Alternatives Assessment – Water Discharge Location						
Water Discharge Location – Cost Effectiveness						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
Criteria	Assessment					
Water Discharge Location – Cost Effectiveness						
Goliath Gold Project Financing	Investor desirability and/or risk	Advantages: Water discharge is essential for proposed operations, and noteworthy investor confidence. Wabigoon Lake is the largest water body in the vicinity of the Project site. Additional capital required to fund purchase of property to reach Wabigoon Lake. Close proximity of Wabigoon Lake to the Project, reduces water discharge infrastructure needs and associated costs and risks.	Advantages: Water discharge is essential for proposed operations, and noteworthy investor confidence. Thunder Lake is the second largest water body in the vicinity of the Project site. Close proximity of Thunder Lake to the Project, particularly infrastructure needs and associated costs and risks.	Advantages: Water discharge is essential for proposed operations, and noteworthy investor confidence. Hartman Lake is the third largest water body in the vicinity of the Project site.	Advantages: Tree Nursery ponds have the potential to support the Project's water discharge needs. Close proximity to Project site.	Advantages: Blackwater Creek has the potential to support the Project's water discharge needs. Close proximity to Project site.
		Disadvantages: Wabigoon Lake is water level controlled lake. Residents on Wabigoon Lake. Closure costs required.	Disadvantages: Thunder Lake is a water-level controlled lake. Residents on Thunder Lake. Closure costs required.	Disadvantages: Greater capital costs due to infrastructure development. Residents on Hartman Lake. Closure costs required.	Disadvantages: None apparent.	Disadvantages: None apparent.
Return on Investment (ROI)	Provides a competitive and acceptable ROI	Advantages: Close proximity to the site limits infrastructure costs though less than the alternative. -	Advantages: Close proximity to the site limits infrastructure costs though less than the alternative	Advantages: None apparent.	Advantages: Close proximity to the site limits infrastructure costs though less than the alternative.	Advantages: Close proximity to the site limits infrastructure costs for this alternative.
		Disadvantages: Potentially carries risk to ROI, as property purchase could be variable and potentially effect timeline of Project.	Disadvantages: Potentially carries risk to ROI.	Disadvantages: Greater operational and construction costs would affect ROI.	Disadvantages: None apparent.	Disadvantages: None apparent.
Financial Risk	Provides a manageable or acceptable financial risk	Advantages: Alternative able to support Project water discharge needs. Larger volume presents an advantage in the event of greater than expected water discharge.	Advantages: Alternative able to support Project water discharge needs. Larger volume presents an advantage in the event of greater than expected water discharge.	Advantages: Alternative able to support Project water discharge needs. Larger volume presents an advantage in the event of greater than expected water discharge.	Advantages: Alternative able to support Project water discharge needs. No residents or recreational facilities along Tree Nursery Ponds of tributaries, which reduces risk to EA/permitting timelines.	Advantages: Alternative able to support Project water discharge needs. No residents or recreational facilities along Tree Nursery Ponds of tributaries, which reduces risk to EA/permitting timelines. Discharge to Blackwater Creek will aid to make-up potential flow deficits due to watercourse realignments.
		Disadvantages: Wabigoon Lake, downstream of Project supports residents, tourism operators, and other recreational facilities which may cause EA/permitting delays.	Disadvantages: Thunder Lake, downstream of Project supports residents, Provincial Park, and other recreational facilities which may cause EA/permitting delays.	Disadvantages: Hartman Lake supports residents, and other recreational facilities which may cause EA/permitting delays.	Disadvantages: None apparent.	Disadvantages: None apparent.
Cost Effectiveness	Summary Evaluation and Rating	Wabigoon Lake is capable of supporting the Project's water discharge needs. Due to the potential risk in ROI and potential risk to EA/permitting timelines due to resident, tourism operator interest Wabigoon Lake is seen as a viable alternative but other alternatives are better suited to the Goliath Project. Summary Rating: Acceptable	Thunder Lake is capable of supporting the Project's water discharge needs. Due to potential risk to EA/permitting timelines due to resident, tourism operator interest Thunder Lake is seen as a viable alternative but other alternatives are better suited to the Goliath Project. Summary Rating: Acceptable	Hartman Lake is capable of supporting the Project's water discharge needs. Due to the potential risk in ROI and potential risk to EA/permitting timelines due to residents, high operational costs, and complex nature of construction Hartman Lake is not seen as a viable alternative as other alternatives are better suited to the Goliath Project. Summary Rating: Unacceptable	Tree Nursery Ponds are capable of supporting the Projects water discharge needs. The Tree Nursery Ponds provide the lower cost opportunities for infrastructure, but the ponds serve as the fresh water source for the Project Summary Rating: Acceptable	Blackwater Creek is capable of supporting the Projects water discharge needs and will aid in mitigating potential flow deficits due to proposed watercourse realignments. Blackwater Creek provides the lowest cost and most suitable location for discharge as Blackwater flows by all supporting water discharge infrastructure, and does not serve as a fresh water supply. Summary Rating: Preferred

Water Discharge Location – Technical feasibility and technical reliability						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
Criteria	Assessment					
Readily Available Technology	Has been successfully implemented in similar mining Projects and can be relied upon for sufficient performance over an extended period of time.	Advantages: Discharge of excess water and treated effluent to lakes is an industry common practice.	Advantages: Discharge of excess water and treated effluent to lakes is an industry common practice.	Advantages: Discharge of excess water and treated effluent to lakes is an industry common practice.	Advantages: Discharge of excess water and treated effluent to creeks is an industry common practice.	Advantages: Discharge of excess water and treated effluent to creeks is an industry common practice.
		Disadvantages: None apparent.	Disadvantages: None apparent.	Disadvantages: None apparent.	Disadvantages: None apparent.	Disadvantages: None apparent.
	New technologies must be supported by sufficient investigations and technical study to provide confidence in their performance abilities	N/A	N/A	N/A	N/A	N/A
Technical feasibility and technical reliability	Summary Evaluation and Rating	Use of lakes for water discharge is an industry common practice. Summary Rating: Acceptable	Use of lakes for water discharge is an industry common practice. Summary Rating: Acceptable	Use of lakes for water discharge is an industry common practice. Summary Rating: Acceptable	Use of creeks for water discharge is an industry common practice. Summary Rating: Acceptable	Use of creeks for water discharge is an industry common practice. Summary Rating: Acceptable

Water Discharge Location – Effects to the Human Environment						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
Criteria	Assessment					
Local residents and recreational users	Effect on property values	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		-	-	-	-	-
	Effect on employment opportunities	N/A	N/A	N/A	N/A	N/A
	Effect on local access points	N/A	N/A	N/A	N/A	Advantages: None apparent
						Disadvantages: Potential inflow could potentially increase flow and therefore impact access on Blackwater Creek
	Effect on current noise levels	N/A	N/A	N/A	N/A	N/A
	Effect on water supply for both well water and drinking water	Advantages: Water discharge would not adversely affect availability of lake water to local residents or tourism operators in the area during operations. Water quality reporting and local resident notification procedures could be established to provide up to date water quality information to local residents and mitigate risks to drinking water supply. No known potential to interfere with area well users.	Advantages: Water discharge would not adversely affect availability of lake water to local residents in the area during operations. Water quality reporting and local resident notification procedures could be established to provide up to date water quality information to local residents and mitigate risks to drinking water supply. No known potential to interfere with area well users.	Advantages: Water discharge would not adversely affect availability of lake water to local residents in the area during operations. Water quality reporting and local resident notification procedures could be established to provide up to date water quality information to local residents and mitigate risks to drinking water supply. No known potential to interfere with area well users.	Advantages: No residents or local water users along Tree Nursery Ponds or drainage tributaries. No known potential to interfere with area well users.	Advantages: No residents use Blackwater Creek as a source of drinking water. No known potential to interfere with area well users.
		Disadvantages: Receiving waters are used for private residents, tourism outfitters, and the City of Dryden. Local residents and tourist operators may perceive industrial water discharge to lakes/creeks as an infringement/disturbance.	Disadvantages: Receiving waters are used for private residents. Local residents and tourist operators may perceive industrial water discharge to lakes/creeks as an infringement/disturbance.	Disadvantages: Receiving waters are used for private residents. Local residents and tourist operators may perceive industrial water discharge to lakes/creeks as an infringement/disturbance.	Disadvantages: Local residents and tourist operators may perceive industrial water discharge to lakes/creeks as an infringement/disturbance.	Disadvantages: Local residents and tourist operators may perceive industrial water discharge to lakes/creeks as an infringement/disturbance.
	Effect on visual disturbance	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Potential for adverse health effects	See Public health and safety criteria	See Public health and safety criteria	See Public health and safety criteria	See Public health and safety criteria	See Public health and safety criteria
Infrastructure	Effect on local access	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Effect on power supply systems	N/A	N/A	N/A		
Public Health and Safety	Attainment of air quality point of impingement standards or scientifically defensible alternatives	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Effect on drinking water supply	Advantages: Treated effluent would be in compliance with final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Treated effluent would be in compliance with final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Treated effluent would be in compliance with final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Treated effluent would be in compliance with final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Treated effluent would be in compliance with final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.
		Disadvantages: Potential for water quality effects in the event of an unintended release of effluent.	Disadvantages: Potential for water quality effects in the event of an unintended release of effluent.	Disadvantages: Potential for water quality effects in the event of an unintended release of effluent.	Disadvantages: Potential for water quality effects in the event of an unintended release of effluent.	Disadvantages: Potential for water quality effects in the event of an unintended release of effluent.
	Effect on local health services	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Local Economy	Effect on local businesses and economic	N/A	N/A	N/A	N/A	N/A

Water Discharge Location – Effects to the Human Environment						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
	opportunities	N/A	N/A	N/A	N/A	N/A
	Effect on access for tourism operators and/or natural resource harvesters	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Tourism	Effect on local tourism	Advantages: Controlled discharge to Wabigoon Lake would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Thunder Lake would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Hartman Lake would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Tree Nursery Ponds would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Blackwater Creek would limit potential for adverse effects to fisheries resources.
		Disadvantages: Potential for perceived disruption of recreational use and fisheries.	Disadvantages: Potential for perceived disruption of recreational use and fisheries.	Disadvantages: Potential for perceived disruption of recreational use and fisheries.	Disadvantages: Potential for perceived disruption of recreational use and fisheries.	Disadvantages: Potential for perceived disruption of recreational use and fisheries.
Regional Economy	Effect on regional businesses and economic opportunities	Advantages: No known adverse effects.	Advantages: No known adverse effects.	Advantages: No known adverse effects.	Advantages: No known adverse effects.	Advantages: No known adverse effects.
		Disadvantages: If delays to the Project EA/permitting schedule were to occur due to a result of potential resident and tourism operator interests, there would be a corresponding delay in project related employment and business opportunities to the region.	Disadvantages: If delays to the Project EA/permitting schedule were to occur due to a result of potential resident and tourism operator interests, there would be a corresponding delay in project related employment and business opportunities to the region.	Disadvantages: If delays to the Project EA/permitting schedule were to occur due to a result of potential resident and tourism operator interests, there would be a corresponding delay in project related employment and business opportunities to the region.	Disadvantages: If delays to the Project EA/permitting schedule were to occur due to a result of potential resident and tourism operator interests, there would be a corresponding delay in project related employment and business opportunities to the region.	Disadvantages: If delays to the Project EA/permitting schedule were to occur due to a result of potential resident and tourism operator interests, there would be a corresponding delay in project related employment and business opportunities to the region.
Government Services	Effect on local government services and capacities	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Resource management objectives	Effect on established resource management plans	Advantages: Effluent will only be discharged when in compliance with final effluent standards, in line with Federal and Provincial guidelines.	Advantages: Effluent will only be discharged when in compliance with final effluent standards, in line with Federal and Provincial guidelines.	Advantages: Effluent will only be discharged when in compliance with final effluent standards, in line with Federal and Provincial guidelines.	Advantages: Effluent will only be discharged when in compliance with final effluent standards, in line with Federal and Provincial guidelines.	Advantages: Effluent will only be discharged when in compliance with final effluent standards, in line with Federal and Provincial guidelines.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
Built heritage and cultural heritage	Effect on any built heritage resource or cultural heritage features	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	Alteration that is not sympathetic or is incompatible with the historic fabric and appearance of cultural heritage resources	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	Isolation of a built heritage resource or heritage attribute from it surrounding environment, context or a significant relationship	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	Direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	A change in land use	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	Avoidance of damage to built heritage resources or cultural heritage landscapes, or document cultural resources if damage or relocation cannot be reasonably avoided	Advantages: Archeological and built heritage sites (if any) would be identified and avoided, or otherwise catalogued according to applicable regulations and standards. Any sites discovered during construction can be protected and/or avoided.	Advantages: Archeological and built heritage sites (if any) would be identified and avoided, or otherwise catalogued according to applicable regulations and standards. Any sites discovered during construction can be protected and/or avoided.	Advantages: Archeological and built heritage sites (if any) would be identified and avoided, or otherwise catalogued according to applicable regulations and standards. Any sites discovered during construction can be protected and/or avoided.	Advantages: Archeological and built heritage sites (if any) would be identified and avoided, or otherwise catalogued according to applicable regulations and standards. Any sites discovered during construction can be protected and/or avoided.	Advantages: Archeological and built heritage sites (if any) would be identified and avoided, or otherwise catalogued according to applicable regulations and standards. Any sites discovered during construction can be protected and/or avoided.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
Archaeological resources	Effect on land disturbances	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.

Water Discharge Location – Effects to the Human Environment						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	Avoidance of archaeological sites or mitigation by excavation if avoidance is not possible, as per the Standards and Guidelines for Consultant Archaeologists (2010).	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
First Nation Reserves and communities	Effect on conditions of community on First Nation reserves	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
Spiritual and ceremonial sites	Avoidance of damage or disturbance to known spiritual and/or ceremonial sites	Advantages: Spiritual, ceremonial, cultural heritage and archeological sites would be identified through Traditional Knowledge and archeological studies and would be avoided or otherwise suitability catalogued and managed in accordance with applicable regulatory needs and commitments. Any sites discovered during construction can be protected and avoided.	Advantages: Spiritual, ceremonial, cultural heritage and archeological sites would be identified through Traditional Knowledge and archeological studies and would be avoided or otherwise suitability catalogued and managed in accordance with applicable regulatory needs and commitments. Any sites discovered during construction can be protected and avoided.	Advantages: Spiritual, ceremonial, cultural heritage and archeological sites would be identified through Traditional Knowledge and archeological studies and would be avoided or otherwise suitability catalogued and managed in accordance with applicable regulatory needs and commitments. Any sites discovered during construction can be protected and avoided.	Advantages: Spiritual, ceremonial, cultural heritage and archeological sites would be identified through Traditional Knowledge and archeological studies and would be avoided or otherwise suitability catalogued and managed in accordance with applicable regulatory needs and commitments. Any sites discovered during construction can be protected and avoided.	Advantages: Spiritual, ceremonial, cultural heritage and archeological sites would be identified through Traditional Knowledge and archeological studies and would be avoided or otherwise suitability catalogued and managed in accordance with applicable regulatory needs and commitments. Any sites discovered during construction can be protected and avoided.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
Traditional Land use	Effect on Traditional Land use as caused by the project	Advantages: Controlled discharge to Wabigoon Lake would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Thunder Lake would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Hartman Lake would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Tree Nursery Ponds would limit potential for adverse effects to fisheries resources.	Advantages: Controlled discharge to Blackwater Creek would limit potential for adverse effects to fisheries resources.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
Aboriginal and Treaty Rights	Effect on Aboriginal and Treaty rights	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
Effects to Human Environment	Summary Evaluation and Rating	Water discharge to Wabigoon Lake would not be expected to have any adverse effects to the human environment during normal operations. Local residents and tourism operators along Wabigoon Lake may perceive industrial water discharge as an infringement/disturbance and resist the action. Summary Rating: Acceptable	Water discharge to Thunder Lake would not be expected to have any adverse effects to the human environment during normal operations. Local residents along Thunder Lake may perceive industrial water discharge as an infringement/disturbance and resist the action. Summary Rating: Acceptable	Water discharge to Hartman Lake would not be expected to have any adverse effects to the human environment during normal operations. Local residents and tourism operators along Hartman Lake may perceive industrial water discharge as an infringement/disturbance and resist the action. Summary Rating: Acceptable	Water discharge to the Tree Nursery ponds would not be expected to have any adverse effects to the human environment during normal operations. There are no residents or water users along the Tree Nursery Ponds and tributaries. Summary Rating: Acceptable	Water discharge to Blackwater Creek ponds would not be expected to have any adverse effects to the human environment during normal operations. Although residents live in close proximity to Blackwater Creek, there are no known users that use the creek as a drinking water source. Summary Rating: Preferred

Water Discharge Location – Effects to the Physical and Biological Environments						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
Criteria	Assessment					
Effect on Air Quality and Climate	Maintain air quality point of impingement standards or defensible alternatives	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	Emission rates of greenhouse gases (GHGs)	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
Effect on aquatic life and habitat	Fulfilment of water quality standards and guidelines for protection of aquatic life or ensuring no further degradation of water quality if current conditions do not match PWQO	Advantages: Excess water and treated effluent to be discharged would be compliance with final Federal and Provincial effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Excess water and treated effluent to be discharged would be compliance with final Federal and Provincial effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Excess water and treated effluent to be discharged would be compliance with final Federal and Provincial effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Excess water and treated effluent to be discharged would be compliance with final Federal and Provincial effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.	Advantages: Excess water and treated effluent to be discharged would be compliance with final Federal and Provincial effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives.
		Disadvantages: Potential for effects on water quality effects in the event of	Disadvantages: Potential for effects on water quality effects in the event of an	Disadvantages: Potential for effects on water quality effects in the event of an	Disadvantages: Potential for effects on water quality effects in the event of an	Disadvantages: Potential for effects on water quality effects in the event of an unintended

Water Discharge Location – Effects to the Physical and Biological Environments						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
		an unintended release.	unintended release.	unintended release.	unintended release.	release.
	Management of water level in effected water bodies and streams to maintain aquatic life	Water discharge during normal operation with Wabigoon Lake is not expected to alter associated aquatic or other habitats.	Advantages: Water discharge during normal operation with Thunder Lake is not expected to alter associated aquatic or other habitats.	Advantages: Water discharge during normal operation with Hartman Lake is not expected to alter associated aquatic or other habitats.	Advantages: Water discharge during normal operation with the Tree Nursery Ponds is not expected to alter associated aquatic or other habitats. Flow increases due to discharge could be seasonally offset by avoiding or minimizing discharge during high flow periods.	Advantages: Water discharge during normal operation with Blackwater Creek is not expected to alter associated aquatic or other habitats. Flow increases due to discharge could be seasonally offset by avoiding or minimizing discharge during high flow periods.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: As above	Disadvantages: As above
	Impact to Fish Spawning Habitat	Water discharge during normal operation with Wabigoon Lake is not expected to alter associated aquatic or other habitats including spawning habitat	Advantages: Water discharge during normal operation with Thunder Lake is not expected to alter associated aquatic or other habitats	Advantages: Water discharge during normal operation with Thunder Lake is not expected to alter associated aquatic or other habitats	Advantages: Water discharge during normal operation with the Tree Nursery Ponds is not expected to alter associated aquatic or other habitats. Flow increases due to discharge could be seasonally offset by avoiding or minimizing discharge during high flow periods. Therefore it is not anticipated that increased flow will impact spawning habitat with the Thunder Lake Tributaries/Tree Nursery Ponds.	Advantages: Water discharge during normal operation with the Tree Nursery Ponds is not expected to alter associated aquatic or other habitats. Flow increases due to discharge could be seasonally offset by avoiding or minimizing discharge during high flow periods. Therefore it is not anticipated that increased flow will impact spawning habitat with Blackwater Creek.
		Disadvantages: Construction of pipeline to Wabigoon Lake has the potential to impact spawning habitat.	Disadvantages: Construction of pipeline to Thunder Lake has the potential to impact spawning habitat.	Disadvantages: Construction of pipeline to Hartman Lake has the potential to impact spawning habitat.	Disadvantages: None apparent.	Disadvantages: None apparent.
	Maintenance of fish population	Advantages: Flow increases during water discharge are not expected to affect fish populations.	Advantages: Flow increases during water discharge are not expected to affect fish populations.	Advantages: Flow increases during water discharge are not expected to affect fish populations.	Advantages: Flow increases during water discharge are not expected to affect fish populations.	Advantages: Flow increases during water discharge are not expected to affect fish populations.
		Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent	Disadvantages: None apparent
	Maintenance of groundwater levels for both flows and quality	Local surface water and groundwater systems are not functionally connected.	Local surface water and groundwater systems are not functionally connected.	Local surface water and groundwater systems are not functionally connected.	Local surface water and groundwater systems are not functionally connected.	Local surface water and groundwater systems are not functionally connected.
Effect on wetlands	Fulfilment of water quality standards and guidelines for protection of aquatic life or ensuring no further degradation of water quality if current conditions do not match PWQO	See equivalent indicator in Effects on fish and aquatic habitat	See equivalent indicator in Effects on fish and aquatic habitat	See equivalent indicator in Effects on fish and aquatic habitat	See equivalent indicator in Effects on fish and aquatic habitat	See equivalent indicator in Effects on fish and aquatic habitat
	Area, type and quality (functionality) of wetlands that would be displaced or altered	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Maintenance of wetland connectivity	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Effect on terrestrial species and habitat	Area, type and quality of terrestrial habitat that would be displaced or altered	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Effects of noise disturbance generated by the project	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Maintenance of wildlife movement corridors and plant dispersion	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Effect on overall wildlife population	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Effect on Species at Risk (SAR)	Sensitively level of effected SAR (Endangered, Threatened, Special Concern)	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.	Advantages: None apparent.
		Disadvantages: None apparent.	Disadvantages: None apparent.	Disadvantages: None apparent.	Disadvantages: None apparent.	Disadvantages: None apparent.
	Area, type and quality of SAR that would be displaced or altered	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat

Water Discharge Location – Effects to the Physical and Biological Environments						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
	Effects of noise disturbance generated by the project	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat	See equivalent indicator in Effects on Terrestrial and Species Habitat
	Maintenance of wildlife movement corridors and plant dispersion	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Effects to Physical and Biological Environments	Summary Evaluation and Rating	Water discharge to Wabigoon Lake would not alter aquatic and other habitat functions during normal operation, and will meet applicable effluent standards. Because of greater assimilative capacity the potential for aquatic impacts during a potential unintended release is less likely to case aquatic impacts compare to the alternative. Flow would be managed to comply with water level controls for Wabigoon Lake. Summary Rating: Acceptable	Water discharge to Thunder Lake would not alter aquatic and other habitat functions during normal operation, and will meet applicable effluent standards. Because of greater assimilative capacity the potential for aquatic impacts during a potential unintended release is less likely to case aquatic impacts compare to the alternative. Flow would be managed to comply with water level controls for Thunder Lake. Summary Rating: Acceptable	Water discharge to Thunder Lake would not alter aquatic and other habitat functions during normal operation, and will meet applicable effluent standards. Because of greater assimilative capacity the potential for aquatic impacts during a potential unintended release is less likely to case aquatic impacts compare to the alternative. Summary Rating: Acceptable	Water discharge to the Tree Nursery Ponds would not alter aquatic and other habitat functions during normal operation, and will meet applicable effluent standards. Summary Rating: Acceptable	Water discharge to Blackwater Creek would not alter aquatic and other habitat functions during normal operation, and will meet applicable effluent standards. Summary Rating: Acceptable

Water Discharge Location – Potential ability for future closure/reclamation processes						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
Criteria	Assessment					
Public Safety and Security	Effect on safety and security risks to the community and general public	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Environmental Health and Long Term Sustainability	Effect on long term air quality and the ability to meet point of impingement standards	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Effect on long term water quality and the ability to meet water quality guidelines	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Effect on long term wildlife habitats including SARs	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Land Use	Effect on long term land uses	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
	Effect on long term visual appearance of Project Site	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A
Closure and Reclamation	Summary Rating	There are no water discharge limitations or liabilities relating to site reclamation at closure. Summary Rating: Acceptable	There are no water discharge limitations or liabilities relating to site reclamation at closure. Summary Rating: Acceptable	There are no water discharge limitations or liabilities relating to site reclamation at closure. Summary Rating: Acceptable	There are no water discharge limitations or liabilities relating to site reclamation at closure. Summary Rating: Acceptable	There are no water discharge limitations or liabilities relating to site reclamation at closure. Summary Rating: Acceptable
Overall	Summary Rating	Wabigoon Lake is capable of meeting the Project's water discharge needs. Water discharge would be treated, restricted, and controlled and is not expected to have any adverse effects. Local and downstream users may perceive water discharge infrastructure as an infringement/disturbance and may resist such action, which could translate in EA and permitting delays. However, due to the assimilative capacity of Wabigoon Lake impacts to the aquatic environment and disruptions are less likely.	Thunder Lake is capable of meeting the Project's water discharge needs. Water discharge would be treated, restricted, and controlled and is not expected to have any adverse effects. Local and downstream users may perceive water discharge infrastructure as an infringement/disturbance. However, due to the assimilative capacity of Thunder Lake impacts to the aquatic environment and disruptions are less likely.	Hartman Lake is capable of meeting the Project's water discharge needs. Water discharge would be treated, restricted, and controlled and is not expected to have any adverse effects. Local and downstream users may perceive water discharge infrastructure as an infringement/disturbance. High operational, complex requirements of construction provide high risk to ROI and Project development. However, due to the assimilative capacity of Hartman Lake impacts to the aquatic environment and disruptions are less likely.	The tree nursery ponds are capable of meeting the Project's water discharge needs. Water discharge would be treated, restricted, and controlled and is not expected to have any adverse effects including those to fish habitat and spawning habitat. In addition the Tree Nursery Ponds provide the low cost alternative. Water discharge will require detailed monitoring as water taking is to be completed within the same creek system.	Blackwater Creek is capable of meeting the Project's water discharge needs. Water discharge would be treated, restricted, and controlled and is not expected to have any adverse effects including those to fish habitat and spawning habitat. In addition Blackwater Creek provides the lowest cost alternative and most suitable to Project development.

Water Discharge Location – Potential ability for future closure/reclamation processes						
	Alternative	1	2	3	4	5
	Description	Wabigoon Lake	Thunder Lake	Hartman Lake	Tree Nursery Ponds	Blackwater Creek
		Summary Rating; Acceptable	Summary Rating; Acceptable	Summary Rating; Unacceptable	Summary Rating; Acceptable	Summary Rating; Preferred

NOW Ecosite Code	NWO Ecosite Name	Corresponding Provincial Ecosites	Habitat Class
ES1	Beach / Bar	B005, (B160, B161, B162, B169, B170, B171, B172, B176, B177, B178, B185, B186, B187, B188)	Upland
ES2	Sand Dunes	B006	Upland
ES3	Bluff	B001, B002, B003, B004	Upland
ES4	Cliff	B157, B158, B159, B173, B174, B175	Upland
ES5	Talus or Steep Slope	B166, B167, B168, B182, B183, B184	Upland
ES6	Crevice / Cave	Not yet available	Upland
ES7	Rock Barren	B163, B164, B165, B179, B180, B181	Upland
ES8	Alvar	B173, B174, B175, B176, B177, B178, B179, B180, B181	Upland
ES9	Sand Barren	B007	Upland
ES10	Prairie/Savannah	B030, B031, B045, B046, B061, B062, B078, B079, B094, B095, B110, B111, (B008, B009, B020, B021)	Successional
ES11	Red Pine-White Pine-Jack Pine: Very Shallow Soil	B011, (B015, B023, B027)	Upland
ES12	Black Spruce-Jack Pine: Very Shallow Soil	B012, B013, B014, B016, B024, B025, B026, (B017, B018, B019, B028)	Upland
ES13	Jack Pine-Conifer: Dry-Moderately Fresh, Sandy Soil	B034	Upland
ES14	Pine-Spruce Mixedwood: Sandy Soil	B035, B034, B036, B037 (B038)	Upland
ES15	Red Pine-White Pine: Sandy Soil	B033, B039	Upland
ES16	Hardwood-Fir-Spruce Mixedwood: Sandy Soil	B040, (B041, B042, B043)	Upland
ES17	White Cedar: Fresh-Moist, Coarse-Fine Loamy Soil	B051, B066, B115, B084, B100	Upland
ES18	Red Pine-White Pine: Fresh, Coarse Loamy Soil	B048, B054	Coniferous
ES19	Hardwood-Fir-Spruce Mixedwood: Fresh, Sandy-Coarse Loamy Soil	B055, B056, B057, B058, B059	Deciduous
ES20	Spruce-Pine/Feathermoss: Fresh, Sandy-Coarse Loamy Soil	B049, B050	Coniferous
ES21	Fir-Spruce Mixedwood: Fresh, Coarse Loamy Soil	B052, B050, (B053)	Coniferous
ES22	Spruce-Pine / Ledum / Feathermoss: Moist, Sandy-Coarse Loamy Soil	B065, B067, (B064, B068)	Coniferous

ES23	Hardwood-Fir-Spruce Mixedwood: Moist, Sandy-Coarse Loamy Soil	B070, (B069, B071, B072, B073, B074, B075, B076)	Deciduous
ES24	Red Pine-White Pine: Fresh, Fine Loamy Soil	B097, B103, (B081, B087)	Coniferous
ES25	Pine-Spruce/Feathermoss: Fresh, Silty Soil	B098, B099	Coniferous
ES26	Spruce-Pine/Feathermoss: Fresh, Fine Loamy-Clayey Soil	B082, B083, B098, B099	Coniferous
ES27	Fir-Spruce Mixedwood: Fresh, Silty-Fine Loamy Soil	B101, (B085, B086, B102)	Coniferous
ES28	Hardwood-Fir-Spruce Mixedwood: Fresh, Silty Soil	B104, (B088, B090, B091, B092, B106, B107, B108)	Deciduous
ES29	Hardwood-Fir-Spruce Mixedwood: Fresh, Fine Loamy-Clayey Soil	B088, B104, (B090, B091, B092, B106, B107, B108)	Deciduous
ES30	Black Ash Hardwood: Fresh, Silty-Clayey Soil	B089, B105, (B084, B088, B100, B104)	Deciduous
ES31	Spruce-Pine/Feathermoss: Moist, Silty-Clayey Soil	B114, (B113, B115, B116, B117)	Coniferous
ES32	Fir-Spruce Mixedwood: Moist, Silty-Clayey Soil	B116, (B114, B115, B117)	Coniferous
ES33	Hardwood-Fir-Spruce Mixedwood: Moist, Silty-Clayey Soil	B119, (B118, B120, B121, B122, B123, B124, B125)	Deciduous
ES34	Treed Bog: Black Spruce/Sphagnum: Organic Soil	B126, (B127, B137)	Wetland
ES35	Poor Swamp: Black Spruce: Organic Soil	B127, B222, (B128, B223)	Wetland
ES36	Intermediate Swamp: Black Spruce (Tamarack): Organic Soil	B128, B223, B129, B224, (B127, B222)	Wetland
ES37	Rich Swamp: Cedar (Other Conifer): Organic Soil	B129, B224, (B128, B223)	Wetland
ES38	Rich Swamp: Black Ash (Other Hardwood): Organic-Mineral Soil	B130, B131, B132, B133	Wetland
ES39	Open Bog: Ericaceous Shrub/Sedge/Sphagnum: Organic Soil	B138	Wetland
ES40	Treed Fen: Tamarack-Black Spruce / Sphagnum: Organic Soil	B136	Wetland
ES41	Open Poor Fen: Ericaceous Shrub / Sedge / Sphagnum: Organic Soil	B139	Wetland
ES42	Open Moderately Rich Fen: Ericaceous Shrub / Sedge: Organic Soil	B140, B139	Wetland
ES43	Open Extremely Rich Fen: Ericaceous Shrub / Sedge / Brown Moss: Organic Soil	B141	Wetland
ES44	Thicket Swamp: Organic-Mineral Soil	B134, B135	Wetland
ES45	Shore Fen: Organic Soil	B146, B147, (B145)	Wetland
ES46	Meadow Marsh: Organic-Mineral Soil	B142, B144, (B143)	Wetland
ES47	Sheltered Marsh: Emergent: Sedimentary Peat Substrate	B149	Wetland
ES48	Exposed Marsh: Emergent: Mineral Substrate	B148	Wetland
ES49	Open Water Marsh: Submergent / Floating-leaved: Sedimentary Peat Substrate	B150, B152	Wetland
ES50	Open Water Marsh: Submergent: Mineral Substrate	B150, B151	Wetland
ES51	Shallow Water: Sparsely Vegetated: Rock	B154	Open water
ES52	Shallow Water: Sparsely Vegetated: Muck	B156	Open water
ES53	Shallow Water: Sparsely Vegetated: Sand	B155	Open water
ES54	Shallow Water: Sparsely Vegetated: Gravel	B154	Open water
ES55	Shallow Water: Sparsely Vegetated: Cobble	B154	Open water
ES56	Shallow Water: Sparsely Vegetated: Stone	B154	Open water

ES67			Open water

Source: MNRF (2016: website). A guide to translate northwestern Ontario ecosites into “Ecosites of Ontario”. Available at: http://www.cnfer.on.ca/SEP/PELC/PDFs/ELC%20info%20sheet%20--%20north%20west%20--%20January%202012.pdf

TMI_145-WL(1)-02_Table_2

Ecosite	RSA		LSA		Footprint	
	%	km2	%	km2	%	km2
1	0.01	0.22	0.00	0.00	0.00	0.00
2	0.01	0.32	0.00	0.00	0.00	0.00
3	0.00	0.08	0.00	0.00	0.00	0.00
4	0.01	0.45	0.00	0.00	0.00	0.00
6	0.00	0.08	0.00	0.00	0.00	0.00
7	0.49	15.52	0.08	0.04	0.00	0.00
9	0.16	5.15	0.33	0.17	0.00	0.00
11	0.17	5.36	0.00	0.00	0.00	0.00
12	3.88	121.92	2.27	1.14	0.00	0.00
13	1.40	43.84	6.04	3.02	6.62	0.28
14	0.88	27.78	0.37	0.19	0.00	0.00
15	0.11	3.38	0.00	0.00	0.00	0.00
16	0.47	14.83	0.03	0.02	0.00	0.00
17	0.83	26.01	0.00	0.00	0.00	0.00
18	0.20	6.31	0.00	0.00	0.00	0.00
19	5.92	185.85	1.53	0.76	0.00	0.00
20	4.90	153.79	8.54	4.27	0.00	0.00
21	8.78	275.67	4.98	2.49	0.00	0.00
22	0.65	20.39	1.36	0.68	0.34	0.01
23	0.16	4.99	0.00	0.00	0.00	0.00
24	0.16	5.08	0.00	0.00	0.00	0.00
25	3.44	107.91	5.76	2.88	5.80	0.25
26	5.66	177.53	9.65	4.83	30.73	1.32
27	2.23	70.02	0.26	0.13	0.00	0.00
28	0.68	21.47	0.00	0.00	0.00	0.00
29	13.93	437.21	13.69	6.85	12.76	0.55
30	0.48	15.05	0.05	0.02	0.00	0.00
31	0.41	12.81	2.38	1.19	1.33	0.06
32	0.92	29.01	1.30	0.65	9.96	0.43
33	1.87	58.58	1.78	0.89	0.00	0.00
34	0.10	3.04	0.95	0.47	0.00	0.00
35	1.83	57.47	4.19	2.10	1.67	0.07
36	3.74	117.41	3.80	1.90	6.33	0.27
37	1.03	32.32	0.84	0.42	1.24	0.05
38	0.18	5.68	0.00	0.00	0.00	0.00
39	0.00	0.02	0.00	0.00	0.00	0.00
40	1.02	32.00	2.81	1.41	0.00	0.00
41	0.03	0.95	0.10	0.05	1.24	0.05
42	0.18	5.58	6.18	3.09	0.00	0.00
43	0.04	1.26	2.21	1.11	0.00	0.00
44	1.39	43.63	2.37	1.19	1.62	0.07
45	1.31	41.06	0.57	0.28	0.00	0.00
46	1.18	36.95	1.25	0.63	0.00	0.00

47	0.04	1.13	0.00	0.00	0.00	0.00
50	0.00	0.02	0.00	0.00	0.00	0.00
56	0.00	0.06	0.00	0.00	0.00	0.00
67	0.00	0.10	0.00	0.00	0.00	0.00
Developed	9.15	287.04	13.22	6.61	20.37	0.88
TOTAL	**80.05**	**3138.47**	**98.90**	**50.04**	**100.00**	**4.30**
Water	**19.95**	**626.16**	**1.10**	**0.55**	**0.00**	**0.00**
Grand Total	**100.00**	**3764.63**	**100.00**	**50.58**	**100.00**	**4.30**

TMI_145-WL(1)-02_Table_3

	Ecosite																								
	ES13		ES22		ES25		ES26		ES29		ES31		ES32		ES35		ES36		ES37		ES40		ES44		Water		Developed		Total (km2)
Project Component	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	%	km2	
Collection	0.00	0.00	0.00	0.00	6.41	0.01	41.45	0.09	7.29	0.02	3.51	0.01	29.65	0.07	0.00	0.00	1.88	0.00	0.00	0.00	2.94	0.01	4.75	0.01	0.00	0.00	2.12	0.00	**0.22**
Pit	0.00	0.00	0.00	0.00	1.45	0.00	12.25	0.04	26.08	0.09	0.00	0.00	32.94	0.11	0.00	0.00	15.48	0.05	0.00	0.00	0.00	0.00	11.82	0.04	0.00	0.00	0.00	0.00	**0.33**
Plant	0.00	0.00	0.00	0.00	52.59	0.00	47.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
TSF	0.00	0.00	0.00	0.00	14.91	0.09	51.44	0.32	7.03	0.04	2.87	0.02	0.00	0.00	3.00	0.02	4.44	0.03	8.60	0.05	6.85	0.04	0.86	0.01	0.00	0.00	0.00	0.00	**0.62**
Lowgrade	0.00	0.00	0.00	0.00	1.52	0.00	96.86	0.05	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.06**
Overburden	0.00	0.00	0.00	0.00	0.00	0.00	4.75	0.01	48.97	0.12	0.00	0.00	27.01	0.06	0.00	0.00	10.08	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	9.17	0.02	**0.24**
Waste rock storage	0.00	0.00	0.00	0.00	13.85	0.05	59.03	0.22	15.09	0.06	0.00	0.00	0.00	0.00	0.00	0.00	12.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.37**
Aggregate	21.70	0.28	1.11	0.01	0.00	0.00	17.74	0.23	0.00	0.00	1.12	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	58.29	0.76	**1.31**
																											Total area:		**3.16**

TMI_153-WL(1)-10_Table_1

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
Bird	American White Pelican *Pelecanus erythrorhynchus*	Seasonal migration	N/A	Nesting colonies on isolated islands, away from disturbance and near an abundant food source. Eggs are deposited in a shallow depression on the ground	Marine or freshwater environments (e.g., rivers, lakes, marshes and estuaries) with suitable breeding habitat and abundant prey	Low Figures 3 and 4	Breeding birds begin returning to Ontario in April. Age of maturity is believed to be 3 years. Site fidelity towards breeding colonies remains unclear. Females lay a clutch of two eggs in May. Eggs are incubated for 31-32 days. Typically only one chick fledges, with survival rates of the younger chick resting around 15%, compared to the older chick at 88%. Young feed primarily on minnows and suckers provided by adults. Young begin to leave the nest at 17 days, and have completely left by day 25. Young gather in large crèches by day 35 as a substitute to parental care. Young fledge by 9-10 weeks and remain near the colony until late August/early September. Foraging sometimes occurs onwards of well over 100 km from colonies. Pelicans do not overwinter in Ontario. Instead they migrate south, occasionally as	Potential Habitat: Sizable open waterbodies within the LSA that may contain suitable nesting and foraging habitat

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							far as southern Mexico, and overwinter on the Pacific or Atlantic coasts.	
Bird	Bald Eagle *Haliaeetus leucocephalus*	Seasonal migration	Avoids crosswing large waterbodies during migration. Southward migration in the fall generally occurs along major river drainage systems	Solitary stick nests in large supercanopy trees near water, typically in areas with low human activity	Mature forest with scattered supercanopy trees, adjacent (6-200 m) to large waterbodies with abundant prey	Low Figures 1 and 2	Bald Eagles are long-lived, capable of surviving >30 years, and reach sexual maturity at 4-6 years. Breeding pairs are thought to mate for life, unless one mate dies. Adults establish a territory 1-3 months prior to egg laying (beginning mid-February), with average territory sizes ranging from 0.5-4 km^2 (up to 22 km^2). Breeding pairs display a high degree of territory fidelity between years, but sometimes alternate between 2-4 territories. Females lay an average of 2 eggs from March-June. Incubation lasts for 34-35 days, but can	Potential habitat: mature stands (>70yrs for deciduous, >80yrs for coniferous) that may include superstory trees, within 200m from a waterbody, further than 1km from human settlements

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							extend as long as 46 days. Young typically fledge at 10-11 weeks (8-14 week range). Up to 50% of initial fledging attempts are unsuccessful, with young falling to the ground and remaining there for several weeks until they fledge. Young generally remain within an area of 30 km^2 in their natal territory for ~45 days after fledging. Immature Bald Eagles migrate nomadically, while adults migrate in the fall when food is no longer abundant in the breeding territory. Fall migration occurs much slower than spring migration.	

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
Bird	Bank Swallow *Riparia riparia*	Seasonal migration	N/A	Nest in burrows excavated in eroding vertical bank faces, often in colonies	Natural and artificial sites with vertical banks and sand-silt substrates (e.g., riverbanks, lake and ocean bluffs and aggregate pits) are necessary for nesting burrows. Breeding sites are situated near open terrestrial foraging habitat (e.g., grasslands, meadows, pastures and croplands. Large wetlands are used as communal nocturnal roosts post-breeding and migration periods	No	Bank swallows generally arrive in Ontario April-May. They are colonial nesters, with colony sizes sometimes numbering in several thousand nests. Males mostly excavate the nest burrow and nest chamber, while females build most of the nest cup inside using grasses, plant stems, fibers, and feathers. Breeding pairs are socially monogamous, with breeding occurring May-August. Birds can breed in their first year, with maturity occurring at 10-11 months. There is typically only a single brood in Ontario Bank Swallow populations, with clutches averaging around 5 eggs (2-7 range). Incubation takes 14 days. Nestlings fledging at 18-22 days of age, but will continue to roost in the burrow for several weeks after fledging. They are aerial-foraging insectivorous birds characterized by their habit of feeding on insects while in flight.	Bank Swallow nesting habitat is not present in LSA

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							Migration of Ontario populations is poorly understood, but banded individuals have been recovered as far south as Peru. Southward migration occurs late July-August.	
Bird	Barn Swallow *Hirundo rustica*	Seasonal migration	N/A	Build mud nests on or under artificial structures (e.g., barns, outbuildings, houses, garages, bridges and road culverts), often in colonies	Barn Swallows require areas with artificial structures to nest, adjacent to open foraging habitat (e.g., grasslands, meadows, pastures/cropland, lake and river shorelines, road right-of-ways and wetlands)	Yes Figure 5 and 6	Barn Swallows are socially monogamous colonial nesters (up to ~60 nests in Ontario). Their nests are made with mud pellets and lined with vegetation and feathers, and may take 6-15 days to build. Females mature at roughly 1 year. Egg-layinh occurs from May-August in Ontario, with clutch sizes averaging at 4-5 eggs. Incubation takes 13-14 days. Young fledge at 19-24 days old. Second broods are common in Ontario. Outside of the breeding season, Barn	Potential Habitat: human structures within the LSA

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							Swallows will use communal roosts, often roosting with other swallow species. They are aerial-foraging insectivorous birds characterized by their habit of feeding on insects while in flight. Southern migration in Ontario occurs in September, with some individuals travelling onwards of 8,000 km to their wintering grounds.	
Bird	Black Tern *Chlidonias niger*	Seasonal migration	N/A	Semi-colonial, nest just above the waterline on floating or emergent vegetation in marshes	Limestone-based, rich, freshwater marshes with abundant emergent vegetation, typically associated with wetlands >20 ha. Less abundant on the Canadian Sheild (igneous rock base)	Low Figure 3 and 4	Black terns are semi-colonial marsh nesters, typically found in densities of <20 pairs in Ontario. Nests are opportunistically placed on a variety of structures. These include floating or anchored dead vegetation, floating boards or logs, cattail rootstalk, Muskrat (*Ondatra zibethicus*) lodges or feeding platforms, abandoned bird's nests, raised mud and broken down bulrushes. The nest itself is usually a shallow depression in the substrate but may be constructed by the	Potential habitat: contiguous marsh habitat >20ha

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							pair on dead vegetation, and can be wet or dry. Adults return to Ontario in early-May, with breeding occurring later the same month. Clutch sizes average at 3 eggs (range of 1-6). Incubation lasts 19-24 days, with young fledging at 20-24 days old. Black Tern diet consists of aquatic invertebrates and fish. Terns will gather in large numbers in July and August to prepare for winter migration. Southern migration in Ontario occurs in September.	
Bird	Bobolink *Dolichonyx oryzivorus*	Seasonal migration	N/A	Ground nests built, often established under tall forbes, in natural grasslands, pastures and hayfields	Grasslands and tall-grass prairies, croplands (hayfields, pasture, no-till and small-grain fields), wet prairies, grminoid petlands; generally not abundant in short-grass prairies or row crop monocultures (e.g., corn, soybean and wheat)	Low Figures 5 and 6	Bobolinks arrive in early-May with breeding in Ontario occurring later the same month, typically within 10 days after pair formation. Clutch sizes average around 5 eggs. Incubation lasts ~12 days, with young fledging by late-June. Adults and immatures form flocks for their southward migration, and will travel onwards of 10,000 to their wintering grounds. Fall	Potential Habitat: Natural or anthropogenic, non-wetland clearings in the LSA

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							migration in Ontario takes place August-September.	
Bird	Canada Warbler *Cardellina canadensis*	Seasonal migration	N/A	Nest in wet forested areas, often in dense ferns or fallen logs	Deciduous, coniferous or mixedwood forests with well-developed shrub layers and a structurally complex forest floor. They are most abundant in moist, mixed forests	Yes Figures 1 and 2	The Canada Warbler is typically monogamous, arriving at breeding ground in Mau-June. Clutch sizes average at four to five eggs. Incubation usually lasts about 12 days. The chicks remain in the nest for 10 days, and are dependent on parents for two to three weeks after they leave the nest. Canada Warbler feeds primarily on flying insects and spiders in the shrub layer. Fall migration may begin as early as July and extends through September.	Potential Habitat: Mature forest stands (>70yrs for deciduous, >80yrs for coniferous)
Bird	Chimney Swift *Chaetura pelagica*	Seasonal migration	Mississippi Valley used for seasonal migration	Nests (half-saucer twig nest) and roosts in hollow structures, like hollow trees and chimneys	Generally associated with human development. Found in urban and rural areas where chimneys (or similar structures) are available for nesting and roosting. Often	Yes Figures 5 and 6	Chimney Swifts are monogamous and first breed at about 2 years. Pairs remain together and will return to the same nesting sites every year. Swifts arrive in Ontario in April-May, Mean clutch size is 4	Potential Habitat: human structures within the LSA

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
					concentrated near water where prey are abundant		eggs (range 2-6), with incubation taking 19-21 days. Fledging success varies between 70-86% with a mean of 3 young fledged per nest.	
Bird	Common Nighthawk *Chordeiles minor*	Seasonal migration	N/A	Ground nests established in natural or artificial open habitat	Open habitat (e.g., sand dunes, beaches, logged and burned areas, forest clearings, winter roads and seismic lines, rock barrens, rocky outcrops, prairies, peatbogs and pasture)	Yes Figures 5 and 6	Nighthawks arrive in Canada May-June with breeding occurring May-August. Clutch sizes are generally only 2 eggs, with incubation taking 16-20 days. Nestlings remain in the nest until mid-June to August, and become fully developed at 45-52 days. Migration south occurs August-September. Fall migration often coincides with the emergence of flying ants.	Potential Habitat: Natural or anthropogenic, non-wetland clearings in the LSA
Bird	Eastern Loggerhead Shrike *Lanius ludovicianus migrans*	Seasonal migration	N/A	Nest in small trees and shrubs, hawthorn (Cratageus sp.) is preferred in Ontario	Open areas dominated by grasses and/or forbes, interspersed with scattered shrubs/trees and bare ground (e.g., pasture, old fields, prairie, savannah and shrub-steppe)	Low Figures 5 and 6	Loggerhead Shrikes return to Canadian breeding areas as early as late March. Individuals reach breeding maturity at 1 year. Clutch size averages 5-6 eggs. Incubation lasts 16-18 days. Young fledge at 16-20 days after hatch. Site reuse is high but variable, with males	Potential Habitat: Natural or anthropogenic, non-wetland clearings in the LSA

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							more often returning to previously held territories than females. Adult fidelity is greater than natal fidelity. Site fidelity appears to be correlated with nesting success in the previous season. Fall migration occurs in September.	
Bird	Eastern Whip-poor-will *Caprimulgus vociferous*	Seasonal migration	N/A	Nest directly on leaf litter in semi-open, patchy or regenerating forests with little ground cover	Habitat requirements are based on forest structure rather than composition. Avoid wide-open areas and closed-canopy forests. Prefer semi-open or patchy forests with clearings (e.g., barrens or regenerating areas) and little ground cover	Low Figures 5 and 6	Breeding occurs in May-July, with clutches of 2 eggs laid directly on leaf litter. Incubation takes 19-21 days, with young fledging 3-4 weeks after hatching. Timing of migratory events for the Ontario population is not available, but is expected to follow the same pattern as the other migratory bird SAR.	Potential Habitat: Natural or anthropogenic, non-wetland clearings in the LSA
Bird	Eastern Wood-pewee *Contopus virens*	Seasonal migration	N/A	Nest on horizontal branches >2 m high in mature-intermediate deciduous and mixedwood forests with open understory, near forest clearings or edges	Generally associated with the mid-canopy layer of deciduous and mixed wood forest clearings and edge habitat. Most abundant in intermediate-to-mature forest stands with little understory vegetation	Yes Figures 1 and 2	Adults arrive to breeding ground in May-June. Pair formation and nest building start soon after arrival. Clutch size averages 3 eggs. Incubation lasts about 12 to 13 days, and nestlings fledge after about 16 to 18 days. Up to two broods can be produced per year. Generation time is	Potential Habitat: mature deciduous forest stands (>70yrs for deciduous)

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							estimated to be 2-3 years. Fall migration occurs August-October.	
Bird	Golden Eagle *Aquila chrysaetos*	Seasonal migration	Avoids crosswing large waterbodies during migration	Typically nest on cliffs, but may also nest in large superstory trees or artificial structures	Use a wide variety of open and semi-open habitats, but most abundant in hilly or mountainous terrain along rivers and streams in areas with sufficient prey and suitable nesting sites	Low Figures 1 and 2: Preferred nesting habitat absent, but may use mature forests	Golden Eagles reach maturity around five years of age and are believed to live approximately 20 to 30 years in the wild. They typically form monogamous pair bonds that can last several years. Non-migratory populations (residents) have been found to maintain pair bonds year-round; however, little information is known about year-round pair bonds in migrants. Migratory adults arrive February-May. Pairs lay eggs in April-May, with clutch averaging at 2 eggs (range 1-4). Incubation takes 41-45 days, with young fledging around 65-75 days. Young will remain in the area around the nest after fledging for approximately two	Potential habitat: mature forest stands (>70yrs for deciduous, >80yrs for coniferous)

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							weeks, eventually following their parents away from the nest site. Fall migration generally occurs in October-December.	
Bird	Least Bittern *Ixobrychus exilis*	Seasonal migration	N/A	Nest on platforms constructed on stiff emergent vegetation, within 10 m of open water, sometimes in small, loose colonies	Marshes with abundant emergent vegetation, usually cattails (*Typha spp.*), with relatively stable water levels and interspersed areas of open water	Low Figures 3 and 4	Adults arrive at breeding sites in April, with calling and nesting beginning by mid-May. Clutch sizes average 5 eggs (2-7 range), with some pairs having 2 broods a season. Incubation takes 17-20 days. Fledging time is not available for Ontario populations. Fall migration takes place in August-September. Prior to this, juveniles disperse widely from their natal areas.	Potential Habitat: all marsh habitat
Bird	Olive-sided Flycatcher *Contopus cooperi*	Seasonal migration	N/A	Build twig nests in coniferous trees (in Ontario) near forest openings or edges, typically	Generally associated with open areas containing tall trees/snags, forest edges near natural or man-made openings, burned forests or semi-open	Yes Figures 1 and 2	Adults typically arrive in breeding sites in May (range April-June). Pairs are generally monogamous. Females lay an average clutch of 3 eggs. Incubation takes 15-19 days, with young	Potential Habitat: Mature coniferous forest stands (>80yrs for coniferous)

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
				associated with mature forests	mature coniferous or mixedwood forest stands. More likely to occur near wetlands		fledging at 17-23 days. Fall migration begins July-August, where individuals may travel onwards of 8,000 km to their wintering grounds.	
Bird	Peregrine Falcon *Falco peregrinus anatum*	Seasonal migration	Follow clearly defines landforms (e.g., beaches, shorelines and islands) during their seasonal migrations	Nest on cliff ledges or crevices, occasionally on tall buildings or bridges	Occupy a wide range of habitats (e.g., arctic tundra, sea coasts, prairies and urban areas). Generally found nesting on cliff ledges or crevices, occasionally on tall buildings or bridges in areas with abundant prey	No	Peregrine Falcons form long-term monogamous pair bonds. In northern Ontario, adults return to breeding sites in late March and begin laying eggs in late April. Incubation lasts around 33 days, with young fledging at 35-42 days after hatching. Young become independent at the onset of migration. Fall migration information is not available for Ontario populations, but is expected to be similar to other raptor SAR.	Peregrine Falcon nesting habitat not present in LSA
Bird	Rusty Blackbird *Euphagus carolinus*	Seasonal migration	N/A	Build twig, grass and moss nests in thickets of small conifers or deciduous shrubs, or in dead trees, overhanging or near open water	Habitat characterized by forest wetlands (slow-moving streams, peatbogs, sedge meadows, marshes, swamps and beaver ponds). Breeding habitat closely corresponds to the boreal forest.	Yes Figures 3 and 4	Information on spring migration is not available for the Ontario population. Clutches range from 3-6 eggs. Incubation lasts 14 days, with young fledging at 13 days. Rust Blackbirds begin to gather in late-July to begin their southward	Potential Habitat: All marsh and treed wetland habitats

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							migration, and often join mixed flocks of other blackbird species.	
Bird	Short-eared Owl *Asio flammeus*	Seasonal migration	N/A	Ground nests established in natural or artificial open habitat	Found in wide range of unforested habitats, including: arctic tundra, grasslands, sand-sage, fallow pastures, and occasionally fields planted with row-crops. However, the primary factor influencing habitat selection is prey abundance	Low Figures 5 and 6	Clutches of 4-7 eggs are initiated from April to June. A single brood is typically raised. Incubation takes approximately 27 days. Before they can fly, nestling owls typically disperse short distances from the nest site, hiding in nearby vegetation. The timing and extent of migration for this species is unclear, but populations in the Yukon exhibit peak migration activity in late April and August-October.	Potential Habitat: Natural or anthropogenic, non-wetland clearings in the LSA
Bird	Yellow Rail *Coturnicops noveboracensis*	Seasonal migration	N/A	Nest on ground in sedge, grass and rush dominated marshes with little standing water, but where the substrate remains saturated throughout the	Typically associated with marshes dominated by sedges, true grasses, and rushes, where there is little or no standing water and where the substrate remains saturated throughout the summer (e.g., damp fields and meadows,	Low Figures 3 and 4	Yellow Rails reach breeding maturity at 1 year. Breeding adults arrive in Canada as early as mid-May. Females have one a single brood in a breeding season. Clutches typically have 7-10 eggs. Incubation takes 17-18 days, with young fledging in 35	Potential Habitat: All marsh habitat

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
				summer; nest sites concealed by a canopy of dead vegetation	on river and stream floodplains, bogs, and near the drier margins of estuarine and salt marshes		days. Fall migration typically takes place in September-October.	
Bird	Wood Thrush *Hylocichla mustelina*	Seasonal migration	N/A	Nests mainly in second-growth and mature deciduous or mixedwood forests with well-developed understories; Red-berried Elder (*Sambucus raemosa*) is important nesting shrub in Ontario	Found mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. This species prefers large forest mosaics, but may also nest in small forest fragments	Yes Figures 1 and 2	Adults arrive in breeding ground in May. Age of first reproduction is 1 year. Clutches typically have 4 eggs, and it is fairly common for a female to have two broods. Incubation lasts 10-12 days, with young fledging at 12-15 days. Fledglings remain in their natal home range for 24-33 days before departing to their winter ranges in August-September.	Potential Habitat: Mature deciduous forest stands (>70yrs for deciduous)

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
Mammal	American Badger *Taxidus taxus taxus*	N/A	Will use artificial clearings and linear features to facilitate movement	Burrows in coherent soils associated with open habitat	Occurs in non-forested grassland and shrubland biomes. Soil and prey availability to be the key defining features of habitat; coherent soils that can be burrowed into without collapsing are preferred. Badgers are also known from alpine areas and wetlands. Agricultural areas support badgers provided there are sufficient hedgerows, fencerows and field edges. Cultivated fields are largely avoided.	Low Figures 5 and 6: Similar habitat requirements as ground-nesting birds	Breeding occurs in July-August with polygynous males often ranging widely to find females. Implantation is delayed until late winter, followed by parturition in March or April. Less than half of females breed during their first summer. Litter sizes average 1-2 kits, but may have as many as 5. Juveniles typically disperse during their first summer. American Badgers do not hibernate, but movements are reduced in the winter and they may enter torpor for brief periods during extreme cold.	Potential Habitat: Natural or anthropogenic, non-wetland clearings in the LSA
Mammal	Eastern Cougar *Puma concolor*	N/A	Will use artificial clearings and linear features to facilitate movement	Maternal dens used while rearing young, usually burrows under crevices in rock or burrows under large trees.	Found in large, undisturbed forests or other natural areas where there is little human activity. Habitat selection is based primarily on the abundance of prey, particularly white-tailed deer (*Odocoileus virginianus*)	Yes Presence is limited by abundance of prey, not habitat	Females reach sexual maturity at 1-3 years, and will have a litter of 2-4 kittens every 2-4 years. Family groups remain together for two years while the young learn to hunt. Average life expectancy for adults is 8-10 years.	Eastern Cougar habitat selection is based on prey availability, not habitat structure

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
Mammal	Little Brown Myotis *Myotis lucifugus*	Spring - migration from hibernacula to foraging habitat;	N/A	Maternal roosts - cavities in large-diameter snags at a moderate state of decay, or buildings	Can be found in forested areas where hibernacula and roosting habitat is abundant. Hibernacula may be hundreds of kilometers away from their summer foraging areas. Foraging habitat includes waterways, forest edges, and in gaps in the forest. Large open fields or clearcuts generally are avoided.	Low Figures 1 and 2: Similar habitat requirements to Mature Forest Birds	Breeding is promiscuous. Females reach maturity at 1 year, Females store sperm and ovulate in spring with a single pup born after a 44-60 day gestation period, usually in late June or early July. Females form maternity colonies to birth and raise the pups. Pups are weaned at approximately 26 days. Generation time is estimated as 5-10 years. Maximum longevity may exceed 30 years.	Potential Habitat: Maternal roosts are most likely to occur in mature forests stands (>70yrs for deciduous, >80yrs for coniferous). However, the maternal roost survey determined that these critical habitat features are not abundant in the Project area: 5 potential roosts in 22 ha surveyed
		Fall - return to hibernacula		Hibernacula - caves and similar structures (e.g., abandoned mines) that expend below the frostline				
Mammal	Northern Myotis *Myotis septentrionalis*	Spring - migration from hibernacula to foraging habitat;	N/A	Maternal roosts - cavities in large-diameter snags at a moderate state of decay, or buildings	Can be found in forested areas where hibernacula and roosting habitat is abundant. Hibernacula may be hundreds of kilometers away from their summer foraging areas. Foraging habitat includes waterways, forest edges, and in gaps in the forest. Large open fields or clearcuts generally are avoided.	Low Figures 1 and 2: Similar habitat requirements to Mature Forest Birds	Breeding is promiscuous. Females reach maturity at 1 year, Females store sperm and ovulate in spring with a single pup born after a 44-60 day gestation period, usually in late June or early July. Females form maternity colonies to birth and raise the pups. Pups are weaned at approximately 26 days. Generation time is estimated as 5-10 years.	Potential Habitat: Maternal roosts are most likely to occur in mature forests stands (>70yrs for deciduous, >80yrs for coniferous). However, the maternal roost survey determined that these critical habitat features are not abundant in the Project area: 5 potential roosts in 22 ha surveyed
		Fall - return to hibernacula		Hibernacula - caves and similar structures (e.g., abandoned mines) that expend below the frostline				

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
Mammal	Wolverine *Gulo gulo*	N/A	Undisturbed, contiguous mature forest	Females den under snow-covered rocks and logs, or within snow tunnels	Found in a wide variety of forested and tundra habitats that provide sufficient year-round food supplies (e.g., smaller prey species and animal carcasses)	Low Figures 1 and 2: Similar habitat requirements to Mature Forest Birds	Wolverine breed from May to August, with male Wolverine generally mating with more than one female. Wolverine have been characterized as having a bet-hedging life history strategy to deal with unpredictable environments. Births generally coincide with periods of greater ungulate carrion availability and snow cover, which provides enhanced security cover for kits. Males are not sexually mature until over two years, while females reach sexual maturity at about 15 months. Females, however, do not produce litters successfully until they are an average of 3.4 years old. Average litter size is two to three kits.	Potential Habitat: Mature forest stands (>70yrs for deciduous, >80yrs for coniferous)
Reptile	Snapping Turtle *Chelydra serpentine*	Emergence and dispersal of young towards water in fall	Uses streams to travel between waterbodies	Nests - Open, flask-shaped, in soft substrate (e.g., sand or gravel) along waterways, may use anthropogenic features	Found in slow-moving water with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs,	Yes Figures 7 and 8	Snapping Turtles have a life-history strategy characterized by high and variable mortality of embryos and hatchlings, delayed sexual maturity, extended adult longevity, and	Potential Habitat: Waterbodies and watercourses

Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
				Hibernacula - under cover in streams that flow continuously through winter, wedged beneath submerged logs and covered in silt along lakeshores, or burried deep in anoxic mud/under floating mats of vegetation in marshy areas	shallow bays or river edges and slow streams, or areas combining several of these wetland habitats.		iteroparity (repeated reproductive events) with low reproductive success per reproductive event. Females, and presumably also males, in more northern populations mature later (at 15-20 years) and at a larger size than in more southern populations (~12 years). Lifespan in the wild is poorly known, but long-term mark-recapture data from Algonquin Park suggest a maximum age of over 100 years. Making takes place in early spring. Nesting takes place in late May and June, with females laying approximately 40 eggs (range of 12-69) in a flask-shaped nest. Sex determination in Snapping Turtles is temperature-dependent, although adult sex ratios tend to remain neat 1:1. Likewise, incubation is temperature dependant and highly variable, ranging from approximately 70-100 days. The probability of	

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Taxon	Species	Seasonal Movements	Movement Corridors	Residences	Habitat Requirements	Habitat Present in LSA	Life History	Habitat Mapping
							a Snapping Turtle embryo surviving to sexual maturity may be less than 0.1%.	

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Bird	American White Pelican *Pelecanus erythrorhynchus*	American White Pelicans are found across the north-central and western United States. In Canada, they are found from the interior of British Columbia, east to northwestern Ontario. In Ontario, there are currently two primary breeding localities; Lake of the Woods and Lake Nipigon. Other secondary breeding localities include the north shore of Lake Superior where the number of nests is less than 25.	Overall abundance of American White Pelicans was estimated in 2005 at about 134,000 breeding adults in North America. In 2009, Ontario breeding populations were estimated at: 5,595 pairs in Lake of the Woods; 733 pairs in Lake Nipigon; and 18 active nests were reported on the Lake Superior north shore, and 15-20 nests were reported at Lac Seul (but breeding was unsuccessful).	American White Pelicans are listed as "*Not at Risk*" federally (1987), but are considered "*Threatened*" provincially (2009) because they are locally scarce. The Ontario population represents the north-eastern extent of its range. However, American White Pelicans are responding positively to current environmental conditions with more frequent and substantive reports of their presence in eastern Ontario.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Marshbird and Waterfowl Surveys (2011-2012, 2016)
Bird	Bald Eagle *Haliaeetus leucocephalus*	Bald Eagles have a wide North American distribution, occurring in all continental states of the USA and all provinces and territories of Canada (excluding the southern prairies). All of Ontario is considered to have been within the historical range of the Bald Eagle, where it was considered a breeding season resident. Confirmed breeding locations for the	Bald Eagle populations suffered a substantial decline in the mid-20th century largely attributed to DDT and PCBs (and other toxicants) bioaccumulating in the environment. The population in northern Ontario remained more robust than southern Ontario during the population decline. Roughly 380 known active	Bald Eagles are listed as "*Not at Risk*" federally (1984), but are considered "*Special Concern*" provincially (2008) because they are locally scarce. It has long been an important symbol in the human culture of the Americas and is known to have important spiritual and cultural value to many First Nation cultures.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Stick Nest Surveys (2010-2011, 2015)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		Bald Eagle are currently widely distributed across Ontario and breeding season distribution is essentially continuous across the province at the macro scale. Bald Eagles are broadly distributed across northern Ontario, with higher densities and more continuous distribution in northwestern Ontario .	nests were identified in northwestern Ontario in 1990, accounting for 87% of nests in northern Ontario. The number of known active nests in northern Ontario increased by 78 percent between 1990 and 1998. This trend has likely continued since that time. Bald Eagles also appear to have expanded northward.	Further, Bald Eagles are considered "keystone species" in many forest and coastal ecosystems.	
Bird	Bank Swallow *Riparia riparia*	The Bank Swallow has an extensive global distribution, breeding in temperate zones of the northern hemisphere (North America, Europe and Asia) and wintering throughout Central and South America, Arabia, Africa, India, and southeastern Asia. In Ontario, Bank Swallows breed across the entire province, but is most common in southern Ontario; they are is sparsely distributed throughout the	Estimates based on North American Breeding Bird Survey data from 1998 to 2007 suggest that the Ontario Bank Swallow population accounted for approximately 1% of the global, 3% of the continental, and 17% of the national population. The best available information indicates that the Ontario Bank Swallow breeding population is in the order of 409,000 individuals as of 2016, but	Bank Swallows are listed as "*Threatened*" both federally (2013) and provincially (2014) due to population declines largely attributed to habitat loss. Bank Swallows may create suitable nesting habitat for other species. Several other avian species have been observed nesting within Bank Swallow colonies, often by enlarging burrows or simply occupying existing burrows. These include	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		Canadian Shield and Hudson Bay Lowland regions.	much of northern Ontario has not been thoroughly surveyed.	American Kestrel (*Falco sparverius*), Barn Owl (*Tyto alba*), Belted Kingfisher (*Megaceryle alcyon*), among others. It is unknown if interspecific competition occurs over nest sites.	
Bird	Barn Swallow *Hirundo rustica*	Barn Swallows are the most abundant and widespread swallow in the world, this familiar species breeds in temperate regions across North America, Europe and Asia, and overwinters in Central and South America, southern Africa, and southern and southeast Asia. Throughout its range, it is found in close association with human populations. In Canada, it is known to breed in all provinces and territories. They can be found throughout Ontario, but	Since 1970 the Ontario Barn Swallow population has declined at an average annual rate of 2.56 percent, amounting to a cumulative loss of 66 percent. The rate of decline over the most recent 10-year period is similar to that since 1970. On a regional scale, the probability of observation declined the most in the northern and southern Canadian Shield regions by 51 percent and 32 percent respectively. The Ontario Breeding Bird Atlas	Bank Swallows are listed as "*Threatened*" both federally (2011) and provincially (2012) due to population declines largely attributed to habitat loss. Other bird species often compete for Barn Swallow nest sites, including Cliff Swallows (*Petrochelidon pyrrhonota*) and House Sparrows (*Passer domesticus*).	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Marshbird and Waterfowl Surveys (2011-2012, 2016)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		91% of the provincial population is concentrated south of the Canadian Shield. In northern Ontario is localized, being closely associated with roads and human settlements and largely absent in more remote areas.	estimated the Ontario Barn Swallow population at 400,000 individuals during 2001 to 2005, which represents roughly 1% of the global population. From this estimate, the northern Ontario population is roughly 36,000 individuals.		
Bird	Black Tern *Chlidonias niger*	The Black Tern breeds in the temperate regions of Europe, and in North America where it ranges from northern British Columbia and Alberta south to Arizona and Kansas and east to New Brunswick. It is found in scattered locations across Ontario, north to Big Trout Lake and Fort Albany. The highest densities occur along the lower Great Lakes coastlines, Bruce Peninsula, Manitoulin Island and the southern edge of the	The Black Tern population in southern Ontario is estimated between 2,873 and 14,996 breeding pairs. The northern Ontario population is likely much lower due to fewer suitable nesting wetlands. Data from 2011-2011 indicate that Black Tern populations in Ontario are declining at a rate at 4.69%.	Black Terns are listed as "*Not at Risk*" federally (1996), but are considered "*Special Concern*" provincially (2008) due to declines and habitat loss.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Marshbird and Waterfowl Surveys (2011-2012, 2016)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		Canadian Shield. Abundance across much of the north is limited by a lack of suitable wetlands for nesting, but distribution in that region is poorly known due to low monitoring coverage.			

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Bird	Bobolink *Dolichonyx oryzivorus*	The breeding range of the Bobolink in North America includes the southern part of all Canadian provinces from British Columbia to Newfoundland and Labrador and south to the northwestern, north-central and northeastern U.S. The species is not present in the Yukon, Northwest Territories and Nunavut. The Bobolink winters in southern South America, east of the Andes in Bolivia, Brazil, Paraguay and Argentina. In Ontario, Bobolinks are mostly confined to areas south of the Canadian Shield. Its range extends north to the Highway 17 corridor between North Bay and Sault Ste. Marie. Scattered populations occur locally farther north, most notably in the Clay Belt areas in Timiskaming and Cochrane districts in the northeast. It is largely absent around the	In Canada, the Bobolink reaches its greatest abundance in southern Manitoba, southern Ontario, and in the regions of Montérégie, Outaouais and Abitibi in southern Québec. It is relatively uncommon in Saskatchewan, Alberta and British Columbia. Southern Ontario is home to about 13 percent of the world's Bobolink population. Ontario's population was estimated at about 800,000 adults between 2001-2005. Population estimated for northern Ontario are unavailable, however the Ontario Breeding Bird Atlas reported a decline of occupancy of 9.1% across the Southern and Northern Shield regions (where populations occur sporadically) from 1985-2005.	Bobolinks are listed as "Threatened" both federally (2010) and provincially (2010) due to population declines largely attributed to habitat loss and fragmentation, and incidental mortality. As ground nesters they are particularly susceptible to predation and disturbance.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Bobolink Targeted Survey (2011)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		north shore of Lake Superior, but there are pockets of occurrence in the Thunder Bay area and in the extreme northwest in the Rainy River and Dryden areas.			
Bird	Canada Warbler *Cardellina canadensis*	The Canada Warbler only breeds in North America and 80 per cent of its known breeding range is in Canada. It breeds in all provinces and territories except Nunavut and Newfoundland and Labrador. It winters in northwestern South America. Although the Canada Warbler breeds at	The Ontario Breeding Bird Atlas estimated the Canada Warbler population at 900,000 individuals between 2001-2005. They also noted an overall 15% decline in occupancy across the Ontario distribution from 1985-2005 (which was not significant); significant declines in the Southern	Canada Warblers are listed as "*Threatened*" federally (2008) and "*Special Concern*" provincially (2009) due to largely unexplained population declines.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		low densities across its range, in Ontario, it is most abundant along the Southern Shield.	Shield and Carolinian Life Zone of 10% and 36%, respectively.		
Bird	Chimney Swift *Chaetura pelagica*	The Chimney Swift breeds in eastern North America, possibly as far north as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel. It winters in northwestern South America.	The Canadian Chimney Swift population is estimated at 11,820 breeding individuals, with 7,500 in Ontario. Chimney Swift populations are declining in all areas of occurrence, at a rate of 7.8% per year since 1968 in Canada, representing a total decline of 95%.	Chimney Swifts are listed as "*Threatened*" both federally (2007) and provincially (2009) due to largely unexplained population declines.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)
Bird	Common Nighthawk *Chordeiles minor*	The breeding range of Common Nighthawks includes all of North America and Central America. In Canada, the species occurs in all Canadian provinces and territories, except Nunavut. Common Nighthawks	The Canadian population of Common Nighthawks was estimated at 400,000 individuals in 2007. Population estimates are not available for Ontario, however the Ontario Breeding Bird Atlas reported a 44% decline of	Common Nighthawks are listed as "*Threatened*" federally (2007) and "*Special Concern*" provincially (2009) due to population declines. As ground nesters they are particularly susceptible to predation and	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Whip-poor-will and Nighthawk Targeted Survey (2011-2012)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		winter throughout South America, primarily in regions in eastern Peru and Ecuador, and in southern Brazil. In Ontario, the species occurs throughout the province except for the coastal regions of James Bay and Hudson Bay.	occupancy from 1985-2005.	disturbance. Habitat loss and the wide-spread use of pesticides have been identified as factors contributing to these declines.	
Bird	Eastern Loggerhead Shrike *Lanius ludovicianus migrans*	The Loggerhead Shrike occurs only in North America. In western Canada, it occurs from southwestern Alberta, through southern Saskatchewan and into southern Manitoba. In eastern Canada, it is now found reliably in only two areas in southern Ontario, and occurs only sporadically in southwestern Québec. Most Eastern Loggerhead Shrikes in Ontario are found in two core grassland habitats - the Carden Plain north of Lindsay, and the Napanee Limestone Plain. They overwinter in the southern United States.	There has been a 26% decline in observations in Ontario between 2004-2014. The total population of Eastern Loggerhead Shrikes may be fewer than 110 mature individuals.	Eastern Loggerhead Shrikes are listed as "*Endangered*" both federally (2014) and provincially (2008) due to large-scale population declines and range contraction since 1970.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Bird	Eastern Whip-poor-will *Caprimulgus vociferous*	The Eastern Whip-poor-will's breeding range includes two widely separate areas. It breeds throughout much of eastern North America, reaching as far north as southern Canada and also from the southwest United States to Honduras. In Canada, the Whip-poor-will can be found from east-central Saskatchewan to central Nova Scotia and in Ontario they breed as far north as the shore of Lake Superior. Although Eastern Whip-poor-wills were once widespread throughout the central Great Lakes region of Ontario, their distribution in this area is now fragmented.	The Ontario population of Eastern Whip-poor-wills was roughly 30,000 individuals as of 2009. The overall Canadian population experienced a decline of over 30% since the late 90s.	Eastern Whip-poor-wills are listed as "*Threatened*" both federally (2009) and provincially (2009) due to both long-term and short-term declines attributed to habitat loss and degradation, and reduced prey abundance. As ground nesters they are particularly susceptible to disturbance and predation.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Whip-poor-will and Nighthawk Targeted Survey (2011-2012)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Bird	Eastern Wood Pewee *Contopus virens*	The breeding range of the Eastern Wood-pewee covers much of south-central and eastern North America. It breeds from southeastern Saskatchewan to the Maritime provinces, south to southeastern Texas and east to the U.S. Atlantic coast. About 11% of its global breeding range is in Canada, which accounts for about 8% of the breeding population. The eastern wood-pewee is found across most of southern and central Ontario, and in northern Ontario as far north as Red Lake, Lake Nipigon and Timmins.	The North American Breeding Bird Survey (1987-2006) estimated the number of breeding adults in Canada at 435,000, 69% occurring in Ontario with the greatest abundance in southern Ontario.	Eastern Wood-pewees are listed as "*Special Concern*" both federally (2012) and provincially (2014) due to a persistent decline over the last 40 years. The 10-year rate of decline (25%) comes close to satisfying the criteria for "*Threatened*" status. The cause of declines are poorly understood, but are likely linked to habitat loss and degradation, and reduced prey abundance.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)
Bird	Golden Eagle *Contopus virens*	In North America, the Golden Eagle is found predominantly in the west but historically was more widespread in the eastern United States and Canada. In Canada, Golden Eagles are most common in the western mountains and prairies but are also fairly	Over the past century, the eastern population has undergone long term declines. Knowledge of the breeding distribution of eastern Golden Eagles is limited. Prior to 1994, fewer than 20 Golden Eagle territories east of Manitoba were recorded	Golden Eagles are listed as "*Not at Risk*" federally (1996), but are considered "*Endangered*" provincially (2008). Although their populations may be secure throughout their global range, the incredibly low breeding	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Stick Nest Surveys (2010-2011, 2015)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		widespread in Labrador and Quebec's Ungava peninsula. In Ontario, breeding Golden Eagles are presently known only from the Hudson Bay Lowland, although there is some evidence suggesting they once nested much further south.	in Canada. From the most recent Ontario Breeding Bird Atlas assessment, there may be as few as 10-20 breeding pairs in Ontario.	population in Ontario makes it a priority for conservation efforts.	
Bird	Least Bittern *Ixobrychus exilis*	The species nests from southern Canada to southern South America. In Canada, it breeds in southern Manitoba, Ontario, Quebec, New Brunswick, and probably Nova Scotia, with the majority of birds breeding in southern Ontario. In Ontario, the Least bittern is mostly found south of the Canadian Shield, especially in the central and eastern part of the province. Small numbers also breed occasionally in northwest Ontario.	An Ontario estimate of 555-2360 pairs was derived from the first Ontario atlas project and the Ontario Rare Bird Breeding Program. More recent estimates suggest there may be between 1000-2800 pairs in Canada, or potentially as low as 850-1300 pairs. The degree of recent declines is hard to assess, because the birds are hard to detect, but bird atlas projects and marsh bird monitoring programs suggest a decline in Ontario of >30% over the past decade.	Least Bitterns are listed as "*Threatened*" both federally (2009) and provincially (2008) due to their small, declining population in Canada. Declines are largely attributed to habitat loss and degradation	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Marshbird and Waterfowl Surveys (2011-2012, 2016)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Bird	Olive-sided Flycatcher *Contopus cooperi*	The Olive-sided Flycatcher breeds throughout much of forested Canada and in the western and northeastern United States. Approximately 54% of its breeding range is in Canada. The winter distribution is more restricted, being primarily in Panama and the Andes Mountains from Venezuela to Peru and Bolivia. In Ontario, it is widely distributed throughout the central and northern areas of the province.	The Olive-sided Flycatcher is locally and patchily distributed and generally found at low densities throughout its range in Canada. The Canadian population is estimated to have declined by 79% from 1968 to 2006 and 29% from 1996 to 2006. As of 2007 there were estimated to be roughly 450,000 breeding individuals in Canada. However, a 7% decline was reported in Ontario between 1985-2005.	Olive-sided Flycatchers are listed as "*Threatened*" federally (2007), but are considered "*Special Concern*" provincially (2009) due to substantial declines over the last 50 years. The causes of this decline are uncertain.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)
Bird	Peregrine Falcon *Falco peregrinus anatum*	This species is widely distributed, found on every continent, except Antarctica. In Canada, they breed in all provinces and territories except Prince Edward Island, Nunavut and insular Newfoundland. Although Peregrine Falcons now nest in and around Toronto and several other southern Ontario cities, the majority of Ontario's	An Ontario-wide survey in 2005 reported 145 individual Peregrine Falcons across 78 territories, 53 territories occurring within northern Ontario.	Peregrine Falcons are listed as "*Special Concern*" both federally (2007) and provincially (2013). Although historically the species suffered a massive decline and was previously listed as "*Threatened*" federally, Canadian populations are recovering as a result of reintroduction programs	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		breeding population is found around Lake Superior in northwestern Ontario.		and naturally following the ban of organochlorine pesticides.	
Bird	Rusty Blackbird *Euphagus carolinus*	The Rusty Blackbird has a breeding range includes most Canadian provinces and territories, the state of Alaska, several Great Lakes states and most New England states. The winter range of the Rusty Blackbird includes most of the mid- to eastern states of the United States, although it winters irregularly in the southern part of most Canadian provinces.	The species has experienced a severe decline that appears to be ongoing, albeit at a slower rate. There is no evidence to suggest that this trend will be reversed. Historical estimates suggested there were around 1.1-1.4 million individuals across their Canadian range, accounting for roughly 70% of the global breeding population. However, the lowest estimates based on the Christmas Bird Count trends suggested the Canadian Rusty Blackbird population may be as low as 110,400 individuals.	Rusty Blackbirds are listed as "*Special Concern*" federally (2006) but have no provincial designation.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Marshbird and Waterfowl Surveys (2011-2012, 2016)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Bird	Short-eared Owl *Asio flammeus*	The Short-eared Owl has a world-wide distribution, and in North America its range extends from the tundra south to the central United States. In Ontario, the species has a scattered distribution, found along the James Bay and Hudson Bay coastlines, along the Ottawa River in eastern Ontario, in the far west of the Rainy River District, and elsewhere in southern Ontario, at places such as Wolfe and Amherst Islands near Kingston. Most northern populations are migratory, moving southward in the winter.	The nomadic nature of Short-eared Owls has made quantitative assessment of population trends problematic. The Canadian population is estimated around 350,000 individuals. They have experienced a continuing over the past 40 years, with a 23% decline in only the past 10 years. Declines have been attributed to habitat loss and degradation in both its breeding and winter ranges.	Short-eared Owls are listed as "*Special Concern*" both federally (2008) and provincially (2008) due to their continuing decline.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)
Bird	Yellow Rail *Coturnicops noveboracensis*	Most of its breeding range (about 90%) is in Canada. It is relatively uncommon in most areas; populations are most widespread and common in coastal areas of Hudson and James Bay in northern Manitoba, Ontario and Quebec. It winters in shallow marshes that occur in a narrow band	The global population size is known, although the best estimates suggest it may be between 10,000-25,000 individuals. Ontario Breeding Bird Atlas estimates range from 115-125 breeding pairs in 1985, but 157 calling males were detected near Rainy River	Yellow Rails are listed as "*Special Concern*" both federally (2009) and provincially (2008). This species was listed due to its small population size, limiting habitat requirements and reports of localized declines.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011); Marshbird and Waterfowl Surveys (2011-2012, 2016)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		extending from Texas to the Carolinas. In Ontario, it is mainly found in the Hudson Bay Lowlands region, and is only found in localized marshes in southern Ontario.	alone in one year of the second atlas project (2001-2005). Population trends remain unclear.		
Bird	Wood Thrush *Hylocichla mustelina*	The Wood Thrush breeds in southeastern Canada from southern Ontario east to Nova Scotia. It also nests across the eastern United States, south to northern Florida and the Gulf Coast. In the west, it ranges from eastern Texas to southeast South Dakota and west-central Minnesota. The Wood Thrush is found all across southern Ontario. It is also found, but less common, along the north shore of Lake Huron, as far west as the southeastern tip of Lake Superior. They winter in Central America mainly in lowland and tropical forests along the	The Canadian Wood Thrush population was estimated at 665,000 individuals in the 90s, with the largest breeding populations in Ontario accounting for 78% (520,000). However, more recent estimates suggest there may be as few as 260,000 in Canada. Recent trends suggest the Ontario population has declined by 36% from 2002-2012.	The Wood Thrush is listed as "*Threatened*" federally (2012), but as "*Special Concern*" provincially (2014) due to suffering both short- and long-term population declines attributed to nest predation and parasitism, and habitat loss.	Breeding Bird Surveys (2011-2012, 2016); Bird Migration Survey (2011)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		Atlantic and the Pacific slopes from southern Mexico south to Panama.			
Mammal	American Badger *Taxidus taxus taxus*	The American Badger ranges from California and Texas to the Great Lakes region. In Canada, the badger is found in southern British Columbia, all the prairie provinces and Ontario. A disjunct population exists in south-western Ontario, largely centred on Norfolk County. In northwestern Ontario, American Badgers are occasionally reported from the agricultural lands of the Rainy River and Fort Frances area, but these are	The Canadian population of the Taxus subspecies is unclear, but may range from 1000-29,000 individuals. There are no data available for Ontario.	The American Badger Taxus subspecies is listed as "*Special Concern*" federally, but is considered "*Endangered*" provincially. The provincial designation does not differentiate between *T.t. jacksoni*, present in southern Ontario, and ***T.t. taxus*** that may periodically occur in northerwestern Ontario (but are not considered resident populations by the federal government). American Badger dens	Encounter Surveys (2011-2012)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		considered non-residents from the United States.		are used by many other species, including many species of snakes, small mammals and lagomorphs.	
Mammal	Eastern Cougar *Puma concolor*	Mountain Lions a very wide range, encompassing large areas of North, Central and South America. In Ontario, Cougars are most likely believed to live in northern Ontario because of the remoteness of the habitat. However, there have been many reports from the southern part of the province.	Ontario population estimates are unknown.	Eastern Cougars are listed as "*Endangered*" provincially (2008), but do not have a federal listing.	Encounter Surveys (2011-2012)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Mammal	Little Brown Myotis *Myotis lucifugus*	In Canada, the Little Brown Myotis occurs from Newfoundland to British Columbia, and northward to near the treeline in Labrador, Northwest Territories and the Yukon. The little brown bat is widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake.	Approximately 50% of the global range of this small bat is found in Canada. Subpopulations in the eastern part of the range have been devastated by White-nose Syndrome, a fungal disease caused by an introduced pathogen. This disease was first detected in Canada in 2010, and to date has caused a 94% overall decline in known numbers of hibernating Myotis bats in Nova Scotia, New Brunswick, Ontario, and Quebec. The current range of White-nose Syndrome has been expanding at an average rate of 200-250 kilometres per year. At that rate, the entire Canadian population is likely to be affected within 12 to 18 years.	The Little Brown Myotis is listed as "*Endangered*" federally (2013) and provincially (2013) due to massive declines attributed to white-nose syndrome.	Acoustic Monitoring (2011-2012); Bat Maternity Roost Monitoring (2015)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
Mammal	Northern Myotis *Myotis septentrionalis*	In Canada, the Northern Myotis occurs from Newfoundland to British Columbia, and northward to near the treeline in Labrador, Northwest Territories and the Yukon. It is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon.	Approximately 40% of the global range of this northern bat is in Canada. Subpopulations in the eastern part of the range have been devastated by White-nose Syndrome, a fungal disease caused by an introduced pathogen. This disease was first detected in Canada in 2010 and to date has caused a 94% overall decline in numbers of known hibernating Myotis bats in Nova Scotia, New Brunswick, Ontario, and Quebec hibernacula compared with earlier counts before the disease struck. The current range of White-nose Syndrome overlaps with approximately one third of this species' range and is expanding at an average rate of 200 to 250 kilometres per year. At that rate, the entire Canadian population will	The Northern Myotis is listed as "*Endangered*" federally (2013) and provincially (2013) due to massive declines attributed to white-nose syndrome.	Acoustic Monitoring (2011-2012); Bat Maternity Roost Monitoring (2015)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
			likely be affected within 12 to18 years.		
Mammal	Wolverine *Gulo gulo*	Wolverines are occur over most of Canada and the northern United States. Historically, the Wolverine was found throughout all of Ontario. Wolverines are currently found in northwestern Ontario following a range reduction in the 1800s due to habitat conversion during human settlement, logging and railroad construction, and the overharvest of	The Canadian population likely exceeds 10,000 breeding individuals. They are generally considered to be widespread, but not abundant. The population estimate for Wolverines in Ontario is 458-645, although densities are likely not uniform across their Ontario range. There is some suggestion that Wolverine populations are increasing in the northern	Wolverines are listed as "*Special Concern*" federally (2014), but as "*Threatened*" provincially (2008) because they are locally scarce and their habitat is increasingly fragmented by industrial activity.	Encounter Surveys (2011-2012)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		ungulates. However, recent-re-colonization in their northeastern range has been reported.	extent of their range, but declining in the south.		
Reptile	Snapping Turtle *Chelydra serpentine*	The Snapping Turtle has the greatest latitudinal distribution of any turtle in North America, ranging from southern Manitoba south to Texas, In Canada, the species is present in mainland Nova Scotia, southern New Brunswick, southern and central Quebec, southern and central Ontario, southern Manitoba and southeastern Saskatchewan. Within the Canadian range of the species, a range disjunction occurs in northwestern Ontario, north of Lake Superior. where summers are likely too cool for Snapping Turtle embryos to	Ontario has the largest number of recorded Snapping Turtle sightings of any province, with 4466 observations in the Ontario Ministry of Natural Resources Natural Heritage Information Centre database from 1800 to 2002 (Ontario Herpetofaunal Survey 2005). However, accurate population estimates are not available.	Snapping Turtles are listed as "*Special Concern*" federally (2008) and provincially (2009) because its life history characteristics (late maturity, great longevity, low recruitment, lack of density-dependent responses) and its dependence on long warm summers to complete incubation successfully make it unusually susceptible to anthropogenic threats.	Visual Encounter Survey (2011); Marshbird and Waterfowl Surveys (2011-2012, 2016)

Taxon	Species	Distribution	Abundance and Trend	Importance / Status	Survey Methods / Timing
		complete development successfully.			

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
Bird	American White Pelican *Pelecanus erythrorhynchus*	ALL	**No Effect**: The nearest potential American White Pelican habitat in the LSA is >3.5 km from the Project Footprint	N/A	N/A	N/A	3 and 4
Bird	Bald Eagle *Haliaeetus leucocephalus*	All	**No Effect**: The nearest potential Bald Eagle nesting or foraging habitat in the LSA is >800 m from the Project Footprint	N/A	N/A	N/A	1 and 2
Bird	Bank Swallow *Riparia riparia*	ALL	**No Effect**: Bank Swallow habitat is not present in the LSA.	N/A	N/A	N/A	
Bird	Barn Swallow *Hirundo rustica*	ALL	**No Effect**: Barn Swallows are closely associated with human settlements and are very tolerant of human activity. The updated Project footprint will not remove existing potential Barn Swallow nesting habitat (i.e., human structures) in the	N/A	N/A	N/A	5 and 6

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
			LSA. The existing nests located in the old tree nursery will not be disturbed.				
Bird	Black Tern *Chlidonias niger*	ALL	**No Effect**: The nearest potential Black Tern habitat (i.e., contiguous marsh habitat >20 ha) occurs >1.2 km from the Project Footprint	N/A	N/A	N/A	3 and 4
Bird	Bobolink *Dolichonyx oryzivorus*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11% potential habitat loss in LSA; habitat loss falls below threshold	5 and 6
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of	low	13.1% cumulative potential habitat loss in LSA; habitat	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
				potential habitat in the LSA		loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	moderate	ground nesting, particularly vulnerable during nesting period	
Bird	Canada Warbler *Cardellina canadensis*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11.3% potential habitat loss in LSA; habitat loss falls below threshold	1 and 2
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
Bird	Chimney Swift *Chaetura pelagica*	ALL	**No Effect**: Chimney Swifts are closely associated with human settlements and are very tolerant of human activity. The Project will not destroy potential Chimnet Swift nesting habitats (i.e., human structures) in the LSA	N/A	N/A	N/A	
Bird	Common Nighthawk *Chordeiles minor*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11% habitat loss in LSA; habitat loss falls below threshold	5 and 6
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of	low	13.1% cumulative potential habitat loss in LSA; habitat	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
				potential habitat in the LSA		loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	moderate	ground nesting, particularly vulnerable during nesting period	
Bird	Eastern Loggerhead Shrike *Lanius ludovicianus migrans*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11% potential habitat loss in LSA; habitat loss falls below threshold	5 and 6
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
Bird	Eastern Whip-poor-will *Caprimulgus vociferous*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11% potential habitat loss in LSA; habitat loss falls below threshold	5 and 6
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	moderate	ground nesting, particularly vulnerable during nesting period	
Bird	Eastern Wood Pewee *Contopus virens*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	5.5% potential habitat loss in LSA; habitat loss falls below threshold	1 and 2
		Site Prep/Construction	Functional Habitat Loss	20% cumulative	low	5.8% cumulative potential habitat	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
				reduction of potential habitat in the LSA		loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	5.5% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	5.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	
Bird	Golden Eagle *Contopus virens*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11.3% potential habitat loss in LSA; habitat loss falls below threshold	1 and 2
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of	low	11.6% cumulative potential habitat loss in LSA; habitat	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
				potential habitat in the LSA		loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	
Bird	Least Bittern *Ixobrychus exilis*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	4.2% potential habitat loss in LSA; habitat loss falls below threshold	3 and 4
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	4.3% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	4.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential	low	4.2% cumulative potential habitat loss in LSA; habitat	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
				habitat in the LSA		loss falls below threshold	
		Site Prep/Construction and Operation	Exposure to contaminants	SAR behavior and biology	moderate	wetland birds are vulnerable to environmental contamination either through direct exposure or through the decline of prey in effected wetlands	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	
Bird	Olive-sided Flycatcher *Contopus cooperi*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	5.7% potential habitat loss in LSA; habitat loss falls below threshold	1 and 2
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	6.4% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	6.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative	low	6.5% cumulative potential habitat	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
				reduction of potential habitat in the LSA		loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	
Bird	Peregrine Falcon *Falco peregrinus anatum*	ALL	**No Effect**: Peregine Falcon habitat is not present in the LSA.	N/A	N/A	N/A	
Bird	Rusty Blackbird *Euphagus carolinus*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	4.7% potential habitat loss in LSA; habitat loss falls below threshold	3 and 4
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	5.0% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	4.7% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	4.8% cumulative potential habitat loss in LSA; habitat loss falls below threshold	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
		Site Prep/Construction and Operation	Exposure to contaminants	SAR behavior and biology	moderate	wetland birds are vulnerable to environmental contamination either through direct exposure or through the decline of prey in effected wetlands	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	
Bird	Short-eared Owl *Asio flammeus*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11% potential habitat loss in LSA; habitat loss falls below threshold	5 and 6
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential	low	13.1% cumulative potential habitat loss in LSA; habitat	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
				habitat in the LSA		loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	moderate	ground nesting, particularly vulnerable during nesting period	
Bird	Yellow Rail *Coturnicops noveboracensis*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	4.2% potential habitat loss in LSA; habitat loss falls below threshold	3 and 4
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	4.3% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	4.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	4.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Exposure to contaminants	SAR behavior and biology	moderate	wetland birds are vulnerable to environmental contamination	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
						either through direct exposure or through the decline of prey in effected wetlands	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	moderate	ground nesting, particularly vulnerable during nesting period	
Bird	Wood Thrush *Hylocichla mustelina*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	5.5% potential habitat loss in LSA; habitat loss falls below threshold	1 and 2
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	5.8% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	5.5% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	5.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	particularly vulnerable during nesting period	
Mammal	American Badger *Taxidus taxus taxus*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11% potential habitat loss in LSA; habitat loss falls below threshold	5 and 6
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	13.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	moderate	American Badgers are not particularly mobile, and may have difficulty escaping project activities	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
		Site Prep/Construction and Operation	Vehicle Collision	SAR behavior and biology	moderate	vehicle collisions are a leading cause of wildlife mortality associated with human activity	
Mammal	Eastern Cougar *Puma concolor*	ALL	Direct Habitat Loss	30% reduction of prey species (White-tailed deer and snowshoe hare) in the LSA	low	Eastern Cougar prey species are highly tolerant of human activity, and prey abundance is not anticipated to change	
		ALL	Functional Habitat Loss	30% reduction of prey species (White-tailed deer and snowshoe hare) in the LSA	low	Eastern Cougar prey species are highly tolerant of human activity, and prey abundance is not anticipated to change	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	Cougars are highly mobile and able to escape project activities.	
		Site Prep/Construction and Operation	Vehicle Collision	SAR behavior and biology	moderate	vehicle collisions are a leading cause of wildlife mortality associated with human activity	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
Mammal	Little Brown Myotis *Myotis lucifugus*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11.3% potential habitat loss in LSA; habitat loss falls under threshold.	1 and 2
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	Female bats are vulnerable when they are caring for young in maternal roosts	
Mammal	Northern Myotis *Myotis septentrionalis*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11.3% potential habitat loss in LSA; habitat loss falls under threshold.	1 and 2

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	Female bats are vulnerable when they are caring for young in maternal roosts	
Mammal	Wolverine *Gulo gulo*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	11.3% potential habitat loss in LSA; habitat loss falls under threshold. The LSA does not represent high quality Wolverine habitat as it is highly fragmented.	1 and 2

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.2% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	11.6% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	12.1% cumulative potential habitat loss in LSA; habitat loss falls below threshold	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	moderate	Female Wolverines are vulnerable when they are denning with young in the winter	
		Site Prep/Construction and Operation	Vehicle Collision	SAR behavior and biology	moderate	vehicle collisions are a leading cause of wildlife mortality associated with human activity	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
Reptile	Snapping Turtle *Chelydra serpentine*	ALL	Direct Habitat Loss	20% reduction of potential habitat in the LSA	low	Potential habitat loss in LSA is negligible (<1%)	7 and 8
		Site Prep/Construction	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	Cumulative potential habitat loss in LSA is negligible (<1%)	
		Operation	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	Cumulative potential habitat loss in LSA is negligible (<1%)	
		Closure	Functional Habitat Loss	20% cumulative reduction of potential habitat in the LSA	low	Cumulative potential habitat loss in LSA is negligible (<1%)	
		Site Prep/Construction and Operation	Exposure to contaminants	SAR behavior and biology	low	Snapping Turtles are tolerant of environmental contamination and can persist in polluted areas	
		Site Prep/Construction and Operation	Direct Mortality	SAR behavior and biology	low	Project activities will not impact waterbodies or watercourses	

Taxon	Species	Phase	Effects	Indicators	Impact	Rationale	Figures
		Site Prep/Construction and Operation	Vehicle Collision	SAR behavior and biology	high	vehicle collisions are a leading cause of wildlife mortality associated with human activity. Snapping Turtles may be drawn to road right-of-ways when searching for basking or nesting sites	

Taxon	Species	Effects	Mitigation	Reference
Bird	American White Pelican *Pelecanus erythrorhynchus*	**No Effect**: The nearest potential American White Pelican habitat in the LSA is >3.5 km from the Project Footprint	N/A	N/A
Bird	Bald Eagle *Haliaeetus leucocephalus*	**No Effect**: The nearest potential Bald Eagle nesting or foraging habitat in the LSA is >800 m from the Project Footprint	N/A	N/A
Bird	Bank Swallow *Riparia riparia*	**No Effect**: Bank Swallow habitat is not present in the LSA.	N/A	N/A
Bird	Barn Swallow *Hirundo rustica*		N/A	N/A
Bird	Black Tern *Chlidonias niger*	**No Effect**: The nearest potential Black Tern habitat (i.e., contiguous marsh habitat >20 ha) occurs >1.2 km from the Project Footprint	N/A	N/A
Bird	Bobolink *Dolichonyx oryzivorus*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Canada Warbler *Cardellina canadensis*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2

Taxon	Species	Effects	Mitigation	Reference
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Chimney Swift *Chaetura pelagica*	**No Effect**: Chimney Swifts are closely associated with human settlements and are very tolerant of human activity. The Project will not destroy Chimney Swift nesting habitats (i.e., human structures), and may in fact create nesting habitat through the construction of new buildings	N/A	N/A
Bird	Common Nighthawk *Chordeiles minor*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Eastern Loggerhead Shrike *Lanius*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the	4.11.2

Taxon	Species	Effects	Mitigation	Reference
	ludovicianus migrans		pit design and siting Project infrastructure in previously disturbed areas.	
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2

Taxon	Species	Effects	Mitigation	Reference
Bird	Eastern Whip-poor-will *Caprimulgus vociferous*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			education regarding seasonal changes in animal behaviour and their presence	
Bird	Eastern Wood Pewee *Contopus virens*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Golden Eagle *Contopus virens*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Buffer existing raptor nests	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15)	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			to avoid potential mortality to birds and roosting bats	
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Least Bittern *Ixobrychus exilis*	Direct Habitat Loss	Provide vegetated buffers of 120 m along rivers creeks and wetlands wherever feasible.	4.11.2
			Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Implement sediment and erosion control plans for the Project, with an emphasis on the protection of wetlands, and sensitive surface water receptors	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2

Taxon	Species	Effects	Mitigation	Reference
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Exposure to contaminants	Proper management of waste rock storage area (WRSA), including covering with a low permeability dry cover at closure to help manage acid rock drainage (ARD)	4.11.2
			Treatment of Project tailings prior to release back into the surrounding environment	
			Maintain abiotic conditions in tailings ponds to limit attraction of waterfowl and marshbirds	
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			changes in animal behaviour and their presence	
Bird	Olive-sided Flycatcher *Contopus cooperi*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Peregrine Falcon *Falco peregrinus anatum*	**No Effect**: Peregrine Falcon habitat is not present in the LSA.	N/A	
Bird	Rusty Blackbird *Euphagus carolinus*	Direct Habitat Loss	Provide vegetated buffers of 120 m along rivers creeks and wetlands wherever feasible.	4.11.2
			Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Implement sediment and erosion control plans for the Project, with an emphasis on the protection of wetlands, and sensitive surface water receptors	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Exposure to contaminants	Proper management of waste rock storage area (WRSA), including covering with a low permeability dry cover at closure to help manage acid rock drainage (ARD)	4.11.2
			Treatment of Project tailings prior to release back into the surrounding environment	
			Maintain abiotic conditions in tailings ponds to limit attraction of waterfowl and marshbirds	
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Short-eared Owl *Asio flammeus*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Yellow Rail *Coturnicops noveboracensis*	Direct Habitat Loss	Provide vegetated buffers of 120 m along rivers creeks and wetlands wherever feasible.	4.11.2
			Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Implement sediment and erosion control plans for the Project, with an emphasis on the protection of wetlands, and sensitive surface water receptors	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Exposure to contaminants	Proper management of waste rock storage area (WRSA), including covering with a low permeability dry cover at closure to help manage acid rock drainage (ARD)	4.11.2
			Treatment of Project tailings prior to release back into the surrounding environment	
			Maintain abiotic conditions in tailings ponds to limit attraction of waterfowl and marshbirds	
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Bird	Wood Thrush *Hylocichla mustelina*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable bird breeding habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Mammal	American Badger *Taxidus taxus taxus*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Wildlife awareness training for all staff including SAR	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			identification/legislation and education regarding seasonal changes in animal behaviour and their presence	
			Establish exclusion fences around tailings ponds to prevent wildlife exposure	
		Vehicle Collision	Enforce speed limits within the Project area to reduce the potential for wildlife/vehicle collisions	4.11.2
			Timely removal of roadkill or carcasses found in the Project area to limit the attraction of wildlife	
			Optimize utilization of existing road network	4.11.2
			Dispose of food waste generated on site in an appropriate manner to limit wildlife attraction to the area	4.11.2
Mammal	Eastern Cougar *Puma concolor*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			habitats capable of supporting a diversity of wildlife species.	
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
			Establish exclusion fences around tailings ponds to prevent wildlife exposure	
		Vehicle Collision	Enforce speed limits within the Project area to reduce the potential for wildlife/vehicle collisions	4.11.2
			Timely removal of roadkill or carcasses found in the Project area to limit the attraction of wildlife	
			Optimize utilization of existing road network	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Dispose of food waste generated on site in an appropriate manner to limit wildlife attraction to the area	4.11.2
		Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable roosting habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15)	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			to avoid potential mortality to birds and roosting bats	
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Mammal	Northern Myotis *Myotis septentrionalis*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
			Protection of suitable roosting habitat where possible	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2

Taxon	Species	Effects	Mitigation	Reference
		Direct Mortality	Conduct timber clearing outside of the breeding bird window (May 1 to August 15) to avoid potential mortality to birds and roosting bats	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
Mammal	Wolverine *Gulo gulo*	Direct Habitat Loss	Minimized the amount of habitat clearing required for the Project by optimizing the pit design and siting Project infrastructure in previously disturbed areas.	4.11.2
			Restoration of disturbed habitats at closure or encouraging development of habitats capable of supporting a diversity of wildlife species.	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2

Taxon	Species	Effects	Mitigation	Reference
		Direct Mortality	Clear vegetation after August 15th, but before there is a sufficient snowpack for Wolverines to den	4.11.2
			Wildlife awareness training for all staff including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence	4.11.2
			Establish exclusion fences around tailings ponds to prevent wildlife exposure	
		Vehicle Collision	Enforce speed limits within the Project area to reduce the potential for wildlife/vehicle collisions	4.11.2
			Timely removal of roadkill or carcasses found in the Project area to limit the attraction of wildlife	
			Optimize utilization of existing road network	4.11.2
			Dispose of food waste generated on site in an appropriate manner to limit wildlife attraction to the area	4.11.2
Reptile	Snapping Turtle *Chelydra serpentine*	Direct Habitat Loss	Provide vegetated buffers of 120 m along rivers creeks and wetlands wherever feasible.	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			Implement sediment and erosion control plans for the Project, with an emphasis on the protection of wetlands, and sensitive surface water receptors	4.11.2
			Develop a wetland clearing strategy with the local MNRF to reduce the effects (e.g., draining wetlands to discourage hibernation)	4.11.2
		Functional Habitat Loss	Implementation of sound abatement strategies to limit the negative effects of sound on wildlife	4.11.2
			Where feasible, direct anthropogenic lighting to reduce excess production of light into the surrounding environment.	4.11.2
		Exposure to contaminants	Proper management of waste rock storage area (WRSA), including covering with a low permeability dry cover at closure to help manage acid rock drainage (ARD)	4.11.2
			Treatment of Project tailings prior to release back into the surrounding environment	
		Direct Mortality	Restricting the clearing of potential terrestrial reptile and	4.11.2

Taxon	Species	Effects	Mitigation	Reference
			amphibian breeding habitats to periods outside the breeding season as directed by MNRF	
		Vehicle Collision	Enforce speed limits within the Project area to reduce the potential for wildlife/vehicle collisions	4.11.2
			Optimize utilization of existing road network	4.11.2

TMI_153-WL(1)-10_Table_5

Footprint	LSA (ha)	Lost Habitat (ha)	Lost Habitat (%)	Degrated - Construction (ha)	Degraded - Operation (ha)	Degraded - Closure (ha)	Cumulative - Construction (%)	Cumulative - Operation (%)	Cumulative - Closure (%)
Marsh (Yellow Rail/Least Bittern)	145.3	6.1	4.2	0.2	0.1	0.1	4.3	4.2	4.2
Marsh and Treed Wetlands (Rusty Blackbird)	644.4	30.4	4.7	1.9	0.1	0.4	5.0	4.7	4.8
Mature Deciduous Stands (Eastern Wood-pewee/Wood Thrush)	334.2	18.2	5.5	1.0	0.0	0.5	5.8	5.5	5.6
Mature Coniferous Stands (Olive-sided Flycatcher)	1239.5	70.7	5.7	9.1	5.7	9.5	6.4	6.2	6.5
Open Habitat (Ground-nesting Birds)	883.5	97.6	11.0	17.9	4.9	18.5	13.1	11.6	13.1

TMI_162-WL(1)-19_Table_1

SongMeter/BatMeter ID	Ecosite	Habitat Category
BAT1	U997	Developed
BAT2	B197X	Developed
BAT3	B098TlD n	Successional
BAT4	B114TlD n	Successional
BAT2	B142N n	Wetland
BAT1	U998	Developed
SR1	U997	Developed
SR2	B093N D n	Developed
SR3	B093N D n	Developed
SR4	B049TlD n	Successional
SR5	B093N D n	Developed
SR6	B093N D n	Developed
SR7	B197X	Developed
SR8	B093N D n	Developed
SR9	B007X D n	Developed
SR10	B098TlD n	Successional
SR11	B098TlD n	Successional
SR12	B197X	Developed
SR13	B007X D n	Developed
SR14	B098TlD n	Successional
SR15	B098TlD n	Successional
SR16	U997	Developed
SR17	B093N D n	Developed
SR18	B093N D n	Developed
SR19	B065TtD n	Coniferous
SR20	B093N D n	Developed
SR21	B135S D n	Developed
SR22	B197X	Developed
SR23	B197X	Developed
SR24	U998	Developed
SR25	B049TlD n	Successional
SR26	U999	Developed
SR27	B197X	Developed
SR28	B197X	Developed
SR29	B104TlD n	Deciduous
SR30	B197X	Developed
SR31	B055TtM n	Deciduous
SR32	B096S D n	Developed
SR33	B104TtD n	Deciduous

Point Count ID	Ecosite	Habitat Category
DEC13	B114TtD n	Coniferous
DEC14	B098TtD n	Coniferous
1	B114TlD n	Successional
10	B114TlD n	Successional
11	B104TlD n	Deciduous
12	B114TlD n	Coniferous
13	B104TlD n	Deciduous
2	B098TlD n	Successional
3	B049TlM n	Coniferous
4	B135S D n	Developed
5	B098TlD n	Coniferous
0	B098TlD n	Coniferous
CON1	B114TtD n	Coniferous
CON10	B098TtD n	Coniferous
CON11	B098TtD n	Coniferous
CON12	B114TtD n	Coniferous
CON2	B114TtD n	Coniferous
CON3	B114TtD n	Coniferous
CON4	B114TtD n	Coniferous
CON5	B114TtD n	Coniferous
CON6	B114TtD n	Coniferous
CON7	B114TtD n	Coniferous
CON8	B114TtD n	Coniferous
CON9	B098TlD n	Coniferous
Point Count 1	B197X	Developed
Point Count 10	B197X	Developed
Point Count 11	B197X	Developed
Point Count 12	B197X	Developed
Point Count 13	B197X	Developed
Point Count 14	B197X	Developed
Point Count 15	B197X	Developed
Point Count 16	B142N n	Wetland
Point Count 17	B104TtD n	Deciduous
Point Count 18	B104TtD n	Deciduous
Point Count 19	B197X	Developed
Point Count 2	B197X	Developed
Point Count 20	B197X	Developed
Point Count 21	B197X	Developed
Point Count 22	B197X	Developed
Point Count 23	B197X	Developed
Point Count 24	B197X	Developed
Point Count 25	B197X	Developed
Point Count 26	B197X	Developed

Point Count 27	B197X	Developed
Point Count 28	B197X	Developed
Point Count 29	U999	Developed
Point Count 3	B197X	Developed
Point Count 30	B197X	Developed
Point Count 31	B197X	Developed
Point Count 32	U999	Developed
Point Count 33	B197X	Developed
Point Count 34	B197X	Developed
Point Count 35	U999	Developed
Point Count 36	U999	Developed
Point Count 37	B049TlD n	Successional
Point Count 38	B055TlM n	Deciduous
Point Count 39	B197X	Developed
Point Count 4	B197X	Developed
Point Count 40	B197X	Developed
Point Count 41	B049TtD n	Coniferous
Point Count 42	B142N n	Wetland
Point Count 43	B129TtD n	Wetland
Point Count 44	B129TtD n	Wetland
Point Count 45	B142N n	Wetland
Point Count 46	B128TtD n	Wetland
Point Count 47	B104TtD k	Deciduous
Point Count 48	B104TtD n	Deciduous
Point Count 49	B104TlD n	Deciduous
Point Count 5	B197X	Developed
Point Count 50	B104TlD n	Deciduous
Point Count 51	B099TtD n	Coniferous
Point Count 52	B050TtM n	Coniferous
Point Count 53	B104TtD n	Deciduous
Point Count 54	B104TtD n	Deciduous
Point Count 55	B104TlD n	Deciduous
Point Count 56	B104TlD n	Deciduous
Point Count 57	B104TlM n	Deciduous
Point Count 58	B104TlM n	Deciduous
Point Count 59	B104TlM n	Deciduous
Point Count 6	B197X	Developed
Point Count 7	B197X	Developed
Point Count 8	B197X	Developed
Point Count 9	B197X	Developed
TY1	B142N n	Wetland
TY10	B095S D n	Developed
TY11	B093N D n	Developed
TY12	U997	Developed
TY13	B104TtD n	Deciduous
TY15	B104TlD n	Deciduous
TY16	B049TtD n	Coniferous

TY17	B049TlD n	Successional
TY18	B065TtD n	Coniferous
TY19	B065TtD n	Coniferous
TY2	B142N n	Wetland
TY20	B049TlD n	Successional
TY21	B104TlD n	Successional
TY22	B098TlD n	Successional
TY23	B104TlD n	Successional
TY24	B049TtMDn	Coniferous
TY25	B098TtD n	Coniferous
TY26	B098TtD n	Coniferous
TY27	B104TtD n	Deciduous
TY28	B071TtD n	Deciduous
TY29	B104TtD n	Deciduous
TY3	B144N n	Wetland
TY30	B104TtD n	Deciduous
TY31	B104TtD n	Deciduous
TY32	B099TtD n	Coniferous
TY33	B116TlD n	Coniferous
TY34	B099TtD n	Coniferous
TY35	B104TtD k	Deciduous
TY36	B104TtD k	Deciduous
TY37	B114TtD n	Coniferous
TY39	B104TlD n	Deciduous
TY4	B144N n	Wetland
TY40A	U999	Developed
TY41	B050TtM n	Coniferous
TY42	B050TtM n	Coniferous
TY43	B012TtVSn	Upland
TY44	B012TtVSn	Upland
TY45	B012TtVSn	Upland
TY46	B012TtVSn	Upland
TY47	B049TtM n	Coniferous
TY48	B104TtD k	Deciduous
TY49	B104TtD n	Deciduous
TY50A	B096S D n	Developed
TY51	B049TtM n	Coniferous
TY52	B049TtM n	Coniferous
TY53RPT	B197X	Developed
TY54RPT	B129TtD n	Wetland
TY55RPT	B129TtD n	Wetland
TY56RPT	B104TtD n	Deciduous
TY57RPT	B104TtD n	Deciduous
TY5A	B049TtD n	Coniferous
TY7	B098TlD n	Coniferous
TY8	B098TtD n	Coniferous
TY9	B098TtD n	Coniferous

UPL15	B114TtD n	Coniferous
WET16	B135S D n	Developed
WET17	B135S D n	Developed

TMI_162-WL(1)-19_Table_6

Coniferous	#	Deciduous	#	Successional	#	Wetland	#	Upland	#	Developed	#
White-throated Sparrow	56	White-throated Sparrow	38	Hermit Thrush	7	Ruby-crowned Kinglet	10	Nashville Warbler	8	White-throated Sparrow	50
Nashville Warbler	29	Red-eyed Vireo	27	Chipping Sparrow	6	Swainson's Thrush	9	Yellow-rumped Warbler	6	Red-eyed Vireo	42
Swainson's Thrush	25	Ovenbird	24	Alder Flycatcher	4	White-throated Sparrow	9	Hermit Thrush	5	American Robin	38
Red-eyed Vireo	24	Nashville Warbler	19	Clay-coloured Sparrow	4	Lincoln's Sparrow	8	Swainson's Thrush	5	Nashville Warbler	26
Ruby-crowned Kinglet	24	Swainson's Thrush	19	American crow	3	Hermit Thrush	7	White-throated Sparrow	5	American crow	24
Ovenbird	20	American Robin	17	Blue Jay	3	Nashville Warbler	7	Gray Jay	4	Ovenbird	22
Hermit Thrush	19	Magnolia Warbler	17	Common Yellowthroat	3	Swamp Sparrow	7	Ruby-crowned Kinglet	4	Mourning Warbler	18
American Robin	18	Red-breasted Nuthatch	16	Lincoln's Sparrow	3	Wilson's Snipe	5	Least Flycatcher	3	Common Raven	16
Tennessee Warbler	15	Ruby-crowned Kinglet	16	Magnolia Warbler	3	Yellow-bellied Flycatcher	5	Red-breasted Nuthatch	3	Magnolia Warbler	15
Golden-crowned Kinglet	14	Song sparrow	15	American Goldfinch	2	Common Yellowthroat	4	White-winged Crossbill	3	Chestnut Sided Warbler	14
Red-breasted Nuthatch	14	Black-capped Chickadee	14	Black-billed Cuckoo	2	Gray Jay	4	Winter Wren	3	Red-breasted Nuthatch	14
Magnolia Warbler	13	Chestnut Sided Warbler	13	Cedar Waxwing	2	Red-winged Blackbird	4	Alder Flycatcher	2	Ruby-crowned Kinglet	14
Winter Wren	13	Least Flycatcher	12	Least Flycatcher	2	Winter Wren	4	Black-capped Chickadee	2	Swainson's Thrush	14
Kentucky Warbler	11	Common Raven	11	Northern Flicker	2	Alder Flycatcher	3	Chipping Sparrow	2	Blue Jay	13
Yellow-rumped Warbler	11	Alder Flycatcher	9	Black-and-white Warbler	1	Common Raven	3	Common Raven	2	Least Flycatcher	12
Chipping Sparrow	8	Blue Jay	9	Chestnut Sided Warbler	1	Least Flycatcher	3	Dark-eyed Junco	2	Black-capped Chickadee	11
Dark-eyed Junco	7	Chipping Sparrow	9	Common Raven	1	Palm Warbler	3	Golden-crowned Kinglet	2	Alder Flycatcher	10
Ruffed Grouse	7	Hermit Thrush	9	Dark-eyed Junco	1	Yellow-rumped Warbler	3	Northern Flicker	2	Hermit Thrush	10
Brown Creeper	6	Mourning Warbler	9	Evening Grosbeak	1	American Robin	2	American Robin	1	Northern Flicker	10
Least Flycatcher	6	Common Yellowthroat	7	Golden-crowned Kinglet	1	Boreal Chickadee	2	Boreal Chickadee	1	Chipping Sparrow	9
Northern Parula	6	Tennessee Warbler	7			Chipping Sparrow	2	Brown Creeper	1	Winter Wren	9
Redbreasted Nuthatch	6	Yellow-rumped Warbler	7			Great Blue Heron	2	Common Yellowthroat	1	Swamp Sparrow	8
Blue Jay	5	Black-and-white Warbler	6			Red-breasted Nuthatch	2	Magnolia Warbler	1	Veery	8
Chestnut Sided Warbler	5	Dark-eyed Junco	6			Red-eyed Vireo	2	Mourning Warbler	1	American Goldfinch	7
Common Raven	5	Northern Flicker	6			Sandhill Crane	2	Ovenbird	1	Common Yellowthroat	7
Gray Jay	5	Northern Parula	6			American crow	1	Red-eyed Vireo	1	Song sparrow	7
Northern Flicker	5	Blackburnian Warbler	5			Blue Jay	1	Veery	1	Yellow-rumped Warbler	7
Swamp Sparrow	5	Gray Jay	5			Chestnut Sided Warbler	1	Woodpecker sp.	1	Common Grackle	6
American Goldfinch	4	Lincoln's Sparrow	5			Conneticut Warbler	1			Ruffed Grouse	6
Boreal Chickadee	4	Veery	5			Golden-crowned Kinglet	1			Common Goldeneye	5
Cedar Waxwing	4	Golden-crowned Kinglet	3			Greater Yellowlegs	1			Gray Jay	5
Downy Woodpecker	4	Ruffed Grouse	3			LeConte's Sparrow	1			Savannah Sparrow	5
Mourning Warbler	4	Swamp Sparrow	3			Mourning Warbler	1			Wilson's Snipe	5

Coniferous	#	Deciduous	#	Successional	#	Wetland	#	Upland	#	Developed	#
Song sparrow	4	Wilson's Snipe	3			Northern Harrier	1			Barn Swallow	3
Bay-breasted Warbler	3	Winter Wren	3			Red-necked Grebe	1			Bay-breasted Warbler	3
Blackburnian Warbler	3	Yellow-bellied Sapsucker	3			Song sparrow	1			Black-and-white Warbler	3
Blue-headed Vireo	3	American crow	2			Tennessee Warbler	1			Clay-coloured Sparrow	3
Lincoln's Sparrow	3	Blue-headed Vireo	2							Common Yellowthroat	3
Red-winged Blackbird	3	Kentucky Warbler	2							Common Loon	3
Wilson's Snipe	3	Red-winged Blackbird	2							Common Merganser	3
Alder Flycatcher	2	Rose-breasted Grosbeak	2							Dark-eyed Junco	3
American crow	2	American Goldfinch	1							Kentucky Warbler	3
Black-and-white Warbler	2	American Redstart	1							Ring-billed Gull	3
Common Yellowthroat	2	Brown Creeper	1							Tennessee Warbler	3
Eastern Phoebe	2	Cedar Waxwing	1							Tree Swallow	3
Hairy Woodpecker	2	Downy Woodpecker	1							Blackburnian Warbler	2
Pileated Woodpecker	2	Eastern Phoebe	1							Cedar Waxwing	2
Yellow-bellied Sapsucker	2	Great Blue Heron	1							European Starling	2
American Redstart	1	Hairy Woodpecker	1							Golden-crowned Kinglet	2
Blackbacked woodpecker	1	Northern Waterthrush	1							Lincoln's Sparrow	2
Black-billed Cuckoo	1	Palm Warbler	1							Northern Parula	2
Black-capped Chickadee	1	Pileated Woodpecker	1							Palm Warbler	2
Cape May Warbler	1									Philadelphia Vireo	2
Common Yellowthroat	1									Red-winged Blackbird	2
Great Blue Heron	1									Yellow-bellied Sapsucker	2
LeConte's Sparrow	1									American Bittern	1
Mourning Dove	1									American Kestrel	1
Northern Waterthrush	1									American Redstart	1
Palm Warbler	1									Bald Eagle	1
Pine siskin	1									Barred Owl	1
Rose-breasted Grosbeak	1									Cape May Warbler	1
Veery	1									Downy Woodpecker	1
Wood Thrush	1									Eastern Phoebe	1
										Gray Catbird	1
										Great Blue Heron	1

Coniferous	#	Deciduous	#	Successional	#	Wetland	#	Upland	#	Developed	#
										Great Horned Owl	1
										Hairy Woodpecker	1
										Herring Gull	1
										Killdeer	1
										Mallard	1
										Pileated Woodpecker	1
										Purple Finch	1
										Redbreasted Nuthatch	1
										Ruby-throated Hummingbird	1
										Spotted Sandpiper	1
										Yellow-bellied Flycatcher	1

Species	#	Year Observed
Red-winged Blackbird	14	2011
Canada Goose	12	2011
Ring-necked Duck	10	2011
Tree Swallow	10	2011
Mallard	5	2011
Barn Swallow	4	2011
Common Grackle	4	2011
Eastern Kingbird	4	2011
Belted Kingfisher	3	2011
American Robin	2	2011
Common Raven	2	2011
Swamp Sparrow	11	2012
Red-winged Blackbird	8	2012
Common Yellowthroat	7	2012
Bank Swallow	4	2012
Canada Goose	4	2012
Ring-necked Duck	4	2012
American Bittern	3	2012
American Robin	3	2012
Common Raven	3	2012
Great Blue Heron	3	2012
Mallard	3	2012
Spotted Sandpiper	3	2012
Eastern Kingbird	2	2012
Hermit Thrush	2	2012
Herring Gull	2	2012
LeConte's Sparrow	2	2012
Northern Flicker	2	2012
Redbreasted Nutchatch	2	2012
Redeyed Vireo	2	2012
Red-necked Grebe	2	2012
Ruby Crowned Kinglet	2	2012
Sora	2	2012
Swainsons Thrush	2	2012
Whitethroated Sparrow	2	2012
American Crow	1	2012
Bald Eagle	1	2012
Blackcapped Chickadee	1	2012
Bonaparte's Gull	1	2012
Cerulean Warbler	1	2012

Species	#	Year Observed
Common Goldeneye	1	2012
Common Merganser	1	2012
Hooded Merganser	1	2012
Killdeer	1	2012
Nashville Warbler	1	2012
Northern Shrike	1	2012
Northern Waterthrush	1	2012
Red-tailed Hawk	1	2012
Ruffed Grouse	1	2012
Song Sparrow	1	2012
Tree Swallow	1	2012
Red-winged Blackbird	8	2016
Swamp Sparrow	6	2016
Common Raven	4	2016
Whitethroated Sparrow	2	2016
Mallard	1	2016
Ruffed Grouse	1	2016
Common Merganser	1	2016
Canada Goose	1	2016
American Robin	1	2016
Common Goldeneye	1	2016

TMI_178-AE(1)-16_Table_1 - Plant and Mine Infrastructure Illumination Design Criteria

Area	Minimum Average Maintenance Illuminance (Lux)	Maximum Working Plane (m)
Switchrooms and Control Rooms	160	0.75
MCC Control Panels	160	0.75
Feeders	160	On Pan
Compressors and Pumps	160	On Drive
Processing Equipment, i.e. Screens, etc.	160	On Deck/Drives
Milling Area	160	On Drive
Hydraulic Power Packs	160	On Drive
Transfer Chutes	80	0.75
Intermittent Inspection Area/Tasks	80	0.75
Plant Bunkers and Pits	80	0.75
Internal Stairs (within plant buildings)	80	0
Internal Walkways (within plant buildings)	40	0
Platforms	40	0
Conveyors, Gantries and Tunnels	40	0
External Stairs and Catwalks	20	0
Building Access	10	0
Access Roadways	10	0
Stockpile Area Lighting	5	0
Building Surrounds	5	0

TMI_178-AE(1)-16_Table_2 - Process Plant and Mine Infrastructure Light Fixture Technical Specifications

CAT	Light Fixture Description	Plant Area	Total Qty	Light Loss Factor (LLF)	Lamp Lumen Depreciation (LLD)	Luminaire Level (LUM)	Watts (W)	Tilt Angle (°)
A	Flood Light, NEMA 6, Very Wide Optic	Entry Carpark & Security Gatehouse (4 off) Mine Administration Building (5 Off) Fuel Tanks (5 Off) ROM Pad (1 Off)	**15**	0.903	0.950	15,665	132.2	45
B	Area Light (Process Plant Building)	Process Plant Building and CIL Tanks (14 Off) HV Switchroom (4 Off) ROM Pad (1 Off)	**19**	0.903	0.950	6,427	56.9	45
D	Area Light (Workshop Exterior)	Truck Workshop	**4**	0.903	0.950	6,427	56.9	45
E	Area Light (Primary Crusher Building)	Primary Crusher Building	**3**	0.903	0.950	6,427	56.9	45
F	Flood Light, NEMA 6, Very Wide Optic (Stockpile Area)	Feed Bin Stockpile	**1**	0.903	0.950	15,665	132.2	45
G	Flood Light, NEMA 6, Very Wide Optic (Truck Line-Up Area)	Haul Truck Line-Up	**2**	0.903	0.950	15,665	132.2	45
H	Flood Light, NEMA 6, Very Wide Optic	Raw Ore Emergency Reclaim Hopper	**2**	0.903	0.950	15,665	132.2	22.5