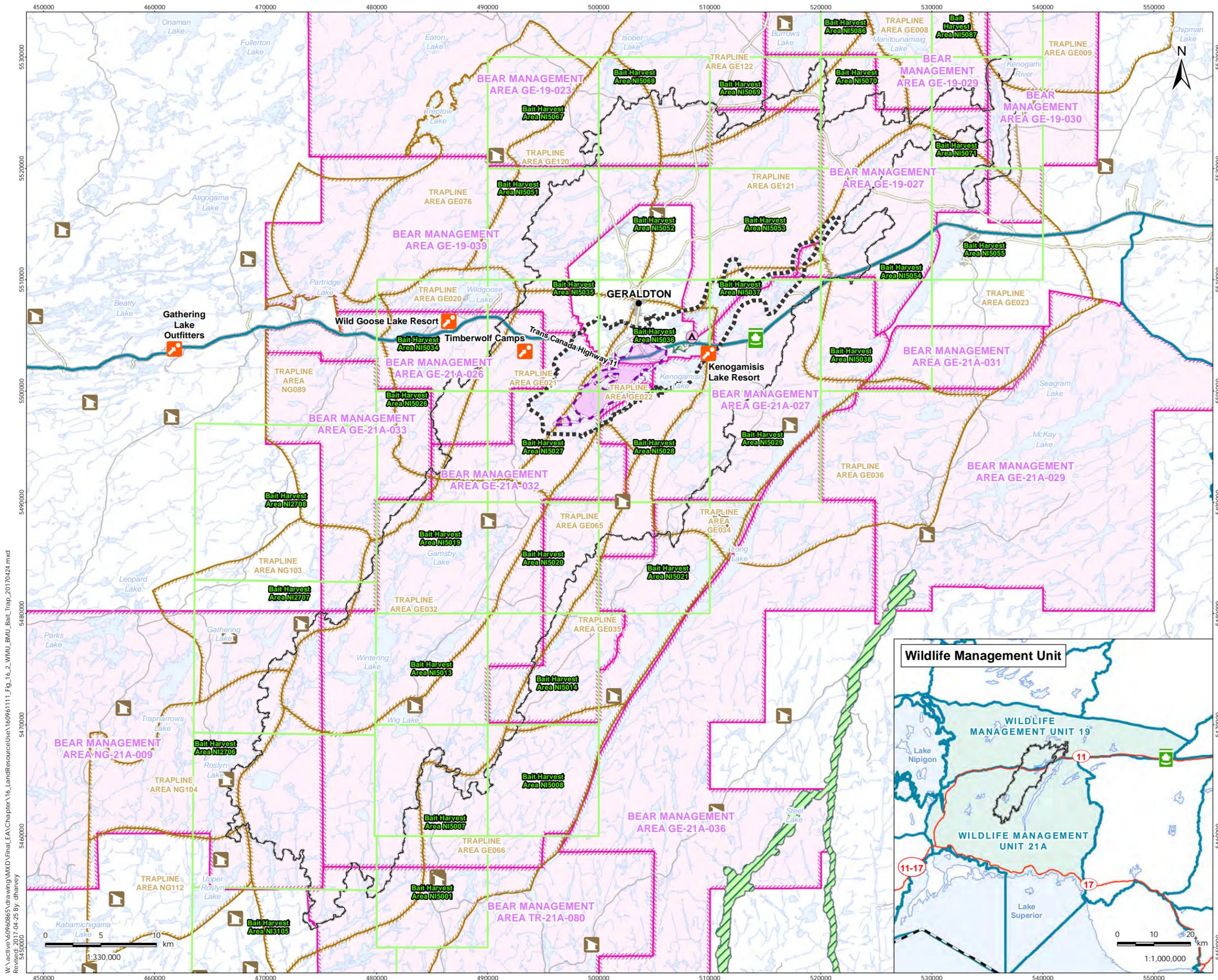
- moose
- black bear
- deer
- snowshoe hare
- ruffed grouse
- Canada goose and cackling goose
- Wilson's snipe
- American woodcock
- various duck species.

Species of interest for traditional purposes by Aboriginal communities are discussed in Chapter 18.0 (TLRU VC). Specific hunter and harvesting (hunting) activities are available from the MNRF for black bear, white-tailed deer and moose. Table 16-3 provides hunting information for these species for the two WMUs overlapped by the PDA, LAA and RAA.

The number of tags issued for moose and deer vary from year to year as established by the MNRF. For example, in WMU 19, the total number of moose tags in 2014 (for both gun and bow, bull and cow; tags are not needed for calves in this WMU) was 432 (MNRF 2015). In 2015, this number was increased to 536 while in 2016 and 2017 the number decreased to 503 and 451 tags, respectively (MNRF 2016; MNRF 2017).

Similarly, the number of tags available for hunting deer vary annually however since 2014 the number of antlerless deer tags available in WMU 19 has remained constant at 40 (MNRF 2015; MNRF 2016; MNRF 2017). Note, licenced hunters may harvest an antlered deer anywhere in the province during open season with a few exceptions.

There is no draw for tags to hunt black bear in Ontario; a resident bear hunting licence tag is required. Non-resident bear hunters must obtain a non-resident bear hunting licence tag and validation certification and be accompanied by a licenced BMA operator.

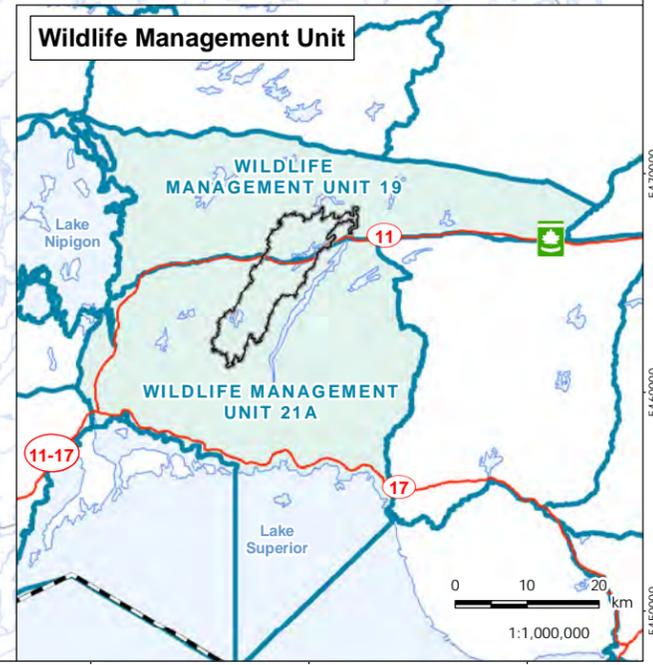


Legend

- Regional Assessment Area
- Local Assessment Area
- Project Development Area
- Guide Outfitter
- Kenogamisis Fish and Game Conservation Campground
- Trapper Cabin
- Bait Harvest Areas
- Bear Management Area
- Trapline Area
- Wildlife Management Unit

Existing Features

- Highway
- Major Road
- Local Road
- Watercourse - Permanent
- Watercourse - Intermittent
- Provincial Park
- Waterbody



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 16N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.

Client/Project
Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
16-2

Title
Wildlife Management Units, Bear Management Areas, Registered Trapline Areas, and Bait Harvesting Areas

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 Revised: 2017-04-25 By: dhanvey



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Table 16-3: Estimated Black Bear, White-tailed Deer and Moose Hunting Activity and Harvest, 2006 to 2013

Year	WMU 19		WMU 21A	
	Hunters	Harvest	Hunters	Harvest
BLACK BEAR				
2006	245	89	502	185
2007	252	109	654	236
2008	218	42	609	143
2009	240	61	604	127
2010	286	84	616	137
2011	247	95	531	132
2012	277	97	554	97
2013	270	77	625	148
WHITE-TAILED DEER				
2008	N/A	N/A	264	30
2009	69	13	346	11
2010	19	3	311	23
2011	15	2	244	7
2012	92	0	293	17
2013	31	1	285	21
MOOSE				
2006	1,233	92	3,469	270
2007	1,226	110	4,119	264
2008	1,354	81	4,173	198
2009	1,425	52	4,110	218
2010	1,647	114	4,178	251
2011	1,498	102	4,191	284
2012	1,540	92	4,017	207
2013	1,461	70	3,740	197

SOURCES: MNRF 2014a, 2014b, 2014c

NOTES:

"Harvest numbers are estimates based on replies received from a sample of hunters and are therefore subject to statistical error. Harvest numbers have been rounded to the nearest whole number." (MNRF 2014a, 2014b, 2014c)

"The estimate of the number of active hunters may vary from other reported values (e.g., licence sales) as some hunters may hunt in more than one Wildlife Management Unit (WMU), while others may have purchased a licence but decided not to hunt." (MNRF 2014a, 2014b, 2014c)

"The additional number of bears harvested using a resident second game seal is only available at a provincial scale." (MNRF 2014a)

"An additional ±150 calf moose are harvested each year across the province by resident hunters who did not apply for an adult validation tag." (MNRF 2014c)

N/A - not applicable

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It is conservatively estimated that all vegetated areas (upland and wetland communities) and areas of open water located in the PDA are potential hunting areas for mammals and birds. Descriptions of vegetation communities and their percent cover across the PDA and LAA are discussed in Section 12.2.2.1. The approximate area of vegetation communities (including open water) is 1,955 ha. This excludes areas classified as disturbed (i.e., not considered a naturally occurring vegetation community) such as the Highway 11, Kenogamisis Golf Club and settlement areas (i.e., townsites).

Within these vegetation communities, habitat for species of interest to hunters is quantified in Chapter 13.0 (wildlife and wildlife habitat VC) which includes moose foraging and late winter cover habit, woodland caribou habitat, and avian nesting, stopover and foraging areas.

Kenogamisis Lake is one of several waterfowl staging and stopover areas in the PDA and LAA and is used by species of interest to hunters, such as ruddy ducks, canvasbacks and redheads. During fieldwork, waterfowl hunting was observed in the LAA on Kenogamisis Lake and waterfowl hunters were observed accessing the lake via Lahtis Road. The former presence of a private hunting camp on Lahtis Road confirms hunting did occur within the vicinity of the PDA.

Chapter 18.0 (TLRU VC) provides a description of hunting by Aboriginal communities.

16.2.2.2 Guide Outfitting and Bear Management Areas

There are four guide outfitters located generally within the RAA; Kenogamisis Lake Resort, Timberwolf Camps, Gathering Lake Outfitters and Wild Goose Lake Resort. The locations of the guide outfitter establishments are shown on Figure 16-2.

Guide outfitter and tourist operator services for hunting are regulated through Ontario Regulation 665/98 – Hunting under the Fish and Wildlife Conservation Act. Guide outfitting services for black bear are linked to the BMA to which a guide outfitter has exclusive rights to offer services. Guide outfitters providing moose hunting services to non-residents are required to provide services in the WMU for which they have moose licence tags. Unlike BMAs, where a guide outfitter has exclusive operator rights to a specific area, multiple guide outfitters may provide moose hunting services within the same WMU. The location of BMAs are shown on Figure 16-2. Table 16-4 lists the BMAs that overlap the PDA, LAA and RAA.

Although two WMUs and four BMAs overlap the LAA, there is only one guide outfitter with facilities in the LAA: Kenogamisis Lake Resort. The resort has eight private cabins for guests and is located on the east side of the Central Basin (approximately 3.8 km east of the PDA) and offers hunting services related to moose, bear, wolves, ducks and grouse (Kenogamisis Lake Resort 2015). On its website, the resort also advertises swimming and fishing for Walleye, Northern Pike and Perch in Kenogamisis Lake. Kenogamisis Lake Resort currently has the rights to GE-21A-027, however another outfitter is currently using the BMA. The operators of Kenogamisis Lake Resort confirmed that accessing their BMA is generally via the Fleury Extension (accessed from the southern portion of Goldfield Road near Terrace Bay).

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Timberwolf Camps is located within the RAA approximately 10 km west of the PDA. Timberwolf Camps offers black bear, moose, and grouse hunting in the vicinity of its main camp plus boat-in and fly-in locations (Timberwolf Camps 2016). Fishing opportunities are also provided. Timberwolf Camps is the licensee for GE-19-023. Access to their BMA is north of Geraldton.

Gathering Lake Outfitters is located outside of the RAA approximately 42 km west of the PDA. Hunting (e.g., black bear, wolf, moose and grouse) and fishing experiences are available (Gathering Lake Outfitters 2016). Gathering Lake Outfitters is the licensee of BMA GE-021A-032 (within the PDA), NG-21A-009 (within the RAA), and two other BMAs that are located outside of the RAA. Approximately, 2% of GE-021A-032 will be overprinted by the PDA. During conversations between GGM and Gathering Lake Outfitters, it was identified that the portion of the BMA located on the PDA is associated with three permitted bait areas which are also tied to bear quotas (bear quota is 1 bait per 50 square kilometres [km²]).

Wild Goose Lake Resort is located approximately 19 km west of the PDA and is located just outside of the RAA. Wild Goose Lake Resort has 12 cottages and camping sites and offers both hunting and fishing experiences (Wild Goose Lake Resort 2015). BMAs GE-21A-026 and GE-19-039 are licenced to Wildlife Goose Lake Resort and represents about 25% of the resort's business. Boats are also cached on Boobas, Rogers and Lindsley Lakes for clients' use.

The above noted guide outfitters have established businesses however, other guides may offer services in accordance with the appropriate regulations within the LAA and RAA.

Table 16-4: Bear Management Areas in the RAA

BMA	Total Area of BMA (ha)	Area in PDA (ha)	Area in LAA (ha)	Area in RAA* (ha)
GE-21A-032 ^B	92,285	1,583	5,287	62,730
GE-19-039 ^D	58,531	0	2,191	27,651
GE-19-027 ^E	26,757	0	435	12,121
GE-21A-026 ^D	17,219	0	0	6,900
GE-21A-027 ^A	48,053	15	2,750	24,611
NG-21A-009 ^B	90,289	0	0	12,416
GE-19-023 ^C	88,539	0	0	5,908
GE-19-029 ^E	21,054	0	0	696
GE-19-030 ^E	35,481	0	0	1,967
GE-21A-033 ^E	20,240	0	0	945
TR-21A-080 ^E	43,132	0	0	1,685

NOTES:

- A Kenogamisis Lake Resort
- B Gathering Lake Outfitters
- C Timberwolf Camps
- D Wild Goose Lake Resort
- E Outfitter associated with BMA is unknown
- * The area within the RAA includes the areas within the PDA and LAA.

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16.2.2.3 Trapping and Trapline Areas

The LAA falls within Ontario Trapping Region Part 2. Trapping activity is managed according to trapping region and is governed by the MNRF under the *Fish and Wildlife Conservation Act, Ontario Regulation 667/98 – Trapping*. Rules regarding permitted trapping methods and tools, trapping season dates, and licence requirements for trapping and possessing pelts are described in the *Summary of the Fur Management Regulations* (Government of Ontario n.d.b). Trapping seasons for most species in Ontario Trapping Region Part 2 begin in the early fall and run anywhere from January to mid-May. Specific trapping seasons and licence requirements for trapping and possession are provided in the Baseline Report - Socio-Economic (Appendix E10).

Preferred species of furbearers in RAA (which includes the LAA and PDA) include pine marten and lynx; however, beaver and red squirrel are likely the most heavily harvested (MNRF pers. comm. 2015). The following are the species observed in the PDA during fieldwork for the Baseline Reports - Terrestrial (Appendix E8) that are of potential interest to trappers:

- lynx
- pine marten
- beaver
- black bear
- snowshoe hare
- grey wolf
- red fox
- red squirrel
- woodchuck
- ermine.

There are 18 registered trapline areas in the RAA, 15 of which are known to be held under resident trapper licences with three trapline licences classified by MNRF as type “unknown”. There are no cabins associated with traplines within the PDA or LAA. The trapline areas and the location of the nearest trapper cabin are shown in Figure 16-2. Table 16-5 lists the traplines within the RAA, presenting the area of the trapline within the PDA and the percentage of the disturbed, non-disturbed and in-water areas.

Of the six trapline areas in the LAA, two are overlapped by the PDA: GE022 and GE021. Approximately 4% of the land area associated with trapline area GE022 is currently disturbed habitat (i.e., brownfield) and less likely to be used for trapping. Approximately 20 ha of trapline area GE021 is located within the PDA of which approximately 2% of the trapline area within the PDA is currently disturbed.

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Two licensees hold the licences for both GE022 and GE065 (as primary and secondary license holders). In discussions with GGM, the licence holders reported minimal activity on both traplines over the past two years with a reduction in animals harvested. Typically, these traplines are checked every second day in the winter. The licence holder advised that trapping for beavers begins October 5 and martens on October 25. Trapping for other species commences in early November with the trapping season for all species ending on February 28th (except for waterfowl). The licence holder advised that he traps the odd marten, fox, wolf and coyote in the northern part of the trapline. The licence holder confirmed that access to GE065 is via Half Way Road off Goldfield Road and that this road is not open in the winter.

The MNR and CEA Agency identified commercial trapline areas held by Aboriginal peoples. These include GE021, GE023, GE034, GE035, GE008, GE009, GE120, and NG089 which are located within and beyond the RAA. GGM has confirmed, as part of consultation activities, that GE021 is held by a member of AZA and GE009, GE023 and GE034 are held by members of LLFN. Traditional trapping activities, not associated with commercial trapline licences, are discussed in Chapter 18.0 (TLRU VC).

Table 16-5: Registered Trapline Areas in the RAA

Trapline Area Number	Overlap with PDA	Licence Type	Cabin Present	Total Area (ha)	Area in the PDA (ha)	Disturbed Area (percent of total RAA)	Non-disturbed Area (percent of total RAA)	Area covered in water (percent of total RAA)
GE008	No	Resident Trapper License	No	16,358	0	0%	100%	13%
GE009	No	Resident Trapper License	Yes – outside the RAA	22,260	0	0%	100%	11%
GE020	No	N/A	No	14,522	0	0%	100%	1%
GE021	Yes	Resident Trapper License	No	15,845	20	2%	98%	5%
GE022	Yes	Resident Trapper License	No	13,583	2,173	4%	96%	20%
GE023	No	Resident Trapper License	No	42,931	0	1%	99%	6%
GE032	No	N/A	Yes – within the RAA	27,712	0	0%	100%	16%
GE034	No	Resident Trapper License	Yes – outside the RAA	25,838	0	2%	98%	17%
GE035	No	Resident Trapper License	Yes – outside the RAA	19,157	0	0%	100%	1%
GE065	No	Resident Trapper License	Yes – within the RAA	50,846	0	0%	100%	8%

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Table 16-5: Registered Trapline Areas in the RAA

Trapline Area Number	Overlap with PDA	Licence Type	Cabin Present	Total Area (ha)	Area in the PDA (ha)	Disturbed Area (percent of total RAA)	Non-disturbed Area (percent of total RAA)	Area covered in water (percent of total RAA)
GE066	No	N/A	Yes – outside the RAA	32,975	0	1%	99%	4%
GE120	No	Resident Trapper License	No	24,188	0	2%	98%	11%
GE121	No	Resident Trapper License	Yes – within the RAA	28,842	0	2%	98%	6%
GE122	No	Resident Trapper License	Yes – outside the RAA	27,720	0	1%	99%	4%
NG089	No	Resident Trapper License	No	30,361	0	0%	100%	2%
NG103	No	Resident Trapper License	Yes – outside the RAA	17,010	0	0%	100%	3%
NG104	No	Resident Trapper License	Yes – within the RAA	16,290	0	0%	100%	2%
NG112	No	Resident Trapper License	Yes – outside the RAA	12,916	0	0%	100%	5%

SOURCE: MNRF 2014d

NOTE:

N/A not applicable

16.2.2.4 Recreational Fishing

Recreational fishing in Ontario requires both residents and non-residents to hold an Outdoors Card and the appropriate recreational licence tags. The seasons and limits for different fish species for FMZ 7 are presented in the MNRF's *2017 Fishing Ontario, Recreational Fishing Regulations Summary* (Government of Ontario 2016b).

The LAA is located within FMZ 7, which includes recreational and tourism-based fisheries. Watercourses in the PDA and LAA are part of the Kenogamisis Lake watersheds with Kenogamisis Lake supporting fishing activity (Figure 16-3). The present section focuses on recreational fisheries. Commercial fisheries in the LAA are limited to those associated with bait harvesting, which is discussed in Section 16.2.2.5. Aboriginal fisheries are described in TLRU (Chapter 18.0).

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Preferred species in the RAA are Walleye, Northern Pike, Lake Whitefish, Lake Trout, Brook Trout and Yellow Perch (MNRF pers. comm. 2015). Burbot, White Sucker or Cisco may also be caught in the RAA. Fish surveys conducted for the EIS/EA confirmed the presence of the following species that are fished in the LAA:

- Burbot
- Northern Pike
- Lake Whitefish
- Walleye
- Yellow Perch
- Cisco
- White Sucker

During fish surveys, the listed species were recorded in Lake A-322, Lake A-323, Goldfield Lake, Kenogamisis Lake, Kenogamisis River, Marron Lake, Mosher Lake, Southwest Pond (SWP) 2 and SWP 3. Table 11-6 in Chapter 11.0 (fish and fish habitat VC) lists the watercourses in which individual species were found during fish surveys.

Kenogamisis and Goldfield Lakes are popular for fishing. Both are accessible by road and have boat launches. Several other watercourses in the LAA that support commercial, recreational and Aboriginal (CRA) fisheries may be used for recreational fishing. Anglers tend to move from lake to lake throughout the season depending on conditions, and access the more remote lakes by car or snowmobile, or on foot, using forest access roads, such as Goldfield Road (MNRF pers. comm. 2015). Mosher Lake is also used for fishing.

In Kenogamisis Lake, fishing activity is widely distributed, but tends to be more concentrated around the East and Main Narrows, where the fast-moving water attracts Walleye (Ellis n.d.). During fieldwork, field crews observed anglers casting into Kenogamisis Lake from boats, the shore and bridges. Facilities that may be associated with fishing in the LAA include a fish cleaning station in MacLeod Provincial Park, two public boat launches and, on the shore of the Southwest Arm, two public access points (Figure 16-3).

Ice fishing is popular on Kenogamisis Lake. Anglers on the Southwest Arm of Kenogamisis Lake typically use the public access point at the end of Lahtis Road or the public access point accessible via Hardrock Road (i.e., locally known as the Pumphouse) to launch shelters for ice fishing. The ice fishing season generally extends from December to mid-April.

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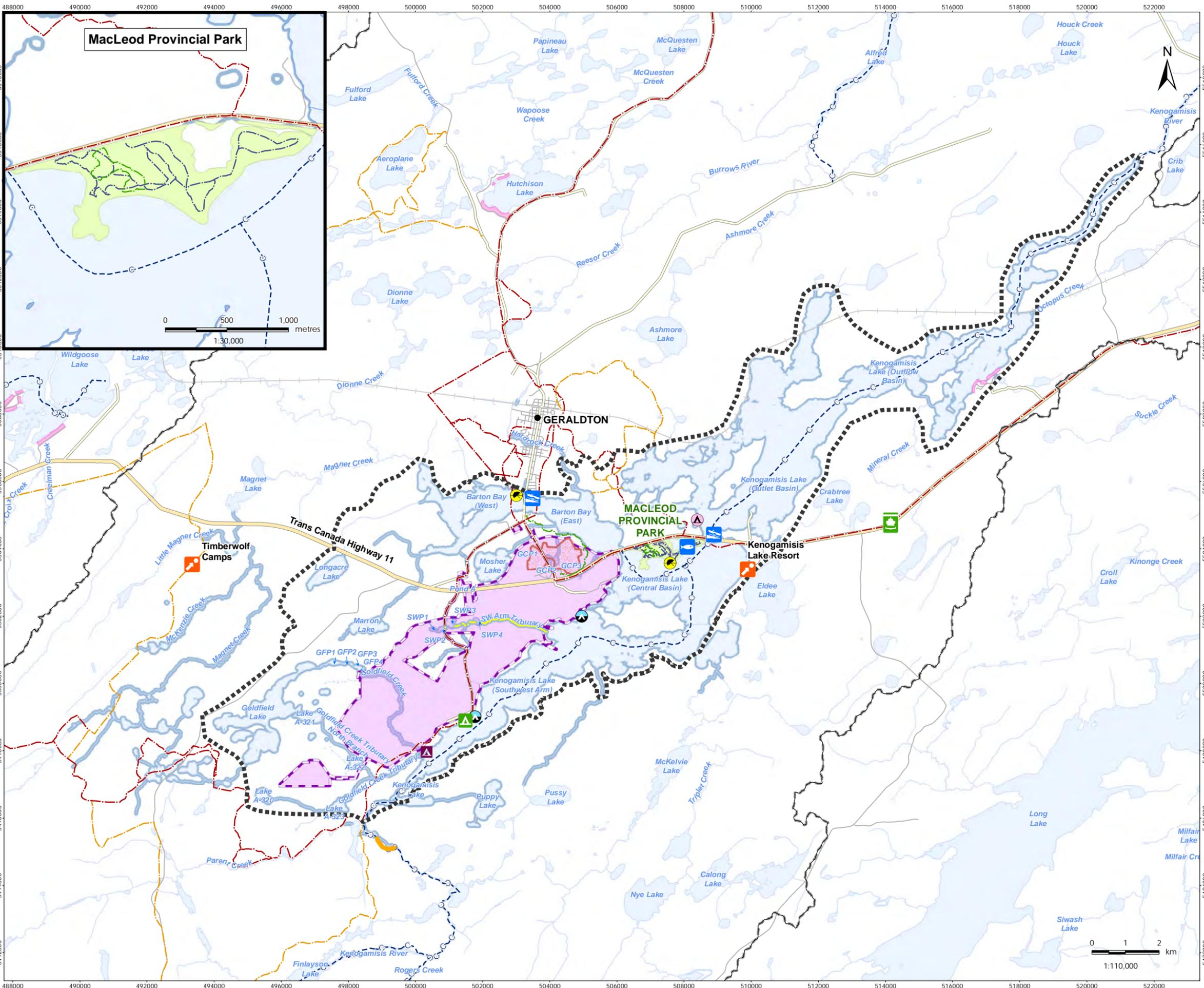
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Recreational fishing occurs throughout the year in the LAA, with some species subject to shorter open seasons. In late June, Kenogamisis Fish and Game hosts the Geraldton Walleye Classic, a two-day Walleye fishing tournament on Kenogamisis Lake. During the competition, anglers may fish anywhere in the lake. In 2014, 226 anglers participated in the tournament, which was consistent with the participation rates for preceding years (Geraldton Community Forest 2014). The tournament is hosted out of MacLeod Provincial Park (LaFrance 2014).

In 2011–2012, the Ministry of Environment (MOE) posted a fish consumption advisory regarding consumption limits for species caught in Barton Bay and Kenogamisis Lake. The advisory recommended monthly consumption limits for Lake Herring, Lake Whitefish, Northern Pike, Redhorse Sucker, Walleye, White Sucker, and Yellow Perch (MOE n.d.). The consumption restrictions were due to mercury for each of the fish listed, in addition to arsenic for Northern Pike, Redhorse Sucker, Yellow Perch, and lead in the case of White Sucker. Consumption advisories are not unique to Kenogamisis Lake. The 2015-2016 *Guide to Eating Ontario Fish*, provides consumption advice for other lakes in the broader region (Government of Ontario 2015a).

16.2.2.5 Bait Harvesting

Commercial bait harvesting is the capture and sale of baitfish and/or leeches to retailers who supply bait to the recreational fishing industry. The activity is licensed by the MNRF and regulated under the *Fish and Wildlife Conservation Act, Ontario Regulation 664/98-Fish Licensing*. Commercial operators must obtain licences that are associated with defined bait harvesting areas. An operator may hold licences for several bait harvesting areas. Members of the public may also catch bait for personal use and from the same watercourses as commercial operators.



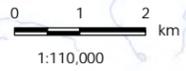
- Legend**
- Regional Assessment Area
 - Local Assessment Area
 - Project Development Area
 - Guide Outfitter
 - ▲ Kenogamis Fish and Game Conservation Campground
 - ▲ Crownland Campsite
 - Fish Cleaning Station
 - Public Access Point
 - Public Beach
 - Public Boat Launch
 - ▲ Private Hunt Camp
 - Cross Country Ski Trail
 - Hiking Trail
 - Snowmobile Trail
 - Canoe Route
 - Other Trail
 - Fishing Area Watercourse *
 - Navigable Waterway
 - Cottage Area
 - Golf Course
 - Portage Trail
 - Fishing Area Waterbody *
 - Provincial Park
- Existing Features**
- Highway
 - Major Road
 - Local Road
 - Railway (inactive)
 - Watercourse - Permanent
 - Watercourse - Intermittent
 - Waterbody

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 16N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.
- * Water appearing on NTS 1:50,000 mapping are assumed to be CRA Fisheries. Within the Fish Habitat LAA, CRA waters are based on the known distribution of game fish and bait fish, and include all such water where those fish are known to occur.

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 Greenstone Gold Mine GP Inc. (GGM)
 Hardrock Project

Figure No.
 16-3
 Title
 Recreation Areas and
 Trails within the RAA

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 Revised: 2017-04-24 By: dhanvey



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Four bait harvesting areas overlap the PDA and LAA (Figure 16-2). In Ontario, 48 species of baitfish and leeches can be harvested commercially (Government of Ontario n.d.c). Both baitfish and leeches may be harvested in the LAA. During fish surveys, eighteen baitfish species were recorded in the LAA:

- Blacknose Shiner
- Blackchin Shiner
- Fathead Minnow
- Finescale Dace
- Northern Redbelly Dace
- Pearl Dace
- Spottail Shiner
- Shorthead Redhorse
- White Sucker
- Brook Stickleback
- Ninespine Stickleback
- Iowa Darter
- Johnny Darter
- Log-Perch
- Lake Chub
- Cisco
- Central Mudminnow
- Trout-Perch

Bait harvesting can occur in a watercourse where baitfish species and leeches are present and where there is adequate access. Table 11-6 in Chapter 11.0 (fish and fish habitat VC) lists the watercourses in which baitfish species were found during fish surveys. Baitfish may be more abundant in waterbodies that do not support sportfish. There is a high level of variation in yields throughout the season, with decreases often occurring in August. Many commercial bait harvesters reduce operations in the winter months as baitfish are not as readily available. Based on GGM's consultation process and responses to the land and resource use questionnaire, minnow bait is harvested in Mosher Lake and is accessed by Old Arena Road. Access may also be gained from the south side of the lake. As indicated in Baseline Reports – Fish and Fish Habitat (Appendix E7), baitfish species recorded in Mosher Lake include Blacknose Shiner, Pearl Dace, Fathead Minnow, Finescale Dace, Iowa Darter, and White Sucker. Longacre Lake in the LAA is also known as a productive area for bait harvesting.

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Table 16-6 shows the total areas of overlap between these bait harvesting areas and the PDA and LAA.

Table 16-6: Commercial Bait Harvesting Areas in the RAA

Bait Harvest Area Number	Total Area (ha)*	Area in PDA (ha)	Area in LAA (ha)	Area in RAA ¹ (ha)
NI2706	22,877	0	0	14,387
NI2707	22,464	0	0	10,050
NI2708	22,981	0	0	130
NI3105	24,626	0	0	890
NI5001	10,001	0	0	815
NI5007	10,161	0	0	6,374
NI5008	10,000	0	0	606
NI5013	10,089	0	0	10,089
NI5014	10,000	0	0	4,153
NI5019	10,019	0	0	9,552
NI5020	10,000	0	0	8,584
NI5021	10,000	0	0	2,397
NI5026	9,985	0	0	4,893
NI5027	10,000	538	2,111	10,000
NI5028	10,000	237	764	9,774
NI5029	10,000	0	0	1,553
NI5034	9,992	0	0	552
NI5035	10,000	141	1,935	8,700
NI5036	10,000	1,277	6,194	10,000
NI5037	10,000	0	2,388	7,268
NI5038	10,000	0	0	21
NI5051	10,000	0	0	5,119
NI5052	10,000	0	0	10,000
NI5053	10,001	0	928	10,001
NI5054	10,000	0	144	4,470
NI5055	10,000	0	0	623
NI5067	10,000	0	0	250
NI5068	10,000	0	0	5,847
NI5069	10,000	0	0	5,737
NI5070	10,000	0	0	4,565

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Table 16-6: Commercial Bait Harvesting Areas in the RAA

Bait Harvest Area Number	Total Area (ha)*	Area in PDA (ha)	Area in LAA (ha)	Area in RAA ¹ (ha)
NI5071	10,000	0	0	3,585
NI5086	10,000	0	0	<1
NI5087	10,000	0	0	6

SOURCE: MNRF 2014d*

NOTE:

1 The area within the RAA includes the areas within the PDA and LAA.

One individual holds the licence for Bait Harvest Areas NI5027, NI5028, NI5036, and NI5054. GGM met with the licence holder to discuss access and frequency of use. The bait harvester indicated that there are no issues with access to the bait harvesting areas. GGM will not provide the licence holder access to the glory hole (a slope breakthrough at surface) for safety reasons.

GGM also met with licence holder NI5035, who confirmed that there have not been issues regarding access to date. Access to the bait harvesting areas occurs every other day predominantly in the spring and summer (i.e., until freezing).

The CEA Agency identified commercial baitfish license areas held by Aboriginal peoples. These include NI5007, NI5013, NI5019, NI5020, NI5034, NI5035, NI5055. These baitfish areas are located outside of the LAA but within the RAA as shown in Table 16-6. Traditional harvesting activities, not associated with commercial baitfish licences, is discussed in Chapter 18.0 (TLRU).

16.2.2.6 Navigation

For the purposes of the assessment of effects on land and resource use, navigation is defined as the movement and maneuvering of craft on watercourses. In the LAA, navigation occurs in conjunction with recreational boating, including canoeing, and the use of Aboriginal travelways as discussed in TLRU (Chapter 18.0). Navigation may be associated with other activities described earlier, namely fishing, hunting, bait harvesting, trapping and guide outfitting. Although navigation may be carried out for commercial purposes such as harvesting there are no commercial navigation activities, such as ferry services or water transport operations, in the LAA. None of the watercourses in the RAA are listed on the NPA schedule of navigable waters.

When assessing navigability, the following questions are considered by Transport Canada when determining if a waterway is a navigable water:

- Do the physical characteristics of the waterway support carrying (floating and traversing) a vessel of any size (e.g., canoe/kayak) from one point to another?

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- Is there information (i.e., evidence) of current use by the public of the waterway as a transportation route either as a self-contained route or as part of a navigation network extending beyond the boundaries of the specific waterway?
- Is there information (i.e., evidence) of historical or past use by the public of the waterway as a transportation route either as a self-contained route or as part of a navigation network extending beyond the boundaries of the specific waterway?
- Is there a reasonable likelihood of use by the public as a transportation route?

Within the PDA, potential watercourses were initially identified during a desktop exercise during early studies using GIS modelling software to establish appropriate areas for further investigation in the field. The software determines the likelihood of where water would be present based on elevation changes on the landscape. Utilizing this information, ground-truthing surveys were completed in the field to determine if a feature actually existed at the locations predicted by the GIS modelling exercise. When investigated in the field, many areas did not have water or a channel. A field-level assessment was undertaken to determine if, at a minimum, a canoe could traverse watercourses in the PDA. TK and TLRU studies and consultation input were also reviewed to identify reports of navigation of specific watercourses in the PDA and LAA.

Navigability of watercourses within the PDA are as follows:

- Although navigation has not been observed during field studies, identified through consultation, or reported by Aboriginal communities in TK and TLRU studies, it is assumed that navigation is possible with obstacles on the following watercourses/waterbodies:
 - Goldfield Creek
 - Southwest Arm Tributary (downstream of Southwest Arm Tributary Pond 3 [SWP3])
- SWP3 is a small lake with a maximum depth of 8.1 metres (m). It is navigable, although navigation has not been observed.
- Golf Course Pond 3 is an artificial pond located on the golf course built adjacent to historical MacLeod tailings. Navigation does not occur on the pond. From a navigability perspective GCP3 is not connected to Barton Bay as Watercourse C (WC-C) is not navigable.
- Watercourse C (WC-C) is not navigable and exists due to the creation of the golf course and associated drainage and grading.
- Watercourse D (WC-D) is a roadside highway ditch that has standing water. WC-D is not navigable.
- Watercourse F (WC-F) is characterized by a valley depression on the north side of Highway 11. There is no defined channel and it was dry at the time of the field-level assessment (June 2014). WC-F is not navigable.

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- Watercourse I (WC-I) is an ephemeral drainage ditch adjacent to Highway 11 and the MTO Patrol Yard. Based on site investigations, WC-I is considered not navigable.
- Watercourse J (WC-J) does not have a defined channel bed or banks. No defined watercourse could be located at the time of the field-level assessment (June 2014), only isolated pockets of standing water in a wetland. WC-J is not navigable.
- Watercourse N (WC-N) does not have a defined channel bed or banks. No defined watercourse could be located at the time of the field-level assessment (June 2014), only isolated pockets of standing water in a Black Spruce swamp. WC-N is not navigable.
- Watercourse O (WC-O) does not have a defined channel bed or banks throughout most of the watercourse length. WC-O is not navigable.
- Watercourse Z (WC-Z) has terrestrial grasses and shrubs growing throughout the poorly defined channel suggesting that this watercourse has an intermittent flow regime. WC-Z is not navigable.

Navigation routes in the LAA include:

- Mosher Lake is used for both fishing and bait fishing and is navigable.
- A canoe route and one portage trail along the Kenogamisis River. The route travels northeast along the river through the Southwest Arm, Central Basin and Outflow Basin. A segment of this route branches off toward the Main Narrows (Figure 16-3).
- There are two public boat launches on Kenogamisis Lake (Section 16.2.2.4 and Figure 16-3). Given the popularity of the Main and East Narrows for fishing and the proximity to boat launches and public beaches, a relatively high level of boat traffic compared to elsewhere on Kenogamisis Lake can be assumed in these areas.
- In addition to public launches on Kenogamisis Lake, public access points are located at the end of Lahtis Road and via Hardrock Road on the Southwest Arm of Kenogamisis Lake.
- The MNRF has identified two Land Use Permits (LUPs) for private boathouses with lake access on the north shore of the Southwest Arm of Kenogamisis Lake. The MNRF has confirmed that these two LUPs expired in 2011. No boathouses have been constructed at these sites.
- MNRF identified a known boat cache location on Marron Lake, suggesting navigation occurs on that lake as well. During Project fieldwork, boating activity was observed on Kenogamisis Lake, Goldfield Lake, and Lake A-323 in the LAA.

Table 16-7 summarizes the navigability of watercourses within the PDA and LAA.

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Table 16-7: Navigable Watercourses in the PDA and LAA

Watercourse	Location	Navigation observed	Navigation possible by canoe or larger vessel	Navigation possible but obstacles present
Golf Course Pond 3	PDA	-	-	-
WC-C	PDA	-	-	-
WC-D	PDA	-	-	-
WC-F	PDA	-	-	-
WC-I	PDA	-	-	-
WC-J	PDA	-	-	-
WC-N	PDA	-	-	-
WC-O	PDA	-	-	-
WC-Z	PDA	-	-	-
Goldfield Creek	PDA	-		✓
Goldfield Creek Tributary (downstream of Lake A-323 only)	LAA	-	-	✓
Goldfield Creek Tributary-North Branch (downstream of Lake A-322 only)	PDA/ LAA	-	-	✓
Mosher Lake	LAA	-	✓	-
SWP3	PDA	-	✓	-
Southwest Arm Tributary (downstream of SWP3)	PDA	-	-	✓
Goldfield Lake	LAA	✓	✓	-
Kenogamisis Lake	LAA	✓	✓	-
Lake A-323	LAA	✓	✓	-
Lake A-321	LAA	-	✓	-
Lake A-320 (remote)	LAA	-	✓	-
Lake A-322 (remote)	LAA	-	✓	-
Marron Lake	LAA	-	✓	-
Magnet Creek	LAA	-		✓
Watercourse H (downstream of Marron Lake)	LAA	-	-	✓
Longacre Lake	LAA	-	✓	-
McKenzie Creek	LAA	-		✓

NOTES:

- ✓ Potential for navigation.
- No potential for navigation.

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Chapter 18.0 (TLRU VC), identifies traditional travelways along Goldfield Creek, Goldfield Creek Tributary, SWP3, Southwest Arm Tributary, Goldfield Lake, Kenogamisis Lake, and Magnet Creek watercourses.

16.2.2.7 Visual Setting and Acoustic Environment

The existing visual character of the PDA is described in terms of views from four vantage points located within the LAA. The following vantage points were selected based on the most common vantage points on the Project and are considered representative of consultation input.

- Michael Power Boulevard looking south toward the Project
- Intersection of Highway 11 and Lahtis Road looking east toward the Project
- Kenogamisis Lake looking west toward the Project
- The entrance of MacLeod Provincial Park along Highway 11 looking west toward the Project.

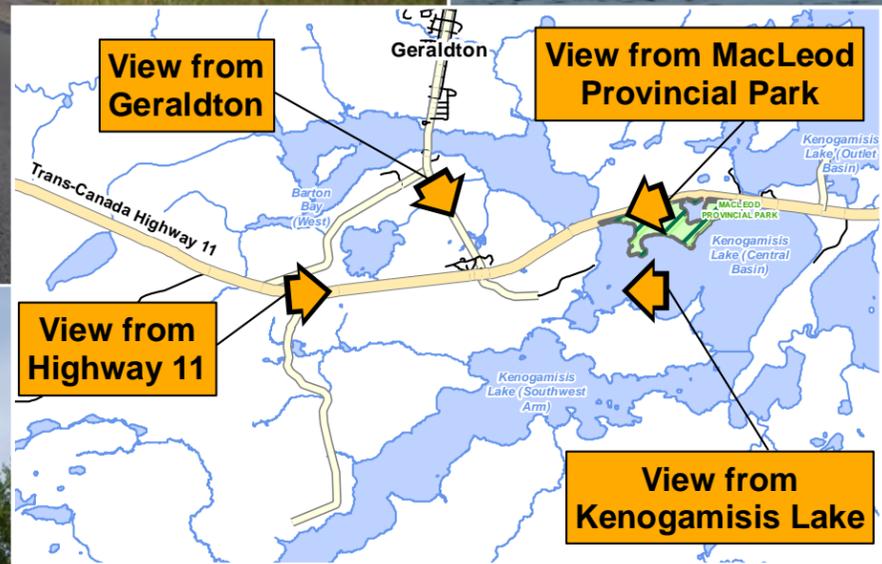
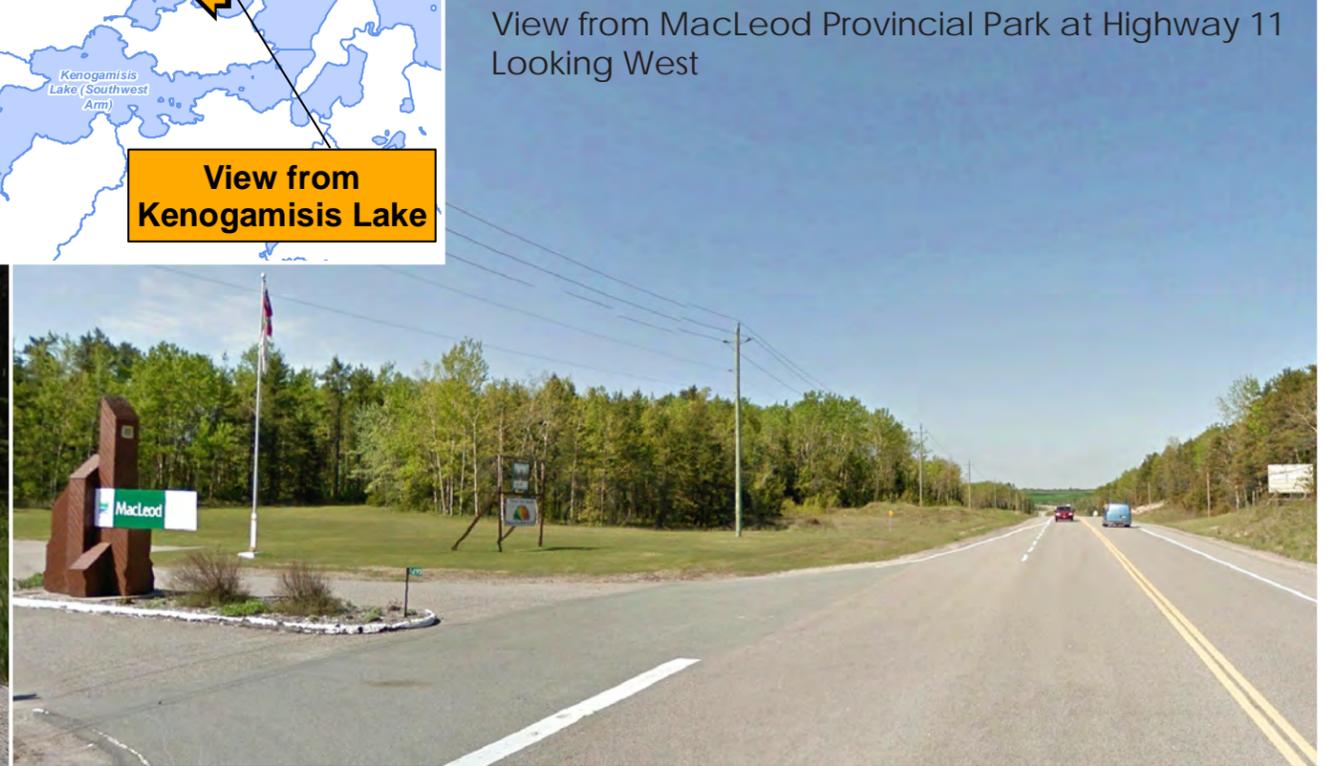
Photographs illustrating views from each of the four vantage points listed above are provided in Figure 16-4.

The existing visual character of the PDA consists of Highway 11, commercial and residential properties, deciduous and coniferous forest cover, wetlands such as swamps, marshes, bogs and fens, and the historical mining area that has been altered through past forestry and mining activities. Historical mining infrastructure characterizes this area, such as the former headframe, mine shafts and a glory hole. Vegetation cover is not extensive and ranges from sparsely vegetated open areas to mature wooded areas. Highway 11 is a prominent feature of the physical landscape traversing relatively flat terrain and bisecting forested areas. Views from Kenogamisis Lake consist of uninterrupted dense forest along a flat shoreline dominated by views of the sky (Figure 16-4).

Lighting measurements of sky glow ranged from 20.7 – 21.3 magnitudes per square arcsecond (mag/arcsec²) (Atmospheric Environment TDR; Appendix F1) and were similar to an E2 region as defined by the CIE, or a rural area with few residents where the lighting environment is considered 'low brightness'. Stars appear large and close in the night sky and in the absence of haze the Milky Way can be seen to the horizon.

Based on observations from the baseline study of the acoustic environment ("Environmental Baseline Data Report – Hardrock Project: Acoustics"; Appendix E2) it was found that vehicle traffic along Highway 11 and Michael Power Boulevard were the dominant sources of noise within the RAA during daytime hours, while sound from the natural environment dominated the night-time hours. This is typical for small communities located near a major highway, where daytime traffic dominates the acoustic environment at 50 decibels, A-weighted (dBA) and natural sounds dominate in the absence of traffic noise, closer to 40 to 45 dBA. The acoustic environments within the LAA and RAA are characteristic of a Class 2 acoustical environment; that is defined by the MOECC publication *Environmental Noise Guideline - Stationary and Transportation Sources – Approval and Planning, Publication NPC-300* as an environment which experiences "urban hum" or traffic noise during daytime hours while sound from the natural environment dominates the night (MOE 2013).

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View from Highway 11 Near Lahtis Road Looking East

View from MacLeod Provincial Park at Highway 11 Looking West

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March 2017
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Client/Project
Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
16-4

Title
**Vantage Points -
Existing Conditions**

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16.2.2.8 Recreational Areas

MacLeod Provincial Park

MacLeod Provincial Park is located across the central basin of Kenogamisis Lake to the east of the PDA. The Park is designated as a Recreational Class Park (Ontario Parks 2011), whose management is guided by the *MacLeod Provincial Park Management Plan* (Ontario Parks 1987). Since 1994, MacLeod Provincial Park has been managed jointly by Ontario Parks and the Municipality, and has been operated by Geraldton Community Forest Inc. under a contract with the Municipality (Ontario Parks 2011).

Under the *Provincial Parks and Conservation Reserves Act*, park management plans must be reviewed every 10 years. Ontario Parks published terms of reference in 2011 to initiate the review process for the *MacLeod Provincial Park Management Plan* (Ontario Parks 2011). The *MacLeod Provincial Park Terms of Reference* describe the objectives of the plan as:

- the permanent protection of the woodlands, wildlife habitat and beaches in MacLeod Provincial Park
- the maintenance of biodiversity and protection of provincially significant elements of Ontario's natural and cultural heritage, including the archaeological sites in MacLeod Provincial Park
- the provision of opportunities for compatible, ecologically sustainable recreation.

MacLeod Provincial Park is approximately 74 ha in size, approximately half (38 of 74 ha) of which has been developed for the campground and day-use area. The Park offers 120 campsites, 28 of which have electrical service, and a group camping area. The campsites are open from May 15 to the last weekend in September (Ontario Parks 2011). Fifty of the campsites are leased on a seasonal basis and are occupied for the entire operational season. Campsites are located on the eastern half of the park, with most campsites located on the east side along the shore of the park's lagoon or along the shore of Kenogamisis Lake looking southeast. A hiking trail/natural environment zone is located on the western portion.

Other services at the Park include two comfort stations (washrooms/showers/laundry), vault toilets, a trailer dumping station and a fish cleaning station. A Groundwater Under the Direct Influence of surface water well supplies drinking water. The Park also has a sandy beach for swimming.

In addition to swimming and camping, MacLeod Provincial Park offers opportunities for fishing, boating, canoeing, biking, picnicking and birdwatching. Recreational facilities within the Park include a bandstand/stage (for concerts), a playground, a day-use area, a boat launch and nature and ski trails.

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Local visitors make use of the park for day-use, seasonal campsites, and special events given its proximity to both Geraldton and Longlac. Information provided by Ontario Parks provides an indication of the level of usage for both day-use and camping from 2014 to 2016 and is shown in Table 16-8. The data are based on 120 developed campsites with an average camping party size of 2.9 people, and an average day use vehicle having 1.4 people per vehicle. However, the day-use statistics are considered unreliable because there is no charge for day-use access to the Park and the number of day-use visitors is not consistently tracked (MNRF pers. comm. 2016). Data for 2016 are for May to July, and do not include August or September.

Table 16-8: MacLeod Provincial Park Visitor Statistics, 2014 to 2016

Month	2014			2015			2016		
	Day-Use	Campers	Total	Day-Use	Campers	Total	Day-Use	Campers	Total
May	11	687	698	0	1,273	1,273	0	1,069	1,069
June	13	3,109	3,122	14	3,280	3,294	4	3,631	3,635
July	10	3,506	3,516	3	3,219	3,622	0	3,718	3,718
August	3	3,492	3,495	3	3,512	3,515	-	-	-
September	0	1,202	1,202	0	2,108	2,108	-	-	-
Total	37	11,996	12,033	20	13,392	13,812	4	8,418	8,422

SOURCE: MNRF pers. comm. 2016

NOTE:

- not available

Based on the park use survey conducted for the Project (24 respondents), most park users (63%) are residents of Geraldton and most visitors (88%) had visited the Park previously (74% of respondents had visited the Park more than 10 times in the past). MacLeod Provincial Park is a destination for visitors (87%) and visitors typically stayed multiple nights (75%). Popular activities in the park include camping (19%), fishing (15%), hiking/walking (14%), swimming (13%), and boating (9%). The location of these activities is most often at the campground (39%) and Kenogamisis Lake/Access Point/Beach (26%). Park visitors often hear highway traffic (44%), vehicles on roads within the park (31%), and other noise sources (21%), but some respondents don't hear any noise (4%). Traffic on Highway 11 near the Park was most often reported as moderate (46%), with other respondents reporting very high (8%), high (29%) and low (17%) traffic levels.

Recreational Trails

The Barton Bay Wildlife Trail is a walking trail that starts at the Discover Geraldton Interpretive Centre in the PDA and winds 4.2 km through the PDA and LAA. It is utilized by both local residents and visitors, school groups and tourists (Discover Geraldton Interpretive Centre 2013). Through the property owners survey, it is understood that residents of Rosedale Point and Little Longlac use the trail on a regular basis.

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Snowmobile trails maintained by the Greenstone Snowmobile Club (formerly the Geraldton Snow Club) traverse the PDA. Snowmobile trails may also be used to access areas for traditional purposes. In comments made by AFN to the CEA Agency, AFN confirmed they use snowmobile trails, which are operated by the Ontario Federation of Snowmobile Clubs and maintained by the Greenstone Snowmobile Club. Most segments of the snowmobile trails in and near the PDA run parallel to Michael Power Boulevard, Lahtis Road and Old Arena Road. Geraldton Snowmobile Club has confirmed that the trail along Lahtis Road is no longer maintained. Snowmobile trails also extend throughout the LAA and connect to a larger network of snowmobile trails in the RAA. Trails around Geraldton are part of the Greenstone Snowmobile Loop and connect Geraldton to the towns of Nakina and Longlac (Longlac and Geraldton Snow Clubs n.d.).

There are 128 members of the Greenstone Snowmobile Club, 78 of whom are local to the area. Other memberships are sold to visitors when they come to Greenstone to use the snowmobile trails. GGM met with a representative of the Greenstone Snowmobile Club on August 23, 2016 to provide a Project update and discuss potential future implications to the Club as a result of the Project. During the meeting, it was identified that the Geraldton loop to Jellicoe that follows Lahtis Road was not open during the 2015 season and the snowmobile club do not have plans to maintain the trail at the present time. The Lahtis Road portion of the snowmobile trail was an Ontario Federation of Snowmobile Clubs' trail maintained by the Greenstone Snowmobile Club. GGM committed to assisting the Greenstone Snowmobile Club with labour and equipment to improve existing trails and will also provide sponsorship for trail signage. Future meetings between the Club and GGM are planned.

A small portion of the RAA (near the Kenogami River) falls within the jurisdiction of the Longlac Snowmobile Club. The Longlac Snowmobile Club's trail to Nakina falls outside of the RAA.

Other recreational trails in the LAA include a short walking trail in MacLeod Provincial Park and a small network of cross-country ski trails that are maintained by the Geraldton Nordic Ski Club (Geraldton Nordic Ski Club 2014). The cross-country ski trails are located in the provincial park.

Several trails shown in Figure 16-3 are listed as "other trails". They are identified in the LIO Data Warehouse and may consist of old decommissioned mining or forestry roads that may be used for recreation (MNRF pers. comm. 2015).

Table 16-9 lists the types and lengths of recreational trails that are overlapped by the PDA and LAA and identifies portions of the trails that occur on both Crown and patent land. GGM has undertaken discussions with each surface rights holder (i.e., patent land) to purchase these surface rights and most negotiations have been concluded. Recreational trails are shown in Figure 16-3.

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Table 16-9: Length of Recreational Trails and Land Ownership in the RAA

Trail Type	PDA		LAA		RAA	
	Crown Land (km)	Patent Land (km)	Crown Land (km)	Patent Land (km)	Crown Land (km)	Patent Land (km)
Hiking trails	0.2	1.4	3.3	5.3	129.1	16.0
Greenstone Snowmobile Club trails	4.3	5.3	7.6	16.4	60.3	53.2
Cross-country ski trails	-	-	6.8	-	6.8	0.00
Other trails	-	-	36.2	0.1	123.4	0.2

SOURCE: MNRF 2014d

NOTE:

- not available

Other Recreational Areas

The Kenogamisis Fish and Game Conservation Campground is located off Highway 11, near the second bridge at the main narrows of Kenogamisis Lake. The campground offers a variety of recreational activities including camping, swimming, and boating.

Four Kenogamisis Fish and Game Conservation Campground visitor surveys were submitted to GGM. Copies of the completed surveys are included in the RoC (Appendix C). Half of the visitors were from Geraldton and half from elsewhere in Ontario. The respondents were a mix of couples, families, repeat visitors, day users, and night and multiple night users. Popular activities in the campground include the clubhouse, kayaking, campfires, family gatherings, birding, swimming, camping, and picnicking. The survey respondents often hear existing highway traffic, vehicles on roads within the park, and other noises. However, the survey results are only generally indicative of visitor characteristics, park use and experiences, given the small number of respondents.

Other recreation sites in the LAA include a swimming area at the south end of Geraldton and a Crown land campsite located off Lahtis Road on the shore of the Southwest Arm of Kenogamisis Lake (Figure 16-3). The campsite has a sloped area that is used as a boat launch, although there is no ramp or other structures at the site.

Two public access points are located at the end of Lahtis Road and via Hardrock Road on the Southwest Arm of Kenogamisis Lake. The access points are used for fishing, as boat launches, and as launches for ice fishing shelters.

The PDA, LAA and RAA also contain lands that may be used for recreation and which are held privately (as discussed in Section 16.2.2.1). Land tenure and ownership are described in Chapter 2.0 (environmental setting).

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Recreational facilities, including the Kenogamisis Golf Club and municipal parks, are described in Chapter 15.0 (community services and infrastructure VC).

16.2.2.9 Mining and Aggregates

Mineral Tenures and Exploration Activity

Historical mining in the PDA and surrounding region is described in Chapter 2.0 (environmental setting). Currently, the PDA intersects 15 active mining claims, which are distributed across the townships of Errington, Salsberg, Ashmore and McKelvie. Table 16-10 lists the active mining claims that are overlapped by the PDA and LAA. The three largest claim holders in the LAA are GGM, Prodigy Gold Inc. and Scott David Shields (MNDM 2016). GGM is the sole holder of mining rights in the PDA, except for a mining claim on the west side of the PDA which is held by Tombill Mines Ltd. (Figure 16-5). Refer to the Glossary for the definition of mining tenure terms shown on Figure 16-5. GGM is in the process of acquiring the surface rights to a small portion of the Tombill mining claim that falls within the PDA. The northern portion of the peninsula east of the PDA is active mining claims and dispositions held by GGM and others. The inset on Figure 16-5 illustrates the surface and mining rights for MacLeod Provincial Park. All of the surface rights for MacLeod Provincial Park are held by the Crown, whereas GGM holds the mining rights to the majority of the Park area, except for a small portion as shown on Figure 16-5.

GGM is currently undergoing the Claims to Lease process for the unpatented claims in the southern part of the PDA (CLM 535) (shown in Figure 2-4) and limited areas of the 120 m surface rights reservation around Kenogamisis Lake that is affected by the PDA.

Table 16-10: Active Mining Claims in the PDA and LAA, 2016

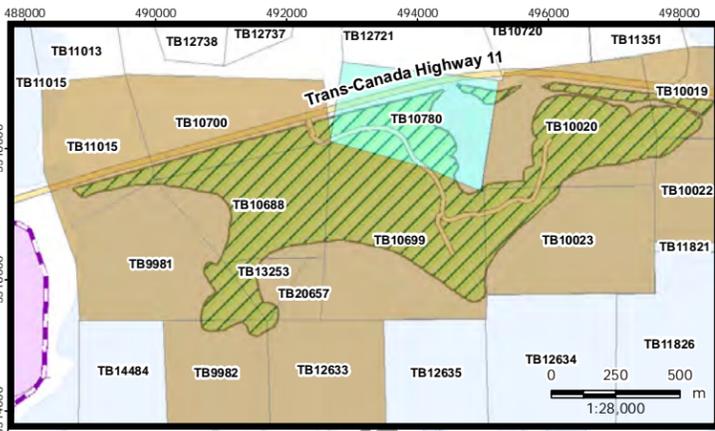
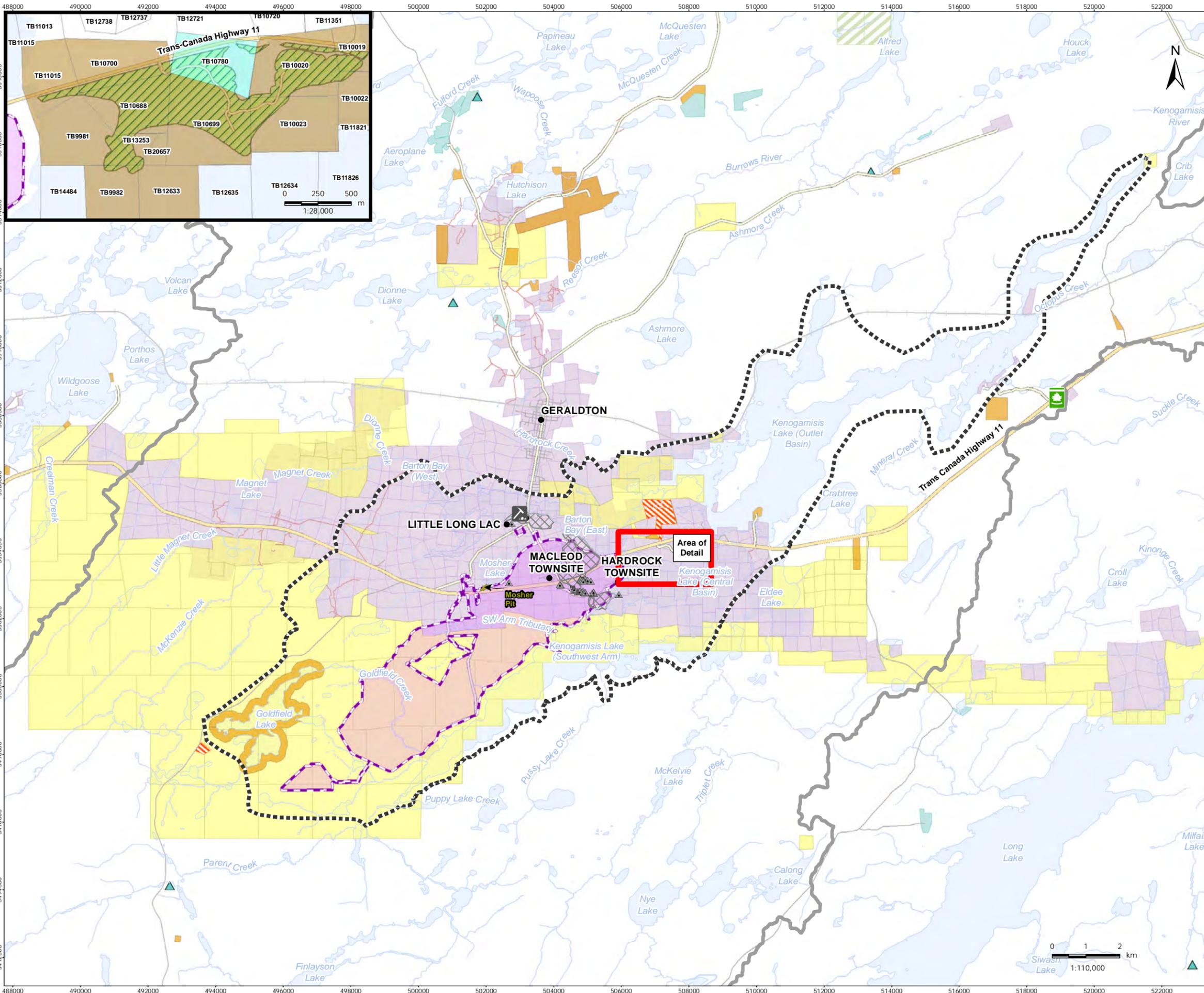
Mining Tenure	PDA	LAA
Number of active claims	18	115
Area of active claims (ha)	1,377	3,998

SOURCE: MNDM 2016

Exploration activity in northwestern Ontario is focused primarily on gold, although some activity also targets diamonds, chromite, base metals and platinum.

Aggregate Resources

Aggregate extraction occurs in the LAA. One sand and gravel pit, the Mosher Pit, is located within the PDA to the south of Mosher Lake and north of Highway 11 (Figure 16-5). Mosher Pit is situated on GGM's patented land and was previously operated by Premier under permit. Additionally, there are two aggregate sources (i.e., site AP 500 095 and AP 500 090), both located on Crown land and operated by the Ontario Ministry of Transportation (Figure 16-5). Site AP 500 095 is located within the LAA and operates as both a pit and quarry. Site AP 500 090 is just outside of the LAA and operates as a pit.



- Legend**
- Advanced Mining Exploration Activities (Premier)
 - Historic Mine Building
 - Historic Mine Shaft
 - Moshier Pit
 - Historic Tailings Area
 - Regional Assessment Area
 - Local Assessment Area
 - Project Development Area
- Existing Features**
- Highway
 - Major Road
 - Local Road
 - Other MNR Non Forestry Roads
 - Watercourse - Permanent
 - Watercourse - Intermittent
 - Inactive Aggregate Site
- Mining Activity**
- Active Aggregate Site
 - MTO Aggregate Site
 - Pending Mining Claim
 - Active Alienation
 - Active Mining Claim
 - Active Disposition
 - Waterbody
 - Surface Rights (Crown)
 - Mining Rights (Crown)
 - Surface Rights (Crown) Mining Rights (Goldstone Gold)

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 16N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.

Client/Project
Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
16-5

Title
Mining Tenures and Aggregate Resources

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 Revised: 2017-03-16 By: dhanvey

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16.2.2.10 Forestry

The PDA and majority of the LAA are located within the Kenogami FMU; a small area of the LAA is in the Lake Nipigon FMU (Figure 16-6). The Kenogami FMU is administered by the MNR and managed by Ne-Daa-Kii-Me-Naan Inc. under an eFRL. An eFRL is defined as a “transitional area for First Nations seeking a longer-term forest license” (Four Rivers Matawa Environmental Services Group 2015) such as a Sustainable Forest License which allows for 20 years of tree harvesting. Forest management activities in the Kenogami FMU are guided by the *Kenogami Forest Management Plan 2011–2021* (Terrace Bay Pulp 2011b). Term 2 of the plan covers 2016 to 2021 (Ne-Daa-Kii-Me-Naan Inc. 2015). According to operations plans for Term 2, most of the harvest areas in the LAA are located in the western portion of the PDA and LAA; however, there are also small areas of planned harvest and renewal on the north shore of Kenogamis Lake. The *Lake Nipigon Forest Management Plan 2011–2021* does not identify areas of active forest management within the LAA.

The total planned areas for harvest and renewal for the Term 2 of the Kenogami Forest Management Plan in the PDA and LAA are presented in Table 16-11.

Table 16-11: Planned Forest Management Activities in Kenogami FMU (2011–2021) in the RAA

Forest Management Activity	PDA	LAA	RAA
Planned harvest area (ha)	342	757	757
Planned renewal area (ha)	0	28	28

SOURCE: Terrace Bay Pulp 2011a, b; Ne-Daa-Kii-Me-Naan Inc. 2015

Commercially valuable tree species in the PDA and LAA, as identified by the MNR (MNR pers. comm. 2015), are:

- jack pine
- white spruce
- black spruce
- balsam fir
- white birch
- trembling aspen
- tamarack

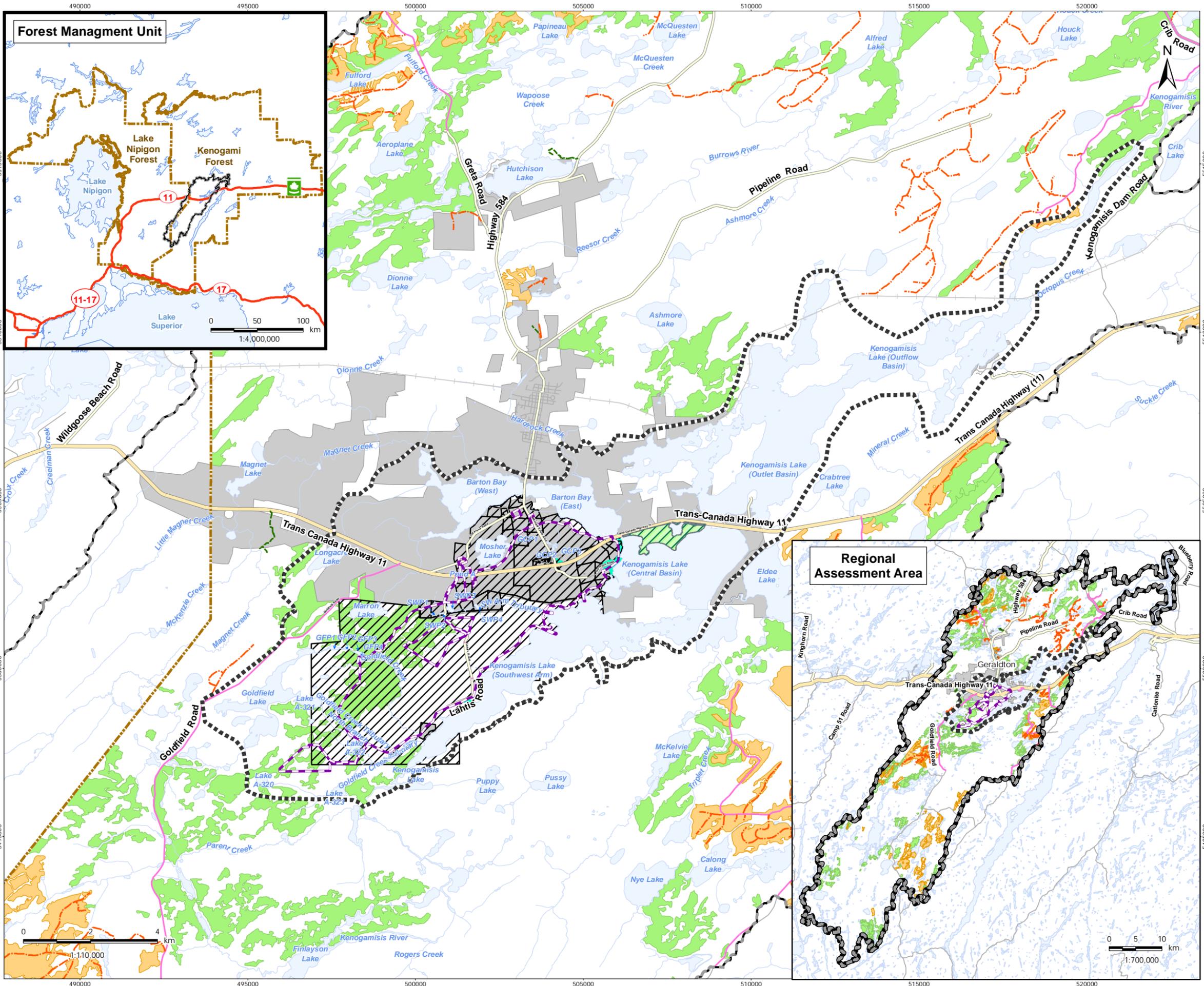
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The most recent harvest data published for the Kenogami FMU presented the top five most harvested species in the FMU by area: spruce (1,289 ha), followed by conifer mixedwood (826 ha), pine-spruce mixedwood (611 ha), spruce lowland 3 (755 ha), spruce lowland 1 (645 ha) and pine-spruce mixedwood (611 ha) (MNR and Ne-Daa-Kii-Me-Naan Inc. 2013). Wood from the FMU supplies mills in Terrace Bay, Hearst and Longlac (Government of Ontario 2015b). There are no mills within the LAA. Harvested wood is used for pulp, lumber and specialty products, veneer and plywood, fuel wood, road and bridge construction on cut blocks, and bioproduct, which is made from biofibre mixedwood (MNR and Ne-Daa-Kii-Me-Naan Inc. 2013).

Based on data from applicable forest management plans, LIO datasets and air photos, there are no discernible forestry camps or timber yards within the LAA.

The patents for most patented land within the PDA include conditions which reserve certain rights to the Crown (e.g., minerals, trees, the right to construct roads).



Legend

- Regional Area of Assessment
- Local Assessment Area
- Project Development Area
- Forest Management Unit
- Crown Tree Reservation
 - No
 - Yes
- Forest Management Plan **
 - Patent Land
 - Planned Harvest Area (2011-2021)
 - Planned Renewal (2011-2021)
- Forestry Road - Open *
- Forestry Road - Limited *
- Forestry Road - Winter *
- Forestry Road - Status Unknown *

Existing Features

- Highway
- Major Road
- Local Road
- Watercourse - Permanent
- Watercourse - Intermittent
- Waterbody

Notes

- Coordinate System: NAD 1983 UTM Zone 16N
- Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.

* Forestry Roads are shown only within the Regional Assessment Area

** Patent Land, Planned Harvest Areas, and Planned Renewal Areas are only shown within the Regional Assessment Area

Client/Project
Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
16-6

Title
Planned Forest Management
Activity and Forest Access Roads

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 Revised: 2017-04-24 By: dhanvey

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16.3 PROJECT INTERACTIONS WITH LAND AND RESOURCE USE

Table 16-12 identifies Project physical activities that may interact with land and resource use. These interactions are indicated by a check mark (✓) and are discussed in Section 16.4 in the context of effects mechanisms, mitigation, and residual effects. Justification for non-interactions (-) is provided following Table 16-12.

Table 16-12: Potential Project Environmental Effects on Land and Resource Use, Prior to Mitigation

Project Components and Physical Activities	Potential Environmental Effects (prior to mitigation)		
	Change in recreational land and resource use	Change in commercially-based land and resource use	Change in navigation
CONSTRUCTION			
Site Preparation (removal of existing buildings and associated infrastructure, timber harvesting, vegetation clearing, earthworks, overburden and topsoil stockpiling, temporary effluent treatment and discharge)	✓	✓	-
Watercourse Crossings and Goldfield Creek Diversion	✓	✓	✓
Pre-Production Mining and Development of Mine Components (open pit, waste rock storage areas, ore stockpile, water management facilities, Phase 1 of TMF)	✓	✓	✓
Buildings and Supporting Infrastructure (process plant, temporary camp, STP, mine dry, administration building, truckshop, warehouse and offices, power plant)	✓	✓	-
Linear and Ancillary Facilities (site roads and parking areas, onsite pipelines, power lines/transformer station, fuel supply, storage and distribution)	✓	✓	✓
Highway 11 Realignment and MTO Patrol Yard Relocation	✓	✓	✓
Aggregate Sources (excavation and dewatering related to aggregate source development and extraction)	✓	✓	-
Employment and Expenditure	✓	✓	-
OPERATION			
Open Pit Mining (drilling, blasting, loading and hauling of ore and waste rock)	✓	✓	-
Waste Rock Disposal	✓	✓	-

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Table 16-12: Potential Project Environmental Effects on Land and Resource Use, Prior to Mitigation

Project Components and Physical Activities	Potential Environmental Effects (prior to mitigation)		
	Change in recreational land and resource use	Change in commercially-based land and resource use	Change in navigation
Ore Processing (ore crushing and conveyance, ore milling)	✓	✓	-
Water Management (contact water collection system, process water supply, effluent management and treatment, open pit dewatering)	✓	✓	-
Tailings Management (including excavation and removal of historical tailings)	✓	✓	-
Site Buildings, Linear Facilities and Associated Infrastructure (site roads, power plant, explosives facility, fuel supply, storage and distribution)	✓	✓	-
Employment and Expenditure	✓	✓	-
CLOSURE			
Active Closure (primary decommissioning and rehabilitation)	✓	✓	✓
Post-Closure (pit filling and monitoring)	✓	✓	-
Employment and Expenditure	✓	✓	-

NOTES:

- ✓ Potential interactions that might cause an effect without mitigation.
- Interactions are not expected.

Changes in recreational and commercially-based land and resource use are concerned with effects on land-based areas or watercourses where these activities occur.

The assessment of effects on navigation is concerned with direct effects on the navigability of watercourses. Project activities that could directly affect navigation are the construction of watercourse crossings and realignments, and infilling of navigable watercourses. Other activities are limited to land and would not affect navigation. Although access restrictions imposed as part of site preparation could affect access to boat launches and infrastructure, these effects would not directly affect navigation. Access restrictions that could affect water-based activities (i.e., boating, fishing, hunting, trapping, guide outfitting and bait harvesting) are assessed as part of recreational land and resource use and commercially-based land and resource use.

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Some commercial plant harvesting by Aboriginal peoples may occur (e.g., berry gathering, driftwood). Changes in the abundance of plant species of interest to Aboriginal communities or vegetation communities that support harvested species is assessed in Chapter 12.0 (vegetation communities VC).

16.4 ASSESSMENT OF RESIDUAL ENVIRONMENTAL EFFECTS ON LAND AND RESOURCE USE

16.4.1 Analytical Methods

16.4.1.1 Analytical Assessment Techniques for Land and Resource Use

Assessment techniques used to quantify potential Project effects on land and resource use include spatial analysis and existing conditions data collection on the extent of land and resource use activity in the PDA, LAA and RAA. Qualitative analysis of Project effects was also carried out to characterize the nature of Project effects and relied on data collected from literature review, surveys and interviews, targeted consultation with commercial users, an understanding of Project mechanisms and mitigation, information from other VCs and professional experience.

Specifically, reductions in the size of licensed areas and areas potentially used for recreation were assessed by examining the overlap of the land use area by the Project. Similarly, changes in access to areas potentially used for commercial and recreational activities were also assessed by determining the potential access restrictions resulting from the Project.

Sensory disturbance as a result of the Project was assessed both quantitatively (in the case of atmospheric and acoustic) and qualitatively (for visual). Chapters 7.0 and 8.0 describe the methods used to assess potential atmospheric (dust and light) and acoustic effects, respectively. A qualitative analysis of the potential change in visual setting was conducted by considering the changes in visual quality associated with the WRSAs and TMF. The visual assessment considered the views from four vantage points in the LAA. Views under existing conditions are compared to future views as developed through computer simulations.

Due to the relationship between the land and resource use VC and other socio-economic and biophysical VCs, reference is made to other assessment sections, as appropriate, and conclusions related to these VCs are used to define the Project mechanisms for land and resource use. For instance, fish and wildlife habitats and populations are important to the practice of commercial harvesting and consumptive recreation and the residual effects on fish and fish habitat are considered as an input to the availability of resources to these activities. Refer to Chapters 11.0 and 13.0 for further details regarding the technical assessment for fish and fish habitat and wildlife and wildlife habitat, respectively.

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16.4.1.2 Assumptions and the Conservative Approach

A conservative approach was used throughout the assessment to address data limitations and availability (e.g., low questionnaire response rates and limited information on hunting and trapping). In addition, when identifying potential interactions between the Project and land use activities, activities with a degree of uncertainty were assumed to contribute to the environmental effect. Land use activities were assumed to occur within the LAA and RAA, even if information collected through questionnaires or consultation did not specifically identify these activities or site-specific uses.

GGM is committed to maintaining an alternate access within the PDA to the Southwest Arm of Kenogamisis Lake during construction and operation, however to be conservative the assessment in this chapter assumes that access to the Southwest Arm of Kenogamisis Lake through the PDA will be restricted during construction and operation.

16.4.2 Assessment of Change in Recreational Land and Resource Use

The assessment of change in recreational land and resource use (e.g., hunting, fishing, use of trails, and camping) was assessed for those Project activities identified with a checkmark in Table 16-17.

16.4.2.1 Project Mechanisms for Change in Recreational Land and Resource Use

In the absence of mitigation measures being applied, Project mechanisms for a change in recreational land and resource use are as follows:

- Removal of areas in the PDA used for recreational purposes such as fishing, hunting, snowmobiling, and hiking due to site clearing during construction.
 - The assessment assumes removal of recreational resource areas within the PDA occurs during construction, and effects associated with removal are predicted throughout all Project phases. As discussed in Section 16.1, effects on recreational facilities and associated infrastructure within the Municipality of Greenstone, including the Kenogamisis Golf Club, the historical MacLeod-Cockshutt Mining Headframe and the Discover Geraldton Interpretive Centre are assessed in Chapter 15.0 (community services and infrastructure VC).
 - GGM has acquired privately-held recreation sites in the PDA that will become inaccessible.

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- Access to the PDA will be restricted during construction and continue throughout operation, and active closure. This will restrict access to recreational areas in and adjacent to the PDA:
 - Closure of Lahtis Road at Highway 11 will alter access to recreational areas located adjacent to the PDA along the shoreline of the Southwest Arm of Kenogamisis Lake, including the Crown land campsite and public access points (including boat launch areas also used for launching ice fishing huts). Current use of Lahtis Road and these recreational areas has been confirmed by recreational land users, LLFN and MNO (refer to Chapter 18.0 for further information).
 - Access to waterways in the PDA will be restricted due to safety concerns. This includes use of the Southwest Arm Tributary, Goldfield Creek diversion and Goldfield Creek Tributary – North Branch (downstream of Lake A-322).
 - Access to the PDA will be managed through installation of a remotely-operated vehicle gate on the site access road, controlled by security personnel on 24-hour duty. Signage will also be placed at locations around the perimeter of the PDA to identify the presence of the Project and its components.
- The Project may result in a decrease in wildlife in the LAA due to vegetation clearing resulting in habitat loss in the PDA, sensory disturbance, increased risk of mortality and disruption of existing wildlife movement patterns (Section 13.4).
 - This could include a decrease in the presence of wildlife species of potential interest to hunters, which could thereby reduce opportunities for hunting these species within the LAA.
 - With the implementation of the identified mitigation measures in Chapter 13.0 (wildlife and wildlife habitat VC), direct mortalities resulting from the Project are expected to be within the normal variability of baseline conditions and are not expected to affect the long-term persistence or viability of wildlife within the RAA.
- Project mechanisms that have potential to affect the availability fisheries resources in the LAA are the same mechanisms that have potential to affect fish and fish habitat as discussed in Section 11.4, including:
 - During construction, operation, and closure potential mechanisms for lethal and sub-lethal effects on fish include: the mobilization and transport of sediment to fish habitat; changes to flow; dewatering; destruction of fish eggs; stranding of fish; the introduction of deleterious materials to fish habitat from point (i.e., treated effluent discharge) and non-point sources (i.e., surface run-off, groundwater seepage, and dustfall); and shock waves from explosives usage.
 - A permanent alteration of fish habitat may occur through changes to water characteristics from treated effluent, groundwater discharge, physical changes, extraction of surface water, changes to the riparian vegetation and structure, and changes to flow regime related to construction, operation, and closure activities.

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- Fish habitat may be lost as a result of the placement of materials or structures in water during construction. No operation or closure activities have been identified that would result in a loss of fish habitat. Loss of fish habitat that cannot be avoided will be addressed through the implementation of the Fish Habitat Offset Plan. Based on the results of the assessment on fish and fish habitat, effects on the sustainability and productivity of CRA fisheries within the LAA are not anticipated as a result of the Project. Therefore, no potential effects on the availability of fisheries resources are anticipated in the LAA during all Project phases.
- The in-migration of construction and operation workers could increase competition for species valued by hunters and anglers.
 - This pressure would be managed to great extent through existing provincial catch and bag limits and tag and seal requirements for valued species. Furthermore, pressure on fish and wildlife species within the LAA would likely be dispersed over a large area because of the tendency of hunters and anglers to seek out less frequented areas for their activities and areas where resources are more plentiful. Given the abundance of less disturbed areas outside away from the PDA, it is likely that local competition would not be a major issue. Therefore, no potential effects on fish and wildlife resources as a result of increased competition are anticipated in the LAA.
- Recreational users in the LAA, including visitors to MacLeod Provincial Park, may be affected by sensory disturbance resulting from Project activities during construction, operation and active closure. Sensory disturbance may result from:
 - increased emissions of dust and light (refer to Sections 7.4.2.1 and 7.4.4.1)
 - increased levels of noise and vibration (Section 8.4.2.1)
 - increase in traffic on Highway 11 because of the Project (“Traffic Impact Study, Premier Gold Mines Limited, Hardrock Property”; Appendix F9)
 - changes to the visual landscape as the WRSAs and TMF increase in geographic extent and height.

16.4.2.2 Mitigation for Change in Recreational Land and Resource Use

Mitigation to reduce adverse effects on recreational land and resource use is presented in Table 16-13.

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Table 16-13: Mitigation Measures for a Change in Recreational Land and Resource Use

Mitigation Measure for a Change in Recreational Land and Resource Use	Construction	Operation	Closure
Implementation of mitigation outlined for the atmospheric environment (Chapter 7.0), acoustic environment (Chapter 8.0), fish and fish habitat (Chapter 11.0) and wildlife and wildlife habitat (Chapter 13.0).	✓	✓	✓
Provide in-kind support to assist Greenstone Snowmobile Club in improving the existing trail to Longlac.	✓	-	-
Where possible in accessible areas (e.g., along cleared rights-of-way), leave trees and other vegetation in place to buffer the view of Project components, reducing the change in viewshed and muffling nuisance noise.	✓	✓	-
Site the majority of Project components so as to achieve a 120-m setback for the surface rights reservation area on claim to lease lands and a 30-m high water mark setback for patent lands; existing vegetation will remain in these areas.	✓	-	-
Implement progressive rehabilitation works, including stabilization and rehabilitation of aggregate source areas, the north cell of the TMF, plateaus and benches of WRSAs A, B, and C and the overburden storage areas.	✓	✓	-
Remove construction-related buildings, access roads and laydown areas following construction.	✓	-	-
Initiate revegetation as soon as practical after Project components are no longer needed.	✓	✓	✓
Rehabilitation will be designed to meet desired end land uses, end land uses will be identified in the Closure Plan, in consultation with agencies, stakeholders and Aboriginal communities, as the Project progresses.	-	-	✓

NOTES:

- ✓ Mitigation measures are applicable.
- Mitigation measures are not applicable.

In addition to the mitigation measures to reduce potential environmental effects other commitments include:

- GGM is committed to maintaining alternate access within the PDA to the Southwest Arm of Kenogamisis Lake during construction and operation.
- Communicate Project activities, locations and timing throughout construction, operation and closure to affected land and resource users, interest groups, the MNRF and local authorities.
- Use signage at locations around the perimeter of the PDA to alert local land and resource users of the presence of the Project and its components.

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- Follow-up and monitoring, and adaptive management for the acoustic environment as outlined in Chapter 23.0 and the "Hardrock Project Conceptual Noise and Vibration Management and Monitoring Plan" (Appendix M10):
 - Consideration of broadband backup alarms for select construction equipment to reduce potential for complaints (e.g., trucks operating at WRSA A).
 - Consideration of refinements to construction methods for WRSA A to further reduce sound level disturbance to park users, if needed.
- GGM will support the Greenstone Snowmobile Club through sponsorship of signs put up on the trails around the Geraldton and Longlac areas.

16.4.2.3 Characterization of Residual Effect for Change in Recreational Land and Resource Use

The predicted residual effects on land and resource use as a result of the Project are as follows. The residual effects for a change in recreational land and resource use apply to all users (Aboriginal and non-Aboriginal).

Decrease in the Availability of Hunting Areas and Wildlife

GGM is required to restrict access to the PDA so that mining activities can be carried out safely. Although access to the PDA will be restricted, the removal or restriction of areas considered appropriate for hunting is conservatively estimated at 1,950 ha, slightly less than the total PDA of 2,200 ha, and excludes lands where hunting is impractical or unlawful, such as in the urban settlement areas and golf course.

In addition to the removal of wildlife habitat, sensory disturbance and a change in wildlife mortality risk and movement patterns may adversely affect the availability of wildlife in the LAA (Chapter 13.0). The Project may result in avoidance or under-utilization of habitat by wildlife within 200 m of the PDA due to sensory disturbance (i.e., noise, light and/or vibration). However, habitat within this sensory disturbance zone is expected to retain some value for wildlife. The environmental effects assessment for wildlife (Chapter 13.0) predicts an adverse effect on wildlife and wildlife habitat due to the removal of habitat from the PDA and from the indirect loss or alteration of wildlife habitat due to sensory disturbance, an increase in wildlife mortality risk and the disruption to wildlife movement patterns within and across the LAA.

The decrease in the availability of hunting areas or wildlife resources is predicted to reduce the ability to undertake hunting in the PDA and LAA and is therefore moderate in magnitude. The residual effect is predicted to start in construction and continue throughout operation and active closure. The residual effect on the availability of hunting areas on the PDA is likely to be partially reversed following active closure when access restrictions to part of the PDA are lifted and some wildlife habitat is restored. The effect on the availability of wildlife resources beyond the PDA will be reversed following completion of active closure, when new movement patterns

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are established and sensory disturbance abates and the interactions that result in increased mortality risk within the PDA (e.g., site clearing and human activity) will cease. Seasonal aspects are unlikely to alter the residual environmental effect on recreational hunting, since effects will be restricted to the hunting season and therefore seasonality is implicitly considered in the assessment.

Decrease in the Availability of Fishing Areas or Decrease in Fish

Access to fishing areas located within the PDA will be restricted throughout construction, operation and active closure. Although Goldfield Creek, the Southwest Arm Tributary and Lake SWP-3 support game fish, these areas are not documented fishing areas (i.e., through consultation input, TK studies or observations made during fieldwork). In addition, fish habitat that is altered or lost will be offset by creating new habitat within the Goldfield Creek diversion. A conservative approach will be taken, whereby a greater area of new habitat will be created than the area lost or altered. Overall, there will be no net loss of areas for fishing as a result of the Project. More than half of the 6.58 ha of fish habitat that will be altered or lost is comprised of artificial golf course pond and poor quality habitat such as roadside ditches. Removal of the public access points along the Southwest Arm of Kenogamisis Lake is predicted to prevent anglers from launching their shelters for ice fishing into the Southwest Arm because there is currently no other appropriate location for launching a shelter available on this portion of Kenogamisis Lake. However, access to Kenogamisis Lake is available from two other boat launches, located on Barton Bay East and the Outlet Basin. The loss of access to ice fishing from the Southwest Arm of Kenogamisis Lake will start in construction and continue beyond active closure. The residual adverse effect is considered moderate in magnitude as the reduced access is predicted to diminish the ability to undertake fishing activities in the LAA.

As discussed Section 16.4.2.1, no Project-related effects on sustainability and productivity of CRA fisheries within the LAA are anticipated. Therefore, no residual adverse effects on fish as a resource in the LAA are predicted.

Loss of Recreational Areas or Change in Access

The Project will result in the removal of recreational areas in the PDA and the loss of access to recreational areas adjacent to the PDA through the closure of Lahtis Road and the removal of roads within the Hardrock and MacLeod Townsites.

The removal of areas used for recreational purposes such as fishing, hunting, snowmobiling and hiking are assessed elsewhere within this section (i.e., Section 16.4.2.3).

GGM has consulted with MNRF to discuss the removal of the campsite and the two public access points located on Crown land (shown on Figure 16-3) within the LAA. These sites will be unavailable to users throughout all Project phases. Given the presence of other boat launches and camping areas in the LAA and RAA, this loss is not expected to eliminate opportunities for recreational activities on Crown land.

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Access to waterways within the PDA will be restricted during construction and operation, including Southwest Arm Tributary, Goldfield Creek diversion and Goldfield Creek Tributary – North Branch (downstream of Lake A-322). Users will be notified through use of signage posted at the edge of the PDA.

Lahtis Road will be closed during construction and operation due to safety reasons and will prevent access to areas southwest of the PDA that may be accessed via this route. Although there is no Project-specific information to confirm recreational use of this area it is conservatively assumed that recreational activities occur. An alternate route via Goldfield Road may provide access to areas southwest of the PDA. The closure of Lahtis Road will also alter access to the shoreline of the Southwest Arm of Kenogamisis Lake.

The residual effect is characterized as adverse and is predicted to be moderate in magnitude. The loss of recreational areas in the PDA and reduced access to recreational land and resource use areas in some areas beyond the PDA is predicted to reduce the availability of recreational land and resources in the LAA. The effect will be continuous, long-term and is considered reversible as public access to Lahtis Road to the Goldfield Creek diversion will resume following closure.

Loss of Recreational Trails

The Project is predicted to result in the long-term removal of approximately 10.6 km of snowmobile trails and 1.4 km of the Barton Bay Wildlife Trail in the PDA. The geographic extent of this residual adverse effect is limited to the PDA and removal will occur as a single event during construction. GGM has consulted the Municipality of Greenstone and the Greenstone Snowmobile Club to discuss the removal of these trails. GGM has discussed with the Municipality of Greenstone the possible relocation of the Barton Bay Wildlife Trail and the Municipality has indicated that the potential to relocate the trail may exist in the future. In discussions with GGM, the Greenstone Snowmobile Club indicated that given the location of the PDA, they would prefer to eliminate the southwest portion of the trail system heading to Longlac and improve the existing portion of the trail system to Longlac. No other official snowmobile trails (i.e., those appearing on Ontario Federation of Snowmobile Clubs mapping) will be removed or made inaccessible through the closure of Lahtis Road. Considering the portion of snowmobile trail to be removed has not been maintained for the past several years and the Municipality of Greenstone may relocate the hiking trail, the removal of trails within the PDA is considered low in magnitude. Seasonal aspects are unlikely to alter the residual environmental effect on recreational trails. Following active closure, snowmobiling and hiking may resume in certain areas of the PDA.

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Sensory Disturbance to Recreational Resource Users

Project-related emissions of particulate matter (dust) are predicted to meet regulated requirements for all Project phases except for a small area close to the PDA where the increase in particulate matter above MOECC guidelines will be infrequent and limited to Mill Phase 1 (i.e., no more than 0.1% of the time) (refer to Figure 7-7 in the atmospheric environment VC Chapter 7.0). The Project's effect on ambient lighting is predicted to be below the relevant CIE Guideline levels at all the assessed receptors (refer to Chapter 7.0 for further information). The WRSAs will act as a barrier to light from the process plant and mobile equipment. Forested areas are also predicted to reduce the effect of process plant lighting and mobile equipment.

Predicted increases in Project-related noise and vibration will comply with applicable regulations at all assessed points of reception including the points of interest located within MacLeod Provincial Park. In general, the predicted sound levels for the areas adjacent to PDA including the Southwest Arm of Kenogamisis Lake and Mosher Lake are between 40 to 45 dBA. These sound levels are characteristic of a rural environment where sounds of the natural environment dominate such as the sounds of water (i.e., waves), rustling leaves or other sounds heard in a forested area. Exceptions include the area along the shoreline of Southwest Arm of Kenogamisis Lake adjacent to the PDA where sound levels are predicted to be between 45 to 50 dBA, which is considered consistent with the hum from an urban environment. Vibration generated by the Project is not anticipated beyond the PDA. A forested buffer around the PDA including the shoreline of Southwest Arm of Kenogamisis Lake would attenuate Project sound levels. It should be noted that these predicted sounds and vibration levels are conservatively modelled as detailed in the "Technical Data Report – Hardrock Project: Acoustic Environment" (Appendix F2) (e.g., construction activities occur along the perimeter of the PDA and road construction along the realigned Highway 11 within the right-of-way; no attenuation is provided by enclosures/structures; stationary sources emitting sound were modelled as concentrated point sources). Sensory disturbance to users due to Project-related emissions (e.g., dust, light, noise and vibration) in the LAA is not anticipated.

Changes to the visual setting will commence during construction with the start of vegetation clearing, timber harvesting and the construction of Project components. Changes to the visual landscape will continue throughout the operation phase with the development of the TMF and WRSAs. During operation, the WRSAs and TMF will continue to increase in geographic extent and height above ground level and the surrounding tree line. These two Project components are predicted to be the most visually prominent features in the LAA. The WRSAs are predicted to be visible from the four vantage points as shown on Figure 16-7. The distance from the peak of WRSA A to the closest point of shoreline along the Southwest Arm of Kenogamisis Lake is approximately 340 m. Given the orientation of the campsites at MacLeod Provincial Park, it is not expected that campers at the park will have a direct view of the PDA. The approximate distance from campsite 38 (the closest campsite to the Project) to the peak of WRSA A is 1,580 m, while the distance from the closest shoreline of MacLeod Provincial Park to the peak of WRSA is 955 m. It is expected that users of the recreational trail and day-use area including the beach within MacLeod Provincial Park would see the WRSA from vantage points within the Park.

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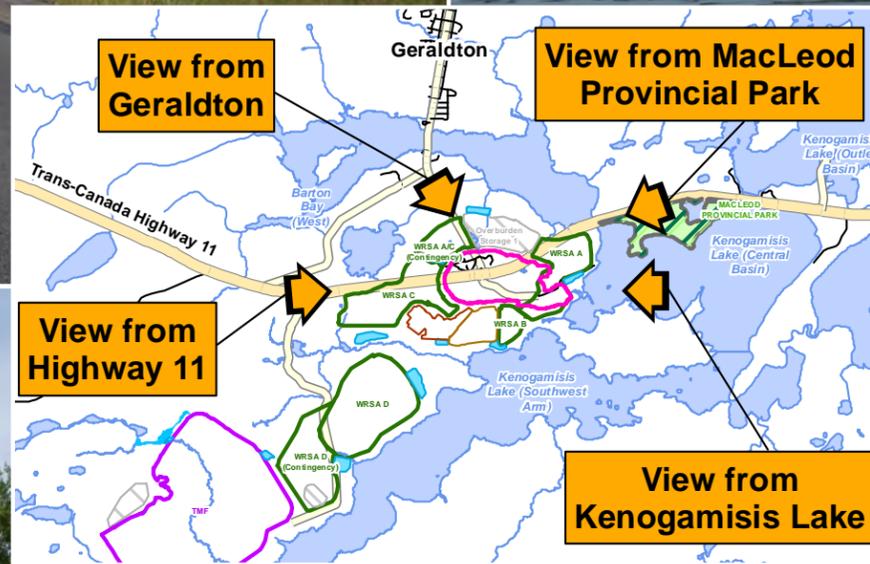
Progressive rehabilitation and closure activities include revegetation and removal of Project components. Rehabilitation will include reapplication of topsoil where feasible, and sowing of grassy and herbaceous seed-mixes. Areas conducive to tree and shrub growth will be left to naturally revegetate through the natural recruitment of adjacent trees and shrubs in the surrounding landscape. The WRSA benches and plateaus are to be revegetated at closure.

The visual setting in the LAA will be permanently altered to varying degrees due to the WRSAs and TMF. The visual setting from several vantage points will be changed from existing conditions; in particular, the viewscape from Kenogamisis Lake will include the WRSAs and TMF. From other vantage points in the LAA, Project components may not be visible or will be only partially visible relative to the existing landscape. The effect is conservatively characterized as moderate in magnitude in recognition of the altered viewscape for users at key vantage points (e.g., Kenogamisis Lake) and the change in land user experience in proximity to the PDA. There is potential for some users to shift their activities to areas that are further away from the PDA. The residual effect is predicted in the context of a local environment that has been disturbed by mining, forestry and development over the past 90 years. The existing visual character of the PDA consists of Highway 11, commercial and residential properties, deciduous and coniferous forest cover, wetlands such as swamps, marshes, bogs and fens, and historical mining area that has been altered through past forestry and mining activities. Historical mining infrastructure characterizes this area, such as the former headframe, mine shafts and a glory hole (a stope breakthrough at surface). Vegetation cover is not extensive and ranges from sparsely vegetated open areas to mature wooded areas. Highway 11 is a prominent feature of the physical landscape traversing relatively flat terrain and bisecting forested areas. As a result, land and resource use has occurred within a socio-economic context that is similar to that which will be present throughout the Project.

View from Geraldton at Michael Power Boulevard Looking South



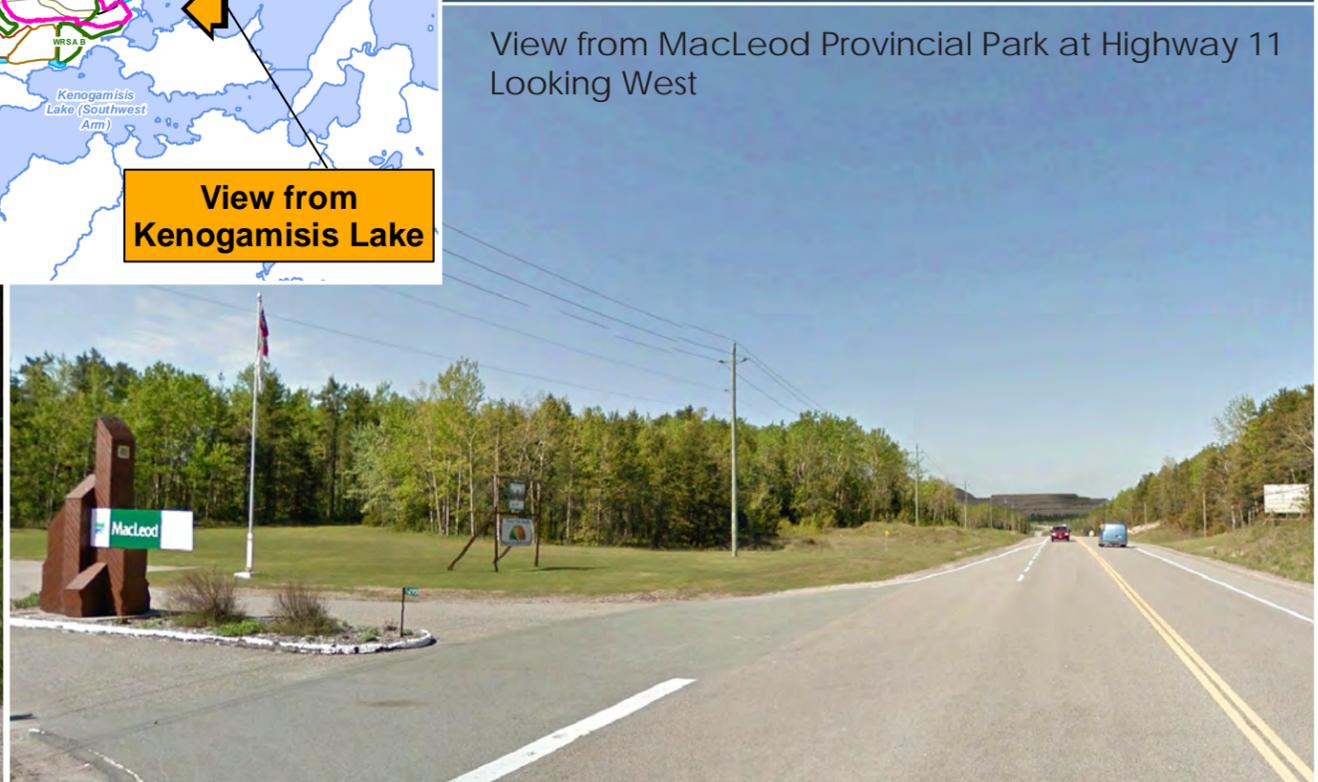
View from Kenogamisis Lake (Central Basin) Looking West



View from Highway 11 Near Lahtis Road Looking East



View from MacLeod Provincial Park at Highway 11 Looking West



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March 2017
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Client/Project
Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
16-7

Title
**Vantage Points -
After Post-Closure**

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16.4.3 Assessment of Change in Commercially-Based Land and Resource Use

The assessment of change in commercial land and resource is assessed for those Project activities identified with a checkmark in Table 16-17.

16.4.3.1 Project Mechanisms for Change in Commercially-Based Land and Resource Use

Project mechanisms for a change in commercially-based land and resource use are as follows:

Trapping, Guide Outfitting, and Bait Harvesting

As with the Project mechanisms described for recreational land and resource use in Section 16.4.2.1, site clearing and access restrictions would result in a loss of commercially-based land and resource use activities within the PDA. The loss of trapping, guide outfitting and bait harvesting in the PDA, initiated in Project construction, will persist through to the end of active closure. Table 16-14 lists the harvesting tenures overlapped by the PDA and the proportion of each tenure area that will be lost due to access restrictions. A loss of tenure area for BMAs also reduces the number of bait areas permitted, which may affect the quota, where the quota is one bait per 50 km².

Table 16-14: Total and Relative Trapping, BMAs and Bait Harvesting Area Overlapped by the RAA

Harvesting Area	Total Area (ha)	Area Overlapped by PDA (ha)	Area Overlapped by PDA as Proportion of Total Harvesting Area (%)	Area Overlapped by LAA (ha)	Area Overlapped by LAA as Proportion of Total Harvesting Area (%)	Area Overlapped by RAA (ha)	Area Overlapped by RAA as Proportion of Total Harvesting Area (%)
GE008	16,358	0	0%	0	0%	3,402	21%
GE009	22,260	0	0%	0	0%	347	2%
GE020	14,522	0	0%	0	0%	1,786	12%
GE021	15,845	20	0%	3,182	20%	15,742	99%
GE022	13,583	2,173	16%	7,780	57%	13,583	100%
GE023	42,931	0	0%	197	0%	5,396	13%
GE032	27,712	0	0%	0	0%	27,371	99%
GE034	25,838	0	0%	2,747	11%	14,381	56%
GE035	19,157	0	0%	0	0%	2,537	13%
GE065	50,846	0	0%	0	0%	39,714	78%
GE066	32,975	0	0%	0	0%	737	2%
GE120	24,188	0	0%	0	0%	14,462	60%

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Table 16-14: Total and Relative Trapping, BMAs and Bait Harvesting Area Overlapped by the RAA

Harvesting Area	Total Area (ha)	Area Overlapped by PDA (ha)	Area Overlapped by PDA as Proportion of Total Harvesting Area (%)	Area Overlapped by LAA (ha)	Area Overlapped by LAA as Proportion of Total Harvesting Area (%)	Area Overlapped by RAA (ha)	Area Overlapped by RAA as Proportion of Total Harvesting Area (%)
GE121	28,842	0	0%	558	2%	24,811	86%
GE122	27,720	0	0%	0	0%	3,456	12%
NG089	30,361	0	0%	0	0%	749	2%
NG103	17,010	0	0%	0	0%	776	5%
NG104	16,290	0	0%	0	0%	1,669	10%
NG112	12,916	0	0%	0	0%	69	1%
GE-19-023	88,539	0	0%	0	0%	5,908	7%
GE-19-027	26,757	0	0%	435	2%	12,121	45%
GE-19-029	21,054	0	0%	0	0%	696	3%
GE-19-030	35,481	0	0%	0	0%	1,967	6%
GE-19-039	58,531	0	0%	2,191	4%	27,651	47%
GE-21A-026	17,219	0	0%	0	0%	6,900	40%
GE-21A-027	48,053	15	0%	2,750	6%	24,611	51%
GE-21A-032	92,285	1,583	2%	5,287	6%	62,730	68%
GE-21A-033	20,240	0	0%	0	0%	945	5%
NG-21A-009	90,289	0	0%	0	0%	12,416	14%
TR-21A-080	43,132	0	0%	0	0%	1,685	4%
NI2706	22,877	0	0%	0	0%	14,387	63%
NI2707	22,464	0	0%	0	0%	10,050	45%
NI2708	22,981	0	0%	0	0%	130	1%
NI3105	24,626	0	0%	0	0%	890	4%
NI5001	10,001	0	0%	0	0%	815	8%
NI5007	10,161	0	0%	0	0%	6,374	63%
NI5008	10,000	0	0%	0	0%	606	6%
NI5013	10,089	0	0%	0	0%	10,089	100%
NI5014	10,000	0	0%	0	0%	4,153	42%
NI5019	10,019	0	0%	0	0%	9,552	95%
NI5020	10,000	0	0%	0	0%	8,584	86%
NI5021	10,000	0	0%	0	0%	2,397	24%

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Table 16-14: Total and Relative Trapping, BMAs and Bait Harvesting Area Overlapped by the RAA

Harvesting Area	Total Area (ha)	Area Overlapped by PDA (ha)	Area Overlapped by PDA as Proportion of Total Harvesting Area (%)	Area Overlapped by LAA (ha)	Area Overlapped by LAA as Proportion of Total Harvesting Area (%)	Area Overlapped by RAA (ha)	Area Overlapped by RAA as Proportion of Total Harvesting Area (%)
NI5026	9,985	0	0%	0	0%	4,893	49%
NI5027	10,000	538	5%	2,111	21%	10,000	100%
NI5028	10,000	237	2%	764	8%	9,774	98%
NI5029	10,000	0	0%	0	0%	1,553	16%
NI5034	9,992	0	0%	0	0%	552	6%
NI5035	10,000	141	1%	1,935	19%	8,700	87%
NI5036	10,000	1,277	13%	6,194	62%	10,000	100%
NI5037	10,000	0	0%	2,388	24%	7,268	73%
NI5038	10,000	0	0%	0	0%	21	0%
NI5051	10,000	0	0%	0	0%	5,119	51%
NI5052	10,000	0	0%	0	0%	10,000	100%
NI5053	10,001	0	0%	928	9%	10,001	100%
NI5054	10,000	0	0%	144	1%	4,470	45%
NI5055	10,000	0	0%	0	0%	623	6%
NI5067	10,000	0	0%	0	0%	250	2%
NI5068	10,000	0	0%	0	0%	5,847	58%
NI5069	10,000	0	0%	0	0%	5,737	57%
NI5070	10,000	0	0%	0	0%	4,565	46%
NI5071	10,000	0	0%	0	0%	3,585	36%
NI5086	10,000	0	0%	0	0%	<1	0%
NI5087	10,000	0	0%	0	0%	6	0%

The change in access may require some licence holders to seek alternative routes. With the closure of Lahtis Road, the trapper holding the licence for GE022 advised he will require new access.

Based on the layout of the PDA, no potential effects on access to areas of Mosher Lake used for bait harvesting and trapping are anticipated.

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Disturbance effects on commercially-based uses in the LAA will be similar to those for recreational users, including potential effects on the availability of wildlife resources of interest to trappers and guide outfitters (due to sensory disturbance, mortality risk and disruption of existing wildlife movement patterns), and sensory disturbance to users.

Areas within the PDA that support baitfish are mostly ephemeral drainage features and will be replaced with new, more permanent habitat with the Goldfield Creek diversion. As described in the Project mechanisms for recreational fishing, no Project-related effects on the sustainability and productivity of CRA fisheries within the LAA are anticipated as a result of the Project. Therefore, no potential effects on the availability of fisheries resources of value to guide outfitters and bait harvesters are anticipated in the LAA.

Once active closure activities are completed, and depending on the desired end land use and function of the PDA, some Project effects will cease or approach existing levels as described for commercial users. This includes the removal of access restrictions from most areas of the PDA to allow commercially-based land and resource use to resume activities in the PDA. Following active closure, new wildlife movement patterns may be established as sensory disturbance abates and revegetation of the PDA progresses, although for some species (e.g., species requiring more developed tree cover) this may take a longer period of time.

Timber Harvesting and Resource Extraction Activities

The PDA overlaps areas of Crown timber located within the Kenogami FMU. Commercial forestry does not currently occur on patented land within the PDA (refer to Figure 16-6). Timber areas within the PDA would be cleared as part of site preparation, as well as through the construction of watercourse crossings and realignments, TMF, and linear facilities. These activities would remove Crown timber from future forest management activity. The removal of productive forest is considered permanent.

Prior to the start of construction, GGM will obtain necessary patents, claims, mining leases, and licences of occupation covering the PDA. No Project components will be constructed on mining claims/leases held by other entities. Effects on mining claims/leases held by other entities are predicted, as active mining claims/leases held by other entities located on the peninsula east of the PDA may be affected by potential Project-related changes to access.

The Project would overlap one aggregate source, the Mosher Pit. However, because GGM holds the surface and mineral rights to the area occupied by the aggregate pit, the Project would not conflict with its exploitation. No potential effects on aggregate sources outside the PDA are anticipated.

16.4.3.2 Mitigation for Change in Commercially-Based Land and Resource Use

Mitigation to reduce adverse effects on trapping, guide outfitting, and bait harvesting activities are presented in Table 16-15.

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Table 16-15: Mitigation Measures for a Change in Commercially-Based Land and Resource Use

Mitigation Measure for a Change in Commercially-Based Land and Resource Use	Construction	Operation	Closure
Implementation of proposed mitigation measures for recreational land and resource (refer to Section 16.4.2.2).	✓	✓	✓
Maintain access to mining claims located on the peninsula east of the PDA.	✓	✓	✓

NOTE:

✓ Mitigation measures are applicable.

In addition to the mitigation measures and commitments to reduce potential environmental effects described in Section 16.4.2.2 other commitments include the following:

- GGM will continue to meet with affected tenure holders on a regular basis (i.e., semi-annually) to discuss issues and concerns and to provide Project updates.
- GGM will continue discussions regarding accommodation for the lost trapping area associated with GE022 and GE021 and will also discuss access to GE022 following the closure of Lahtis Road, and trapping on GGM's patented lands prior to the start of construction and where there is currently little activity.
- GGM will continue discussions with BMA licence holder GE-21 A-032 to reach an equitable solution to lost land and bait traps.
- Communicate Project activities, locations and timing throughout construction, operation and closure to affected trappers, guide outfitters, and bait harvesters leading up to construction and throughout the life of the Project.
- GGM will continue to consult with MNRF and the eFRL holder (Ne-Daa-Kii-Me-Naan Inc.) to address, to the extent possible, access to the PDA and the harvest of Crown timber that will be removed as part of site preparation. Timber removal will be completed in accordance with the *Crown Forest Sustainability Act* and *Crown Timber Act*.
- GGM will continue negotiations with Ne-Daa-Kii-Me-Naan Inc. to obtain an Overlapping Agreement and to harvest the trees under their pulp mill licence.
- GGM will seek a Release of Tree Reservation under the *Public Lands Act* to remove trees on patent lands which have timber rights reserved to the Crown.
- GGM will obtain necessary patent claims, mining leases, licences of occupation and staked claims in areas that are overlapped by the Project.

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16.4.3.3 Characterization of Residual Effect for Change in Commercially-Based Land and Resource Use

Trapping, Guide Outfitting, and Bait Harvesting

The Project will result in the restricted access to or loss (removal due to site clearing) of areas for harvesting for tenure holders in the PDA. However, this loss or restricted access to harvesting areas in the PDA includes areas where harvesting would be impractical or unlawful, such as in the urban settlement, private property, and golf course. The loss of area will vary for each of the affected trapline, guide outfitter and bait harvesting areas (Table 16-14) and will continue throughout construction, operation and active closure.

The residual environmental effect is predicted to reduce the ability to undertake trapping, guide outfitting and bait harvesting and is characterized as moderate in magnitude. The residual effect will be limited to the PDA, access restrictions will occur continuously through construction, operation, and active closure.

Access to harvesting areas located in the LAA will also be altered with the closure of Lahtis Road at the start of construction. Representatives of Timberwolf Camps did not identify concerns with the Project and did not foresee access constraints for its BMA due to the Project. As discussed in Section 16.4.3.1, the closure of Lahtis Road will prevent access to the area southwest of the PDA for those licence holders that access the area via this route. The licence holder for GE022 is the only commercial licence holder known to use Lahtis Road to access the licenced area. As noted in section 16.2.2.2, the operators of Kenogamisis Lake Resort generally access BMA GE-21A-027 via the Fleury Extension (accessed from the southern portion of Goldfield Road near Terrace Bay). The closure of Lahtis Road at the start of construction is not anticipated to have an adverse effect on access to BMA GE-21A-027. An alternate route via Goldfield Road may provide access during spring, summer and fall, however use of Goldfield Road in the winter may not be feasible as the road is unmaintained. The residual effect will be adverse, and moderate in magnitude because some licence holders may not be able to access harvesting areas previously accessed via Lahtis Road, which may reduce the ability for trapping and guiding in the LAA. The effect may be greatest during the winter when alternate access via Goldfield Road may not be feasible.

The removal of area from BMA GE-21-A-032 represents an approximately 2% reduction of the total area for the BMA. It is not anticipated that the area removed from the BMA will result in the loss of the bait quota.

The change in the availability of wildlife resources (due to sensory disturbance and movement patterns) is predicted to reduce the ability to undertake hunting in the LAA and is therefore considered moderate in magnitude. The residual effect is predicted to start in construction and continue throughout operation and active closure. The effect on the availability of wildlife resources will be reversed following completion of active closure when sensory disturbance abates and new movement patterns across the PDA are established. The availability of wildlife may be affected by timing, as seasonal aspects may affect changes in movement of wildlife.

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Once active closure activities are completed, most areas will become accessible again for commercially-based harvesting. Wildlife is expected to return to the PDA, increasing the availability of resources for trapping and guide outfitting compared to levels during construction and operation.

The PDA will include accessible and inaccessible areas which are defined by a mix of areas available for commercial harvesting and designated land use areas, and private property where commercial harvesting is likely restricted.

The residual effect is predicted in the context of a local environment that has been disturbed by mining, forestry and development over the past 90 years. The PDA consists of Highway 11, commercial and residential properties, deciduous and coniferous forest cover, wetlands such as swamps, marshes, bogs and fens, and a historical mining area that has been altered through past forestry and mining activities. Historical mining infrastructure characterizes this area, such as the former headframe, mine shafts and a glory hole (i.e., a stope breakthrough at surface). Vegetation cover is not extensive and ranges from sparsely vegetated open areas to mature wooded areas. Highway 11 is a prominent feature of the physical landscape traversing relatively flat terrain and bisecting forested areas. As a result, commercial users have been operating in a socio-economic context that is similar to that which will be present throughout the Project.

Sensory Disturbance to Commercially-based Resource Users

Commercially-based harvesting activities may be affected by sensory disturbance (refer to Section 16.4.2.3), in particular to clients of guide outfitting services. The remoteness and quality of the guide outfitting experience are valued; therefore, construction activities may decrease interest in outfitting services in the vicinity of PDA especially if more intact landscapes and fish and wildlife habitats can be accessed elsewhere within the harvesting tenure areas and without increasing travel distance for users. As stated in Section 16.4.3, sensory disturbance to users due to Project-related emissions (e.g., dust, light, noise and vibrations) in the LAA is not anticipated. However, changes in the visual setting in the LAA are predicted due to the WRSAs and TMF. A description of the change in visual setting is provided in Section 16.4.2.3.

The effect is conservatively characterized as moderate in magnitude in recognition of the altered viewscape for users at key vantage points (e.g., Kenogamisis Lake) and the change in land user experience in proximity to the PDA.

Timber Harvesting and Resource Extraction Activities

The PDA overlaps approximately 342 ha of the 2011 to 2021 planned harvesting area within the Kenogami FMU. This represents less than 1% of the total planned harvesting area within the FMU. The permanent loss of harvesting area in the PDA is considered not significant.

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Planned harvest areas identified within the Kenogami Forest Management Plan have received EA approval for removal of timber. Ne-Daa-Kii-Me-Naan Inc. has the first right of refusal to harvest the timber. Through discussions with Ne-Daa-Kii-Me-Naan Inc., GGM will enter into an Overlapping Agreement to harvest under Ne-Daa-Kii-Me-Naan Inc.'s pulp mill licence. Consideration would be given to winter/summer harvest areas and the market for hardwood at the time of harvesting.

Access to other planned harvest areas within the LAA will be via Goldfield Road. A change in tenures and areas used for forestry management beyond the PDA and in the LAA is not predicted because of the closure of Lahtis Road.

For removal of timber on Crown land which is not included in the Kenogami Forest Management Plan, GGM would need to obtain a Forest Resource Licence from MNRF. The areas shown on Figure 16-6 as Crown land and falling outside of the eFRL's planned harvest area are subject to a Forest Resource Licence.

GGM has completed a title search to determine which patented properties within the PDA include a timber rights reservation, as shown on Figure 16-6. GGM will obtain a Release of Tree Reservation under the *Public Lands Act* prior to harvesting the timber.

As noted, GGM will obtain necessary patents, mining leases covering the PDA and as a result, Project components will be constructed within the area for which GGM holds the surface and mineral rights. Also, GGM will maintain access to active mining claims owned by other entities located on the peninsula west of the PDA. No residual adverse effects on surface and mineral rights is anticipated.

These residual effects are predicted in the context of a local environment that has been disturbed by mining, forestry and development over the past 90 years and continues to experience disturbance from major transportation infrastructure (i.e., Highway 11) and urban settlement areas. As previously mentioned, commercial users have been operating in a socio-economic context that is similar to that which will be present throughout the Project.

The residual effects for a change in commercially-based land and resource use apply to all users (Aboriginal and non-Aboriginal).

16.4.4 Assessment of Change in Navigation

The assessment of change in navigation is assessed for those Project activities identified with a checkmark in Table 16-17.

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16.4.4.1 Project Mechanisms for Change in Navigation

None of the watercourses in the PDA or LAA are listed on the NPA schedule of navigable waters. Navigation has not been confirmed within the PDA through consultation input, TK and TLRU studies or observations made during fieldwork (Table 16-7), however it is conservatively assumed that navigation is possible in the PDA on Goldfield Creek, the Southwest Arm Tributary (downstream of Southwest Arm Tributary Pond 3 [SWP3]), and SWP3.

In-water works and/or changes to watercourses have the potential to affect navigation:

- Although there has been no confirmed use of Goldfield Creek for navigation, the diversion will change the channel alignment for possible users. SWP3 forms part of Goldfield Creek diversion route.
- Access restrictions to the PDA (as discussed in Section 16.4.2.1) would prevent use of waterbodies in the PDA where navigation is considered possible, during construction, operation, and active closure.
- Navigation, if it occurs, could also be affected by the construction of watercourse crossings across the Southwest Arm Tributary and Goldfield Creek Tributary-North Branch (downstream of Lake A-322). These watercourse crossings will be removed during active closure. Other watercourses in the PDA where crossings will be installed are not navigable.
- Installation and removal of the treated effluent discharge locations (i.e., construction and permanent) and a freshwater intake could temporarily affect navigation along the shoreline of the Southwest Arm of Kenogamisis Lake.
- The deposition of material into non-navigable waterbodies could potentially flow into navigable waterbodies, thereby affecting the potential for navigation on those waterbodies.
- Potential reductions in surface water flow could affect the navigability of watercourses.

Watercourses may be used to access areas for commercial harvesting and recreational use. Changes to navigation could therefore alter access to these areas and the practice of land and resource activities. This connection is highlighted in Sections 16.4.2 and 16.4.3.

No Project activities will interact with the Kenogamisis Lake canoe route shown on Figure 16-3 and therefore no potential effects on this route are anticipated as a result of the Project.

16.4.4.2 Mitigation for Change in Navigation

Mitigation measures to reduce or eliminate adverse effects on navigation are provided in Table 16-16.

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Table 16-16: Mitigation Measures for a Change in Navigation

Mitigation Measure for a Change in Navigation	Construction	Operation	Closure
Use established watercourse crossings and avoid obstructions to navigation.	✓	✓	✓
Construction activities will be undertaken in a way to prevent debris from flowing into a navigable waterbody.	✓	-	-
Implementation of mitigation outlined for surface water (Chapter 10.0), specifically those related to surface water quantity.	✓	✓	✓

NOTES:

- ✓ Mitigation measures are applicable.
- Mitigation measures are not applicable.

Further to the mitigation measures listed above, GGM commits to the following additional measures:

- Communicate Project activities affecting watercourses used for navigation (e.g., treated effluent discharge locations and freshwater intake in Kenogamisis Lake) to relevant land and resource users, interest groups, the MNRF and local authorities leading up to construction and throughout the life of the Project. The communication strategy will include the use of public announcements using local media.
- Engage local boaters, resource users and the MNRF to address navigation issues as well as access and safety issues in the vicinity of the treated effluent discharge locations and freshwater intake related to navigation along watercourses affected by the Project.
- GGM will post signs along the perimeter of the PDA to alert boaters of the presence of the Project and its activities and facilities.

16.4.4.3 Characterization of Residual Effect for Change in Navigation

Although there has been no confirmed use of Goldfield Creek for navigation, the diversion will permit navigation by small vessels such as canoes or kayaks, with obstacles (e.g. beaver dams and vegetation obstructions), between Goldfield Lake and the Southwest Arm of Kenogamisis Lake following closure. It is conservatively assumed that the change in the Goldfield Creek channel alignment could pose an inconvenience to potential users. The Goldfield Creek diversion is a permanent Project component, therefore the route change between the two lakes is characterized as long-term and irreversible.

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As described in Section 16.4.2.1, access will be restricted to the PDA throughout construction, operation and active closure. Following active closure, access restrictions to the PDA will be lifted allowing for navigation of the Goldfield Creek diversion and Southwest Arm Tributary. Because both Goldfield Creek and the Southwest Arm Tributary are currently only potentially navigable by small vessels such as canoes or kayaks and include a number of barriers (e.g., beaver dams and vegetation obstructions), the effect will be low, since navigation will still be possible with obstacles for these types of watercraft.

The installation of watercourse crossings will create obstacles to potential navigation activities within the Southwest Arm Tributary and the Goldfield Creek Tributary – North Branch (downstream of Lake A-322) during construction, operation and active closure. Watercourse crossings will be removed during active closure.

Installation and removal of the treated effluent discharge locations and freshwater intake in the Southwest Arm of Kenogamisis Lake may create a short-term disruption to navigation in a small area along the shoreline during construction and active closure. Installation and removal may result in an exclusion area for boats while workers and equipment are present. Given the width of the Southwest Arm at the location of the treated effluent discharge locations and freshwater intake, and the small construction footprint, boaters would be able to navigate around the exclusion area. Following construction, the treated effluent discharge locations and freshwater structures will be properly marked. During active closure, the permanent treated effluent discharge locations and freshwater intake would be removed, and navigation could resume in this area of the Southwest Arm.

Although the deposition of material into non-navigable waterbodies could potentially flow into navigable waterbodies and thereby potentially affect navigation, with the application of mitigation and management measures, no residual effects are anticipated.

As discussed in Chapter 10.0 (surface water VC), predicted reductions in surface water flows are either within natural variability or, in the case of Goldfield Creek, residual effects will be offset by the diversion (“Draft Hardrock Project: Fisheries Act, Paragraph 35(2)(b) Authorization and MMER Schedule 2 Draft Fisheries Offset Plan”; Appendix F10). The diversion of Goldfield Creek to the Southwest Arm Tributary routes much more flow through the Tributary, but the increased flow and water level effects are mitigated through use of grade control structures. Therefore, project-related changes to surface water quantity are not predicted to adversely affect the navigability of watercourses.

The residual effects for a change in navigation apply to all users (Aboriginal and non-Aboriginal).

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16.4.5 Summary of Residual Environmental Effects on Land and Resource Use

A summary of residual environmental effects that are likely to occur as a result of the Project is provided in Table 16-17.

Residual adverse effects are considered further in terms of their significance in Section 16.5 and are carried forward to the cumulative effects assessment (Chapter 20.0). A conceptual framework and scope for environmental management and monitoring plans, including follow-up and monitoring programs is provided in Chapter 23.0. Conceptual environmental management and monitoring plans are also provided in Appendix M.

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Table 16-17: Summary of Residual Environmental Effects on Land and Resource Use

Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
CHANGE IN RECREATIONAL LAND AND RESOURCE USE											
Decrease in the availability of hunting areas and wildlife	✓	✓	✓	Adverse	Moderate	LAA	N/A	Continuous	Medium-term	Reversible	Typical
				<p>Direction: Adverse. The removal of wildlife habitat and the imposition of access restrictions to the PDA at the start of construction will result in the loss of areas for hunting. Also, the Project may cause sensory disturbance, mortality risk and disruption of wildlife movement corridors thereby reducing the availability of wildlife resources.</p> <p>Magnitude: Moderate. Decrease in the availability of hunting areas or wildlife resources is predicted to reduce the ability to undertake hunting in the PDA (access restrictions) and within the LAA due to sensory disturbance (predicted not to extend beyond 200 m of the PDA).</p> <p>Geographic Extent: LAA. Residual adverse effects on availability of wildlife (sensory disturbance) will extend into the LAA.</p> <p>Timing: N/A. Seasonal aspects are unlikely to alter the residual environmental effect on recreational hunting because effects are restricted to the hunting season and is considered in the assessment.</p> <p>Frequency: Continuous. Although the removal of hunting areas within the PDA will be a single event during site preparation the loss of access to the PDA, and indirect loss due to sensory disturbance and change in mortality risk and change in movement patterns will occur continuously throughout construction, operation and active closure.</p> <p>Duration: Medium-term. Loss of hunting due to access restrictions will occur throughout construction, operation, and active closure.</p> <p>Reversibility: Reversible. The residual effect is likely to be reversed following active closure when access restrictions to most the PDA are lifted and some wildlife habitat is restored. The effect on the availability of wildlife resources will be reversed following completion of active closure, when sensory disturbance and mortality risk abates and new movement patterns are established.</p> <p>Ecological and Socio-Economic Context: Typical. Hunting areas are typical of the RAA and are common in the LAA and RAA.</p>							

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
Decrease in the availability of fishing areas or fishing resources	✓	✓	✓	Adverse	Moderate	LAA	N/A	Continuous	Medium-term	Reversible	Typical
				<p>Direction: Adverse. The removal of the public access points and closure of Lahtis Road may result in the loss of access to ice fishing areas in the Southwest Arm. Although there is potential for fishing to occur in the PDA, there are no documented fishing areas and fishing is not known to occur within the PDA.</p> <p>Magnitude: Moderate. The loss of access to launches for ice fishing huts is predicted to reduce the ability to undertake fishing activities.</p> <p>Geographic Extent: LAA. The decrease in access to areas for fishing is predicted to extend beyond the PDA.</p> <p>Timing: N/A. Fishing for some species of fish is permitted year-round, therefore the residual effect will be the same regardless of the season.</p> <p>Frequency: Continuous. Although the removal of access to fishing areas will be a single event during site preparation, loss of access to the PDA will occur continuously throughout construction, operation and active closure.</p> <p>Duration: Medium-term. Residual effect will occur throughout construction, operation and active closure.</p> <p>Reversibility: Reversible. The residual environmental effect is anticipated to be reversed at the end of active closure, when access restrictions to fishing areas within the PDA will be removed with the exception of permanent Project components such as the open pit.</p> <p>Ecological and Socio-Economic Context: Typical. Fishing areas are typical of the RAA and are common in the LAA and RAA. The residual environmental effect is predicted in the context of a local environment that has been disturbed by mining, forestry and development over the past 90 years.</p>							

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
Loss of recreation areas or change in access	✓	✓	✓	Adverse	Moderate	LAA	N/A	Continuous	Long-term	Reversible	Typical
				<p>Direction: Adverse. The Project will result in the loss of access to the Southwest Arm of Kenogamisis Lake through the closure of Lahtis Road and the removal of roads within the Hardrock and MacLeod Townsites during construction and operation. Crown land recreational areas, including the campsite and two access points to Kenogamisis Lake will also be removed from the PDA. The closure of Lahtis Road located within the PDA may result in the reduced access to recreational areas in the LAA.</p> <p>Magnitude: Moderate. The removal of Crown land, public access points adjacent to the PDA and reduced access to recreational areas beyond the PDA is predicted to reduce the ability to undertake recreational activities.</p> <p>Geographic Extent: LAA. The residual adverse effect associated with the closure of Lahtis Road and removal of public access points are predicted to extend into the LAA.</p> <p>Timing: N/A. Loss of recreation areas and change in access would occur year-round.</p> <p>Frequency: Continuous. Change in access will occur on an ongoing basis.</p> <p>Duration: Long-term. The public access points will be removed and Lahtis Road will be closed during construction and operation due to safety reasons. At closure, Lahtis Road is anticipated to be re-opened to the Goldfield Creek diversion. Existing recreation areas in the PDA will be permanently removed.</p> <p>Reversibility: Reversible. The residual environmental effect is anticipated to be reversed at the end of active closure, when access to the PDA would be restored.</p> <p>Ecological and Socio-Economic Context: Typical. Recreational areas affected are typical of the LAA and RAA.</p>							

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
Removal of 10.6 km of snowmobile trails and 1.4 km of hiking trails	✓	-	-	Adverse	Low	PDA	N/A	Single Event	Medium-term	Reversible	Typical
<p>Direction: Adverse. The loss of recreational trails is predicted as a result of the Project.</p> <p>Magnitude: Low. The removal of trails within the PDA is predicted to reduce the ability to undertake hiking and snowmobiling in the PDA.</p> <p>Geographic Extent: PDA. The loss of trails is restricted to the PDA. Based on discussions with the Greenstone Snowmobile Club, removal the snowmobile trail within the PDA will not remove access to other trails within the LAA that are currently in use.</p> <p>Timing: N/A. Seasonal aspects are unlikely to alter the residual environmental effect on recreational trails.</p> <p>Frequency: Single event. The removal of the trails will be a single event during site preparation.</p> <p>Duration: Medium-term. The removal of snowmobile trails and hiking trails from within the PDA is predicted to persist throughout construction, operation and active closure</p> <p>Reversibility: Reversible. The residual environmental effect may be reversed at the end of active closure, when access restrictions would be removed from the PDA.</p> <p>Ecological and Socio-Economic Context: Typical. Snowmobile and hiking trails to be removed are considered typical and common feature in the LAA and RAA as there are other alternative trails available in the LAA and RAA.</p>											

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
Sensory disturbance to land and resource users	✓	✓	✓	Adverse	Moderate	LAA	N/A	Continuous	Long-term	Irreversible	Typical
				<p>Direction: Adverse. Recreational users in the LAA may be affected by sensory disturbance resulting from changes to the viewscape.</p> <p>Magnitude: Moderate. The effect is characterized as moderate in magnitude because the residual effect is predicted to change the land user experience in proximity to the PDA.</p> <p>Geographic Extent: LAA. Sensory disturbance due to changes to the viewscape is predicted to extend into the LAA.</p> <p>Timing: N/A. Seasonal aspects are unlikely to alter the residual environmental effect on sensory disturbance.</p> <p>Frequency: Continuous. Sensory disturbance to land and resource users due to changes to the viewscape is predicted to occur beyond active closure.</p> <p>Duration: Long-term. Changes to the viewscape will extend beyond closure.</p> <p>Reversibility: Irreversible. The visual landscape will be altered permanently.</p> <p>Ecological and Socio-Economic Context: Typical. The residual environmental effect is predicted in the context of a local environment that has been disturbed by mining, forestry and development over the past 90 years.</p>							

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
CHANGE IN COMMERCIALY-BASED LAND AND RESOURCE USE											
Decrease in availability of trapping, guide outfitting and bait harvesting tenure areas	✓	✓	✓	Adverse	Moderate	LAA	N/A	Continuous	Long-term	Reversible	Typical
				<p>Direction: Adverse. The removal of wildlife habitat and the imposition of access restrictions at the start of construction will result in the loss of areas for trapping, guide outfitting and bait harvesting tenure areas from the PDA. Change in access to harvesting areas due to closure of Lahtis Road may extend into the LAA. The construction, operation and active closure of the Project may cause sensory disturbance, mortality risk and disruption of wildlife movement corridors thereby reducing the availability of wildlife resources. A change in the availability of fish resources is not predicted.</p> <p>Magnitude: Moderate. Some licence holders may not be able to access harvesting areas previously accessed via Lahtis Road, which may decrease the ability to use of land for trapping and guiding in the LAA.</p> <p>Geographic Extent: LAA. Although, removal of harvest areas is restricted to the PDA, the residual effects from a change in access to harvesting areas due to closure of Lahtis Road is predicted to extend into the LAA.</p> <p>Timing: N/A. Loss of commercial harvesting areas and change in access would occur year-round.</p> <p>Frequency: Continuous. Although the removal of trapping, guide outfitting, and baitfish tenure areas will be a single event during construction, access restrictions will be a continuous effect throughout all Project phases until active closure is complete.</p> <p>Duration: Long-term. The residual environmental effect is predicted to extend beyond active closure.</p> <p>Reversibility: Reversible. Following active closure, it is anticipated that access to most of the PDA will be available for commercial harvesting.</p> <p>Ecological and Socio-Economic Context: Typical. Trapping, guide outfitting, and baitfish tenure areas are considered typical of the LAA and RAA.</p>							

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
Sensory disturbance to commercial land and resource users	✓	✓	✓	Adverse	Moderate	LAA	Applicable	Continuous	Long-term	Irreversible	Typical
<p>Direction: Adverse. Commercial land and resource users in the LAA may be affected by sensory disturbance resulting from changes to the viewscape.</p> <p>Magnitude: Moderate. The effect is characterized as moderate in magnitude because the residual effect is predicted to change the land user experience in proximity to the PDA.</p> <p>Geographic Extent: LAA. Sensory disturbance due to changes in the viewscape is predicted to extend into the LAA.</p> <p>Timing: N/A. Seasonal aspects are unlikely to alter the residual environmental effect on sensory disturbance.</p> <p>Frequency: Continuous. Sensory disturbance to land and resource users due to changes to the viewscape is predicted to occur beyond active closure.</p> <p>Duration: Long-term. Changes to the viewscape will extend beyond closure.</p> <p>Reversibility: Irreversible. The visual landscape will be altered permanently.</p> <p>Ecological and Socio-Economic Context: Typical. The residual environmental effect is predicted in the context of a local environment that has been disturbed by mining, forestry and development over the past 90 years.</p>											

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
Loss of timber harvesting land base	-	✓	-	Adverse	Low	PDA	N/A	Single Event	Long-Term	Irreversible	Typical
				<p>Direction: Adverse. The PDA overlaps approximately 342 ha of planned harvesting area within the Kenogami FMU for the period from 2011 to 2021. This represents less than 1% of the total planned harvesting area within the FMU. During construction, Crown timber will be removed from future forest management activity and alter the sequence of planned forest management activities in the Kenogami FMU until such time as a mature forest is in place.</p> <p>Magnitude: Low. Removal of timber will reduce the ability of timber harvesting.</p> <p>Geographic Extent: PDA. Harvest areas will be removed within the PDA.</p> <p>Timing: N/A. Seasonal aspects are unlikely to alter the residual environmental effect.</p> <p>Frequency: Single event. The removal of harvest areas will be a single event during construction.</p> <p>Duration: Long-term. The PDA is not predicted to return to productive forest.</p> <p>Reversibility: Irreversible. The removal of timber from the PDA is considered permanent.</p> <p>Ecological and Socio-Economic Context: Typical. The timber harvesting area is considered typical in the LAA and RAA and comprises less than 1% of the total planned harvesting area within the FMU.</p>							

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Residual Effect	Activity			Residual Environmental Effects Characterization							
	Construction	Operation	Closure	Direction	Magnitude	Geographic Extent	Timing	Frequency	Duration	Reversibility	Ecological and Socio-economic Context
CHANGE IN NAVIGATION											
Change in navigation on watercourses affected by the Project	✓	✓	✓	Adverse	Low	LAA	Applicable	Continuous	Long-term	Irreversible	Atypical
				<p>Direction: Adverse. The Project will create obstacles to navigation and change a route that may pose an inconvenience to potential users.</p> <p>Magnitude: Low. Navigation will still be possible with obstacles on waterways within the PDA and the Southwest Arm of Kenogamisis Lake. The Goldfield Creek diversion will permit navigation between the Southwest Arm of Kenogamisis Lake and Goldfield Lake to continue, although the route is changed from existing conditions.</p> <p>Geographic Extent: LAA. Although the majority of residual effects are limited to the PDA, there will be a change in navigation to Goldfield Lake, located in the LAA.</p> <p>Timing: Applicable. Effect will be more noticeable in spring/summer/fall when watercourses are not frozen.</p> <p>Frequency: Continuous. The change in the channel alignment between the Southwest Arm of Kenogamisis Lake and Goldfield Creek via Goldfield Creek will occur on an ongoing basis.</p> <p>Duration: Long-term. Changes to navigation will extend beyond closure.</p> <p>Reversibility: Irreversible. The change in channel alignment between the Southwest Arm of Kenogamisis Lake and Goldfield Lake via Goldfield Creek is permanent.</p> <p>Ecological and Socio-Economic Context: Atypical. Although other watercourses for navigation are available within the LAA and RAA, the route between the Southwest Arm of Kenogamisis Lake and Goldfield Lake via Goldfield Creek is specific to the area.</p>							

NOTE:
See Table 16-2 for detailed definitions.
✓ Residual effect anticipated.
– No residual effect anticipated.



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16.5 DETERMINATION OF SIGNIFICANCE

Residual effects on land and resource use are determined to be **not significant**. As defined in Section 16.1.7, a significant residual adverse environmental effect on land and resource use is one that threatens the long-term viability of the recreational, commercial land use activity or navigation. Residual effects on land and resource use including direct loss of areas for recreational and commercially-based land and resource use within the PDA, changes in access to recreational and commercial harvesting sites within the LAA, changes to navigation and effects on wildlife resources and recreational/commercial users due to sensory disturbance are not predicted to threaten the long-term viability of the recreational, commercial land use activity.

16.6 PREDICTION CONFIDENCE

The level of confidence in the predictions for Project-related residual effects on land and resource use is moderate, based on the experience of the assessment team, the understanding of existing conditions, the level and nature of the described interaction and the known effectiveness of mitigation measures.

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