7.0 CUMULATIVE EFFECTS

7.1 Approach and Methodology

The approach used for assessing the potential cumulative effects of the Project are consistent with the requirements of CEAA 2012, and follow the procedures set out by the Agency in the document entitled “Technical Guidance for Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*, 2012” (CEAA, 2014). Additional information is set out in the operational policy statement entitled “Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*, 2012” (CEAA, 2015).

The procedures and guidance from the Agency (CEAA, 2014) are such that some of the valued components (VCs) will be eliminated in the initial scoping step, while others will be carried through to the determination of significance and the identification of follow-up measures. In accordance with Section 13 of the EIS Guidelines (Appendix Y), the determination of significance (presented in Section 8) has been completed on the residual adverse effects, including the cumulative effects.

7.2 Activities Considered for Assessing Cumulative Effects

7.2.1 Past and Present Activities Considered

In evaluating the potential effects of the Project, consideration was given to the existing conditions onto which the Project effects would be added. As set out in the operational policy statement (CEAA, 2015) and the technical guidance from the Agency (CEAA, 2014), the use of the present day conditions is an appropriate means for capturing the cumulative effect from past activities.

The present day conditions used for describing existing conditions inherently includes the effects of ongoing harvesting activities in the region (fishing, hunting and trapping). These activities are considered to be sustainable, and are thus reflective of the existing, present day conditions. Additionally, the existence, footprint and effects of the existing infrastructure, including Highway 17 and the Canadian Pacific Railway are implicitly included as part of the existing conditions.

7.2.2 Present and Future Activities Considered

The following present and future activities were explicitly considered as part of the cumulative effects assessment for the Project. These project were identified by the Agency as part of the Round 1 information requests as having to be explicitly considered as part of the cumulative effects assessment (TMI_252-CE(1)-02):

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;

- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill;
- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

These projects are discussed briefly below and are show in Figure 7.2.2-1:

- **Treasury Metals Exploration Program**: During all phases associated with the Project, Treasury Metals may conduct mineral exploration within its property boundary to further delineate its deposit or to identify new deposits. Mineral exploration activities could include, but are not limited to; prospecting, surveys and exploration drilling. To the extent possible, these activities would not require the removal of forest cover. Nor would the exploratory drilling work be conducted within wetland areas. Mineral exploration programs could result in effects to the environment which are cumulative with effects from the Project. Accordingly, mineral exploration activities within the Project property boundary have been included through this cumulative effects assessment.
- **Highway 17**: King's Highway 17 is part of the Trans-Canada Highway system and is the main Trans-Canada highway through the province of Ontario. It begins at the Ontario/Manitoba boarder approximately 50 km west of Kenora, Ontario, and traverses west until it becomes Highway 417 west of Arnprior, Ontario. Highway 17 passes through the town of Dryden, Ontario and is a major transportation route between Dryden and the proposed Goliath Gold Project. The MNDM publishes a list of northern highway projects, including projects along Highway 17 (MNDM, 2016), Upcoming work being done to Highway 17 near the Project includes: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. These projects have been included in the cumulative effects assessment.
- **Canadian Pacific Railway**: The Canadian Pacific Railway is a publicly traded company on the Toronto and New York stock exchanges. It has over 14,000 miles of rail network from Vancouver to Montreal along with rail to a few major industrial centers in the US (Canadian Pacific, 2017). Canadian Pacific Railway has tracks that run proximal to the Project, and generally parallel to Highway 17. An annual vegetation control program is implemented along the tracks to decrease vegetation growth adjacent to the rails.

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Thaddeus Lake
Moose Lake
Cedar Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
Wabigoon Lake
AARON PROVINCIAL PARK
DD Contracting Aggregate Pit
WABIGOON
Hartman Lake
Mickle Lake
17
DINORWIC
BUTLER LAKE PROVINCIAL NATURE RESERVE
Mile Lake
Trap Lake
Avery Lake
Eagle Lake
Doré Lake
Melgund Lake
WABIGOON LAKE 27
603
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

TREASURY METALS Inc.

amec foster wheeler

GOLIATH GOLD PROJECT

Projects Considered in Cumulative Effects Assessment

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.2.2-1**
SCALE: 1:300,000	DATE: April 2018

- **Dryden Forest Management Company Limited**: The Dryden Forest Management Company Limited (DFMC) has managed the Dryden Forest area since it was issued a Sustainable Forest License from the Ontario Minister of Natural Resources and Forestry in 1998. The DFMC has identified through its Ten-year Forest Management Plan, that it plans on logging in areas located between Thunder Lake and Hartman Lake located within the Treasury Metals' property boundary between 2016 and 2021 (Dryden Forest Management Company, 2016). The current 10-year Forest Management Plans 2011 to 2021 (FMP) show a planned harvest of approximately 11,952 ha. The forest management plans are not yet available for the period after 2021.
- **Domtar Corporations Dryden Pulp Mill**: Domtar Corporation's Dryden Pulp Mill is located along the Wabigoon Chain of Lakes within Dryden, Ontario and produces cellulose fibers including paper grade and bleached softwood kraft market pulp. It has an annual pulp production capacity of 327,000 tonnes and is the largest employer in Dryden supporting over 350 employees with a regional economic impact of $603.4 million (Domtar, 2017). The pulp mill has been in operation in Dryden since 1913, and was acquired by Domtar in 2007. The pulp mill is located on the west side of Dryden, approximately 15 km from the Project, adjacent to the Wabigoon River.
- **Josephine Cone Mine Project:** The Josephine Cone Mine Project is a proposed iron ore mine owned by Bending Lake Iron Group Limited. The proposed mine would be located 49 km southwest of Ignace, Ontario, 80 km north of Atikokan, Ontario and approximately 50 km southwest of the Project property boundary. This project would be an open pit mine with an ore throughput of approximately 56,000 tonnes per day. This project is currently undergoing a Federal Environmental Assessment, which commenced in mid-2012. The EIS Guidelines were issued in June of 2012, and have since been extended to June of 2018, although no EIS had been filed at the time of Treasury Metals revised EIS preparation. This project, if constructed, has an anticipated life span greater than 25 years.
- **Aggregate Pits and Quarries**: D&D Contracting holds an aggregate permit (Permit 46764) for an aggregate pit within the property boundary of Treasury Metals (MNRF, 2017). This aggregate pit has been included in the cumulative effects assessment.
- **Wataynikaneyap Power**: Wataynikaneyap Power is a transmission company owned by 22 First Nations communities and provides power to remote First Nations communities in Northwestern Ontario by means of diesel generation. The Wataynikaneyap Transmission Project plans to bring reliable power to 16 of these remote communities with 1,800 km of new transmission lines with a potential construction start date in December of 2018 (Wataynikaneyap Power, 2012). A segment of the transmission line will run from the Hydro One 230 kV line southeast of Dinorwic to Pickle Lake. The segment of this project within the cumulative effects study area is expected to be completed in 2020.
- **Local infrastructure:** The development of local infrastructure and minor road upgrades are expected in communities within the cumulative effects study area (i.e., Dryden and Wabigoon). No large scale projects (>$500,000) are anticipated (Meridian Planning Consultants, 2007).

Of the list of Project identified for consideration in TMI_252-CA(1)-02, were two Projects that are excluded from the cumulative effects assessment either because they were never a planned project, or have been cancelled as a project since the Round 1 Information Requests were prepared. These are described below:

- **Proposed 1-5 MW power generation facility**: This was never a proposed project, but was in fact one of the possible options that were considered for providing power to the Project, as described in Section 2 (alternatives assessment). As detailed in the Section 3, power for the Project will be provided from the 115 kV Hydro One transmission line that runs through the Project, adjacent to the processing plant. There are no longer plans to use diesel to generate electricity on site. This activity, which is not a project, is only discussed as part of the cumulative effects assessment as its inclusion was explicitly required by the Agency (TMI_252-CA(1)-02).
- **Energy East Pipeline**: TransCanada's Energy East Pipeline is a 4,500 km pipeline that was planned to transport 1.1 million barrels of oil per day from Alberta and Saskatchewan to refineries and a marine terminal in Eastern Canada (TransCanada, 2017). The pipeline, which would have run through northern Ontario along the existing natural gas pipeline corridor, was terminated by TransCanada Corporation in the fall of 2017. This activity, which is no longer a project, has been included as part of the cumulative effects assessment as it was explicitly required by the Agency (TMI_252-CA(1)-02).

7.3 Scoping for Potential Cumulative Effects

Within the scoping step, the following needs to be determined in order to establish whether a VC needs to advance to the next step:

- Identify the VCs for which residual adverse effects were predicted;
- Determine the spatial boundaries for the cumulative effects;
- Determine the temporal scope for the cumulative effects;
- Examine past and present and future activities to identify whether they overlap both spatially and temporally with the residual adverse effects of the Project.

Each of these will be done in the following section.

7.3.1 Valued Components (VCs) for Assessing Cumulative Effects

The guidance from the Agency states that the assessment of cumulative effects should be done for those valued components (VCs) for which residual environmental effects are predicted. Residual environmental effects are those effects that remain after consideration of technically and economically feasible mitigation. As detailed in Section 6.1.3, the predicted effects of the Project were described using a series of 65 valued components (VCs) that were selected based the likelihood of being affected by the Project, their importance to the Agency, their interest to

stakeholders, or their value and importance to understanding the potential effects of the Project on members of the Indigenous communities. For each of the VCs, indicators were selected to help focus the evaluation. In total the EIS considered 65 VCs, using a total of 136 indicators. The VCs and indicators were grouped into the following 20 disciplines:

- Terrain and soils;
- Geology and geochemistry;
- Noise;
- Light;
- Air quality;
- Climate;
- Surface water quality;
- Surface water quantity;
- Groundwater quality;
- Groundwater quantity;
- Wildlife and wildlife habitat;
- Migratory Birds;
- Fish and fish habitat;
- Wetlands and vegetation;
- Land use;
- Social;
- Economic;
- Human health;
- Heritage resources; and
- Aboriginal Peoples.

The effects of the Project on each of the above disciplines were described in Sections 6.2 through 6.21. In total, residual adverse effects were identified for 15 of the 20 disciplines, for 48 of the 65 VCs, and for 81 of the 136 indicators. Table 7.3.1-1 provides a listing of the disciplines, VCs and indicators used to describe the potential effects of the Project along with an indication as to which of the disciplines, VCs and indicators were identified as having residual adverse effects.

Table 7.3.1-1: Summary of Valued Components (VCs) and Residual Adverse Effects

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
Terrain and soils	Natural landscapes	Viewscapes	Yes
	Overburden	Erosion of disturbed overburden	—
	Soil chemistry	Changes in soil chemistry	—
Geology and Geochemistry	Pit lake water quality	Concentrations of indicator compounds	Yes
Noise	Environmental noise levels	Equivalent noise levels, L_{EQ}	Yes
	Noise disturbance to wildlife (including SAR)	Area predicted L_{EQ} above 50 dBA	Yes
	Blasting noise and vibration	Peak sound pressure level	Yes
		Peak particle velocity	Yes
Noise (continued)	Noise related health effects	Absolute sound pressure, L_{DN}	Yes
		Percent highly annoyed, %HA	Yes

Table 7.3.1-1: Summary of Valued Components (VCs) and Predicted Residual Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
Light	Light trespass	Ambient light levels	—
Air quality	Air quality	Concentrations of indicator compounds	Yes
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Yes
	Changes in climate due to the Project	Changes in annual temperature	—
		Changes in annual precipitation	—
Surface water quality	Surface water quality	Concentrations of indicator compounds	Yes
Surface water quantity	Surface water quantity	Increase in surface water flows	Yes
		Decrease in surface water flows	Yes
		Change in lake levels	—
Groundwater quality	Groundwater quality	Concentrations of indicator compounds	—
Groundwater quantity	Groundwater quantity	Decrease in groundwater elevations in private water wells	—
Wildlife and wildlife habitat	Wildlife Species at Risk	Common Nighthawk	Yes
		Northern Myotis/Little Brown Myotis	Yes
		Barn Swallow	Yes
	Ungulates	Moose	Yes
	Furbearers	American Marten	Yes
		American Beaver	Yes
	Upland birds	Upland birds	Yes
	Wetland birds	Marsh birds	Yes
	Small mammals	Small mammals	Yes
	Reptiles and amphibians	Reptiles and amphibians	Yes
	Invertebrates	Terrestrial invertebrates	Yes
Migratory Birds	Upland birds	Upland birds	Yes
	Wetland birds	Marsh birds	Yes
Fish and fish habitat	Stream-resident fish populations	Direct loss or alteration of habitat	Yes
		Changes in flows or water levels	—
		Changes in water quality	—
		Blasting	—
	Migratory fish populations	Direct loss or alteration of habitat	—
		Changes in flows or water levels	—
		Changes in water quality	—
		Blasting	—
Fish and fish habitat (continued)	Lake-resident fish populations	Direct loss or alteration of habitat	—
		Changes in flows or water levels	—

Table 7.3.1-1: Summary of Valued Components (VCs) and Predicted Residual Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
		Changes in water quality	—
		Blasting	—
	Fish species-at-risk	Direct loss or alteration of habitat	—
		Changes in flows or water levels	—
		Changes in water quality	—
		Blasting	—
Wetlands and vegetation	Wetlands	Wetland extent	Yes
		Wild rice	—
		Floating Marsh Marigold (*Caltha natans*)	—
	Vegetation communities	Predominantly coniferous forest	Yes
		Predominantly deciduous forest	Yes
		Successional areas	Yes
		Potential berry harvesting areas	Yes
Land use	Land Use Planning and Policies	Conflict with accepted land uses as stipulated in approved land use plans.	—
		Overlap with protected areas.	—
	Aggregate Operations	Change in access to aggregate resources.	—
		Change in demand of aggregate resources extraction.	—
	Forestry	Change in access to forestry resources.	—
		Loss of forestry resources.	Yes
	Mineral Exploration	Change in access to mineral claims for exploration and production.	—
	Fishing - Recreational and Commercial	Change in access to fisheries resources.	—
		Change in the abundance of fisheries resources.	—
		Change in contaminant levels in fish	—
		Diminished experience of being on the land.	Yes
	Hunting	Change in access to wildlife resources.	Yes
		Change in abundance of wildlife resources.	Yes
		Diminished experience of being on the land	Yes
	Trapping	Change in access to wildlife resources.	Yes
		Change in abundance of wildlife resources.	Yes
		Diminished experience of being on the land	Yes
	Cottagers and Outfitters	Diminished experience of being on the land.	Yes
Land use (continued)	Cottagers and Outfitters (continued)	Change in access to cottage and/or outfitter areas.	—
		Changes in clientele for outfitters with lodges located near the Project.	Yes

Table 7.3.1-1: Summary of Valued Components (VCs) and Predicted Residual Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
	Other Recreational Uses	Change in access for residents and visitors to public lands for non-consumptive purposes	—
		Change in access for residents and visitors to public lands for consumptive purposes.	Yes
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption	Yes
		Diminished experience of being on the land.	Yes
Social	Population demographics	Population change	Yes
	Education	Capacity of education services	Yes
		Education attainment	Yes
		Project-specific Training	Yes
	Infrastructure and services	Municipal Services	Yes
		Community services (e.g., health, social services)	Yes
	Housing and property values	Housing availability	Yes
		Property values	Yes
	Public safety	Crime rate	Yes
		Capacity of emergency services	Yes
		Requests for emergency services by Project	Yes
	Transportation and traffic	Road network capacity and conditions	Yes
Economic	Labour force, labour participation and employment	Labour income employment	Yes
	Income levels	Income levels and categories	Yes
	Cost of living	Current prevailing cost of living	Yes
	Real estate	Housing prices and affordability	Yes
	Economic development	Municipal taxes and contribution to economic development projects	Yes
	Existing businesses	Local business availability	Yes
	Government revenues	Taxes and revenues	Yes
Human health	Non-Indigenous Human Health	Subsurface/Construction Worker	—
		Outdoor Worker	—
		Indoor Worker	—
		Site Visitor, or Harvester	—
		Resident	—
Human health (continued)	Indigenous Human Health	Resident	—
		Site Visitor, or Harvester	—
		Subsurface/Construction Worker	—

Table 7.3.1-1: Summary of Valued Components (VCs) and Predicted Residual Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
		Outdoor Worker	—
		Indoor Worker	—
Heritage resources	Archaeological sites	Archaeological sites	—
	Historic heritage sites	Historic heritage sites	—
Aboriginal Peoples	Human Health	Risk Assessment for Indigenous Human Health	—
	Harvesting and gathering of plant material	Wild rice	—
		Berry Harvesting	Yes
		Medicinal plant harvesting	Yes
		Changes in access	Yes
		Diminished on-the-land experience	Yes
	Hunting	Ungulates	Yes
		Furbearers	Yes
		Waterfowl	Yes
		Changes in access	Yes
		Diminished on-the-land experience	Yes
	Trapping	Furbearers	Yes
		Changes in access	Yes
		Diminished on-the-land experience	Yes
	Fishing	Sport fish	—
		Baitfish	—
		Commercial fishing	—
		Changes in access	—
		Diminished on-the-land experience	Yes
	Cultural and spiritual	Cultural or spiritual sites	—
		Traditional Travel routes	—
		Diminished on-the-land experience	Yes
	Socio-economic factors	Economic effects	Yes
		Social effects	Yes

Note: The "—" symbol denotes where no residual adverse effects were predicted for the discipline, VC and indicator. This could represent situations where no adverse effects were predicted, or where predicted adverse effects were fully mitigated, as detailed in Sections 6.2 through 6.21.

7.3.2 Spatial Boundaries for Assessing Cumulative Effects

Spatial extents for assessing cumulative effects were identified for each of the VCs identified in Table 7.3.1-1 as having residual adverse effects. These spatial extents were identified giving considerations on the nature of the VC and the characteristic of the residual Project effects. It should be noted that for a cumulative effect to occur with the effects of the Project, the physical

activity does not need to be located within the identified spatial extent. Rather, the effects of the physical activity need to overlap with the spatial extents identified. The spatial extents to be used in this cumulative effects assessment are provided in Table 7.3.2-1.

Table 7.3.2-1: Spatial Extents for use in Assessing Cumulative Effects

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Terrain and Soils	Natural landscapes	The residual adverse effect for natural landscapes is associated with the waste rock storage area (WRSA) that will be visible in some viewscapes from Thunder Lake. For there to be a cumulative effect, the physical activity would need to appear in the same general viewscape. Therefore, the cumulative effects spatial boundaries for the "natural landscapes" VC would be the terrain and soils LSA, on Figure 7.3.2-1.
Geology and Geochemistry	Pit lake water quality	The residual adverse effect for pit lake water quality is restricted to the footprint of the pit lake. The effects associated with discharges from the pit lake are captured as part of the surface water quality VC. For there to be a cumulative effect, the physical activity would need to affect the pit lake directly. Therefore, the cumulative effects spatial boundaries for the "pit lake quality" VC is the operations area for the Project (see Figure 7.3.2-1), which represents the catchment for the pit lake.
Noise	Environmental noise levels Noise disturbance to wildlife (including SAR) Blasting noise and vibration Noise related health effects	The spatial extent for the various noise VCs has been characterized collectively. The predicted noise levels from the Project at sensitive receptor locations provide an indication that noise will be a localized effect, with collective noise levels dropping to a low level with 5 km of individual sources. For there to be a cumulative effect, the physical activity would need to affect the noise levels within 3 km of the Project. Therefore, the spatial boundary for effects on the noise VCs is the noise RSA shown on Figure 7.3.2-2.
Air Quality	Air quality	The spatial extent of the air effects of the Project were shown to be about the same as the 20×20 km modelling domain. At the limits of the modelling domain (e.g., Dryden in the west, Village of Wabigoon in the southeast), the modelled concentrations would be indistinguishable from background at those distances. For there to be a cumulative effect, the physical activity would need to affect air quality parameter concentrations within the modelling domain. Therefore, the spatial boundary for effects on air quality is the 20×20 km air quality RSA shown on Figure 7.3.2-2.
Climate	Project GHG emissions	The only residual adverse effects are those associated with the quantity of emissions from the Project in terms of Treasury Metals' reporting requirements under either the Ontario Cap and Trade Program (O. Reg. 144/16), or Section 46 of Canadian Environmental Protection Act. Therefore, there would be no cumulative effects associated with the Project GHG emissions VC, and no spatial boundary is defined.

Table 7.3.2-1: Spatial Extents for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Surface Water Quality	Surface water quality	Surface water quality modelling completed to support the Project identified that resulting water quality in the receiving environment would be equivalent to background, or would meet the Provincial Water Quality Objectives (PWQO). Measurable changes in water quality as a result of the Project would be restricted to Blackwater Creek and Hoffstrom's Bay Tributary. The water quality modelling predicted changes in surface water quality that would not be measurable downstream in either Thunder Lake or Wabigoon Lake. For a cumulative effect on surface water quality to occur, the physical activity would need to affect the quality of water in the waterbodies measurably affected by the Project. Therefore, the spatial boundaries for cumulative effects would be the surface water quality LSA shown on Figure 7.3.2-3.
Surface Water Quantity	Surface water quantity	The predicted residual adverse effects of the Project on surface water quantity were shown to be restricted to those watersheds affected by the Project (i.e., Blackwater Creek and its tributaries, Thunder Lake Tributary 2 and 3, Little Creek and Hoffstrom's Bay Tributary). There were no residual adverse effects predicted on the levels in either Thunder Lake or Wabigoon Lake. For there to be a cumulative effect, the physical activity would need to affect the flows in these catchments, either upstream or downstream of the Project. Therefore, the spatial boundaries for the cumulative effects would be the surface water quantity LSA, as shown on Figure 7.3.2-3.
Wildlife and Wildlife Habitat	Wildlife Species at Risk	The residual adverse effects on wildlife are associated with the loss of habitat due to the construction of the Project, the alteration of habitat due to the operation of the Project (e.g., noise levels) and mortality wildlife. For most of the VCs, these effects are described on the scale of the wildlife and wildlife LSA as the effects would not be measurable on a regional scale. For cumulative effects to occur, the physical activity would need to have effects that overlap with the LSA used. Therefore, the spatial boundaries for the effects on most wildlife VCs is the LSA, which is shown on Figure 7.3.2-4. This selection is in keeping with CEAA guidance (CEAA, 2014).
	Furbearers	
	Upland birds	
	Wetland birds	
	Small mammals	
	Reptiles and amphibians	
	Invertebrates	
	Ungulates	The ungulate VC uses moose as the indicator. As a result, cumulative effects for ungulates were evaluated using the RSA, given the large and diverse areas required to support moose throughout its life. For cumulative effects to occur, the physical activity would need to have effects that overlap with the RSA used. Therefore, the spatial boundaries for the effects on the ungulate VC is the RSA, which is shown on Figure 7.3.2-4.

Table 7.3.2-1: Spatial Extents for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Migratory Birds	Upland birds	The residual adverse effects on migratory birds are associated with the loss of habitat due to the construction of the Project, the alteration of habitat due to the operation of the Project (e.g., noise levels) and mortality. These effects are described on the scale of the LSA) as the effects would not be measurable on a regional scale. For cumulative effects to occur, the physical activity would need to have effects that overlap with the migratory birds LSA. Therefore, the spatial boundaries for the effects on migratory birds is the LSA, which is shown on Figure 7.3.2-4. This selection is in keeping with CEAA guidance (CEAA, 2014).
	Wetland birds	
Fish and Fish Habitat	Stream-resident fish population	For fish and fish habitat, the only residual adverse effects were those on the stream-resident fish living in those watercourses that would be directly affected by the Project (i.e., Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2). For there to be a cumulative effect, the physical activity would need to affect the same fish population. Therefore, the spatial boundary for the effects on stream resident fish populations is the LSA for fish and fish habitat, shown on Figure 7.3.2-5.
Wetlands and Vegetation	Wetlands	The residual adverse effect predicted for wetlands was for the wetland extent indicator. No residual adverse effects were predicted for either the wild rice or Floating Marsh Marigold indicators. For wetland extent, the effects are associated with the physical loss of or draining of wetlands as a result of the construction of the Project, the removal of upstream catchments areas, and the potential loss of waters in wetlands underlain by granular materials as a result of dewatering. The effects are localized and for there to be a cumulative effect, the physical activity would need to directly affect and wetlands within the wetlands and vegetation LSA. Therefore, the spatial boundaries for the effects on the wetlands is the wetlands and vegetation LSA, which is shown in Figure 7.3.2-6. This selection is in keeping with CEAA guidance (CEAA, 2014).
	Vegetation communities	The residual adverse effects predicted for vegetation communities are associated with the physical loss of vegetation due to clearing for the Project. These effects are localized, and for there to be a cumulative effect, the physical activity would need to directly affect the vegetation within the wetlands and vegetation LSA. Therefore, the spatial boundaries for the effects on the wetlands and vegetation VCs extent is the LSA, which is shown in Figure 7.3.2-6. This selection is in keeping with CEAA guidance (CEAA, 2014).
Land Use	Forestry	A residual adverse effect was predicted for “loss of forestry resources” in the long-term. A portion of the forest management area corresponding with open pit, WRSA and TSF the will be permanently lost. This effects is on a local scale. For there to be a cumulative effects, the physical activity would need to have effects that overlap with the study areas. Therefore, the spatial boundaries for the effects on the forestry VC is the wetlands and terrestrial vegetation LSA (Figure 7.3.2-7).

Table 7.3.2-1: Spatial Extents for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Land Use (cont'd)	Fishing - recreational and commercial	The only residual adverse effect identified for fishing (see Section 6.16) was the for the "diminished experience of being on the land" indicator. Specifically, the WRSA will be visible in some viewscapes from Thunder Lake. For there to be a cumulative effect, the physical activity would need to appear in the same general viewscape. Therefore, the cumulative effects spatial boundaries for the "natural landscapes" VC would be the terrain and soils LSA, on Figure 7.3.2-7.
	Hunting	For hunting, residual adverse effects were identified for both the "change in access to wildlife resources" and "change in abundance for wildlife resources" indicators. These indicators are local scale. For there to be a cumulative effect, the physical activity would need to overlap with the wildlife LSA. Additionally, there was also adverse effect identified for the "diminished experience of being on the land" indicator. This related to the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "hunting" VC would be a combination of the wildlife LSA and the noise RSA, as shown on Figure 7.3.2-7.
	Trapping	For trapping, residual adverse effects were identified for same indicators as were identified for hunting. Therefore, the cumulative effects spatial boundaries for the "trapping" VC would be a combination of the wildlife LSA and the noise RSA, as shown on Figure 7.3.2-7.
	Cottagers and outfitters	The residual adverse effect identified for the "diminished experience of being on the land" indicator would relate both the WRSA being visible in some viewscapes from Thunder Lake, and the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the terrain and soil LSA or with the noise RSA. In addition, residual adverse effects with "change in clientele for outfitters with lodges located near the Project" indicator. For the purposes of determining cumulative effects, located near the Project has been interpreted to be within 25 km of the Project. Therefore, the cumulative effects spatial boundaries for the "cottagers and outfitters" VC would be a combination of the terrain and soils LSA and noise RSA, along with 50 km diameter catchment area, as shown on Figure 7.3.2-7.
	Other recreational uses	The residual adverse effect identified for the "change in access for consumptive purposes" and change in abundance of berries and mushrooms" indicators are both local scale. For there to be a cumulative effect, the physical activity would need to overlap with the terrestrial vegetation LSA. In additional, residual adverse effects were identified for the "diminished experience of being on the land" indicator, related to both the visibility of the WRSA in some viewscapes from Thunder Lake, and the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the

Table 7.3.2-1: Spatial Extents for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
		physical activity would need to have effects that overlap with the terrain and soil LSA or with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "other recreational users" VC would be a combination of the terrestrial vegetation LSA, the terrain and soils LSA, and noise RSA, as shown on Figure 7.3.2-7.
Social	Population demographics Education Infrastructure and services Housing and property values Public safety Transportation and traffic	The social residual effects of the Project were characterized on the scale of the social study area. This study area also includes the Indigenous communities identified by the Agency. For there to be a cumulative effect, the physical activity would need to have effects similar social effects that overlap with this study area. Therefore, the spatial boundaries for the cumulative social effects is the social study area, as shown on Figure 7.3.2-8.
Economic	Labour force, participation and employment Income levels Cost of living Real estate Economic Development Existing businesses Government revenues	The same logic and reasoning used for social VCs applies for the economic VCs. The economic residual effects of the Project were characterized on the scale of the economics study area, which is the same study areas used for the social VCs. This study area includes the Indigenous communities identified by the Agency. For there to be a cumulative effect, the physical activity would need to have effects that overlap with the study area. Therefore, the spatial boundaries for economic cumulative effects is the economics study area (Figure 7.3.2-8).
Aboriginal Peoples	Harvesting and gathering of plant Material	The Project will result in the removal of forest, successional areas and areas potentially supporting berry harvesting. Additionally, access to the cleared areas will be restricted for safety and security reasons. These effects are localized and for t there to be a cumulative effect, the physical activity would need to directly affect the vegetation within the terrestrial vegetation LSA. Additionally, there was also adverse effect identified for the "diminished experience of being on the land" indicator related to the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "harvesting and gathering of plant materials" VC would be a combination of the terrestrial vegetation LSA and the noise RSA, as shown on Figure 7.3.2-9.

Table 7.3.2-1: Spatial Extents for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Aboriginal Peoples (cont'd)	Hunting	For hunting, residual adverse effects were identified for the "furbearer", "waterfowl" and "change in access" indicators, the effects of which are on a local scale. For there to be a cumulative effect, the physical activity would need to overlap with the wildlife LSA. In contrast, the ungulate indicator is considered on a regional scale given the large and diverse areas required to support moose throughout its life. For cumulative effects to occur for ungulates, the physical activity would need to have effects that overlap with the wildlife RSA. Additionally, there was also adverse effect identified for the "diminished experience of being on the land" indicator, associated with areas where Project noise levels would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "hunting" VC would be a combination of the wildlife LSA, the wildlife RSA (for ungulates) and the noise RSA, as shown on Figure 7.3.2-9.
Aboriginal Peoples (continued)	Trapping	For trapping, residual adverse effects were identified for the "furbearer", and "change in access" indicators, the effects of which are on a local scale. For there to be a cumulative effect, the physical activity would need to overlap with the wildlife LSA. Additionally, there was also adverse effect identified for the "diminished experience of being on the land" indicator, associated with areas where Project noise levels would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "trapping" VC would be a combination of the wildlife LSA and the noise RSA, as shown on Figure 7.3.2-9.
	Fishing	For fishing, the only residual adverse effects were identified for the "change in access" and "diminished experience of being on the land" indicator indicators. The change in access is on a local scale. For there to be a cumulative effect, the physical activity would need to overlap with the LSA for fish and fish habitat. The residual adverse effects for "diminished experience of being on the land" are related to both those areas where Project noise levels would be noticeable (i.e., over 40 dBA) and the visibility of the WRSA in some viewscapes from Thunder Lake. For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA and the terrain and soil LSA. Therefore, the cumulative effects spatial boundaries for the "fishing" VC would be a combination of the fish and fish habitat LSA, the noise RSA, and the terrain and soils LSA, as shown on Figure 7.3.2-9.
	Socio-economic effects	The spatial boundaries for socio-economic cumulative effects to Aboriginal peoples are the study area used for the social and economic VCs (see Figure 7.3.2-10).

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Thaddeus Lake
Moose Lake
Cedar Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
EAGLE LAKE 27
594
Wabigoon Lake
AARON PROVINCIAL PARK
DD Contracting Aggregate Pit
WABIGOON
Hartman Lake
Mickle Lake
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Trap Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Natural Landscapes
- Spatial Extent for Pit Lake Quality
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Natural Landscape and Pit Lake Quality

PROJECT N°: TC160516	FIGURE: 7.3.2-1
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
AARON PROVINCIAL PARK
Wabigoon Lake
Hartman Lake
Mickle Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Mile Lake
Trap Lake
Avery Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Air Quality
- Spatial Extent for Noise VCs
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 2.5 5 10 15 20 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Noise VCs and Air Quality

PROJECT N°: TC160516	**FIGURE: 7.3.2-2**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
EAGLE LAKE 27
594
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Mile Lake
Trap Lake
Avery Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Surface Water Quality and Surface Water Quanity
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Surface Water Quality and Surface Water Quanity

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.3.2-3**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Bluett Lake
Rugby Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
665
605
601
Minnitaki Lake
Kabikwabik Lake
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Mile Lake
Avery Lake
Eagle Lake
Trap Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Wildlife VCs (Except Ungulates) and Migratory Bird VCs
- Spatial Extent for Ungulates
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provincial Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
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- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Wildlife VCs and Migratory Bird VCs

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.3.2-4**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Bluett Lake
Lateral Lake
Tot Lake
Muskie Lake
Rugby Lake
Kathlyn Lake
Gullwing Lake
665
605
601
Minnitaki Lake
Kabikwabik Lake
72
Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Mavis Lake
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Eagle Lake
Trap Lake
Doré Lake
Melgund Lake
17
WABIGOON LAKE 27
603
Pickerel Lake
Dinorwic Lake
Ukik Lake
Rock Lake
502
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Stream - Resident Fish Populations
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
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- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Stream - Resident Fish Populations

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.3.2-5**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Bluett Lake
Lateral Lake
Tot Lake
Muskie Lake
Kathlyn Lake
Rugby Lake
665
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
605
601
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Eagle Lake
Trap Lake
Doré Lake
Melgund Lake
17
WABIGOON LAKE 27
603
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Wetland and Terrestrial Vegetation Communities
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

0 2.5 5 10 15 20 Kilometres

TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Wetland and Vegetation Communities

PROJECT N°: TC160516	**FIGURE: 7.3.2-6**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
665
605
601
Minnitaki Lake
Kabikwabik Lake
72
Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
EAGLE LAKE 27
594
AARON PROVINCIAL PARK
Wabigoon Lake
Hartman Lake
Mickle Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Mile Lake
Trap Lake
Avery Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
Rock Lake
502
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Forestry, Access and Abundance for Hunting, Access and Abundance for Trapping, and Access and Abundance for Consumptive Use by Other Recreational Users
- Spatial Extent for Diminished Experience of Being on the Land for Hunting, Fishing, and Consumptive Land Use by Other Recreational Users
- Spatial Extent for Diminished Experience of Being on the Land for Fishing and for Cottagers and Outfitters
- Spatial Extent for Changes in Clientelle for Cottagers and Outfitters
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 2.5 5 10 15 20 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

TREASURY METALS Inc.

amec foster wheeler

GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for the Land and Resource Use VCs

PROJECT N°: TC160516	**FIGURE: 7.3.2-7**
SCALE: 1:300,000	DATE: April 2018

400000 450000 500000 550000 600000

5550000

5500000

MAP OVERVIEW

ENLARGED AREA

500 km

WEST ENGLISH RIVER
MAYNARD LAKE
TIDE LAKE
WABAUSKANG FIRST NATION
WINDIGO POINT
LAC SEUL FIRST NATION
GRASSY NARROWS FIRST NATION
105
516
MUNICIPALITY OF SIOUX LOOKOUT
664
OJIBWAY
609
658
642
72
BLUE LAKE
647
665
605
601
MINNITAKI KAMES
CITY OF KENORA
596
CITY OF DRYDEN
LOLA LAKE
Domtar Corp Dryden Pulp Mill
17
641
17a
TOWNSHIP OF MACHIN
594
AARON
DD Contracting Aggregate Pit
EAST ENGLISH RIVER
WINNANGE LAKE
RUSHING RIVER
VILLAGE OF WABIGOON
BUTLER LAKE
EAGLE LAKE FIRST NATION
EAGLE-DOCTOOTH
17
WABIGOON LAKE OJIBWAY NATION
599
502
SANDBAR LAKE
NAOTKAMEGWANNING (WHITEFISH BAY) FIRST NATION
LAKE OF THE WOODS
71
TOWNSHIP OF IGNACE
622
DD Contracting Aggregate Pit
TURTLE RIVER-WHITE OTTER LAKE

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LEGEND

- Operations Area
- Socio-economic Study Area
- First Nation Reserves*
- Communities*
- Treasury Metals Exploration Program
- Provinical Parks
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- DD Contracting Aggregate Pit
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Extent of Culumative Effects shown in Fig 7.2.2-1
- Railway
- Highway

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.

* Only communities and reserves located within the study area are shown.

Datum: NAD83
Projection: UTM Zone 15N

0 10 20 40 60 80 100 Kilometres

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GOLIATH GOLD PROJECT

Spatial Extents of Cumulative Effects for the Social VCs and Economic Factor VCs

PROJECT N°: TC160516 | **FIGURE: 7.3.2-8**

SCALE: 1:650,000 | DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Whitefish Lake
LAC SEUL 28
Thaddeus Lake
Moose Lake
Cedar Lake
Ord Lake
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Bluett Lake
Rugby Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
665
605
601
Minnitaki Lake
Kabikwabik Lake
72
Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
EAGLE LAKE 27
594
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Eagle Lake
Doré Lake
Melgund Lake
17
WABIGOON LAKE 27
603
Pickerel Lake
Dinorwic Lake
Ukik Lake
Rock Lake
502
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Ungulates Indictor for the Hunting VC
- Spatial Extent for Change in Access for Fishing, Hunting, Trapping, and Harvesting and Gathering Plant Materials
- Spatial Extent for Diminished Experience of Being on the Land for Hunting, Trapping and Harvesting and Gathering of Plant Materials
- Spatial Extent for Diminished Experience of Being on the Land for Fishing
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 2.5 5 10 15 20 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for the Aborginal Peoples VCs Related to Traditional Land and Resource Use

PROJECT N°: TC160516	**FIGURE: 7.3.2-9**
SCALE: 1:300,000	DATE: April 2018

400000 450000 500000 550000 600000

5500000

MAP OVERVIEW

ENLARGED AREA

500 km

WEST ENGLISH RIVER
MAYNARD LAKE
TIDE LAKE
WABAUSKANG FIRST NATION
WINDIGO POINT
LAC SEUL FIRST NATION
GRASSY NARROWS FIRST NATION
105
516
MUNICIPALITY OF SIOUX LOOKOUT
664
OJIBWAY
609
658
642
72
BLUE LAKE
647
665
605
601
MINNITAKI KAMES
CITY OF KENORA
596
CITY OF DRYDEN
LOLA LAKE
Domtar Corp Dryden Pulp Mill
641
17
17a
TOWNSHIP OF MACHIN
594
AARON
DD Contracting Aggregate Pit
WINNANGE LAKE
EAST ENGLISH RIVER
RUSHING RIVER
VILLAGE OF WABIGOON
BUTLER LAKE
EAGLE LAKE FIRST NATION
EAGLE-DOCTOOTH
17
WABIGOON LAKE OJIBWAY NATION
599
502
SANDBAR LAKE
NAOTKAMEGWANNING (WHITEFISH BAY) FIRST NATION
LAKE OF THE WOODS
71
TOWNSHIP OF IGNACE
622
DD Contracting Aggregate Pit
TURTLE RIVER-WHITE OTTER LAKE

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LEGEND

- Operations Area
- Socio-economic Study Area
- First Nation Reserves*
- Communities*
- Treasury Metals Exploration Program
- Provinical Parks
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- DD Contracting Aggregate Pit
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Extent of Culumative Effects shown in Fig 7.2.2-1
- Railway
- Highway

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 10 20 40 60 80 100 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.

* Only communities and reserves located within the study area are shown.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

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GOLIATH GOLD PROJECT

Spatial Extents of Cumulative Effects for Aboriginal Peoples Scio-economic Factors

PROJECT N°: TC160516	**FIGURE: 7.3.2-10**
SCALE: 1:650,000	DATE: April 2018

7.3.3 Temporal Boundaries for Assessing Cumulative Effects

The temporal boundaries used for assessing cumulative effects were selected to be consistent with those used in evaluating the effects of the Project, namely:

- Site preparation and construction phase (2 years);
- Operations (11 to 12 years);
- Closure (3 years); and
- Post-closure (beyond year 17).

Table 7.3.3-1 provides the temporal boundaries for each of the VCs for which residual adverse effects were predicted.

Table 7.3.3-1: Temporal Boundaries for use in Assessing Cumulative Effects

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Terrain and Soils	Natural landscapes	The residual adverse effect is associated with the presence of the WRSA. This feature will be constructed during the first few years of operations, and will remain a permanent feature on the landscape. A physical activity would need to have effects that overlapped with the operations, closure and post-closure phases of the Project for there to be a cumulative effects. However, it is not reasonable to foresee future activities into the far future. Therefore, the temporal boundary for this effect will be set from year 3 to year 37 (20 years following closure).
Geology and Geochemistry	Pit lake water quality	The residual adverse effect associated with the pit lake quality VC is tied to the presence of the pit lake. At the end of mining, the dewatering activities will cease and the open pit will be allowed to fill with water. The filing of the pit lake will take between 5 to 8 years, at which time the pit lake will become a permanent feature on the landscape. A physical activity would need to have effects that overlapped with the post-closure phases of the Project for there to be a cumulative effects. However, it is not reasonable to foresee future activities into the far future. Therefore the temporal boundary for this effect will be set from year 19 (5 years after the end of operations) to year 37 (20 years after closure).
Noise	Environmental noise levels	Activities at the Project associated with the residual adverse effects on the noise VCs are restricted to the site preparation and construction, operations and closure phases of the Project (blasting would not occur during closure). There would be no residual adverse effects on the noise VCs during the post-closure phase. For there to be a cumulative effect on noise, the physical activity would have to occur during the active period of the Project life, from year 1 through year 17 (the end of the closure activities).
	Noise disturbance to wildlife (including SAR)	
	Blasting noise and vibration	
	Noise related health effects	

Table 7.3.3-1: Temporal Boundaries for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Air Quality	Air quality	Activities at the Project associated with the residual adverse effects on the air quality VC are restricted to the site preparation and construction, operations and closure phases of the Project. There would be no residual adverse effects on the air quality VC during the post-closure phase. For there to be a cumulative effect on air quality, the physical activity would have to occur during the active period of the Project life, from year 1 through year 17 (the end of the closure activities).
Climate	Project GHG emissions	This VC relates to Treasury Metals own requirements under the Ontario Cap and Trade Program (O. Reg. 144/16) for the reporting and management of their emissions. Although GHG emissions are identified as contributing to climate change, there were no residual adverse effects predicted for changes in climate due to the Project VC.
Surface Water Quality	Surface water quality	The residual adverse effects of the Project on surface water quality occur during the operations phase, when excess water at the Project will be treated to meet the PWQO before discharge to Blackwater Creek, and the post-closure phase when excess water from the pit lake is passively discharged into a Tributary of Blackwater Creek. During the post-closure phase, seepage from the TSF and WRSA will leave the site and interact with adjacent waterbodies. Releases from the pit lake and seepage from the WRSA and TSF will effectively be permanent. However, it is not reasonable to foresee future activities into the far future. Therefore, the temporal boundary for this effect will be set from year 2 (the start of operations) to year 37 (20 years after closure).
Surface Water Quantity	Surface water quantity	The residual adverse effects of the Project on surface water quantity will vary by phase of the Project. At the start of the site preparation and construction phase, a perimeter ditch will be constructed around the operations area to prevent runoff leaving the site. This will permanently alter the size of the catchment areas for Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek. During operations, fresh water requirements will be provided from the irrigation ponds on Thunder Lake Tributary 2 and 3. Additionally, excess water at the Project will be treated to meet the PWQO before discharge to Blackwater Creek. At closure, the site will be graded and all runoff directed towards the open pit. The reclaimed site will have different runoff characteristics from the baseline conditions for the catchment. Changes to the flows in Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek will be permanent. However, it is not reasonable to foresee future activities into the far future. Therefore, the temporal boundaries for this effect will be set from year 2 (the start of operations) to year 37 (20 years after closure).

Table 7.3.3-1: Temporal Boundaries for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Wildlife and Wildlife Habitat	Wildlife Species at Risk	The predicted residual adverse effects of the Project on the wildlife VCs will continue throughout the active life of the Project, and are expected to recover following the closure and reclamation activities. The temporal boundaries for the residual adverse effects on the wildlife VCs extends from year 1 to year 27 (10 years after closure).
	Ungulates	
	Furbearers	
	Upland Birds	
	Wetland Birds	
	Small mammals	
	Reptiles and amphibians	
	Invertebrates	
Migratory Birds	Upland Birds	The predicted residual adverse effects of the Project on the migratory bird VCs will continue throughout the active life of the Project, and are expected to recover following the closure and reclamation activities. The temporal boundaries for the residual adverse effects on the migratory VCs extends from year 1 to year 27 (10 years after closure).
	Wetland Birds	
Fish and Fish Habitat	Stream-resident fish population	For fish and fish habitat VCs, the only residual adverse effects were those on the stream-resident fish living in those watercourses that would be directly affected by the Project (i.e., Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2). These effects would be restricted to the site preparation and construction phase. It is expected that Treasury Metals will be required to implement a plan to offset the effects of overprinting portions of Blackwater Creek Tributary 1 and 2. The temporal boundaries for the residual adverse effects on the stream-based fish populations extends from year 1 to 2 (the end of the site preparation and construction phase).
Wetlands and Vegetation	Wetlands	The predicted residual adverse effects of the Project on the wetland extent will continue throughout the active life of the Project. The effects are expected to recover following the closure and reclamation activities. The temporal boundaries for the residual adverse effects on wetlands and vegetation valued components extent last from year 1 to year 27 (10 years after closure).
	Vegetation communities	
Land Use	Forestry	The predicted residual adverse effects of the Project on the land use VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with time, therefore, the temporal boundaries for the residual adverse effects on land use valued components extent last from year 1 to year 22 (5 years after the end of the closure phase).
	Hunting	
	Trapping	
	Cottagers and outfitters	
	Other recreational uses	

Table 7.3.3-1: Temporal Boundaries for use in Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Social	Population demographics	The predicted residual adverse effects of the Project on the social VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with time, therefore, the temporal boundaries for the residual adverse effects on social valued components extent last from year 1 to year 22 (5 years after the end of the closure phase).
	Education	
	Infrastructure and services	
	Housing and property values	
	Public safety	
	Transportation and traffic	
Economic	Labour force, participation and employment	The predicted residual adverse effects of the Project on the economic VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with time, therefore, the temporal boundaries for the residual adverse effects on economic valued components extent last from year 1 to year 22 (5 years after the end of the closure phase).
	Income levels	
	Cost of living	
	Real estate	
	Economic development	
	Existing businesses	
	Government revenues	
Aboriginal Peoples	Harvesting and gathering of plant material	The predicted residual adverse effects of the Project on the Aboriginal peoples VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with time, therefore, the temporal boundaries for the residual adverse effects on aboriginal peoples including current use of the land and resources for traditional purposes and socio-economic valued components last from year 1 to year 22 (5 years after the end of the closure phase).
	Hunting	
	Trapping	
	Fishing	
	Socio-economic effects	

7.4 Identification of Potential Cumulative Effects

7.4.1 Screening for Spatial and Temporal Overlap with the Project

For terrain and soils, the residual adverse effect identified for consideration of cumulative effects was the residual effect of the waste rock storage area (WRSA) on the natural landscapes VC. Specifically, the WRSA was identified as being visible from sections of Thunder Lake. The spatial extent for cumulative effects is limited to the terrain and soils LSA (Table 7.3.2-1 and Figure 7.3.2-1). The temporal boundaries are from year 2, when the placement of material in the WRSA begins, through to 37 years (Table 7.3.3-1). The screening determined that there would be or could be some cases (shaded in green) where there was both spatial and temporal overlap

between the effects area of the Project and the effects of certain of the identified future projects. The results of the screening for the “natural landscapes” VC are provided in Table 7.4.1.1-1.

Table 7.4.1-1: Cumulative Effects Screening for Terrain and Soils

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	Although these activities will overlap, the effects are not expected to be similar.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the terrain and soils LSA (Figure 7.3.2-1).
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-1) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas within the FMA (see Figure 7.3.2-1) include harvest clocks within the terrain and soils LSA.
Domtar Dryden Pulp Mill	No	Yes	The Dryden pulp mill does not overlap with the terrain and soil LSA.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine does not overlap with the terrain and soil LSA.
Aggregate pits or quarries	Yes	Yes	The identified aggregate operations falls within the terrain and soils LSA.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the terrain and soil LSA.
Local infrastructure	Yes	Yes	These activities are not identified as overlapping with the terrain and soil LSA.

A single residual effect for geology and geochemistry was identified, specifically the effects on the pit lake water quality VC. The spatial extent is limited to the operations area (Table 7.2.2-1 and Figure 7.3.2-1). The temporal boundaries are from year 19 to 37 years (Table 7.2.3-1). The screening determined that there would be no cases of predicted spatial and temporal overlap between the effects area of the Project and the effects of other projects in the surrounding area. The results of the screening for the pit lake water quality VC are is provided in Table 7.4.1-2.

Table 7.4.1-2: Cumulative Effects Screening for Geology and Geochemistry

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	No	Pit lake does not exist until between 6 and 8 years following operations. Therefore, there would be no temporal overlap.
Highway 17	No	Yes	There is no spatial overlap
Canadian Pacific rail line	No	Yes	There is no spatial overlap
Dryden Forest Management Company	No	Yes	There is no spatial overlap
Domtar Dryden Pulp Mill	No	Yes	There is no spatial overlap

Table 7.3.1-2: Cumulative Effects Screening for Geology and Geochemistry (continued)

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Josephine Cone Mine Project	No	Yes	There is no spatial overlap
Aggregate pits or quarries	No	No	There is no spatial overlap
Wataynikaneyap Power	No	No	There is no spatial overlap
Local infrastructure	No	Yes	There is no spatial overlap

Residual adverse effects for noise were predicted for the environmental noise levels, noise disturbance to wildlife, blasting noise and vibration and noise related health effects VCs (Section 6.4.6). The spatial extent for noise was identified as being restricted to the noise RSA (Table 7.3.2-1 and Figure 7.3.2-2). The temporal boundaries are from year 1 to 17 years (Table 7.3.3-1), as there were no sources of noise identified during the post-closure phase. The screening determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal crossover between the effects area of the Project and the effects of other projects in the surrounding area. The results of the screening for the noise VCs are provided in Table 7.4.1-3.

Table 7.4.1-3: Cumulative Effects Screening for Noise

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the noise RSA (Figure 7.3.2-2), as well as overlapping temporally.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the noise RSA.
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-2) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the noise RSA. The harvesting will overlap temporally with the Project noise effects.
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the noise RSA.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine will not have effects that overlap with the noise RSA.
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that overlaps with the noise RSA (Figure 7.3.2-2), and also overlaps temporally.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the noise RSA.
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-2) and temporally.

Residual adverse effects were predicted for the single air quality VC. The spatial extent for air quality cumulative effects is the LSA used for describing the effects of the Project (Table 7.3.2-1 and Figure 7.3.2-2). The temporal boundaries are from year 1 to 17 years (Table 7.3.3-1), as there were no sources of air emissions identified during the post-closure phase. The screening determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal crossover between the effects area of the Project and the effects of other projects in the surrounding area. The results of the screening for the air quality VC are provided in Table 7.4.1-4.

Table 7.4.1-4: Cumulative Effects Screening for Air Quality

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the air quality LSA (Figure 7.3.2-2), as well as overlapping temporally.
Highway 17	Yes	Yes	Some of the major upgrades to Highway 17 do overlap with the air quality LSA (Figure 7.3.2-2), as well as overlapping temporally with the effects associate with the Project.
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-2) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the air quality LSA. The harvesting will overlap temporally with the Project noise effects.
Domtar Dryden Pulp Mill	Yes	Yes	Although the pulp mill is located outside the air quality LSA, the effects of the mill will overlap. The mill will overlap temporally with the air effects for the Project.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine will not have effects that overlap with the air quality LSA.
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that overlaps with the air quality LSA (Figure 7.3.2-2). This facility will also overlap temporally with the Project.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the air quality LSA.
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-2) and temporally.

Although residual adverse effects have been identified for the Project GHG emissions, there would be no cumulative effects associated with this VC. The residual adverse effects relate to the Project specific emissions and the requirements for regulatory reporting under Section 46 of the Canadian Environmental Protection Act, or under the Ontario Cap and Trade Program Regulation 144/16. No residual adverse effects were identified for the VC entitled “changes in climate due to the Project”.

Despite the effects avoidance (Section 6.8.3) and mitigation (Section 6.8.5), surface water quality modelling identified residual adverse effects for surface water quality. The spatial extent for

surface water quality cumulative effects is the LSA used for the assessment (Table 7.3.2-1 and Figure 7.3.2-3). The residual adverse effects were predicted during the operations and post-closure phases; therefore, the temporal boundaries are from year 2 to 37 years (Table 7.3.3-1). The screening determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal overlap between the effects area of the Project and the effects of other projects in the surrounding area. The results of the screening for the surface water quality VC are provided in Table 7.4.1-5.

Table 7.4.1-5: Cumulative Effects Screening for Surface Water Quality

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the surface water quality LSA (Figure 7.3.2-3), as well as overlapping temporally.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the surface water quality LSA.
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-3) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the surface water quality LSA. The harvesting will overlap temporally with the Project.
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the surface water quality LSA.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine will not have effects that overlap with the surface water quality LSA.
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that may overlap partially with the surface water quality LSA (Figure 7.3.2-3). This facility will also overlap temporally.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the surface water quality LSA.
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-3) and temporally.

Section 6.9.6 describes the predicted residual adverse effects on surface water quantity. The spatial extent is the LSA for surface water (Table 7.2.2-1 and Figure 7.3.2-3). The temporal boundaries are from year 2 to 37 years (Table 7.3.3-1). The assessment determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal overlap between the effects area of the Project and the effects of other projects in the surrounding area. The results of the screening for cumulative effects are provided in Table 7.4.1-6.

Table 7.4.1-6: Cumulative Effects Screening for Surface Water Quantity

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the surface water quantity LSA (Figure 7.3.2-3), as well as overlapping temporally.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the surface water quantity LSA.
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-3) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the surface water quantity LSA. The harvesting will overlap temporally with the Project.
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the surface water quantity LSA.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine will not have effects that overlap with the surface water quantity LSA.
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that may overlap partially with the surface water quantity LSA (Figure 7.3.2-3). This facility will also overlap temporally.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the surface water quantity LSA.
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-3) and temporally.

Residual adverse effects were predicted for each of the wildlife and wildlife habitat VCs (Table 7.3.1-1). The spatial extent of cumulative effects is consistent with the wildlife LSA (Table 7.3.2-1 and Figure 7.3.2-4). The exception is for ungulates, the cumulative effects of which are addressed on a regional scale using the wildlife RSA (Table 7.3.2-1 and Figure 7.3.2-4). The temporal boundaries are from year 1 to 17 years (Table 7.3.3-1). The assessment determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal overlap between the effects area of the Project and the effects of other projects in the surrounding area. The results of the cumulative screening are provided in Table 7.4.1-7.

Table 7.4.1-7: Cumulative Effects Screening for Wildlife and Wildlife Habitat

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the wildlife LSA and wildlife RSA (Figure 7.3.2-4). They will also overlap temporally with the Project.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the wildlife LSA.
	Yes	Yes	The major upgrades to Highway 17 overlap with the wildlife RSA used for ungulates. The effects overlap temporally.

Table 7.4.1-7: Cumulative Effects Screening for Wildlife and Wildlife Habitat (continued)

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Canadian Pacific Rail Line	Yes	Yes	The maintenance of the CPR lines overlap with the wildlife LSA and the wildlife RSA used for ungulates (Figure 7.3.2-4). The effects overlap temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the wildlife LSA, as well as with the wildlife RSA used for ungulates.
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the wildlife LSA (Figure 7.3.2-4).
	Yes	Yes	The effects of the mill will overlap with the wildlife RSA (Figure 7.3.2-4), and will also overlap temporally.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine does not overlap with either the wildlife LSA or wildlife RSA.
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that may overlap partially with the wildlife LSA (Figure 7.3.2-4), and does overlap with the wildlife RSA. This activity will also overlap temporally.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the wildlife LSA (Figure 7.3.2-4).
	Yes	Yes	The Wataynikaneyap Power project does overlap with the wildlife RSA used for ungulates (Figure 7.3.2-4).
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-4) and temporally.

Residual adverse effects were predicted for both of the migratory birds VCs. The spatial extent is the migratory birds LSA, which is the same as the wildlife LSA (Table 7.3.2-1 and Figure 7.3.2-4). The temporal boundaries are from year 1 to 12 years (Table 7.3.3-1). The assessment determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal crossover between the effects area of the Project and the effects of other projects in the surrounding area. The results of the cumulative effects screening are provided in Table 7.4.1-8.

Table 7.4.1-8: Cumulative Effects Screening for Migratory Birds VCs

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the migratory birds LSA (Figure 7.3.2-4), and will overlap temporally.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the migratory birds LSA.
Canadian Pacific Rail Line	Yes	Yes	The maintenance of the CPR lines overlap with the wildlife LSA (Figure 7.3.2-4). The effects overlap temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the migratory birds LSA, as well as

Table 7.4.1-8: Cumulative Effects Screening for Migratory Birds VCs (continued)

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
			overlapping temporally with the Project. The local forestry effects are addressed for the Dryden Forest Management Company.
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap the LSA for migratory birds.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine does not overlap with migratory birds LSA.
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that may overlap partially with the migratory birds LSA (Figure 7.3.2-4). This activity will also overlap temporally.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the migratory birds LSA (Figure 7.3.2-4).
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-4) and temporally.

Residual fish and fish habitat adverse effects were predicted for the stream-resident fish populations VC, specifically, mortality to a portion of the stream-resident fish present in the sections of Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2 overprinted during the site preparation and construction phase. The spatial extents for cumulative effects is the LSA for fish and fish habitat (Table 7.3.2-1 and Figure 7.3.2-5). The temporal boundaries are from year 1 to 2 years (Table 7.3.3-1). The assessment determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal overlap between the effects area of the Project and the effects of other projects in the surrounding area. The results of the cumulative effects screening are presented in Table 7.4.1-9.

Table 7.4.1-9: Cumulative Effects Screening for Fish and Fish Habitat VCs

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the fish and fish habitat LSA (Figure 7.3.2-5), and will overlap temporally with the Project.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the fish and fish habitat LSA (Figure 7.3.2-5).
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-5) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the fish and fish habitat LSA, as well as overlapping temporally with the Project.
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the fish and fish habitat LSA.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine does not overlap with fish and fish habitat LSA.

Table 7.3.1-10: Cumulative Effects Screening for Fish and Fish Habitat (continued)

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that may overlap partially with the fish and fish habitat LSA (Figure 7.3.2-5). This activity will also overlap temporally.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the fish and fish habitat LSA (Figure 7.3.2-5).
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-5) and temporally.

Residual adverse effects for wetlands and vegetation were predicted for both the "wetland extent" indicator for the wetlands VC. Residual adverse effects were also predicted for all of the indicators for the vegetation communities VC. The residual adverse effects for wetlands and vegetation are local, and cumulative effects extent was defined as the wetlands and vegetation LSA (Table 7.3.2-1 and Figure 7.3.2-6). The temporal boundaries are from year 1 to 17 years (Table 7.3.3-1). The assessment determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal crossover between the effects area of the Project and the effects of other projects in the surrounding area. The results of the cumulative effects screening are provided in Table 7.3.1-10.

Table 7.4.1-10: Cumulative Effects Screening for Wetlands and Vegetation

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially with the wetlands and vegetation LSA (Figure 7.3.2-6), and will overlap temporally with the Project.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the wetlands and vegetation LSA (Figure 7.3.2-6).
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-6) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap with the wetlands and vegetation LSA, as well as overlapping temporally with the Project.
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the wetlands and vegetation LSA.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine does not overlap with the wetlands and vegetation LSA.
Aggregate pits or quarries	Yes	Yes	There is one aggregate operation that may overlap partially with the wetlands and vegetation LSA (Figure 7.3.2-6). This activity will also overlap temporally.
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the wetlands and vegetation LSA (Figure 7.3.2-6).
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-6) and temporally.

Table 7.4.1-10: Cumulative Effects Screening for Wetlands and Vegetation (continued)

Residual adverse effects were predicted for a number of the land and resource use VCs. The spatial extent for cumulative effects depends on the VC affected, as well as the indicator. The spatial extents for cumulative effects of land and resource are described in Table 7.3.2-1. For determining the spatial extent of cumulative effects, the following areas (see Figure 7.3.2-7) have been used:

- Wetlands and terrestrial vegetation LSA
  - Loss of forestry resources (forestry).
  - Change in access for consumptive purposes (other recreational uses).
  - Change in abundance of berries and other vegetation (other recreational uses).
- Wildlife and wildlife habitat LSA
  - Change in access to wildlife and wildlife abundance (hunting).
  - Change in access to wildlife and wildlife abundance (trapping).
- Noise RSA
  - Diminished experience of being on the land (hunting).
  - Diminished experience of being on the land (trapping).
  - Diminished experience of being on the land (cottagers and outfitters).
  - Diminished experience of being on the land (other recreational users).
- Terrain and soils LSA
  - Diminished experience of being on the land (fishing).
  - Diminished experience of being on the land (cottagers and outfitters).
  - Diminished experience of being on the land (other recreational users).
- 25 km radius catchment centered on the open pit
  - Change in clientele for outfitters and lodges (cottagers and outfitters).

The temporal boundaries are from year 1 to 22 years (Table 7.3.3-1). The assessment determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal overlap between the effects area of the Project and the effects of other projects in the surrounding area. The results of the cumulative effects screening are provided in Table 7.4.1-11.

Table 7.4.1-11: Cumulative Effects Screening for Land Use (continued)

Table 7.4.1-11: Cumulative Effects Screening for Land Use

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially and will overlap temporally with the Project.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the wetlands LSA, wildlife LSA, terrain and soils LSA, or the noise RSA (Figure 7.3.2-7).
	Yes	Yes	The major upgrades to Highway 17 do overlap with the spatial extent used for cumulative effects related to changes in clientele for outfitters and lodges (Figure 7.3.2-7).
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-7) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap spatially and temporally with the Project (Figure 7.3.2-7).
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the wetlands LSA, wildlife LSA, terrain and soils LSA, or the noise RSA (Figure 7.3.2-7).
	Yes	Yes	The effects of the mill will overlap with the spatial extent used for cumulative effects related to changes in clientele for outfitters and lodges (Figure 7.3.2-7).
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine does not overlap with the wetlands, wildlife, and terrain and soils LSAs, the noise RSA, or the 25 km radius catchment used for changes in clientele for outfitters and lodges (Figure 7.3.2-7).
Aggregate pits or quarries	Yes	Yes	These activities will overlap spatially and temporally with the Project (Figure 7.3.2-7).
Wataynikaneyap Power	No	Yes	The effects of the mill do not overlap with the wetlands LSA, wildlife LSA, terrain and soils LSA, or the noise RSA (Figure 7.3.2-7).
	Yes	Yes	The Wataynikaneyap Power project does overlap or the 25 km radius for cumulative effects related to changes in clientele for outfitters and lodges (Figure 7.3.2-7), and would overlap temporally with the Project.
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-7) and temporally.

Residual adverse effects were predicted for each of the social VCs. The spatial extent for cumulative effects is the socio-economic study area (Table 7.3.2-1 and Figure 7.3.2-8). The temporal boundaries are from year 1 to 22 years (Table 7.3.3-1). The assessment determined that all of the social VCs would have overlap between the effects of the Project and the effects of other projects in the surrounding area. A summary of the screening is provided in Table 7.4.1-12.

Table 7.4.1-12: Cumulative Effects Screening for Social

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Highway 17	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Dryden Forest Management Company	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Domtar Dryden Pulp Mill	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Josephine Cone Mine Project	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Aggregate pits or quarries	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Wataynikaneyap Power	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally

Residual adverse effects were predicted for each of the economic VCs. The spatial extent for cumulative effects is the socio-economic study area (Table 7.3.2-1 and Figure 7.3.2-8). The temporal boundaries are from year 1 to 22 years (Table 7.3.3-1). The assessment determined that all of the economic factor VCs would have overlap between the effects of the Project and the effects of other projects in the surrounding area. The results of the cumulative effects screening is provided in Table 7.4.1-13.

Table 7.4.1-13: Cumulative Effects Screening for Economic Factors

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Highway 17	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Dryden Forest Management Company	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Domtar Dryden Pulp Mill	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Josephine Cone Mine Project	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally

Table 7.3.1-14: Cumulative Effects Screening for Economic Factors (continued)

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Aggregate pits or quarries	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Wataynikaneyap Power	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figure 7.3.2-8) and temporally

Residual adverse effects were predicted for a number of the Aboriginal Peoples VCs. The spatial extent for cumulative effects depends on the VC affected, as well as the indicator. The spatial extents for cumulative effects for Aboriginal Peoples are described in Table 7.3.2-1. For determining the spatial extent of cumulative effects, the following areas (see Figure 7.3.2-9 and 7.3.2-10) have been used:

- Wetlands and terrestrial vegetation LSA
  - Berry harvesting (harvesting and gathering of plant materials).
  - Medicinal plant harvesting (harvesting and gathering of plant materials).
  - Change in access (harvesting and gathering of plant materials).
- Wildlife and wildlife habitat LSA
  - Furbearers (hunting).
  - Furbearers (trapping).
  - Waterfowl (hunting).
  - Change in access (hunting).
  - Change in access (trapping).
- Wildlife and wildlife habitat LSA
  - Ungulates (hunting).
- Noise RSA
  - Diminished on-the-land experience (harvesting and gathering of plant materials).
  - Diminished experience of being on the land (hunting).
  - Diminished experience of being on the land (trapping)
  - Diminished experience of being on the land (cultural and spiritual).
- Terrain and soils LSA
  - Diminished experience of being on the land (fishing).

- Diminished experience of being on the land (cultural and spiritual).

- Socio-economic study area
  - Socio-economic factors.

The temporal boundaries are from year 1 to 22 years (Table 7.3.3-1). The assessment determined that there would be or could be some cases (shaded in green) of predicted spatial and temporal overlap between the effects area of the Project and the effects of other projects in the surrounding area. The results of the cumulative effects screening are provided in Table 7.4.1-14.

Table 7.4.1-14: Cumulative Effects Screening for Aboriginal Peoples

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Treasury Metals exploration program	Yes	Yes	These activities will overlap spatially and will overlap temporally with the Project.
Highway 17	No	Yes	The major upgrades to Highway 17 do not overlap with the wetlands and terrestrial vegetation LSA, wildlife LSA, terrain and soils LSA, or the noise RSA (Figure 7.3.2-9).
	Yes	Yes	These activities overlap with the wildlife RSA used for evaluating cumulative effects to ungulates (Figure 7.3.2-9), and also overlap temporally.
	Yes	Yes	These activities overlap with the socio-economic LSA used for socio-economic factors (Figure 7.3.2-10), and overlap temporally with the Project.
Canadian Pacific Rail Line	Yes	Yes	These activities will overlap spatially (Figures 7.3.2-9 and 7.3.2-10) and temporally.
Dryden Forest Management Company	Yes	Yes	The planned harvesting areas include blocks that overlap spatially and temporally with the Project (Figures 7.3.2-9 and 7.3.2-10).
Domtar Dryden Pulp Mill	No	Yes	The effects of the mill do not overlap with the wetlands LSA, wildlife LSA, terrain and soils LSA, or the noise RSA (Figure 7.3.2-7).
	Yes	Yes	These activities overlap with the wildlife RSA used for evaluating cumulative effects to ungulates (Figure 7.3.2-9), and also overlap temporally.
	Yes	Yes	These activities overlap with the socio-economic LSA used for socio-economic factors (Figure 7.3.2-10), and overlap temporally with the Project.
Josephine Cone Mine Project	No	Yes	The Josephine Cone Mine does not overlap with the wetlands LSA, wildlife LSA, and terrain and soils LSA, the noise RSA, or the wildlife RSA used for ungulates (Figure 7.3.2-9).
	Yes	Yes	These activities overlap with the socio-economic LSA used for socio-economic factors (Figure 7.3.2-10), and overlap temporally with the Project.
Aggregate pits or quarries	Yes	Yes	These activities will overlap spatially (Figures 7.3.2-9 and 7.3.2-10) and temporally.

Table 7.4.1-14: Cumulative Effects Screening for Aboriginal Peoples (continued)

Future Project	Spatial Extents	Temporal Boundaries	Potential for Cumulative Effects
Wataynikaneyap Power	No	Yes	The Wataynikaneyap Power project does not overlap with the wetlands LSA, wildlife LSA, and terrain and soils LSA, or the noise RSA (Figure 7.3.2-9).
	Yes	Yes	The Wataynikaneyap Power project overlaps with the wildlife RSA used for ungulates (Figure 7.3.2-9), and would overlap temporally with the Project.
	Yes	Yes	These activities overlap with the socio-economic LSA used for socio-economic factors (Figure 7.3.2-10), and overlap temporally with the Project.
Local infrastructure	Yes	Yes	These activities will overlap spatially (Figures 7.3.2-9 and 7.3.2-10) and temporally.

7.4.2 Summary of Potential Cumulative Effects

The cumulative effects screening presented in Section 7.4.1 identified the following two disciplines for which residual adverse effects were identified, were identified as having no potential cumulative effects with the projects and activities described in Section 7.2:

- Geology and geochemistry; and
- Climate.

A summary of the cumulative effects screening detailed in Section 7.4.1 has been provided in Table 7.4.2-2. This table lists the identified cumulative effects for each of the activities described in Section 7.2, and for each of the discipline, VCs and indicators listed in Table 7.3.1-1. Where the cumulative effects screening has identified temporal and spatial overlaps, these have passed forward for the description and prediction of cumulative effects.

7.5 Analysis of Cumulative Effects

7.5.1 Terrain and Soil

Section 6.2.6 identified that the Project would result in residual adverse effects for the “natural landscapes” VC, specifically the “viewscapes” indicator. The residual adverse effects relate to the prediction that the WRSA will be visible from some of the viewscapes from Thunder Lake. The spatial extent used for screening these cumulative effects was the terrain and soils LSA (see Figure 7.3.2-1). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

Table 7.4.2-2: Results of the Cumulative Effects Screening for Spatial and Temporal Overlaps with the Residual Adverse Effects of the Project

Discipline	Valued Components (VCs)	Indicators	Are there Spatial and Temporal Overlaps								
			Treasury Metals Exploration Program	Highway 17	Canadian Pacific rail line	Dryden Forest Management Company	Domtar Dryden Pulp Mill	Josephine Cone Mine Project	Aggregate pits or quarries	Wataynikaneyap Power	Local infrastructure
Terrain and soils	Natural landscapes	Viewscapes	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Geology and Geochemistry	Pit lake water quality	Concentrations of indicator compounds	—	—	—	—	—	—	—	—	—
Noise	Environmental noise levels	Equivalent noise levels, LEQ	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Noise disturbance to wildlife (including SAR)	Area predicted LEQ above 50 dBA	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Blasting noise and vibration	Peak sound pressure level	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Peak particle velocity	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Noise related health effects	Absolute sound pressure, LDN	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Percent highly annoyed, %HA	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Air quality	Air quality	Concentrations of indicator compounds	Yes	Yes	Yes	Yes	Yes	—	Yes	—	Yes
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	—	—	—	—	—	—	—	—	—
Surface water quality	Surface water quality	Concentrations of indicator compounds	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Surface water quantity	Surface water quantity	Increase in surface water flows	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Decrease in surface water flows	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Wildlife and wildlife habitat	Wildlife Species at Risk	Common Nighthawk	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Northern Myotis/Little Brown Myotis	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Barn Swallow	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Ungulates	Moose	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes
	Furbearers	American Marten	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		American Beaver	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Upland birds	Upland birds	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Wetland birds	Marsh birds	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Small mammals	Small mammals	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Reptiles and amphibians	Reptiles and amphibians	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Invertebrates	Terrestrial invertebrates	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Migratory Birds	Upland birds	Upland birds	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Wetland birds	Marsh birds	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Fish and fish habitat	Stream-resident fish population	Direct loss or alteration of habitat	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Wetlands and vegetation	Wetlands	Wetland extent	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Vegetation communities	Predominantly coniferous forest	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Predominantly deciduous forest	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Successional areas	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Potential berry harvesting areas	Yes	—	Yes	Yes	—	—	Yes	—	Yes

Table 7.4.2-2: Results of the Cumulative Effects Screening for Spatial and Temporal Overlaps with the Residual Adverse Effects of the Project (continued)

Discipline	Valued Components (VCs)	Indicators	Are there Spatial and Temporal Overlaps								
			Treasury Metals Exploration Program	Highway 17	Canadian Pacific rail line	Dryden Forest Management Company	Domtar Dryden Pulp Mill	Josephine Cone Mine Project	Aggregate pits or quarries	Wataynikaneyap Power	Local infrastructure
Land use	Forestry	Loss of forestry resources.	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Fishing - Recreational and Commercial	Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Hunting	Change in access to wildlife resources.	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Change in abundance of wildlife resources.	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Trapping	Change in access to wildlife resources.	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Change in abundance of wildlife resources.	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Cottagers and Outfitters	Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Changes in clientele for outfitters with lodges located near the Project.	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes
	Other Recreational Uses	Change in access for residents and visitors to public lands for consumptive purposes.	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
Social	Population demographics	Population change	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Education	Capacity of education services	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Education attainment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Project-specific Training	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Infrastructure and services	Municipal Services	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Community services (e.g., health, social services)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Housing and property values	Housing availability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Property values	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Public safety	Crime rate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Capacity of emergency services	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Requests for emergency services by Project	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Transportation and traffic	Road network capacity and conditions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7.4.2-2: Results of the Cumulative Effects Screening for Spatial and Temporal Overlaps with the Residual Adverse Effects of the Project (continued)

Discipline	Valued Components (VCs)	Indicators	Are there Spatial and Temporal Overlaps								
			Treasury Metals Exploration Program	Highway 17	Canadian Pacific rail line	Dryden Forest Management Company	Domtar Dryden Pulp Mill	Josephine Cone Mine Project	Aggregate pits or quarries	Wataynikaneyap Power	Local infrastructure
Economic	Labour force, labour participation and employment	Labour income employment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Income levels	Income levels and categories	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Cost of living	Current prevailing cost of living	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Real estate	Housing prices and affordability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Economic development	Municipal taxes and contribution to economic development projects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Existing businesses	Local business availability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Government revenues	Taxes and revenues	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Aboriginal Peoples	Harvesting and gathering of plant material	Berry Harvesting	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Medicinal plant harvesting	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Changes in access	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Hunting	Ungulates	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes
		Furbearers	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Waterfowl	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Changes in access	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Trapping	Furbearers	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Changes in access	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Fishing	Changes in access	Yes	—	Yes	Yes	—	—	Yes	—	Yes
		Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Cultural and spiritual	Diminished on-the-land experience	Yes	—	Yes	Yes	—	—	Yes	—	Yes
	Socio-economic factors	Economic effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Social effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.1.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on terrain and soil:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities would include surveying and exploratory drilling, but are not likely to involve the removal of forest cover. For this reason, these activities are not expected to be visible from Thunder Lake, and would, therefore, not have a cumulative effect.
- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. This clearing of vegetation would not affect the same viewscapes from Thunder Lake as are affected by the WRSA. Therefore, this activity would not have a cumulative effect.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The planned harvest blocks that fall within the terrain and soils LSA are located to the east of the operations area and would not be visible from Thunder Lake. Therefore, this activity would not have a cumulative effect.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the terrain and soils LSA. However, the quarry is over 4 km to the east of Thunder Lake, and would not be visible from Thunder Lake. Therefore, this activity would not have a cumulative effect.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While these

activities would overlap with the terrain and soil LSA. They would not be visible from Thunder Lake. Therefore, this activity would not have a cumulative effect.

7.5.1.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

However, the analysis presented in Section 7.5.1.1 concluded that none of these activities would have a cumulative effect with the residual adverse effects of the Project for terrain and soils. As there were no predicted cumulative adverse effects, the residual adverse effects of the Project, namely that the WRSA would alter some of the viewscapes from Thunder Lake, as described in Section 6.2.6, will be passed forward for consideration of significance.

7.5.2 Noise

The description of the effects of the Project on noise (Section 6.4.6) identified that the Project would result in residual adverse effects for the following noise VCs:

- Environmental noise levels;
- Noise disturbance to wildlife (including SAR);
- Blasting noise and vibration; and
- Noise related health effects.

The spatial extent used for screening these cumulative effects was the noise RSA (see Figure 7.3.2.1-2). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;

- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.2.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on noise:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities would include activities such as surveying and exploratory drilling. While these activities could overlap with the noise RSA, the noise effects associated with surveying and exploratory drilling would be highly localized, and would not meaningfully overlap with the predicted residual adverse effects of the Project. In particular, any effects associated with the exploration program would not numerically alter the maximum predicted levels (Section 6.4.6) associated with the Project.
- **Canadian Pacific Railway**: As described in Section 7.2.2, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. While the clearing of vegetation would have short-term localized effects on noise levels within the rail corridor, these effects would not extend into the areas where the predicted residual adverse effects of the Project on the noise VCs were predicted. Therefore, this activity would not have a cumulative effect.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The planned harvest blocks that fall within the noise RSA are located to the east of the operations area, and are further away from the sensitive receptors than the Project. The effects of forest harvesting would be relatively short-term, and would not meaningfully overlap with the predicted residual adverse effects of the Project. In particular, noise related to the harvesting under the FMP would not numerically alter the maximum predicted levels (Section 6.4.6) associated with the adverse residual adverse effects of the Project.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the noise RSA. However, the quarry is over 2 km to the east from the middle of the open pit. In addition, the effects of the existing quarry on noise levels in the area would have been captured in the baseline noise program described in Section 5.3.1. The noise associated with this quarry are not expected to meaningfully overlap with the predicted residual adverse effects of the Project on the noise VCs. In particular, noise related to the quarry operations would not

numerically alter the maximum predicted levels (Section 6.4.6) associated with the residual adverse effects of the Project.

- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the noise RSA, any effects would be short-term and highly localized. These activities would not have a cumulative effect.

7.5.2.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.2.1 concluded that, while the Treasury Metals exploration program, the forestry operations by Dryden Forest Management Company and the existing D&D Contracting would produce local noise effects that could overlap with those of the Project, they would not numerically alter the maximum predicted levels (Section 6.4.6) associated with the residual adverse effects of the Project. The analysis determined that the vegetation clearing along the CPR rail line and the development of local infrastructure would not result in cumulative effects with the residual adverse effects of the Project

7.5.3 Air Quality

As described in Section 6.6.6, the Project was predicted to result in residual adverse effects for the “air quality” VC. Although the maximum predicted concentrations at the “community-oriented locations”, as described by the CCME (2000) as being the appropriate locations for determination compliance with ambient air quality standards, were below the relevant ambient standards, the dispersion modelling showed that the Project would result in higher concentrations of the indicator compounds than the existing levels. The spatial extent used for screening these cumulative effects was the air quality LSA (see Figure 7.3.2-2). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;

- Highway 17;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.3.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on air quality:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities would include activities such as surveying and exploratory drilling. While these activities would overlap with the air quality LSA, they would not result in meaningful cumulative air quality effects. Therefore, this activity would not have a cumulative effect.
- **Highway 17:** As described in Section 7.2.2, the stretch of Highway 17 in the general vicinity of the Project is expected to undergo a series of upgrades in the upcoming years, including: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. While these projects could have a localized effect on air quality, they are located at the limits of the air quality LSA, where the effects of the Project would be indistinguishable from background levels. Therefore, the upgrades on Highway 17 would not numerically alter the maximum predicted levels (Section 6.6.6) associated with the residual adverse effects of the Project.
- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. While these activities would overlap with the air quality LSA, they would not result in meaningful cumulative air quality effects. Therefore, this activity would not have a cumulative effect with the residual adverse effects of the Project on air quality.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The harvesting of these blocks is predicted to have a short-term,

localized effect on air quality that would not meaningfully overlap with the predicted residual adverse effects of the Project. In particular, air emissions related to the harvesting under the FMP would not numerically alter the maximum predicted levels (Section 6.6.6) associated with the residual adverse effects of the Project.

- **Domtar Corporation Dryden Pulp Mill:** As described in Section 7.2.2, Domtar Corporation operates a pulp mill within the City of Dryden, producing cellulose fibers, including paper grade and bleached softwood pulp. Although this facility is not located within the air quality LSA, it is located approximately 15 km from the Project and the emissions from the mill and the Project would share a common airshed. However, the effects of the Project on air quality would be indistinguishable from background levels at the limits of the air quality LSA. The air emissions associated with the mill would not numerically alter the maximum predicted concentrations (Section 6.6.6) associated with the residual adverse effects of the Project.

- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the air quality LSA. This existing facility would have similar types of air emissions as the Project, and would be operating under an established provincial approval. Given the quarry is located over 2 km to the east from the middle of the open pit, air emissions from the quarry are not expected to meaningfully overlap with the predicted residual adverse effects of the Project. The air emissions associated with the quarry operations would not numerically alter the maximum predicted levels (Section 6.6.6) associated with the residual adverse effects of the Project.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the air quality LSA, any effects would be short-term and highly localized. These activities would not have a cumulative effect.

7.5.3.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.’s Dryden Pulp Mill;
- Aggregate pits or quarries; and

- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.3.1 concluded that the major upgrades to Highway 17, the ongoing forestry operations by Dryden Forest Management Company, the Domtar mill in Dryden, and the existing D&D Contracting quarry would produce air emissions that could overlap with those of the Project. However, they would not numerically alter the maximum predicted levels (Section 6.6.6) associated with the residual adverse effects of the Project. The analysis determined that the Treasury Metals exploration program, vegetation clearing along the CPR rail line, and the development of local infrastructure would not result in cumulative effects with the residual air quality effects of the Project.

7.5.4 Surface Water Quality

Section 6.8.6 describes the predicted residual adverse effects of the Project on the "surface water quality" VC. The surface water quality modelling determined that surface water quality in the receiving waters would be equivalent to the existing conditions, or would meet the Provincial Water Quality Objectives (PWQO) for the protection of aquatic life. Despite this, modelling did predict surface water concentrations for some indicator compounds that were higher than the existing concentrations. The spatial extent used for screening these cumulative effects was the surface water quality LSA (see Figure 7.3.2-3). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.4.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on surface water quality:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities would include activities such as surveying and exploratory drilling. While these activities would overlap with the surface water quality LSA,

they will not result in effects to surface water quality. Therefore, this activity would not have a cumulative effect.

- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. The clearing of vegetation is not expected to have effects on surface water quality. Therefore, this activity would not have a cumulative effect.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The planned harvest blocks that fall within the surface water quality LSA are located to the east of the operations area. Management practices require suitable setbacks to avoid impacting waterbodies. The forest harvesting is not expected to result in noticeable effects on surface water quality. Therefore, this activity would not have a cumulative effect.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located at the edge of the surface water quality LSA. This quarry is over 2 km to the east from the middle of the open pit, with the active portions of the quarry located outside of the Blackwater Creek. Therefore, any effects of the quarry on surface water quality would not affect the watercourses affected by the Project. Therefore, this activity would not have a cumulative effect.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the surface water quality LSA, any effects would be short-term and highly localized. These activities would not have a cumulative effect.

7.5.4.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.4.1 concluded that none of the activities that overlap spatially with the surface water quality LSA, and temporally with the Project timeline are predicted to have a cumulative effects with the residual adverse effects of the Project on surface water quality. Therefore, the determination of significance presented in Section 8.8 will be based on the residual adverse effects of the Project as described in Section 6.8.6.

7.5.5 Surface Water Quantity

The residual adverse effects of the Project on the "surface water quantity" VC are described in Section 6.9.6. The surface water quantity modelling determined that surface water quantities in the surrounding watercourses would be altered (increased and decreased) as a result of the Project. There were no residual adverse effects predicted for lake levels in either Thunder Lake or Wabigoon Lake. The spatial extent used for screening these cumulative effects was the surface water quantity LSA (see Figure 7.3.2-3). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.5.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on surface water quantity:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities would include activities such as surveying and exploratory drilling. While these activities would overlap with the surface water quantity LSA, they will not result in effects to surface water quantity. Therefore, this activity would not have a cumulative effect.
- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. The clearing of vegetation is not expected to have effects on surface water quantity. Therefore, this activity would not have a cumulative effect.

- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011 to 2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The planned harvest blocks that fall within the surface water quantity LSA are located to the east of the operations area. Management practices require suitable setbacks to avoid impacting waterbodies. While the forest harvesting may have a short-term effect on the runoff from the harvested area, these activities are not expected to numerically alter the predicted residual surface quantity effects of the Project described in Section 6.9.6.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located at the edge of the surface water quantity LSA. This quarry is over 2 km to the east from the middle of the open pit, with the active portions of the quarry located outside of the Blackwater Creek. Therefore any effects of the quarry on surface water quantity would not affect the watercourses affected by the Project. Therefore, this activity would not have a cumulative effect.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the surface water quantity LSA, any effects would be short-term and highly localized. These activities would not have a cumulative effect.

7.5.5.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.5.1 concluded that only the ongoing forestry operations by Dryden Forest Management Company could have effects that would overlap with those of the Project. However, the ongoing forestry operations would not numerically alter the predicted residual adverse effects associated with the Project (Section 6.9.6). The analysis also determined that the Treasury Metals exploration program, vegetation clearing along the CPR rail line, the D&D Contracting quarry, and the development of local infrastructure would not result in cumulative effects with the residual surface water quantity effects of the Project.

7.5.6 Wildlife and Wildlife Habitat

The description of the effects of the Project on wildlife and wildlife habitat (Section 6.12.6) identified that the Project would result in residual adverse effects for the following VCs:

- Wildlife Species at Risk;
- Ungulates;
- Furbearers;
- Upland birds;
- Wetland birds;
- Small mammals;
- Reptiles and amphibians; and
- Invertebrates.

The spatial extent used for screening the cumulative effects for these VCs was the wildlife and wildlife habitat LSA (see Figure 7.3.2.1-4). The exception was for the ungulate VC, which was screened using the wildlife and wildlife habitat RSA (Figure 7.3.2-4). The reason for using a larger study area is that moose, the indicator used for the ungulate VC, require large and diverse areas throughout their life. The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Highway 17 (ungulates VC only);
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill (ungulates VC only);
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power (ungulates VC only); and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.6.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on wildlife and wildlife habitat:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities would include surveying and exploratory drilling, but are not likely to involve the removal of forest cover. For this reason, these activities are not expected to result in the loss of additional wildlife habitat, or generate noise levels that would affect wildlife behavior. Therefore the Treasury Metals exploration program would not have a cumulative effect.
- **Highway 17:** As described in Section 7.2.2, the stretch of Highway 17 in the general vicinity of the Project is expected to undergo a series of upgrades in the upcoming years, including: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. These activities overlap with the wildlife RSA, While these projects could have a localized effect on noise levels, they are not expected to be sufficient loud to affect wildlife behavior. Additionally, the major upgrades to Highway 17 are not expected to result in the loss of additional moose (the indicator selected for the ungulates VC) habitat. Therefore, this activity would not have a cumulative effects with the residual effect.
- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. While these activities would overlap with the wildlife LSA, they would not result any additional loss of habitat as the areas affected are cleared on an annual basis. Therefore, this activity would not have a cumulative effect.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011 to 2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The harvesting of these blocks is predicted to result in the loss of additional habitat in both the wildlife LSA and RSA. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect with the residual adverse effects of the Project on wildlife and wildlife habitat. These effects are quantified in Section 7.5.6.2.
- **Domtar Corporation Dryden Pulp Mill:** As described in Section 7.2.2, Domtar Corporation operates a pulp mill within the City of Dryden, producing cellulose fibers, including paper grade and bleached softwood pulp. Although this facility is not located within the wildlife and wildlife habitat LSA (see Figure 7.3.2-4) used for most indicator species, it is within the wildlife and wildlife habitat RSA used for evaluating effects on

ungulates. However, the mill is an existing facility, and no additional loss of wildlife habitat is associated with the mill (local forest harvesting effects are addressed above). Therefore, this activity would not have a cumulative effect.

- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the wildlife and wildlife habitat LSA. This is an existing operations, whose continued activities should not result in the loss of additional wildlife habitat. Therefore, this activity would not have a cumulative effects with the residual adverse effects of the Project on wildlife and wildlife habitat.
- **Wataynikaneyap Power**: As described in Section 7.2.2, the Wataynikaneyap Power project is a planned 1,800 km transmission line to bring reliable power to 16 remote First Nations communities currently relying on diesel power. A segment of the transmission line running between the Hydro One 230 kV line southeast of Dinorwic to Pickle Lake falls within the wildlife and wildlife habitat RSA used for evaluating ungulates. No part of this activity overlaps with the wildlife and wildlife habitat LSA. The construction of this power line will result in the potential loss of wildlife habitat. Therefore, the Wataynikaneyap Power project is predicted to have a cumulative effect with the residual adverse effects of the Project on wildlife and wildlife habitat. These effects are quantified in Section 7.5.6.2.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the wildlife and wildlife habitat LSA, these activities are not expected to result in the loss of additional wildlife habitat. Therefore, these activities would not have a cumulative effect.

7.5.6.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Highway 17 (ungulates VC only);
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.’s Dryden Pulp Mill (ungulates VC only);
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power (ungulates VC only); and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.6.1 concluded that the ongoing forestry operations by Dryden Forest Management Company, and the 230kV transmission line proposed by Wataynikaneyap Power would result in cumulative effects on wildlife and wildlife habitat. In the case of the Wataynikaneyap Power project, the cumulative effects would only apply for the ungulate VC. The results of this analysis are presented in Table 7.5.6.2-1. The method used for predicting the cumulative effects of these activities is the same approach used for predicting the effects of the Project, as described in Section 6.12.2.

There would be no cumulative effects on wildlife and wildlife habitat associated with the Treasury Metals exploration program, major upgrades to Highway 17, vegetation clearing along the CPR rail line, the Domtar mill in Dryden, the existing D&D Contracting quarry, and the development of local infrastructure.

7.5.7 Migratory Birds

The description of the effects of the Project on wildlife and wildlife habitat (Section 6.12.6) identified that the Project would result in residual adverse effects for the following VCs:

- Upland birds; and
- Wetland birds.

The spatial extent used for screening these cumulative effects for these VCs was the wildlife and wildlife habitat LSA (see Figure 7.3.2.1-4). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

Table 7.5.6.2-1: Residual Adverse Effects and Cumulative Effects on Wildlife and Wildlife Habitat

Valued Components (VCs)	Indicators	Measures	Site Preparation and Construction				Operations				Closure				Post-closure
			Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project
Wildlife SAR	Common Nighthawk	Habitat loss (ha)	300	—	— (2)	300	300	—	—	300	300	—	—	300	—
		Habitat alteration or disruption (ha)	198	—	—	198	122	—	—	122	192	—	—	192	—
		Potential for Mortality (%)	Medium	—	—	Medium	Medium	—	—	Medium	Medium	—	—	Medium	—
	Northern Myotis/ Little Brown Myotis	Habitat loss (ha)	16	5	—	21	16	5	—	21	16	5	—	21	—
		Habitat alteration or disruption (ha)	— (1)	—	—	—	—	—	—	—	—	—	—	—	—
		Potential for Mortality (%)	Low	—	—	Low	Low	—	—	Low	Low	—	—	Low	—
	Barn Swallow	Habitat loss (ha)	Several	—	—	***	Several	—	—	***	Several	—	—	***	—
		Habitat alteration or disruption (ha)	198	—	—	198	122	—	—	122	192	—	—	192	—
		Potential for Mortality (%)	Medium	—	—	Medium	Medium	—	—	Medium	Medium	—	—	Medium	—
Ungulates	Moose	Habitat loss (ha)	84	56	6	146	84	56	6	146	84	56	6	146	—
		Habitat alteration or disruption (ha)	57	—	—	57	34	—	—	34	53	—	—	53	—
		Potential for Mortality (%)	Medium	—	—	Medium	Medium	—	—	Medium	Medium	—	—	Medium	—
Furbearers	American Marten	Habitat loss (ha)	62	36	—	98	62	36	—	98	62	36	—	98	—
		Habitat alteration or disruption (ha)	14	—	—	14	8	—	—	8	14	—	—	14	—
		Potential for Mortality (%)	Low	—	—	Low	Low	—	—	Low	Low	—	—	Low	—
	American Beaver	Habitat loss (ha)	< 4	—	—	< 4	< 4	—	—	< 4	< 4	—	—	< 4	—
		Habitat alteration or disruption (ha)	—	—	—	—	—	—	—	—	—	—	—	—	—
		Potential for Mortality (%)	Low	—	—	Low	Low	—	—	Low	Low	—	—	Low	—
Upland Birds	Upland Birds	Habitat loss (ha)	95	—	—	95	95	—	—	95	95	—	—	95	—
		Habitat alteration or disruption (ha)	3.21	—	—	3.21	4.3	—	—	4.3	2.6	—	—	2.6	—
		Potential for Mortality (%)	Medium	—	—	Medium	Medium	—	—	Medium	Medium	—	—	Medium	—
Wetland Birds	Marsh Birds	Habitat loss (ha)	33	6	—	39	33	6	—	39	33	6	—	39	—
		Habitat alteration or disruption (ha)	2.9	—	—	2.9	7.5	—	—	7.5	0.7	—	—	0.7	—
		Potential for Mortality (%)	Low	—	—	Low	Low	—	—	Low	Low	—	—	Low	—
Small mammals	Small Mammals	Habitat loss (ha)	—	—	—	—	—	—	—	—	—	—	—	—	—
		Habitat alteration or disruption (ha)	400	—	—	400	109	—	—	109	172	—	—	172	—
		Potential for Mortality (%)	Medium	—	—	Medium	Medium	—	—	Medium	Medium	—	—	Medium	—
Reptiles and Amphibians	Reptiles and Amphibians	Habitat loss (ha)	162	35	—	197	162	35	—	197	162	35	—	197	—
		Habitat alteration or disruption (ha)	89	—	—	89	60	—	—	60	88	—	—	88	—

Table 7.5.6.2-1: Residual Adverse Effects and Cumulative Effects on Wildlife and Wildlife Habitat (continued)

Valued Components (VCs)	Indicators	Measures	Site Preparation and Construction				Operations				Closure				Post-closure
			Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project
		Potential for Mortality (%)	Medium	—	—	Medium	Medium	—	—	Medium	Medium	—	—	Medium	—
Invertebrates	Terrestrial Invertebrates	Habitat loss (ha)	—	—	—	—	—	—	—	—	—	—	—	—	—
		Habitat alteration or disruption (ha)	400	—	—	400	400	—	—	400	400	—	—	400	—
		Potential for Mortality (%)	Medium	—	—	Medium	Medium	—	—	Medium	Medium	—	—	Medium	—

Note:

(1) The "—" symbol indicates there were no predicted residual adverse effects, or no cumulative effect

(2) Only the ungulate VC is potentially affected by the Wataynikaneyap Power project

7.5.7.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on migratory birds:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities are not likely to involve the removal of forest cover. For this reason, these activities would not have a cumulative effect.
- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. While these activities would overlap with the wildlife LSA, they would not result any additional loss of habitat as the areas affected are cleared on an annual basis. Therefore, this activity would not have a cumulative effect.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011 to 2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The harvesting of these blocks is predicted to result in the loss of additional habitat in the wildlife and wildlife habitat LSA, which is used for evaluating migratory birds. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect with the residual adverse effects of the Project on migratory birds. These effects are quantified in Section 7.5.7.2.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the wildlife and wildlife habitat LSA. This is an existing operations, whose continued activities should not result in the loss of additional migratory bird habitat. Therefore, this activity would not have a cumulative effect.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the wildlife and wildlife habitat LSA, these activities are not expected to result in the loss of additional migratory bird habitat. Therefore, these activities would not have a cumulative effect.

7.5.7.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.6.1 concluded that the ongoing forestry operations by Dryden Forest Management Company would result in cumulative effects with the residual adverse effects of the Project. The results of this analysis of cumulative effects for migratory birds are presented in Table 7.5.7.2-1. There would be no cumulative effects on migratory birds associated with the Treasury Metals exploration program, vegetation clearing along the CPR rail line, the existing D&D Contracting quarry, and the development of local infrastructure.

7.5.8 Fish and Fish Habitat

Section 6.14.6 identified that the Project would result in residual adverse effects for the “stream-resident fish population” VC, and the “direct loss or alteration of habitat” indicator. The specific residual adverse predicted relates to the mortality of some of the stream-resident fish present in those sections of Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2 that will be overprinted by the Project. This residual adverse effects would occur during the site preparation and construction phase. There were no predicted residual adverse effects on the “migratory fish populations”, “lake-resident fish populations”, or “fish species-at-risk” VCs. The spatial extent used for screening these cumulative effects was the fish and fish habitat LSA (see Figure 7.3.2-5). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

Table 7.5.7.2-1: Residual Adverse Effects and Cumulative Effects on Migratory Birds

Valued Components (VCs)	Indicators	Measures	Site Preparation and Construction			Operations			Closure			Post-closure
			Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project
Upland Birds	Upland Birds	Habitat loss (ha)	95	—	95	95	—	95	95	—	95	—
		Habitat alteration or disruption (ha)	3.21	—	3.21	4.3	—	4.3	2.6	—	2.6	—
		Potential for Mortality (%)	Medium	—	Medium	Medium	—	Medium	Medium	—	Medium	—
Wetland Birds	Marsh Birds	Habitat loss (ha)	33	6	39	33	6	39	33	6	39	—
		Habitat alteration or disruption (ha)	2.9	—	2.9	7.5	—	7.5	0.7	—	0.7	—
		Potential for Mortality (%)	Low	—	Low	Low	—	Low	Low	—	Low	—

Note:

(1) The "—" symbol indicates there were no predicted residual adverse effects, or no cumulative effect

(2) Only the ungulate VC is potentially affected by the Wataynikaneyap Power project

7.5.8.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on fish and fish habitat:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities would include activities such as surveying and exploratory drilling. While these activities would overlap with the fish and fish habitat LSA, they will not result in effects in the direct loss of fish habitat. In addition, these activities would not occur within the footprint of the operations area once the site preparation and construction activities were underway. Therefore, this activity would not have a cumulative effect.
- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. The right-of-way is well removed from the watercourses overprinted by the Project. Additionally, the clearing of vegetation is not expected to have effects on fish or fish habitat. Therefore, this activity would not have a cumulative effect.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The planned harvest blocks that fall within the fish and fish habitat LSA are located to the east of the operations area. Thus, the ongoing forestry activities would not affect the stream-resident fish for which residual adverse effects were predicted. Additionally, the forest harvesting is not expected to result in noticeable effects on fish and fish habitat. Therefore, this activity would not have a cumulative effect.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located at the edge of the surface water quality LSA. This quarry is over 2 km to the east from the middle of the open pit, with the active portions of the quarry located outside of the Blackwater Creek. Therefore any effects of the quarry on surface water quality would not affect the stream-resident fish populations affected by the Project. Therefore, this activity would not have a cumulative effect.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the fish and fish habitat LSA, these activities are not expected to affect fish and fish habitat. Therefore, these activities would not have a cumulative effect.

7.5.8.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.8.1 concluded that none of the activities that overlap spatially with the fish and fish habitat LSA, and temporally with the Project timelines, are predicted to have a cumulative effects with the residual adverse effects of the Project on fish and fish habitat described in Section 6.8.6.

7.5.9 Wetlands and Vegetation

The description of the effects of the Project on wetlands and vegetation (Section 6.15.6) identified that the Project would result in residual adverse effects for the following VCs:

- Wetlands (wetland extent indicator); and
- Vegetation communities and species (predominantly coniferous forest, predominantly deciduous forest, successional areas, and potential berry harvesting areas indicators).

There were no residual adverse effects predicted for either the “wild rice” or “floating marsh marigold” indicators. The spatial extent used for screening these cumulative effects was the wetlands and terrestrial vegetation LSA (see Figure 7.3.2.1-6). The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.9.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on wetlands and vegetation:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities are not likely to involve the removal of forest cover, or take place within wetlands. For this reason, these activities would not have a cumulative effect.
- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. While these activities would overlap with the wetlands and terrestrial vegetation LSA, they would not result any additional loss of vegetation or wetlands as the areas affected are cleared on an annual basis. Therefore, this activity would not have a cumulative effect.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The harvesting of these blocks is predicted to result in the loss of additional habitat in the wildlife and wildlife habitat LSA, which is used for evaluating migratory birds. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect with the residual adverse effects of the Project on wetlands and vegetation. These effects are quantified in Section 7.5.9.2.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the wetlands and terrestrial vegetation LSA. This is an existing operations, whose continued activities should not result in the loss of additional wetlands or vegetation. Therefore, this activity would not have a cumulative effect.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will be ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. While some of these would overlap with the wetlands and terrestrial vegetation LSA, these activities are not expected to result in the loss of additional wetlands or forest cover. Therefore, these activities would not have a cumulative effect.

7.5.9.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Aggregate pits or quarries; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.9.1 concluded that the ongoing forestry operations by Dryden Forest Management Company would result in cumulative effects with the residual adverse effects of the Project. The results of this analysis of cumulative effects for wetlands and vegetation are presented in Table 7.5.9.2-1. There would be no cumulative effects on wetlands and vegetation associated with the Treasury Metals exploration program, vegetation clearing along the CPR rail line, the existing D&D Contracting quarry, and the development of local infrastructure.

Table 7.5.9.2-1: Residual Adverse Effects and Cumulative Effects on Wetlands and Vegetation

Valued Components (VCs)	Indicators	Measures	Site Preparation and Construction			Operations			Closure			Post-closure
			Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Cumulative Effect
Wetlands	Wetland extent	Change in area (ha)	33	6	39	47 (1)	6	53	47 (2)	6	53	— (3)
Vegetation Communities	Predominantly coniferous forest	Change in area (ha)	95	41	136	95 (3)	41	136	95 (3)	41	136	— (3)
	Predominantly deciduous forest	Change in area (ha)	43	5	48	43 (3)	5	48	43 (3)	5	48	— (3)
	Successional areas	Change in area (ha)	70	—	70	70 (3)	—	70	70 (3)	—	70	— (3)
	Potential berry harvesting areas	Change in area (ha)	260	49	309	260 (3)	49	309	260 (3)	49	309	— (3)

Notes:
The "—" symbol indicates there were no predicted adverse effects
(1) The increase in wetland extent reflects the effects of dewatering on WLD5
(2) The effects due to dewatering are expected to persist until the open pit floods and groundwater returns to near pre-development levels
(3) The areas lost during the site preparation and construction phase will not recover until post-closure

7.5.10 Land Use

The description of the effects of the Project on land use (Section 6.16.6) identified that the Project would result in residual adverse effects for the following VCs and associated indicators:

- Forestry
  - Loss of forestry resources.
- Fishing - Recreational and Commercial
  - Diminished on-the-land experience.
- Hunting
  - Change in access to wildlife resources.
  - Change in abundance of wildlife resources.
  - Diminished on-the-land experience.
- Trapping
  - Change in access to wildlife resources.
  - Change in abundance of wildlife resources.
  - Diminished on-the-land experience.
- Cottagers and Outfitters
  - Diminished on-the-land experience.
  - Changes in clientele for outfitters with lodges located near the Project.
- Other Recreational Uses
  - Change in access for residents and visitors to public lands for consumptive purposes.
  - Change in abundance of berries, mushrooms and/or other vegetation used for consumption.
  - Diminished on-the-land experience.

The spatial extent used for screening these cumulative effects varied by VC and indicator as described in Table 7.3.2-1 and shown on Figure 7.3.2-7. The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Highway 17 (cottagers and outfitters, change in client indicator only);
- Canadian Pacific rail line;

- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill (cottagers and outfitters, change in client indicator only);
- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power (cottagers and outfitters, change in client indicator only); and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.10.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on land use:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities, which would include surveying and exploratory drilling, are not expected to result in the clearing of forest cover. The following describes the predicted cumulative effects by VC and indicator:
  - Forestry (loss of forestry resources): These activities are not expected to result in the loss of forest cover. Therefore there would be no cumulative effects.
  - Fishing - Recreational and Commercial (diminished on-the-land experience): These activities are not expected to result in the loss of forest cover and would not be visible from Thunder Lake. Therefore there would be no cumulative effects.
  - Hunting (change in access to wildlife resources): The exploration activities by Treasury Metals would be across the property, outside of the active mining areas, as shown in Figure 7.3.2-7. There would be no restrictions on access due to these actives. Therefore there would be no cumulative effects.
  - Hunting (change in abundance of wildlife resources): These activities would not result in the loss of wildlife habitat, and are unlikely to generate noise levels that will alter wildlife behavior. There should be no effects on wildlife abundance associated with the Treasury Metals exploration program. Therefore there would be no cumulative effects.
  - Hunting (diminished on-the-land experience): These activities would not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
  - Trapping (change in access to wildlife resources): The exploration activities by Treasury Metals would be across the property, outside of the active mining areas, as

shown in Figure 7.3.2-7. There would be no restrictions on access due to these actives. Therefore there would be no cumulative effects.

- Trapping (change in abundance of wildlife resources): These activities would not result in the loss of wildlife habitat, and are unlikely to generate noise levels that will alter wildlife behavior. There should be no effects on wildlife abundance associated with the Treasury Metals exploration program. Therefore there would be no cumulative effects.
- Trapping (diminished on-the-land experience): These activities would not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (diminished on-the-land experience): These activities are not expected to result in the loss of forest cover and would not be visible from Thunder Lake, nor would these activities would not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The Treasury Metals exploration activities would represent a relatively low number of additional people in the area and would be unlikely to have a measurable effect on the clientele for outfitters. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in access for residents and visitors to public lands for consumptive purposes): The exploration activities by Treasury Metals would be across the property, outside of the active mining areas, as shown in Figure 7.3.2-7. There would be no restrictions on access due to these actives. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in abundance of berries, mushrooms and/or other vegetation used for consumption): These activities would not result in the clearing of land and thus would not result in the loss of plant material suitable for consumption. Therefore there would be no cumulative effects.
- Other Recreational Uses (diminished on-the-land experience): These activities would not result in noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.

- **Highway 17:** As described in Section 7.2.2, the stretch of Highway 17 in the general vicinity of the Project is expected to undergo a series of upgrades in the upcoming years, including: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. This activity would only overlap with the change in clientele indicator for the cottagers and outfitters VC. The following describes the predicted cumulative effects for that VC and indicator:
  - Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The major upgrades to Highway 17 would likely result in an increase in temporary construction personnel in the region requiring temporary housing or

accommodations. Therefore, the upgrades to Highway 17 are predicted to have a cumulative effect with the residual adverse effects of the Project, which are discussed further in Section 7.5.10.2.

- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. These activities would overlap with the residual adverse effects of the Project. The following describes the predicted cumulative effects by VC and indicator:
  - Forestry (loss of forestry resources): These activities are not expected to result in the loss of forest cover. Therefore there would be no cumulative effects.
  - Fishing - Recreational and Commercial (diminished on-the-land experience): These activities are not expected to result in the loss of forest cover and would not be visible from Thunder Lake. Therefore there would be no cumulative effects.
  - Hunting (change in access to wildlife resources): The clearing of the existing right-of-way would not result in a change in access to wildlife resources. Therefore there would be no cumulative effects.
  - Hunting (change in abundance of wildlife resources): These activities would not result in the loss of wildlife habitat. There would be no effects on wildlife abundance associated with these activities. Therefore there would be no cumulative effects.
  - Hunting (diminished on-the-land experience): These activities would not result in noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
  - Trapping (change in access to wildlife resources): The clearing of the existing right-of-way would not result in a change in access to wildlife resources. Therefore there would be no cumulative effects.
  - Trapping (change in abundance of wildlife resources): These activities would not result in the loss of wildlife habitat. There would be no effects on wildlife abundance associated with these activities. Therefore there would be no cumulative effects.
  - Trapping (diminished on-the-land experience): These activities would not result in noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
  - Cottagers and Outfitters (diminished on-the-land experience): These activities are not expected to result in the loss of forest cover and would not be visible from Thunder Lake, nor would these activities would not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
  - Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The clearing of the vegetation from the right-of-way is a relatively short-term activity that is unlikely to result in additional people requiring accommodations in the area. Therefore there would be no cumulative effects.

- Other Recreational Uses (change in access for residents and visitors to public lands for consumptive purposes): The clearing of the existing right-of-way occurs on lands where gathering activities could not be conducted safely. There would be no change in access to plant resources used for consumption. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in abundance of berries, mushrooms and/or other vegetation used for consumption): These activities would not result in the clearing of additional lands, and thus would not result in the loss of plant material suitable for consumption. Therefore there would be no cumulative effects.
- Other Recreational Uses (diminished on-the-land experience): These activities would not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.

- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The following describes the predicted cumulative effects by VC and indicator:
  - Forestry (loss of forestry resources): These activities will result in the sustainable harvest of forest material and thus would not result in the loss of forest resources. Therefore there would be no cumulative effects.
  - Fishing - Recreational and Commercial (diminished on-the-land experience): These activities are not expected to result in effects that would be visible from Thunder Lake. Therefore there would be no cumulative effects.
  - Hunting (change in access to wildlife resources): The clearing of lands for sustainable forestry could represent a short-term restriction of access for safety reasons. However, access would be available following harvesting. Therefore there would be no cumulative effects.
  - Hunting (change in abundance of wildlife resources): These activities would result in the loss of wildlife habitat. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect with the residual adverse effects of the Project. These effects are quantified in Section 7.5.10.2.
  - Hunting (diminished on-the-land experience): These activities would not result in noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
  - Trapping (change in access to wildlife resources): The clearing of lands for sustainable forestry could represent a short-term restriction of access for safety reasons. However, access would be available following harvesting. Therefore there would be no cumulative effects.

- Trapping (change in abundance of wildlife resources): These activities would result in the loss of wildlife habitat. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect with the residual adverse effects of the Project. These effects are quantified in Section 7.5.10.2.
- Trapping (diminished on-the-land experience): These activities would not result in noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (diminished on-the-land experience): These activities are not expected to result in effects that are visible from Thunder Lake, nor would these activities would not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The ongoing harvesting of forest resources in the region is not expected to result in an increased number or workers requiring accommodations in the area. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in access for residents and visitors to public lands for consumptive purposes): The clearing of lands for sustainable forestry could represent a short-term restriction of access for safety reasons. However, access would be available following harvesting. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in abundance of berries, mushrooms and/or other vegetation used for consumption): These activities would result in the loss of vegetation, including plant materials suitable for consumption. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect with the residual adverse effects of the Project. These effects are quantified in Section 7.5.10.2.
- Other Recreational Uses (diminished on-the-land experience): These activities would not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.

- **Domtar Corporation Dryden Pulp Mill:** As described in Section 7.2.2, Domtar Corporation operates a pulp mill within the City of Dryden, producing cellulose fibers, including paper grade and bleached softwood pulp. This activity would only overlap with the change in clientele indicator for the cottagers and outfitters VC. The following describes the predicted cumulative effects for that VC and indicator:
  - Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The Dryden pulp mill is an existing facility that employs 350 workers. It is not expected that the ongoing operation of the mill will result in an increased number or workers requiring accommodations in the area. Therefore there would be no cumulative effects.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the study areas used for evaluating

cumulative effects for land use. The following describes the predicted cumulative effects by VC and indicator:

- Forestry (loss of forestry resources): This activity is an existing operations, whose continued activities should not result in the loss of additional forest cover. Therefore there would be no cumulative effects.
- Fishing - Recreational and Commercial (diminished on-the-land experience): This quarry is located over 4 km from Thunder Lake and would not be visible in the same viewscapes as the WRSA. Therefore there would be no cumulative effects.
- Hunting (change in access to wildlife resources): The D&D Contractor quarry is a licensed facility, the ground on which it sits would not currently be available for hunting. Therefore there would be no cumulative effects.
- Hunting (change in abundance of wildlife resources): This existing quarry would not result in the loss of wildlife habitat, and is unlikely to have any effect on wildlife abundance. Therefore there would be no cumulative effects.
- Hunting (diminished on-the-land experience): These activities should not result in noticeable noise levels that would be additive or overlap with those associated with the Project. Therefore there would be no cumulative effects.
- Trapping (change in access to wildlife resources): The D&D Contractor quarry is a licensed facility, the ground on which it sits would not currently be available for trapping unless specific arrangements had been made with the holder of the local trapline license. Therefore there would be no cumulative effects.
- Trapping (change in abundance of wildlife resources): This existing quarry would not result in the loss of wildlife habitat, and is unlikely to have any effect on wildlife abundance. Therefore there would be no cumulative effects.
- Trapping (diminished on-the-land experience): These activities should not result in noticeable noise levels that would be additive or overlap with those associated with the Project. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (diminished on-the-land experience): These activities are would not be visible from Thunder Lake, nor should they result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The D&D Contracting quarry is unlikely to have a measurable effect on the clientele for outfitters. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in access for residents and visitors to public lands for consumptive purposes): The D&D Contractor quarry is a licensed facility, the ground on which it sits would not currently be available for gathering plant materials for consumption. Therefore there would be no cumulative effects.

- o Other Recreational Uses (change in abundance of berries, mushrooms and/or other vegetation used for consumption): This existing quarry would not result in the additional clearing of forests, nor would the grounds of this licensed facility be available for gathering plant materials for consumption. Therefore there would be no cumulative effects.
- o Other Recreational Uses (diminished on-the-land experience): The quarry should not result noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.

- **Wataynikaneyap Power**: As described in Section 7.2.2, the Wataynikaneyap Power project is a planned 1,800 km transmission line to bring reliable power to 16 remote First Nations communities currently relying on diesel power. This activity would only overlap with the change in clientele indicator for the cottagers and outfitters VC. The following describes the predicted cumulative effects for that VC and indicator:
  - o Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The construction of this transmission line would likely result in an increase workforce in the area. Typically work crews for transmission line Projects would need to follow the transmission line as the construction advances. Therefore, this activity is predicted to have a cumulative effect with the residual adverse effects of the Project, which is discussed further in Section 7.5.10.2.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. The following describes the predicted cumulative effects by VC and indicator:
  - o Forestry (loss of forestry resources): The maintenance of the local infrastructure would not result in the loss of additional forest cover. Therefore there would be no cumulative effects.
  - o Fishing - Recreational and Commercial (diminished on-the-land experience): The maintenance of the local infrastructure would not alter the viewscapes visible from Thunder Lake. Therefore there would be no cumulative effects.
  - o Hunting (change in access to wildlife resources): The maintenance of the local infrastructure would not result in changes in the access to wildlife resources. Therefore there would be no cumulative effects.
  - o Hunting (change in abundance of wildlife resources): The maintenance of the local infrastructure would not result in changes in the abundance of wildlife. Therefore there would be no cumulative effects.
  - o Hunting (diminished on-the-land experience): The maintenance of the local infrastructure would not result in noticeable noise levels that would be additive or overlap with those associated with the Project. Therefore there would be no cumulative effects.

- Trapping (change in access to wildlife resources): The maintenance of the local infrastructure would not result in changes in the access to wildlife resources. Therefore there would be no cumulative effects.
- Trapping (change in abundance of wildlife resources): The maintenance of the local infrastructure would not result in changes in the abundance of wildlife. Therefore there would be no cumulative effects.
- Trapping (diminished on-the-land experience): The maintenance of the local infrastructure would not result in noticeable noise levels that would be additive or overlap with those associated with the Project. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (diminished on-the-land experience): The maintenance of the local infrastructure would not alter the viewscapes from Thunder Lake, nor would it result in noticeable noise levels. Therefore there would be no cumulative effects.
- Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project): The maintenance of the local infrastructure would likely be done using local contractors or workers and would result in changes to the clientele for outfitters. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in access for residents and visitors to public lands for consumptive purposes): The maintenance of the local infrastructure would not result in noticeable changes in access to for the gathering plant materials for consumption. Therefore there would be no cumulative effects.
- Other Recreational Uses (change in abundance of berries, mushrooms and/or other vegetation used for consumption): The maintenance of the local infrastructure would not result in additional clearing of forests. Therefore there would be no cumulative effects.
- Other Recreational Uses (diminished on-the-land experience): The maintenance of the local infrastructure would not result in noticeable noise levels. Therefore there would be no cumulative effects.

7.5.10.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Highway 17 (cottagers and outfitters, change in client indicator only);
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill (cottagers and outfitters, change in client indicator only);

- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power (cottagers and outfitters, change in client indicator only); and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.10.1 concluded that there would be cumulative effects with the residual adverse effects of the Project on the land use VCs. The VCs and indicators for which cumulative effects were predicted are discussed below:

- Hunting (change in abundance of wildlife resources):
  - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The loss of wildlife habitat is likely to result in a decrease in the abundance of wildlife available for hunting. Table 7.5.10.2-1 provides a listing of the residual adverse effects and cumulative effects to wildlife habitat, and thus wildlife abundance, for hunting.
- Trapping (change in abundance of wildlife resources):
  - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The loss of wildlife habitat is likely to result in a decrease in the abundance of wildlife available for trapping. Table 7.5.10.2-1 provides a listing of the residual adverse effects and cumulative effects to wildlife habitat, and thus wildlife abundance, for trapping.
- Other Recreational Uses (change in abundance of berries, mushrooms and/or other vegetation used for consumption):
  - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The clearing of vegetation and the loss of wetlands would decrease the abundance of plant materials gathered and consumed. Table 7.5.10.2-1 provides a listing of the residual adverse effects and cumulative effects to changes in consumable plant materials.
- Cottagers and Outfitters (changes in clientele for outfitters with lodges located near the Project):
  - During the site preparation and construction, operations and closure phases, an increase in contractors and general workforce in the areas would result in a need for local accommodations, which could result in a change in clientele for outfitters with lodges located near the Project. Generally, this change in demand could benefit local

businesses, especially during the off-season. However, the increased demand could place strain on the capacity of local outfitters during peak periods of the year. Two other activities, namely the major upgrades to Highway 17 and the construction of the 230kV transmission line proposed by Wataynikaneyap Power could place additional demands on the outfitters in the area for accommodations. However, both of these Projects are located between 15 and 20 km to the east of the Project and would likely preferentially access accommodations closer to those Projects. While cumulative effects are possible, they are unlikely to change the magnitude of the predicted residual adverse effects of the Project.

Table 7.5.10.2-1: Residual Adverse Effects and Cumulative Effects on Land Use VCs

Valued Components (VCs)	Indicators	Measures	Site Preparation and Construction			Operations			Closure			Post-closure
			Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Cumulative Effect	Goliath Gold Project
Hunting	Change in abundance of wildlife resources	Moose	84	84	56	84	84	56	84	84	56	—
		American Marten	62	36	98	62	36	98	62	36	98	—
		American Beaver	< 4	6	10	< 4	6	10	< 4	6	10	—
		Upland Birds	95	—	95	95	—	95	95	—	95	—
		Marsh Birds	33	6	39	33	6	39	33	6	39	—
Trapping	Change in abundance of wildlife resources	American Marten	62	36	98	62	36	98	62	36	98	—
		American Beaver	< 4	6	10	< 4	6	10	< 4	6	10	—
Other recreational users	change in abundance of berries, mushrooms and/or other vegetation used for consumption	Wetland extent	33	6	39	47 (1)	6	39	47 (2)	6	39	— (3)
		Predominantly coniferous forest	95	41	136	95 (3)	41	136	95 (3)	41	136	— (3)
		Predominantly deciduous forest	43	5	48	43 (3)	5	48	43 (3)	5	48	— (3)
		Successional areas	70	—	70	70 (3)	—	70	70 (3)	—	70	— (3)
		Potential berry harvesting areas	260	49	309	260 (3)	49	309	260 (3)	49	309	— (3)

Note:

The "—" symbol indicates there were no predicted residual adverse effects, or no cumulative effect

(1) The increase in wetland extent reflects the effects of dewatering on WLD5

(2) The effects due to dewatering are expected to persist until the open pit floods and groundwater returns to near pre-development levels

(3) The areas lost during the site preparation and construction phase will not recover until post-closure

7.5.11 Social

The description of the effects of the Project on the social valued components (Section 6.3.6) identified that the Project would result in residual adverse effects for the following VCs:

- Population demographics
  - Population change.
- Education
  - Capacity of education services.
  - Education attainment.
  - Project-specific Training.
- Infrastructure and services.
  - Municipal Services.
  - Community services (e.g., health, social services).
- Housing and property values
  - Housing availability.
  - Property values.
- Public safety
  - Crime rate
  - Capacity of emergency services
  - Requests for emergency services by Project.
- Transportation and traffic
  - Road network capacity and conditions.

The spatial extent used for screening these cumulative effects varied by VC and indicator as described in Table 7.3.2-1, and shown on Figure 7.3.2-7. The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.’s Dryden Pulp Mill;

- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.11.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on social valued components:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. The following describes the predicted cumulative effects by VC and indicator:
  - Population demographics (population change): These activities are not expected to result in a measurable change in the population. Therefore there would be no cumulative effects.
  - Education (capacity of education services): These activities is not expected to place a burden on the education services in the region. Therefore there would be no cumulative effects.
  - Education (education attainment): These activities are not expected have any effect on educational attainment in the region. Therefore there would be no cumulative effects.
  - Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
  - Infrastructure and services (municipal services): These activities are not expected to result in any effects to municipal services. Therefore there would be no cumulative effects.
  - Infrastructure and services (community services): These activities are not expected to result in any effects on community services. Therefore there would be no cumulative effects.
  - Housing and property values (housing availability): These activities are not expected to result in any measurable effects on housing availability. Therefore there would be no cumulative effects.
  - Housing and property values (property values): These activities are not expected to result in effects on property values. Therefore there would be no cumulative effects.

- Public safety (crime rate): These activities are relatively small scale and thus, are not expected to result in any effects on the crime rate. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): These activities are not expected to affect the capacity of emergency services. Therefore there would be no cumulative effects.
- Public safety (requests for emergency services by Project): These activities would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): These activities are relatively small in scale; therefore, they are not expected to affect the capacity and condition of the road network. Therefore there would be no cumulative effects.

- **Highway 17:** As described in Section 7.2.2, the stretch of Highway 17 in the general vicinity of the Project is expected to undergo a series of upgrades in the upcoming years, including: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. The following describes the predicted cumulative effects by VC and indicator:
  - Population demographics (population change): These activities will result in an influx of temporary workers. These activities are not expected to have an effect on the populations within the study area. Therefore there would be no cumulative effects.
  - Education (capacity of education services): These activities is not expected to place a burden on the education services in the region. Therefore there would be no cumulative effects.
  - Education (education attainment): These activities are not expected have any effect on educational attainment in the region. Therefore there would be no cumulative effects.
  - Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
  - Infrastructure and services (municipal services): These activities are not expected to result in any measurable effects to municipal services. Therefore there would be no cumulative effects.
  - Infrastructure and services (community services): These activities are not expected to result in any effects on community services. Therefore there would be no cumulative effects.
  - Housing and property values (housing availability): These activities will result in an influx of temporary workers, which could place pressure on the availability of housing within the study area. Therefore the upgrades to Highway 17 are predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.

- Housing and property values (property values): Although these activities will result in an influx of temporary workers, these activities are relatively short term and should not result in changes to property values. Therefore there would be no cumulative effects.
- Public safety (crime rate): These activities are relatively small scale and thus, are not expected to result in any effects on the crime rate. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): These activities may require access to the emergency services in the region, and thus affect the capacity of emergency services. Therefore the upgrades to Highway 17 are predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
- Public safety (requests for emergency services by Project): These activities would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): Although these activities are relatively small on a regional scale, they will directly affect the roadway network. In the short-term, these activities will adversely affect the road networks, which will be enhanced once the upgrades are complete. Therefore the upgrades to Highway 17 are predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.

- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. The following describes the predicted cumulative effects by VC and indicator:
  - Population demographics (population change): These activities are not expected to result in a measurable change in the population. Therefore there would be no cumulative effects.
  - Education (capacity of education services): These activities is not expected to place a burden on the education services in the region. Therefore there would be no cumulative effects.
  - Education (education attainment): These activities are not expected have any effect on educational attainment in the region. Therefore there would be no cumulative effects.
  - Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
  - Infrastructure and services (municipal services): These activities are not expected to result in any effects to municipal services. Therefore there would be no cumulative effects.

- Infrastructure and services (community services): These activities are not expected to result in any effects on community services. Therefore there would be no cumulative effects.
- Housing and property values (housing availability): These activities are not expected to result in any measurable effects on housing availability. Therefore there would be no cumulative effects.
- Housing and property values (property values): These activities are not expected to result in effects on property values. Therefore there would be no cumulative effects.
- Public safety (crime rate): These activities are relatively small scale and thus, are not expected to result in any effects on the crime rate. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): These activities are not expected to affect the capacity of emergency services. Therefore there would be no cumulative effects.
- Public safety (requests for emergency services by Project): These activities would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): These activities are relatively small in scale; therefore, they are not expected to affect the capacity and condition of the road network. Therefore there would be no cumulative effects.

- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011–2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The following describes the predicted cumulative effects by VC and indicator:
  - Population demographics (population change): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, the activities are not expected to have an effect on population change. Therefore there would be no cumulative effects.
  - Education (capacity of education services): These activities is not expected to place a burden on the education services in the region. Therefore there would be no cumulative effects.
  - Education (education attainment): These activities are not expected have any effect on educational attainment in the region. Therefore there would be no cumulative effects.
  - Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.

- Infrastructure and services (municipal services): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, the activities are implicitly included in the existing conditions used in the assessment. Therefore there would be no cumulative effects.
- Infrastructure and services (community services): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, the activities are implicitly included in the existing conditions used in the assessment. Therefore there would be no cumulative effects.
- Housing and property values (housing availability): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, the activities are implicitly included in the existing conditions used in the assessment, and should not result in changes in housing availability. Therefore there would be no cumulative effects.
- Housing and property values (property values): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, the activities are implicitly included in the existing conditions used in the assessment, and should not result in changes in property values. Therefore there would be no cumulative effects.
- Public safety (crime rate): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, the activities are implicitly included in the existing conditions used in the assessment, and should not result in changes in the crime rate. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, the activities are implicitly included in the existing conditions used in the assessment, and should not result in changes to the capacity of emergency services. Therefore there would be no cumulative effects.
- Public safety (requests for emergency services by Project): These activities are would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): These activities are a continuation of the existing sustainable forest harvesting activities in the region. Thus, these activities should not affect the road network. Therefore there would be no cumulative effects.

- **Domtar Corporation Dryden Pulp Mill:** As described in Section 7.2.2, Domtar Corporation operates a pulp mill within the City of Dryden, producing cellulose fibers, including paper grade and bleached softwood pulp. The following describes the predicted cumulative effects by VC and indicator:
  - Population demographics (population change): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the

baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.

- Education (capacity of education services): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Education (education attainment): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
- Infrastructure and services (municipal services): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Infrastructure and services (community services): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Housing and property values (housing availability): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Housing and property values (property values): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Public safety (crime rate): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.
- Public safety (requests for emergency services by Project): These activities would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.

- Transportation and traffic (road network capacity and conditions): The Domtar mill in Dryden is an established component of the community. The mill will not result in changes from the baseline conditions used as the basis for the assessment. Therefore there would be no cumulative effects.

- **Josephine Cone Mine Project**: The Josephine Cone Project is a proposed iron ore mine owned by Bending Lake Iron Group Limited. The proposed mine would be located 49 km southwest of Ignace, Ontario, 80 km north of Atikokan, Ontario and approximately 50 km southwest of the Project. The following describes the predicted cumulative effects for that VC and indicator:
  - Population demographics (population change): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
  - Education (capacity of education services): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
  - Education (education attainment): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
  - Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
  - Infrastructure and services (municipal services): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
  - Infrastructure and services (community services): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.

- Housing and property values (housing availability): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
- Housing and property values (property values): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
- Public safety (crime rate): This activity would result in similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
- Public safety (capacity of emergency services): This activity would similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
- Public safety (requests for emergency services by Project): These activities are would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): This activity would similar types of social effects as the Project, and those effects would overlap. The Project is expected to result in an influx of temporary workers during the construction phase, but would result in a permanent change in population once operations start. Therefore the Josephine Cone Project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.

- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the study areas used for evaluating cumulative effects for land use. The following describes the predicted cumulative effects by VC and indicator:
  - Population demographics (population change): These activities are not expected to result in a measurable change in the population. Therefore there would be no cumulative effects.

- Education (capacity of education services): These activities is not expected to place a burden on the education services in the region. Therefore there would be no cumulative effects.
- Education (education attainment): These activities are not expected have any effect on educational attainment in the region. Therefore there would be no cumulative effects.
- Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
- Infrastructure and services (municipal services): These activities are not expected to result in any effects to municipal services. Therefore there would be no cumulative effects.
- Infrastructure and services (community services): These activities are not expected to result in any effects on community services. Therefore there would be no cumulative effects.
- Housing and property values (housing availability): These activities are not expected to result in any measurable effects on housing availability. Therefore there would be no cumulative effects.
- Housing and property values (property values): These activities are not expected to result in effects on property values. Therefore there would be no cumulative effects.
- Public safety (crime rate): These activities are relatively small scale and thus, are not expected to result in any effects on the crime rate. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): These activities are not expected to affect the capacity of emergency services. Therefore there would be no cumulative effects.
- Public safety (requests for emergency services by Project): These activities would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): These activities are relatively small in scale; therefore, they are not expected to affect the capacity and condition of the road network. Therefore there would be no cumulative effects.

- **Wataynikaneyap Power**: As described in Section 7.2.2, the Wataynikaneyap Power Project is a planned 1,800 km transmission line to bring reliable power to 16 remote First Nations communities currently relying on diesel power. The following describes the predicted cumulative effects by VC and indicator:
  - Population demographics (population change): These activities will result in an influx of temporary workers. These activities are not expected to have an effect on the populations within the study area. Therefore there would be no cumulative effects.

- Education (capacity of education services): These activities is not expected to place a burden on the education services in the region. Therefore there would be no cumulative effects.
- Education (education attainment): These activities are not expected have any effect on educational attainment in the region. Therefore there would be no cumulative effects.
- Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
- Infrastructure and services (municipal services): These activities are not expected to result in any measurable effects to municipal services. Therefore there would be no cumulative effects.
- Infrastructure and services (community services): These activities are not expected to result in any effects on community services. Therefore there would be no cumulative effects.
- Housing and property values (housing availability): These activities will result in an influx of temporary workers, which could place pressure on the availability of housing within the study area. Therefore the upgrades to Highway 17 are predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
- Housing and property values (property values): Although these activities will result in an influx of temporary workers, these activities are relatively short term and should not result in changes to property values. Therefore there would be no cumulative effects.
- Public safety (crime rate): These activities are relatively small scale and thus, are not expected to result in any effects on the crime rate. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): These activities may require access to the emergency services in the region, and thus affect the capacity of emergency services. Therefore the Wataynikaneyap Power project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.
- Public safety (requests for emergency services by Project): These activities would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): There will be temporary burden placed on the road network capacity during the construction phase. As the construction advances, the burden will move further from the study area. Once operations start, these effects would be reversed. Therefore the Wataynikaneyap Power project is predicted to result in cumulative effects, which are discussed further in Section 7.5.11.2.

- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will ongoing maintenance and minor

upgrades completed to the existing road network in the vicinity of the Project. The following describes the predicted cumulative effects by VC and indicator:

- Population demographics (population change): These activities are not expected to result in a measurable change in the population. Therefore there would be no cumulative effects.
- Education (capacity of education services): These activities is not expected to place a burden on the education services in the region. Therefore there would be no cumulative effects.
- Education (education attainment): These activities are not expected have any effect on educational attainment in the region. Therefore there would be no cumulative effects.
- Education (Project-specific training): These activities are not expected to affect the Project-specific training. Therefore there would be no cumulative effects.
- Infrastructure and services (municipal services): These activities are not expected to result in any effects to municipal services. Therefore there would be no cumulative effects.
- Infrastructure and services (community services): These activities are not expected to result in any effects on community services. Therefore there would be no cumulative effects.
- Housing and property values (housing availability): These activities are not expected to result in any measurable effects on housing availability. Therefore there would be no cumulative effects.
- Housing and property values (property values): These activities are not expected to result in effects on property values. Therefore there would be no cumulative effects.
- Public safety (crime rate): These activities are relatively small scale and thus, are not expected to result in any effects on the crime rate. Therefore there would be no cumulative effects.
- Public safety (capacity of emergency services): These activities are not expected to affect the capacity of emergency services. Therefore there would be no cumulative effects.
- Public safety (requests for emergency services by Project): These activities would have no effect on the requests for emergency services by the Project. Therefore there would be no cumulative effects.
- Transportation and traffic (road network capacity and conditions): These activities are relatively small in scale; therefore, they are not expected to affect the capacity and condition of the road network. Therefore there would be no cumulative effects.

7.5.11.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill;
- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.11.1 concluded that there would be cumulative effects with the residual adverse effects of the Project on the social VCs. The VCs and indicators for which cumulative effects were predicted are discussed below:

- Population demographics (population change)
  - The Josephine Cone Mine Project has an expected project life span of more than 25 years. Therefore, it is likely that, should this project proceed, there would be a cumulative effect on population change within the region. In contrast to the relatively compact Goliath Gold Project, the Josephine Cone Mine Project has an estimated capacity 56,000 tonnes per day, nearly 20 times the throughput of the Project. Therefore, it is reasonable to assume that there would be a larger workforce. That said, the Josephine Cone Mine Project is near the limits of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. While the Josephine Cone Mine Project would likely have a cumulative effect on "population change", the project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Education (capacity of education services)
  - The Josephine Cone Mine Project will result in an increase in the regional population, and given the expected operating life of 25 years, would likely result in increased demands for all levels of education. However, the Project is located nearly 100 km by road, from the City of Dryden. Therefore, it is likely that the workers at this Project will be accessing educational services at locations closer to the mine site. Therefore the

Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- Education (education attainment)
  - The presence of the Josephine Cone Mine Project in the region is likely to add motivation for students to remain in school longer and advance their education: achievements to access enhanced employment opportunities. This would be a beneficial effect, and the life span of this project would help mitigate the adverse effects predicted during the closure phase of the Goliath Gold Project. Therefore the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Infrastructure and services (municipal services)
  - The Josephine Cone Mine Project is expected to result in both an influx of temporary workers during the construction phase, and result in a long-term change in the regional population once operations start. However, this Project is at the limit of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. Therefore the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Infrastructure and services (community services)
  - The Josephine Cone Mine Project is expected to result in both an influx of temporary workers during the construction phase, and result in a long-term change in the regional population once operations start. However, this Project is at the limit of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. Therefore the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Housing and property values (housing availability)
  - The major upgrades to Highway 17 will result in an influx of temporary workers into the region. This could place pressure on the availability of housing within the study area. However, these activities will occur more than 10 km from the Project, and will likely be accessing an accommodation catchment area that would be centered on the community of Dinorwic, While the upgrades to Highway 17 are predicted to result in cumulative effects on housing availability, they are unlikely to change the magnitude of the predicted residual adverse effects of the Project.
  - The Josephine Cone Mine Project is expected to result in both an influx of temporary workers during the construction phase, and result in a long-term change in the regional population once operations start. However, this Project is at the limit of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. Most of the changes in population, and thus pressure on housing would be centered on Ignace, or closer to the mine itself. While the Josephine Cone Mine Project

would likely have a cumulative effect on “population change”, the Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- The construction of the Wataynikaneyap Power Project will result in an influx of temporary workers into the region. This could place pressure on the availability of housing within the study area. However, these activities will occur more than 15 km from the Goliath Gold Project, and will likely be accessing an accommodation catchment area that would be centered on the community of Dinorwic, Therefore, the Wataynikaneyap Power project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- Housing and property values (property values)
  - The Josephine Cone Mine Project has an expected operating life of 25 years, and would result in a permanent workforces that will need accommodations. However, the mine is located nearly 100 km by road, from the City of Dryden. Therefore, the workers at the Josephine Cone Mine Project are most likely to be accessing permanent accommodations that are closer to the mine site and the community of Ignace. Therefore, the Josephine Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project on property values.

- Public safety (crime rate)
  - The Josephine Cone Mine Project is expected to result in both an influx of temporary workers during the construction phase, and result in a long-term change in the regional population once operations start. This increase in workers would result in a corresponding increase in spending. Personal decision-making with respect to spending could make the increase in spending a beneficial or adverse effect. However, this Project is at the limit of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. Therefore, the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Public safety (capacity of emergency services)
  - The major upgrades to Highway 17 will involve construction work that could require access to the emergency services in the region, and thus affect the capacity of emergency services. These activities are relatively short-term, and are unlikely to change the magnitude of the predicted residual adverse effects of the Project.
  - The Josephine Cone Mine Project is a relatively large scale undertaking in in terms of throughput, and likely staffing, in comparison to the Goliath Gold Project: This Project is expected to result in an influx of temporary workers during construction, and permanent workers during operations. Given the relatively remote location of the Josephine Cone Mine, it is reasonable to assume that it would need some form of on-site first response capabilities that would mitigate effects on the regional emergency

services. Therefore, this Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.

  - The construction of the Wataynikaneyap Power project could require access to the emergency services in the region, and thus affect the capacity of emergency services. These activities are relatively short-term, and are unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- Transportation and traffic (road network capacity and conditions)
  - The major upgrades to Highway 17 will have a direct effect on the capacity of the existing road networks. As the upgrades are underway, there will be an adverse effect on the road network capacity. This is expected to be relatively short-term. Once the upgrades are complete, the capacity of the road network will be beneficially affected. On balance, the upgrades to Highway 17 are unlikely to change the magnitude of the predicted residual adverse effects of the Project.
  - While the Josephine Cone Mine Project is likely to result in increased regional traffic, the effects on the capacity of the road networks are likely to be greatest in proximity to the proposed mine site. This Project is at the limit of the socio-economic study area (see Figure 7.3.2-8), and effects on the road networks are expected to diminish with distance. Therefore, the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
  - The construction activities associated with the Wataynikaneyap Power Project is expected to place additional burden on the road networks in the region. This added burden would be short-term, and would decrease as the construction of the powerline advances. There would be no measurable effects on the road networks once the transmission line is operational. While the Wataynikaneyap Power Project is predicted to result in cumulative effects, they are unlikely to change the magnitude of the predicted residual adverse effects of the Project.

7.5.12 Economic

The description of the effects of the Project on noise (Section 6.3.6) identified that the Project would result in residual adverse effects for the following VCs:

- Labour force, labour participation and employment
  - Labour income employment.
- Income levels
  - Income levels and categories.
- Cost of living
  - Current prevailing cost of living.

- Real estate
  - Housing prices and affordability.
- Economic development
  - Municipal taxes and contribution to economic development projects.
- Existing businesses
  - Local business availability.
- Government revenues
  - Taxes and revenues.

The spatial extent used for screening these cumulative effects varied by VC and indicator as described in Table 7.3.2-1, and shown on Figure 7.3.2-7. The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill;
- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.12.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on economic valued components:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. The following describes the predicted cumulative effects by VC and indicator:

- Labour force, labour participation and employment (labour income employment): These activities are have been ongoing for several years and not expected to result in measurable alteration to the labour force in the region. Therefore there would be no cumulative effects.
- Income levels (income levels and categories): These activities are have been ongoing for several years and not expected measurable alter the income levels in the region. Therefore there would be no cumulative effects.
- Cost of living (current prevailing cost of living): These activities are not expected to result in any changes to the cost of living. Therefore there would be no cumulative effects.
- Real estate (housing prices and affordability): These activities are not expected to result in any effects real estate. Therefore there would be no cumulative effects.
- Economic development (municipal taxes and contribution to economic development projects): These activities are not expected to result in any effects on economic development. Therefore there would be no cumulative effects.
- Existing businesses (local business availability): These activities are have been ongoing for several years and are not expected to measurable alter existing businesses. Therefore there would be no cumulative effects.
- Government revenues (taxes and revenues): These activities are have been ongoing for several years and are not expected to measurable alter government revenues. Therefore there would be no cumulative effects.

- **Highway 17:** As described in Section 7.2.2, the stretch of Highway 17 in the general vicinity of the Project is expected to undergo a series of upgrades in the upcoming years, including: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. The following describes the predicted cumulative effects by VC and indicator:
  - Labour force, labour participation and employment (labour income employment): These activities will result in an influx of temporary workers. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
  - Income levels (income levels and categories): These activities will only result in an influx of temporary workers. They are not expected to materially change the income levels in the region. Therefore there would be no cumulative effects.
  - Cost of living (current prevailing cost of living): These activities are not expected to affect the cost of living. Therefore there would be no cumulative effects.
  - Real estate (housing prices and affordability): These activities will result in an influx of temporary workers. However, the activities are relatively short-term and should not result in effects on real estate prices. Therefore there would be no cumulative effects.

- o Economic development (municipal taxes and contribution to economic development projects): These activities are not expected to result in any effects on economic development. Therefore there would be no cumulative effects.
- o Existing businesses (local business availability): These activities will result in an influx of temporary workers, which will have an effect on existing businesses. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
- o Government revenues (taxes and revenues): These activities will likely involve established contracting firms and will not result in measurable effects to government revenues, as the revenues would have been generated elsewhere in the province if not working on the upgrades to Highway 17. Therefore there would be no cumulative effects.

- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. The following describes the predicted cumulative effects by VC and indicator:
  - o Labour force, labour participation and employment (labour income employment): These activities are have been ongoing for several years and not expected to result in measurable alteration to the labour force in the region. Therefore there would be no cumulative effects.
  - o Income levels (income levels and categories): These activities are have been ongoing for several years and not expected to result in measurable alteration the income levels in the region. Therefore there would be no cumulative effects.
  - o Cost of living (current prevailing cost of living): These activities are not expected to result in any changes to the cost of living. Therefore there would be no cumulative effects.
  - o Real estate (housing prices and affordability): These activities are not expected to result in any effects real estate. Therefore there would be no cumulative effects.
  - o Economic development (municipal taxes and contribution to economic development projects): These activities are not expected to result in any effects on economic development. Therefore there would be no cumulative effects.
  - o Existing businesses (local business availability): These activities are have been ongoing for several years and not expected to result in measurable changes to existing businesses. Therefore there would be no cumulative effects.
  - o Government revenues (taxes and revenues): These activities are have been ongoing for several years and are not expected to result in measurable alteration to government revenues. Therefore there would be no cumulative effects.
- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP)

covers the 2011 to 2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The following describes the predicted cumulative effects by VC and indicator:

- Labour force, labour participation and employment (labour income employment): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect the labour force in the region. Therefore there would be no cumulative effects.
- Income levels (income levels and categories): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect the income levels in the region. Therefore there would be no cumulative effects.
- Cost of living (current prevailing cost of living): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect the cost of living. Therefore there would be no cumulative effects.
- Real estate (housing prices and affordability): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect real estate. Therefore there would be no cumulative effects.
- Economic development (municipal taxes and contribution to economic development projects): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect economic development. Therefore there would be no cumulative effects.
- Existing businesses (local business availability): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect existing businesses. Therefore there would be no cumulative effects.
- Government revenues (taxes and revenues): These activities are have been ongoing for several years and expected to continue. Therefore they will not measurably affect government revenues. Therefore there would be no cumulative effects.

- **Domtar Corporation Dryden Pulp Mill:** As described in Section 7.2.2, Domtar Corporation operates a pulp mill within the City of Dryden, producing cellulose fibers, including paper grade and bleached softwood pulp. This facility is not located approximately 15 km from the Project. The following describes the predicted cumulative effects by VC and indicator:
  - Labour force, labour participation and employment (labour income employment): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect the labour force in the region. Therefore there would be no cumulative effects.
  - Income levels (income levels and categories): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect the income levels in the region. Therefore there would be no cumulative effects.

- Cost of living (current prevailing cost of living): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect the cost of living. Therefore there would be no cumulative effects.
- Real estate (housing prices and affordability): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect real estate. Therefore there would be no cumulative effects.
- Economic development (municipal taxes and contribution to economic development projects): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect economic development. Therefore there would be no cumulative effects.
- Existing businesses (local business availability): These activities are have been ongoing for several years and are expected to continue. Therefore they will not measurably affect existing businesses. Therefore there would be no cumulative effects.
- Government revenues (taxes and revenues): These activities are have been ongoing for several years and expected to continue. Therefore they will not measurably affect government revenues. Therefore there would be no cumulative effects.

- **Josephine Cone Mine Project**: The Josephine Cone project is a proposed iron ore mine owned by Bending Lake Iron Group Limited. The proposed mine would be located 49 km southwest of Ignace, Ontario, 80 km north of Atikokan, Ontario and approximately 50 km southwest of the Project. The following describes the predicted cumulative effects for that VC and indicator:
  - Labour force, labour participation and employment (labour income employment): The Project is expected to result in an influx of temporary workers during the construction phase, and a permanent workforce over the expected operating life of 25 years. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
  - Income levels (income levels and categories): The Project is expected to result in an influx of temporary workers during the construction phase, and a permanent workforce over the expected operating life of 25 years. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
  - Cost of living (current prevailing cost of living): This Project will result in significant investment in the region as well as an influx of permanent workers. It is expected there would be changes in the cost of living as well as in the income levels. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
  - Real estate (housing prices and affordability): This Project has an expected operating life of 25 years and is likely to have an effect on the demand for real estate. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
  - Economic development (municipal taxes and contribution to economic development projects): This Project is expected to contribute to economic development in the

region. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.

- Existing businesses (local business availability): This Project is expected to have an operating life of 25 years and result in a permanent increase in the population of the region. The influx of the workers to the region, along with the investments and expenditures will affect local businesses. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
- Government revenues (taxes and revenues): This Project is expected to contribute to government revenues. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.

- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the air quality LSA. The following describes the predicted cumulative effects by VC and indicator:
  - Labour force, labour participation and employment (labour income employment): These activities are have been ongoing for several years and are not expected to result in measurable alterations to the labour force in the region. Therefore there would be no cumulative effects.
  - Income levels (income levels and categories): These activities are have been ongoing for several years and are not expected to result in measurable alterations to the income levels in the region. Therefore there would be no cumulative effects.
  - Cost of living (current prevailing cost of living): These activities are not expected to result in any changes to the cost of living. Therefore there would be no cumulative effects.
  - Real estate (housing prices and affordability): These activities are not expected to result in any effects real estate. Therefore there would be no cumulative effects.
  - Economic development (municipal taxes and contribution to economic development projects): These activities are not expected to result in any effects on economic development. Therefore there would be no cumulative effects.
  - Existing businesses (local business availability): These activities are have been ongoing for several years and not expected to result in measurable changes to existing businesses. Therefore there would be no cumulative effects.
  - Government revenues (taxes and revenues): These activities are have been ongoing for several years and are not expected to result in measurable alterations to government revenues. Therefore there would be no cumulative effects.
- **Wataynikaneyap Power**: As described in Section 7.2.2, the Wataynikaneyap Power Project is a planned 1,800 km transmission line to bring reliable power to 16 remote First Nations communities currently relying on diesel power. A segment of the transmission line running between the Hydro One 230 kV line southeast of Dinorwic to Pickle Lake falls

within the socio-economic study area. The following describes the predicted cumulative effects by VC and indicator:

- Labour force, labour participation and employment (labour income employment): These activities will result in an influx of temporary workers. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
- Income levels (income levels and categories): These activities will only result in an influx of temporary workers. They are not expected to materially change the income levels in the region. Therefore there would be no cumulative effects.
- Cost of living (current prevailing cost of living): These activities are not expected to affect the cost of living. Therefore there would be no cumulative effects.
- Real estate (housing prices and affordability): These activities will result in an influx of temporary workers. However, the activities are relatively short-term and should not result in effects on real estate prices. Therefore there would be no cumulative effects.
- Economic development (municipal taxes and contribution to economic development projects): These activities are not expected to result in any effects on economic development. Therefore there would be no cumulative effects.
- Existing businesses (local business availability): These activities will result in an influx of temporary workers, which will have an effect on existing businesses. Therefore there would be cumulative effects, which are discussed in Section 7.5.12.2.
- Government revenues (taxes and revenues): These activities will likely involve established contracting firms and will not result in measurable effects to government revenues, as the revenues would have been generated elsewhere if not working on the construction of the Wataynikaneyap Power Project. Therefore there would be no cumulative effects.

- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. The following describes the predicted cumulative effects by VC and indicator:
  - Labour force, labour participation and employment (labour income employment): These activities are have been ongoing for several years and are not expected to measurably alter the labour force in the region. Therefore there would be no cumulative effects.
  - Income levels (income levels and categories): These activities are have been ongoing for several years and are not expected to measurably alter the income levels in the region. Therefore there would be no cumulative effects.
  - Cost of living (current prevailing cost of living): These activities are not expected to result in any changes to the cost of living. Therefore there would be no cumulative effects.

- Real estate (housing prices and affordability): These activities are not expected to result in any effects real estate. Therefore there would be no cumulative effects.
- Economic development (municipal taxes and contribution to economic development projects): These activities are not expected to result in any effects on economic development. Therefore there would be no cumulative effects.
- Existing businesses (local business availability): These activities are have been ongoing for several years and are not expected to measurably alter existing businesses. Therefore there would be no cumulative effects.
- Government revenues (taxes and revenues): These activities are have been ongoing for several years and are not expected to measurably alter government revenues. Therefore there would be no cumulative effects.

7.5.12.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill;
- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.12.1 concluded that there would be cumulative effects with the residual adverse effects of the Project on the economic VCs. The VCs and indicators for which cumulative effects were predicted are discussed below:

- Labour force, labour participation and employment (labour income employment)
  - There will be a temporary influx of workers to the region to support this Project. However, these activities are unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- The Josephine Cone Mine Project is expected to result in an influx of temporary workers during the construction phase, and a permanent workforce over the expected operating life of 25 years. However, this Project is near the limits of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. Therefore, the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- The construction of the Wataynikaneyap Power Project will result in a temporary influx of workers. However the Wataynikaneyap Power Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- Income levels (income levels and categories)
  - Josephine Cone Mine Project: The project is expected to result in an influx of temporary workers during the construction phase, and a permanent workforce over the expected operating life of 25 years. However, the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Cost of living (current prevailing cost of living)
  - Josephine Cone Mine Project: This Project will result in significant investment in the region as well as an influx of permanent workers. It is expected there would be changes in the cost of living as well as in the income levels. However, this project is near the limits of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. Therefore, the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Real estate (housing prices and affordability)
  - Josephine Cone Mine Project: This Project has an expected operating life of 25 years and is likely to have an effect on the demand for real estate. While the Josephine Cone Mine Project would likely have a cumulative effect, the Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Economic development (municipal taxes and contribution to economic development projects)
  - Josephine Cone Mine Project: This Project is expected to contribute to economic development in the region. While the Josephine Cone Mine Project would likely have a cumulative effect, the project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- Existing businesses (local business availability)
  - The activities associated with the major upgrades to Highway 17, along with the influx of temporary workers is expected to have a short-term benefit to existing businesses. However, these activities are unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- Josephine Cone Mine Project: This Project is expected to have an operating life of 25 years and result in a permanent increase in the population of the region. The influx of the workers to the region, along with the investments and expenditures will affect local businesses. However, the Josephine Cone Mine Project is near the limits of the socio-economic study area (see Figure 7.3.2-8), and effects are expected to diminish with distance. Therefore, the Josephine Cone Mine Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.
- The construction of the Wataynikaneyap Power Project is expected to result in an influx of temporary workers that would have short-term beneficial effect on existing businesses. However, this Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.

- Government revenues (taxes and revenues)
  - The Josephine Cone Mine Project has an expected life span of more than 25 years, and can be expected to contribute to government revenue over the Project life. These effects would be beneficial, and would act cumulatively with the benefits of the Goliath Gold Project. The longer life span of this Project would help mitigate the adverse effects of the Goliath Gold Project predicted during the closure phase. While the Josephine Cone Mine Project would likely have a cumulative effect, the Project is unlikely to change the magnitude of the predicted residual adverse effects of the Project.

7.5.13 Aboriginal Peoples

The description of the effects of the Project on Aboriginal peoples (Section 6.21.6) identified that the Project would result in residual adverse effects for the following VCs and associated indicators:

- Harvesting and gathering of plant material
  - Berry Harvesting.
  - Medicinal plant harvesting.
  - Changes in access.
  - Diminished on-the-land experience.
- Hunting
  - Ungulates.
  - Furbearers.
  - Waterfowl.
  - Changes in access.
  - Diminished on-the-land experience.

- Trapping
  - Furbearers.
  - Changes in access.
  - Diminished on-the-land experience.
- Fishing
  - Changes in access.
  - Diminished on-the-land experience.
- Cultural and spiritual
  - Diminished on-the-land experience.
- Socio-economic factors
  - Economic effects.
  - Social effects.

The spatial extent used for screening these cumulative effects varied by VC and indicator as described in Table 7.3.2-1, and shown on Figure 7.3.2-7. The screening of cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project, and thus could have potential for cumulative effects:

- Treasury Metals Inc. exploration program;
- Highway 17 (hunting, ungulate indicator; socio-economic effects, economic factors and social factors indicators);
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill (hunting, ungulate indicator; socio-economic effects, economic factors and social factors indicators);
- Josephine Cone Mine Project (socio-economic effects, economic factors and social factors indicators);
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power (hunting, ungulate indicator; socio-economic effects, economic factors and social factors indicators); and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

7.5.13.1 Predicted Cumulative Effects

The following describes the predicted cumulative effects associated with the activities identified as having a spatial and temporal overlap with the residual adverse effects of the Project on Aboriginal peoples:

- **Treasury Metals Inc. exploration program**: As described in Section 7.2.2, Treasury Metals will continue exploration work within their property boundaries, concurrent with the Goliath Gold Project. These activities, which would include surveying and exploratory drilling, are not expected to result in the clearing of forest cover. The following describes the predicted cumulative effects by VC and indicator:
  - Harvesting and gathering of plant material (berry harvesting): These activities are not expected to result in the loss of forest cover or appreciable clearing of vegetation. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (medicinal plant harvesting): These activities are not expected to result in the loss of forest cover or impacts on wetlands. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to harvest and gather plant materials. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
  - Hunting (ungulates): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
  - Hunting (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
  - Hunting (waterfowl): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
  - Hunting (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to hunt. Therefore there would be no cumulative effects.
  - Hunting (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
  - Trapping (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.

- Trapping (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to trap. Therefore there would be no cumulative effects.
- Trapping (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Fishing (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to fish. Therefore there would be no cumulative effects.
- Fishing (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Cultural and spiritual (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Socio-economic factors (economic effects): These activities are not expected to result in measurable economic effects. Therefore there would be no cumulative effects.
- Socio-economic factors (social effects): These activities are not expected to result in measurable social effects. Therefore there would be no cumulative effects.

- **Highway 17:** As described in Section 7.2.2, the stretch of Highway 17 in the general vicinity of the Project is expected to undergo a series of upgrades in the upcoming years, including: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. This activity would only overlap with the change in clientele indicator for the cottagers and outfitters VC. The following describes the predicted cumulative effects for that VC and indicator:
  - Hunting (ungulates): These activities are not expected to result in the loss of forest cover. Therefore there would be no cumulative effects.
  - Socio-economic factors (economic effects): The major upgrades to Highway 17 would likely result in an increase in temporary construction personnel in the region. While this could result in increased opportunities for “Aboriginal employment”, it is not expected to have an effect on the “cost of living”, and would not affect “Project purchases from Aboriginal businesses”. Therefore, the upgrades to Highway 17 are predicted to have a cumulative effect with the residual adverse effects of the Project, which are discussed further in Section 7.5.13.2.
  - Socio-economic factors (social effects): The major upgrades to Highway 17 would be relatively short-term, and would likely result in an increase in temporary construction personnel in the region. These activities are expected to have a temporary effect on the “in- and out-migration”, “capacity of emergency services”, and “road network capacity and conditions” measures (see Table 6.1.3.20-1). These activities are not

expected to have an effect on the other measures used for the "social effects" indicator. Therefore, the upgrades to Highway 17 are predicted to have a cumulative effect with the residual effects of the Project, which are discussed further in Section 7.5.13.2.

- **Canadian Pacific Railway**: As described in Section 7.2.1, the existence of the CPR rail line is implicitly included in the existing conditions. The ongoing activities identified with the rail line relate to the annual clearing of vegetation along the right of way for safety reasons. These activities would overlap with the residual adverse effects of the Project. The following describes the predicted cumulative effects by VC and indicator:
  - Harvesting and gathering of plant material (berry harvesting): These activities are not expected to result in the loss of forest cover or appreciable clearing of vegetation. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (medicinal plant harvesting): These activities are not expected to result in the loss of forest cover or impacts on wetlands. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to harvest and gather plant materials. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
  - Hunting (ungulates): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
  - Hunting (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
  - Hunting (waterfowl): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
  - Hunting (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to hunt. Therefore there would be no cumulative effects.
  - Hunting (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
  - Trapping (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
  - Trapping (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to trap. Therefore there would be no cumulative effects.

- Trapping (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Fishing (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to fish. Therefore there would be no cumulative effects.
- Fishing (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Cultural and spiritual (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Socio-economic factors (economic effects): These activities are not expected to result in measurable economic effects. Therefore there would be no cumulative effects.
- Socio-economic factors (social effects): These activities are not expected to result in measurable social effects. Therefore there would be no cumulative effects.

- **Dryden Forest Management Company**: As described in Section 7.2.2, the ongoing management of forest resources in the region surrounding the Project is the responsibility of Dryden Forest Management Company. The current Forest Management Plans (FMP) covers the 2011 to 2021 period, and included harvest blocks in the vicinity of the Project, as shown on Figure 7.2.2-1. The following describes the predicted cumulative effects by VC and indicator:
  - Harvesting and gathering of plant material (berry harvesting): These activities would result in the clearing of vegetation. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect. These effects are quantified in Section 7.5.13.2.
  - Harvesting and gathering of plant material (medicinal plant harvesting): These activities would result in the clearing of vegetation. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect. These effects are quantified in Section 7.5.13.2.
  - Harvesting and gathering of plant material (changes in access): The clearing of lands for sustainable forestry could represent a short-term restriction of access for safety reasons. However, access would be available following harvesting. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (diminished on-the-land experience): These activities would not result have long-term, noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
  - Hunting (ungulates): These activities would result in the clearing of vegetation. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect. These effects are quantified in Section 7.5.13.2.

- Hunting (furbearers): These activities would result in the clearing of vegetation. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect. These effects are quantified in Section 7.5.13.2.
- Hunting (waterfowl): These activities would result in the clearing of vegetation. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect. These effects are quantified in Section 7.5.13.2.
- Hunting (changes in access): The clearing of lands for sustainable forestry could represent a short-term restriction of access for safety reasons. However, access would be available following harvesting. Therefore there would be no cumulative effects.
- Hunting (diminished on-the-land experience): These activities would not result have long-term, noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Trapping (furbearers): These activities would result in the clearing of vegetation. Therefore, the ongoing forest harvesting activities are predicted to have a cumulative effect. These effects are quantified in Section 7.5.13.2.
- Trapping (changes in access): The clearing of lands for sustainable forestry could represent a short-term restriction of access for safety reasons. However, access would be available following harvesting. Therefore there would be no cumulative effects.
- Trapping (diminished on-the-land experience): These activities would not result have long-term, noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Fishing (changes in access): The clearing of lands for sustainable forestry could represent a short-term restriction of access for safety reasons. However, access would be available following harvesting. Therefore there would be no cumulative effects.
- Fishing (diminished on-the-land experience): These activities would not be visible from Thunder Lake, and would not result have long-term, noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Cultural and spiritual (diminished on-the-land experience): These activities would not be visible from Thunder Lake, and would not result have long-term, noticeable noise levels that would diminish the on-the-land experience. Therefore there would be no cumulative effects.
- Socio-economic factors (economic effects): The sustainable harvesting of forestry resources in the region is a long-standing mainstay of the local economy. The economic effects of forestry are implicitly included in the existing conditions used in the assessment. Therefore there would be no cumulative effects.
- Socio-economic factors (social effects): The sustainable harvesting of forestry resources in the region is a long-standing component of the social fabric in the region. The social effects of forestry are implicitly included in the existing conditions used in the assessment. Therefore there would be no cumulative effects.

- **Domtar Corporation Dryden Pulp Mill:** As described in Section 7.2.2, Domtar Corporation operates a pulp mill within the City of Dryden, producing cellulose fibers, including paper grade and bleached softwood pulp. The following describes the predicted cumulative effects for that VC and indicator:
  - Hunting (ungulates): The Domtar mill in Dryden is an existing facility, and no additional loss of wildlife habitat is associated with the mill. The effects of local forest harvesting, which supplies the mill with feedstock, are addressed above. Therefore, this activity would not have a cumulative effect.
  - Socio-economic factors (economic effects): These activities are not expected to result in the loss of forest cover. Therefore there would be no cumulative effects.
  - Socio-economic factors (social effects): These activities are not expected to result in the loss of forest cover. Therefore there would be no cumulative effects.
  - Socio-economic factors (economic effects): The Domtar mill in Dryden is an existing and established facility. The economic effects of this facility are incorporated in the existing conditions used in the assessment. Therefore, there would be no cumulative effects.
  - Socio-economic factors (social effects): The Domtar mill in Dryden is anexisting and established facility. The social effects of this facility are incorporated in the existing conditions used in the assessment. Therefore, there would be no cumulative effects.
- **Josephine Cone Mine Project:** The Josephine Cone Mine Project is a proposed iron ore mine owned by Bending Lake Iron Group Limited. The proposed mine would be located 49 km southwest of Ignace, Ontario, 80 km north of Atikokan, Ontario and approximately 50 km southwest of the Project. The following describes the predicted cumulative effects for that VC and indicator:
  - Socio-economic factors (economic effects): While the Josephine Cone Mine Project is near the edge of the socio-economic study area, it is reasonable to assume the Project would have similar types of economic effects as the Project, and those effects would overlap. Therefore, the Josephine Cone Mine Project is predicted to have cumulative effects, which are discussed further in Section 7.5.13.2.
  - Socio-economic factors (social effects): While the Josephine Cone Mine Project is near the edge of the socio-economic study area, it is reasonable to assume the Project would have similar types of social effects as the Project, and those effects would overlap. Therefore, the Josephine Cone Mine Project is predicted to have cumulative effects, which are discussed further in Section 7.5.13.2.
- **Aggregate pits or quarries**: As described in Section 7.2.2, D&D Contracting operates a quarry in the vicinity of the Project that is located within the study areas used for evaluating cumulative effects for land use. The following describes the predicted cumulative effects by VC and indicator:

- Harvesting and gathering of plant material (berry harvesting): These activities are not expected to result in the loss of forest cover or appreciable clearing of vegetation. Therefore there would be no cumulative effects.
- Harvesting and gathering of plant material (medicinal plant harvesting): These activities are not expected to result in the loss of forest cover or impacts on wetlands. Therefore there would be no cumulative effects.
- Harvesting and gathering of plant material (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to harvest and gather plant materials. Therefore there would be no cumulative effects.
- Harvesting and gathering of plant material (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Hunting (ungulates): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Hunting (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Hunting (waterfowl): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Hunting (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to hunt. Therefore there would be no cumulative effects.
- Hunting (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Trapping (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Trapping (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to trap. Therefore there would be no cumulative effects.
- Trapping (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Fishing (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to fish. Therefore there would be no cumulative effects.
- Fishing (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.

- Cultural and spiritual (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Socio-economic factors (economic effects): These activities are not expected to result in measurable economic effects. Therefore there would be no cumulative effects.
- Socio-economic factors (social effects): These activities are not expected to result in measurable social effects. Therefore there would be no cumulative effects.

- **Wataynikaneyap Power**: As described in Section 7.2.2, the Wataynikaneyap Power Project is a planned 1,800 km transmission line to bring reliable power to 16 remote First Nations communities currently relying on diesel power. The following describes the predicted cumulative effects for that VC and indicator:
  - Hunting (ungulates): These activities would result in the clearing of vegetation. Therefore, the construction of the Wataynikaneyap Power Project ongoing forest is predicted to have cumulative effects. These effects are quantified in Section 7.5.13.2.
  - Socio-economic factors (economic effects): The Wataynikaneyap Power Project would likely result in an increase in temporary construction personnel in the region. While this could result in increased opportunities for “Aboriginal employment”, it is not expected to have an effect on the “cost of living”, and would not affect “Project purchases from Aboriginal businesses”. Therefore, the Wataynikaneyap Power Project is predicted to have cumulative effects, which are discussed further in Section 7.5.13.2.
  - Socio-economic factors (social effects): The Wataynikaneyap Power Project would likely result in an increase in temporary construction personnel in the region. These activities are expected to have a temporary effect on the “in- and out-migration”, “capacity of emergency services”, and “road network capacity and conditions” measures (see Table 6.1.3.20-1). These activities are not expected to have an effect on the other measures used for the “social effects” indicator. Therefore, the Wataynikaneyap Power Project is predicted to have cumulative effects, which are discussed further in Section 7.5.13.2.
- **Development of local infrastructure and minor road upgrades**: As described in Section 7.2.2, it is reasonable to assume that there will ongoing maintenance and minor upgrades completed to the existing road network in the vicinity of the Project. The following describes the predicted cumulative effects by VC and indicator:
  - Harvesting and gathering of plant material (berry harvesting): These activities are not expected to result in the loss of forest cover or appreciable clearing of vegetation. Therefore there would be no cumulative effects.
  - Harvesting and gathering of plant material (medicinal plant harvesting): These activities are not expected to result in the loss of forest cover or impacts on wetlands. Therefore there would be no cumulative effects.

- Harvesting and gathering of plant material (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to harvest and gather plant materials. Therefore there would be no cumulative effects.
- Harvesting and gathering of plant material (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Hunting (ungulates): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Hunting (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Hunting (waterfowl): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Hunting (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to hunt. Therefore there would be no cumulative effects.
- Hunting (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Trapping (furbearers): These activities are not expected to result in the loss of forest cover, wildlife habitat or wetlands. Therefore there would be no cumulative effects.
- Trapping (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to trap. Therefore there would be no cumulative effects.
- Trapping (diminished on-the-land experience): These activities are not expected to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Fishing (changes in access): These activities are not expected to change the access associated with the rights of individual members of Indigenous community to fish. Therefore there would be no cumulative effects.
- Fishing (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Cultural and spiritual (diminished on-the-land experience): These activities would not be visible in viewscapes from Thunder Lake, nor are they expected to result to result in noticeable noise levels. Therefore there would be no cumulative effects.
- Socio-economic factors (economic effects): These activities are not expected to result in measurable economic effects. Therefore there would be no cumulative effects.
- Socio-economic factors (social effects): These activities are not expected to result in measurable social effects. Therefore there would be no cumulative effects.

7.5.13.2 Summary of Predicted Cumulative Effects

The screening for cumulative effects identified that the following activities could overlap both spatially and temporally with the effects of the Project:

- Treasury Metals Inc. exploration program;
- Highway 17 (hunting, ungulate indicator; socio-economic effects, economic factors and social factors indicators);
- Canadian Pacific rail line;
- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill (hunting, ungulate indicator; socio-economic effects, economic factors and social factors indicators);
- Josephine Cone Mine Project (socio-economic effects, economic factors and social factors indicators);
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power (hunting, ungulate indicator; socio-economic effects, economic factors and social factors indicators); and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

The analysis presented in Section 7.5.13.1 concluded that there would be cumulative effects with the residual adverse effects of the Project on the Aboriginal peoples VCs. The VCs and indicators for which cumulative effects were predicted are discussed below:

- Harvesting and gathering of plant materials (berry harvesting)
    - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The clearing of vegetation could result in the loss of potential berry harvesting areas. Table 7.5.13.2-1 provides a quantification of the residual adverse effects and cumulative effects to potential berry harvesting areas.
- Harvesting and gathering of plant materials (medicinal plant harvesting)
    - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The clearing of vegetation could result in the loss of forest stands, successional areas and wetlands that collectively could be used for medicinal plant harvesting. Table 7.5.13.2-1 provides a listing of the residual adverse effects and cumulative effects for wetland and vegetation losses.

- Hunting (ungulates)
    - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the Project region, the effects of which would be cumulative with the residual adverse effects of the Project. Additionally, the Wataynikaneyap Power Project will also result in habitat loss within the wildlife and wildlife habitat RSA. The loss of wildlife habitat is likely to result in a decrease in the abundance of ungulates available for hunting. Table 7.5.13.2-1 provides a listing of the residual adverse effects and cumulative effects to ungulate habitat.
- Hunting (furbearers)
    - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The loss of wildlife habitat is likely to result in a decrease in the abundance of furbearers for hunting. Table 7.5.13.2-1 provides a listing of the residual adverse effects and cumulative effects to furbearers.
- Hunting (waterfowl)
    - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The loss of wildlife habitat and wetlands is likely to result in a decrease in the abundance of waterfowl available for hunting. Table 7.5.13.2-1 provides a listing of the residual adverse effects and cumulative effects to waterfowl.
- Trapping (furbearers)
    - The ongoing forestry operations by Dryden Forest Management Company will result in the harvesting of forest blocks in the vicinity of the Project, the effects of which would be cumulative with the residual adverse effects of the Project. The loss of wildlife habitat is likely to result in a decrease in the abundance of furbearers for trapping. Table 7.5.13.2-1 provides a listing of the residual adverse effects and cumulative effects to furbearers.

Table 7.5.13.2-1: Residual Adverse Effects and Cumulative Effects on Aboriginal Peoples VCs

Valued Components (VCs)	Indicators	Measures	Site Preparation and Construction				Operations				Closure				Post-closure
			Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power	Cumulative Effect	Goliath Gold Project
Harvesting and gathering of plant materials	Berry harvesting	Loss of potential harvest areas (ha)	260	49	— (1)	309	260	49	— (1)	309	260	49	— (1)	309	— (8)
	Medicinal plant harvesting	Loss of forest (ha)	138 (2)	45	—	183	138	45	—	183	138	45	—	183	—
		Loss of wetlands (ha)	33	6	—	39	47 (3)	6	—	53	33	6	—	39	—
Hunting	Ungulates	Habitat loss (ha)	141 (4, 5)	56	6 (6)	203	118 (7)	56	6 (6)	180	137	56	6 (6)	199	—
	Furbearers	Habitat loss (ha)	80	42	—	122	74	42	—	136	80	42	—	122	—
	Waterfowl	Habitat loss (ha)	36	—	—	36	41	—	—	41	34	—	—	34	—
Trapping	Furbearers	Habitat loss (ha)	80	36	—	116	74	36	—	116	80	36	—	116	—

Note:

(1) The "—" symbol indicates there were no predicted residual adverse effects, or no cumulative effect
(2) The loss of forests is calculated as the sum of the "predominantly coniferous forest" and "predominantly deciduous forest" cleared as a result of the Project
(3) The increase in wetlands areas lost during operations reflects the effects of groundwater drawdown on WLD5
(4) The wildlife habitat lost as a result of the Project is a combination of the direct clearing as a result of the Project, and the alteration of habitat as a result of Project noise levels exceeding 50 dBA
(5) The areas for ungulates are determined for the wildlife and wildlife habitat RSA
(6) Only the ungulate VC was determined to have potential cumulative effects with the Wataynikaneyap Power project
(7) The habitat loss varies between Project phases because the areas of habitat predicted to have noise levels above 50 dBA vary
(8) The areas lost during the site preparation and construction phase will not recover until post-closure

- Socio-economic factors (economic effects)
  - Three other activities, namely the major upgrades to Highway 17; the Josephine Cone Mine Project, and the construction of the 230kV transmission line proposed by Wataynikaneyap Power were identified as having economic effects that could overlap with those of the Project. In the case of the Highway 17 upgrades and Wataynikaneyap Power Project, both could result in increased opportunities for "Aboriginal employment", which would be a beneficial rather than adverse effect. Neither one of these projects is expected to have an effect on the "cost of living", as they are relatively short-term construction activities. Nor would either have an effect on "Project purchases from Aboriginal businesses".

    In the case of the Josephine Cone Mine Project, it is reasonable to assume that it would affect both the "Aboriginal employment" and "cost of living" measures. This Project is at the limit of the socio-economic study area and the effects are expected to diminish with distance. Therefore, while these activities could have a cumulative effects, they are unlikely to change the magnitude of the predicted residual adverse effects of the Project for the economic factors indicator.

- Socio-economic factors (social effects)
  - The Highway 17 upgrades and Wataynikaneyap Power Project, and the Josephine Cone Mine project are all expected to result in an increase in temporary construction personnel in the region which are expected to cause cumulative effect on the "in- and out-migration", "capacity of emergency services", and "road network capacity and conditions" measures. Some of these effects would continue into operations with the Josephine Cone Mine project, but at a lower level.

    Neither the Highway 17 upgrades, nor the Wataynikaneyap Power Project are expected to affect the other social measures. However, the Josephine Cone Mine Project has a projected life span of greater than 25 years and would be expected to result in cumulative effects for most of the remaining social factors measures. This Project is at the limit of the socio-economic study area and the effects are expected to diminish with distance. Therefore, while these activities could have a cumulative effects, they are unlikely to change the magnitude of the predicted residual adverse effects of the Project on the social factors indicator.

7.6 Overall Summary of Predicted Cumulative Effects

Table 7.6-1 provides an overall summary of the predicted residual and cumulative effects of the Project. In the table, those disciplines, VCs, and indicators for which no residual adverse effects were predicted are indicated with the "—" symbol. The absence of adverse effects could indicate either that no adverse effects were predicted, or where predicted adverse effects were predicted they were fully mitigated. Sections 6.2 through 6.21 describe the predicted effects, mitigation and residual adverse effects for each of the disciplines, respectively. Those disciplines, VCs, and indicators with predicted residual adverse effects, but no predicted cumulative are indicated with

the “†” symbol in the table. The absence of cumulative effects could represent situations where there was no spatial and temporal overlap with the residual adverse effects of the Project (see Section 7.4.1), or where there was overlap but no cumulative effects were predicted, as detailed in Section 7.5.1 through 7.5.13. Those disciplines, VCs, and indicators for which cumulative effects were predicted but the analysis determined there would be no numeric or material change in magnitude of the residual adverse effects predicted for the Project (see Sections 7.5.1 through 7.5.13) are indicated with a “‡ “ symbol in the table. Where cumulative effects can be quantified, the table indicates where those quantified effects are presented. Finally, the table has been shaded to clearly indicate those disciplines, VCs, and indicators where residual, and cumulative effects were predicted.

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Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Terrain and soils	Natural landscapes	Viewscapes	Yes	Yes	† (2)	†
	Overburden	Erosion of disturbed overburden	—	—	—	—
	Soil chemistry	Changes in soil chemistry	—	—	—	—
Geology and Geochemistry	Pit lake water quality	Concentrations of indicator compounds	Yes	†	†	†
Noise	Environmental noise levels	Equivalent noise levels, L_{EQ}	Yes	Yes	Yes	‡ (3)
	Noise disturbance to wildlife (including SAR)	Area predicted L_{EQ} above 50 dBA	Yes	Yes	Yes	‡
	Blasting noise and vibration	Peak sound pressure level	Yes	Yes	Yes	‡
		Peak particle velocity	Yes	Yes	Yes	‡
	Noise related health effects	Absolute sound pressure, L_{DN}	Yes	Yes	Yes	‡
		Percent highly annoyed, %HA	Yes	Yes	Yes	‡
Light	Light trespass	Ambient light levels	—	—	—	—
Air quality	Air quality	Concentrations of indicator compounds	Yes	Yes	Yes	‡
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Yes	†	†	†
	Changes in climate due to the Project	Changes in annual temperature	—	—	—	—
		Changes in annual precipitation	—	—	—	—
Surface water quality	Surface water quality	Concentrations of indicator compounds	Yes	Yes	†	†
Surface water quantity	Surface water quantity	Increase in surface water flows	Yes	Yes	Yes	—
		Decrease in surface water flows	Yes	Yes	Yes	—
		Change in lake levels	—	—	—	—

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Groundwater quality	Groundwater quality	Concentrations of indicator compounds	—	—	—	—
Groundwater quantity	Groundwater quantity	Decrease in groundwater elevations in private water wells	—	—	—	—
Wildlife and wildlife habitat	Wildlife Species at Risk	Common Nighthawk	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
		Northern Myotis/Little Brown Myotis	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
		Barn Swallow	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
	Ungulates	Moose	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
	Furbearers	American Marten	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
		American Beaver	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
	Upland birds	Upland birds	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
	Wetland birds	Marsh birds	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
	Small mammals	Small mammals	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
	Reptiles and amphibians	Reptiles and amphibians	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)
	Invertebrates	Terrestrial invertebrates	Yes	Yes	Yes	Yes (Table 7.5.6.2-1)

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Migratory Birds	Upland birds	Upland birds	Yes	Yes	Yes	Yes (Table 7.5.7.2-1)
	Wetland birds	Marsh birds	Yes	Yes	Yes	Yes (Table 7.5.7.2-1)
Fish and fish habitat	Stream-resident fish population	Direct loss or alteration of habitat	Yes	Yes	†	†
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
	Migratory fish populations	Direct loss or alteration of habitat	—	—	—	—
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
	Lake-resident fish populations	Direct loss or alteration of habitat	—	—	—	—
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
	Fish species-at-risk	Direct loss or alteration of habitat	—	—	—	—
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
Wetlands and vegetation	Wetlands	Wetland extent	Yes	Yes	Yes	Yes (Table 7.5.9.2-1)
		Wild rice	—	—	—	—
		Floating Marsh Marigold (*Caltha natans*)	—	—	—	—

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Wetlands and vegetation (continued)	Vegetation communities	Predominantly coniferous forest	Yes	Yes	Yes	Yes (Table 7.5.9.2-1)
		Predominantly deciduous forest	Yes	Yes	Yes	Yes (Table 7.5.9.2-1)
		Successional areas	Yes	Yes	Yes	Yes (Table 7.5.9.2-1)
		Potential berry harvesting areas	Yes	Yes	Yes	Yes (Table 7.5.9.2-1)
Land use	Land Use Planning and Policies	Conflict with accepted land uses as stipulated in approved land use plans.	—	—	—	—
		Overlap with protected areas.	—	—	—	—
	Aggregate Operations	Change in access to aggregate resources.	—	—	—	—
		Change in demand of aggregate resources extraction.	—	—	—	—
	Forestry	Change in access to forestry resources.	—	—	—	—
		Loss of forestry resources.	Yes	Yes	†	†
	Mineral Exploration	Change in access to mineral claims for exploration and production.	—	—	—	—
	Fishing - Recreational and Commercial	Change in access to fisheries resources.	—	—	—	—
		Change in the abundance of fisheries resources.	—	—	—	—
		Change in contaminant levels in fish	—	—	—	—
		Diminished experience of being on the land.	Yes	Yes	†	†

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Land use (continued)	Hunting	Change in access to wildlife resources.	Yes	Yes	†	†
		Change in abundance of wildlife resources.	Yes	Yes	Yes	Yes (Table 7.5.10.2-1)
		Diminished experience of being on the land	Yes	Yes	†	†
	Trapping	Change in access to wildlife resources.	Yes	Yes	†	†
		Change in abundance of wildlife resources.	Yes	Yes	Yes	Yes (Table 7.5.10.2-1)
		Diminished experience of being on the land	Yes	Yes	†	†
	Cottagers and Outfitters	Diminished experience of being on the land.	Yes	Yes	†	†
		Change in access to cottage and/or outfitter areas.	—	—	—	—
		Changes in clientele for outfitters with lodges located near the Project.	Yes	Yes	Yes	‡
	Other Recreational Uses	Change in access for residents and visitors to public lands for non-consumptive purposes	—	—	—	—
		Change in access for residents and visitors to public lands for consumptive purposes.	Yes	Yes	†	†
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption	Yes	Yes	Yes	Yes (Table 7.5.10.2-1)

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Land use (continued)	Other Recreational Uses (continued)	Diminished experience of being on the land.	Yes	Yes	†	†
Social	Population demographics	Population change	Yes	Yes	Yes	‡
	Education	Capacity of education services	Yes	Yes	Yes	‡
		Education attainment	Yes	Yes	Yes	‡
		Project-specific Training	Yes	Yes	†	†
	Infrastructure and services	Municipal Services	Yes	Yes	Yes	‡
		Community services (e.g., health, social services)	Yes	Yes	Yes	‡
	Housing and property values	Housing availability	Yes	Yes	Yes	‡
		Property values	Yes	Yes	Yes	‡
	Public safety	Crime rate	Yes	Yes	Yes	‡
		Capacity of emergency services	Yes	Yes	Yes	‡
		Requests for emergency services by Project	Yes	Yes	†	†
	Transportation and traffic	Road network capacity and conditions	Yes	Yes	Yes	‡
Economic	Labour force, labour participation and employment	Labour income employment	Yes	Yes	Yes	‡
	Income levels	Income levels and categories	Yes	Yes	Yes	‡
	Cost of living	Current prevailing cost of living	Yes	Yes	Yes	‡
	Real estate	Housing prices and affordability	Yes	Yes	Yes	‡

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Economic (continued)	Economic development	Municipal taxes and contribution to economic development projects	Yes	Yes	Yes	‡
	Existing businesses	Local business availability	Yes	Yes	Yes	‡
	Government revenues	Taxes and revenues	Yes	Yes	Yes	‡
Human health	Non-Indigenous Human Health	Subsurface/Construction Worker	—	—	—	—
		Outdoor Worker	—	—	—	—
		Indoor Worker	—	—	—	—
		Site Visitor, or Harvester	—	—	—	—
		Resident	—	—	—	—
	Indigenous Human Health	Resident	—	—	—	—
		Site Visitor, or Harvester	—	—	—	—
		Subsurface/Construction Worker	—	—	—	—
		Outdoor Worker	—	—	—	—
		Indoor Worker	—	—	—	—
Heritage resources	Archaeological sites	Archaeological sites	—	—	—	—
	Historic heritage sites	Historic heritage sites	—	—	—	—
Aboriginal Peoples	Human Health	Risk Assessment for Indigenous Human Health	—	—	—	—
	Harvesting and gathering of plant material	Wild rice	—	—	—	—
		Berry Harvesting	Yes	Yes	Yes	Yes (Table 7.5.13.2-1)
		Medicinal plant harvesting	Yes	Yes	Yes	Yes (Table 7.5.13.2-1)

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Aboriginal Peoples (continued)	Harvesting and gathering of plant material (continued)	Changes in access	Yes	Yes	†	†
		Diminished on-the-land experience	Yes	Yes	†	†
	Hunting	Ungulates	Yes	Yes	Yes	Yes (Table 7.5.13.2-1)
	Hunting (continued)	Furbearers	Yes	Yes	Yes	Yes (Table 7.5.13.2-1)
		Waterfowl	Yes	Yes	Yes	Yes (Table 7.5.13.2-1)
		Changes in access	Yes	Yes	†	†
		Diminished on-the-land experience	Yes	Yes	†	†
	Trapping	Furbearers	Yes	Yes	Yes	Yes (Table 7.5.13.2-1)
		Changes in access	Yes	Yes	†	†
		Diminished on-the-land experience	Yes	Yes	†	†
	Fishing	Sport fish	—	—	—	—
		Baitfish	—	—	—	—
		Commercial fishing	—	—	—	—
		Changes in access	Yes	Yes	†	†
		Diminished on-the-land experience	Yes	Yes	†	†
	Cultural and spiritual	Cultural or spiritual sites	—	—	—	—
		Traditional Travel routes	—	—	—	—

Table 7.6-1: Summary of Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Are Cumulative Effects Quantifiable?
Aboriginal Peoples (continued)	Cultural and spiritual (continued)	Diminished on-the-land experience	Yes	Yes	†	†
	Socio-economic factors	Economic effects	Yes	Yes	Yes	‡
		Social effects	Yes	Yes	Yes	‡

Note:

(1) The "—" symbol indicates where no residual adverse effects were predicted for the discipline, VC and indicator. This could represent situations where no adverse effects were predicted, or where predicted adverse effects were fully mitigated, as detailed in Sections 6.2 through 6.21.

(2) The "†" symbol indicates where residual adverse effects were predicted for the discipline, VC and indicator, but the analysis determined there would be no cumulative effects. This could represent situations where there was no spatial and temporal overlap with the residual adverse effects of the Project (see Section 7.4.1), or where there was overlap but no cumulative effects were predicted, as detailed in Section 7.5.1 through 7.5.13.

(3) The "‡ " symbol indicates where cumulative effects were predicted for the discipline, VC and indicator, but the analysis determined there would be no numeric or material change in magnitude of the residual adverse effects predicted for the Project, as described in Section 7.5.1 through 7.5.13.