

22. SUMMARY OF PREDICTED NET EFFECTS

This section summarizes the results of the pathway analysis, Project effects assessment (Project Case) and cumulative effects assessment (Cumulative Effects Case) presented in Sections 6 through 21. The predicted net effects of East-West Tie Transmission Project (the Project) are presented in Table 22-1. The predicted net effects of the Project in combination with other past, present, certain/planned and reasonably foreseeable developments (RFDs) are presented in Table 22-2.

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Physical Environment										
Geology, terrain and soils	Distribution of geology and terrain	Project construction and maintenance during operation can change terrain (topography and surficial geology)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Soil quality	Project construction and maintenance during operation can alter soil quantity, quality and distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Soil quantity and distribution									
	Soil quantity and distribution	Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels, which can cause changes to soil quantity and distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Soil quality	Chemical or hazardous material spills (e.g., petroleum products, ammonium nitrate) in the Project footprint or along access roads can change soil quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Distribution of geology and terrain	Blasting can cause changes to geology, terrain and soil quantity and quality	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Soil quality									
	Soil quantity and distribution									
Soil quality	Air and dust emissions and subsequent deposition can cause chemical changes to the environment and affect soil quality	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
Surface water	Surface water quantity	Local reductions in streamflow and/or water levels at water bodies due to water taking	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Surface water quality									
	Surface water quantity	Local increases in streamflow and/or water levels in receiving water bodies due to discharges of wastewater	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Local increases in suspended solids concentrations and changes in the chemical constituents in receiving water due to discharges of wastewater	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Local increases in the incidence of particulate matter from disturbed areas, concrete mixing, and vehicle/equipment exhausts with consequent changes in concentrations of suspended solids and chemical constituents in receiving water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Contamination of surface water with floating debris and chemical constituents as a result of the washoff of trash and leachate to nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Contamination of surface water with chemical constituents through the washoff of spills and leaks to nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Contamination of surface water with chemical constituents through the washoff of explosives spills and residues to nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Contamination of surface water through washoff of organic debris and chemical constituents into nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Local increases in rates of erosion in work areas as a result of ground disturbance, and consequent increases in sediment transport to nearby water bodies	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Local increases in suspended solids concentrations as a result of the washoff of organic debris and eroded soil to nearby water bodies	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	

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Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Physical Environment (cont'd)										
Surface water (cont'd)	Surface water quantity	Local increases in runoff rates and runoff volumes as a result of changes in land cover from treed to bare ground, low-growing grasses and shrubs, gravel, paved or roofed surfaces	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Surface water quantity	Local increases in rates of erosion of water body banks and beds and consequent increases in sediment loads, as a result of increases in runoff rates and associated streamflow volumes due to changes in land cover	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quantity	Local changes in streamflows and water levels as part of short-term water diversions during construction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Local increases in rates of erosion of water body banks and beds as part of short-term water diversions during construction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quality	Local increases in sediment loads consequent to local increases in rates of erosion of water body banks and beds	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Surface water quantity	Local changes to flow conveyance and in-water erosion-sedimentation processes with potential for changes in flowrates, water levels and sediment loading, as a result of changes to reach and cross-section hydraulics at water body crossings	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
Groundwater	Groundwater quality	Changes to groundwater quality from spills of fuel or other materials	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
	Groundwater quantity	Changes to groundwater quantity from excavations for foundations and dewatering excavations	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quality	Changes to groundwater quality from excavations for foundations and dewatering excavations	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quantity	Changes to groundwater quantity from vegetation clearing that affects recharge thereby potentially increasing groundwater table levels	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quantity	Changes to groundwater quantity from hardening of surfaces (redirection of flow)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quality	Changes to groundwater quality from hardening of surfaces may disturb shallow soils with pre-existing contamination. Such movement of contaminated soils may lead to contamination of groundwater.	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quantity	Changes to groundwater quantity from blasting	Primary	Negative	Moderate	Local	Permanent	Infrequent	Possible	
	Groundwater quality	Changes to groundwater quality from blasting	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quantity	Changes to groundwater quantity associated with operation of construction camp water supply wells	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quality	Changes to groundwater quality associated with operation of construction camp water supply wells	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Groundwater quality	Changes to groundwater quality from herbicide leaching into soil.	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Physical Environment (cont'd)										
Air quality	Ambient concentrations of SPM	CAC and fugitive dust emissions from construction activities can result in changes in ambient concentrations	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Ambient concentrations of PM ₁₀ and PM _{2.5}									
	Ambient concentrations of CO									
	Ambient concentrations of NO ₂									
	Ambient concentrations of SO ₂									
Greenhouse gases	Predicted GHG emissions of CO ₂	GHG emissions from construction activities can result in changes in federal and provincial annual greenhouse gas emissions	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Predicted GHG emissions of N ₂ O									
	Predicted GHG emissions of CH ₄									
Acoustic environment	Project construction-related change in daytime equivalent noise level (L _{eq, day})	Noise emissions from construction activities could increase baseline sound levels at existing PORs	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Project operation-related one-hour equivalent noise level (L _{eq, 1-hour (day, night)})	Noise emissions from operation activities could increase baseline sound levels at existing PORs	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	

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Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment										
Vegetation and Wetlands										
Upland ecosystems	Ecosystem availability (includes CLVAs availability)	Site preparation, construction and operation activities can result in the loss or alteration of upland ecosystem availability	Primary	Negative	Predicted loss of approximately 3,419 ha (2.1% of the vegetation and wetlands LSA Base Case; 0.7% of the vegetation and wetlands RSA Base Case); no predicted loss to uncommon ecosites C12, NW05 and NW10	Local	Permanent/long-term	Continuous	Certain	Not significant
	Ecosystem distribution (includes CLVAs distribution)	Site preparation, construction and operation activities can result in the loss or alteration of upland ecosystem distribution	Primary	Negative	Predicted loss to upland ecosystems is primarily associated with the preferred route ROW and permanent access roads creating a more fragmented distribution of uplands. However, upland ecosystems remain well-connected in areas surrounding the Project. No predicted loss to uncommon ecosites C12, NW05, and NW10.	Local	Permanent/long-term	Continuous	Certain	
	Ecosystem composition	Site preparation, construction and operation activities can result in the loss or alteration of upland ecosystem composition	Primary	Negative	Edge effects and potential introduction of invasive species may alter upland species abundance and richness.	Local	Permanent/long-term	Continuous	Possible	
	Ecosystem availability (includes CLVAs availability)	Reduced soil quantity may affect revegetation	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Soil disturbance and stockpiling can change physical, chemical or biological properties of soil, increase erosion potential, and affect revegetation	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
Ecosystem composition										

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Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Vegetation and Wetlands (cont'd)										
Upland ecosystems (cont'd)	Ecosystem availability (includes CLVAs availability)	Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels, which can cause changes to soils and upland ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Chemical or hazardous material spills (e.g., petroleum products, ammonium nitrate) on the Project footprint or along access or haul roads can affect soil quality and upland ecosystems	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Dust and air emissions, and subsequent deposition can affect upland, wetland and riparian ecosystems through changes in soil quality and direct contact with plants	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Herbicide application on the Project footprint can affect soil quality and upland ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
Ecosystem availability (includes CLVAs availability)	Introduction and spread of noxious and invasive plant species can affect upland ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
Ecosystem distribution (includes CLVAs distribution)										
Ecosystem composition										

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Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Vegetation and Wetlands (cont'd)										
Wetland ecosystems	Ecosystem availability (includes CLVAs availability)	Site preparation, construction and operation activities can result in the loss or alteration of wetland ecosystem availability	Primary	Negative	Predicted loss of approximately 353 ha (2.0% of the vegetation and wetlands LSA Base Case; 0.6% of the vegetation and wetlands RSA Base Case); <1 ha loss to NW 47 (0.4% of vegetation and wetlands LSA Base Case; 0.1% of vegetation and wetlands RSA Base Case)	Local	Permanent/long-term	Continuous	Certain	Not significant
	Ecosystem distribution (includes CLVAs distribution)	Site preparation, construction and operation activities can result in the loss or alteration of wetland ecosystem distribution	Primary	Negative	Wetlands disrupted by preferred route ROW and access roads crossings. However patches of wetlands remain connected in areas surrounding the Project footprint. A small disruption to the uncommon NW47 wetland.	Local	Permanent/long-term	Continuous	Certain	
	Ecosystem composition	Site preparation, construction and operation activities can result in the loss or alteration of wetland ecosystem composition	Primary	Negative	Small changes in water quality and flow and potential introduction of invasive species may alter wetland species abundance and richness	Local	Permanent/long-term	Continuous	Possible	
	Ecosystem availability (includes CLVAs availability)	Reduced soil quantity may affect revegetation	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Soil disturbance and stockpiling can change physical, chemical or biological properties of soil, increase erosion potential, and affect revegetation	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels, which can cause changes to soils and wetland ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Chemical or hazardous material spills (e.g., petroleum products, ammonium nitrate) on the Project footprint or along access or haul roads can affect soil quality and wetland ecosystems	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Ecosystem distribution (includes CLVAs distribution)										
Ecosystem composition										

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Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Vegetation and Wetlands (cont'd)										
Wetland ecosystems (cont'd)	Ecosystem availability (includes CLVAs availability)	Dust and air emissions, and subsequent deposition can affect upland, wetland and riparian ecosystems through changes in soil quality and direct contact with plants	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Herbicide application on the Project footprint can affect soil quality and wetland ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution (includes CLVAs distribution)									
	Ecosystem composition									
	Ecosystem availability (includes CLVAs availability)	Introduction and spread of noxious and invasive plant species can affect wetland ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
Ecosystem distribution (includes CLVAs distribution)										
Ecosystem composition										
Riparian ecosystems	Ecosystem availability	Site preparation, construction and operation activities can result in the loss or alteration of riparian ecosystem availability	Primary	Negative	Predicted loss of approximately 281 ha (1.7% in the vegetation and wetlands LSA; 0.5% in the vegetation and wetlands RSA)	Local	Permanent/long-term	Continuous	Certain	Not significant
	Ecosystem distribution	Site preparation, construction and operation activities can result in the loss or alteration of riparian ecosystem distribution	Primary	Negative	Patches of riparian ecosystems remain connected in areas surrounding the Project footprint	Local	Permanent/long-term	Continuous	Certain	
	Ecosystem composition	Site preparation, construction and operation activities can result in the loss or alteration of riparian ecosystem composition	Primary	Negative	Small changes in water quality and flow and potential introduction of invasive species may alter riparian species abundance and richness	Local	Permanent/long-term	Continuous	Possible	
	Ecosystem availability	Reduced soil quantity may affect revegetation	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution									
	Ecosystem composition									
	Ecosystem availability	Soil disturbance and stockpiling can change physical, chemical or biological properties of soil, increase erosion potential, and affect revegetation	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution									
	Ecosystem composition									
	Ecosystem availability	Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels, which can cause changes to soils and riparian ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution									
	Ecosystem composition									
	Ecosystem availability	Chemical or hazardous material spills (e.g., petroleum products, ammonium nitrate) on the Project footprint or along access or haul roads can affect soil quality and riparian ecosystems	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Ecosystem distribution									
	Ecosystem composition									
	Ecosystem availability	Dust and air emissions, and subsequent deposition can affect upland, wetland and riparian ecosystems through changes in soil quality and direct contact with plants	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
Ecosystem distribution										
Ecosystem composition										
Ecosystem availability	Herbicide application on the Project footprint can affect soil quality and riparian ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
Ecosystem distribution										
Ecosystem composition										
Ecosystem availability	Introduction and spread of noxious and invasive plant species can affect riparian ecosystems	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
Ecosystem distribution										
Ecosystem composition										

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Fish and Fish Habitat										
Brook trout	Habitat availability	Physical alteration of water bodies can change fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Abundance	Instream construction can cause injury or mortality of fish	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Release of sediment during road construction at water body crossings and from land disturbance may cause a change in habitat quality, affecting fish and lower trophic organisms downstream from crossings	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Placement of crossing structures may change channel morphology, affecting fish habitat	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Placement of crossing structures may cause changes in fish access to habitats, affecting fish distribution and abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Distribution									
	Habitat availability	Changes to hydrology or groundwater may alter drainage patterns and increase or decrease drainage flows and surface water levels, which could affect fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Blasting can cause injury or mortality of fish in nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Changes to dust and air emissions resulting from the Project could lead to changes to constituent concentrations in water in the receiving environment, which could affect fish habitat quantity and quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to public access to recreational angling areas could affect fish abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to surface water and sediment quality from spills of fuel or other materials can affect fish and lower trophic level organisms reproduction and survival, and as a result, abundance	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Habitat availability	Herbicide use during vegetation maintenance can affect fish habitat quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		
Northern pike	Habitat availability	Physical alteration of water bodies can change fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Abundance	Instream construction can cause injury or mortality of fish	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Release of sediment during road construction at water body crossings and from land disturbance may cause a change in habitat quality, affecting fish and lower trophic organisms downstream from crossings	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Placement of crossing structures may change channel morphology, affecting fish habitat	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Placement of crossing structures may cause changes in fish access to habitats, affecting fish distribution and abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Distribution									
	Habitat availability	Changes to hydrology or groundwater may alter drainage patterns and increase or decrease drainage flows and surface water levels, which could affect fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	

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Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Fish and Fish Habitat (cont'd)										
Northern pike (cont'd)	Abundance	Blasting can cause injury or mortality of fish in nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Habitat availability	Changes to dust and air emissions resulting from the Project could lead to changes to constituent concentrations in water in the receiving environment, which could affect fish habitat quantity and quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to public access to recreational angling areas could affect fish abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to surface water and sediment quality from spills of fuel or other materials can affect fish and lower trophic level organisms reproduction and survival, and as a result, abundance	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Herbicide use during vegetation maintenance can affect fish habitat quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Walleye	Habitat availability	Physical alteration of water bodies can change fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Abundance	Instream construction can cause injury or mortality of fish	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Release of sediment during road construction at water body crossings and from land disturbance may cause a change in habitat quality, affecting fish and lower trophic organisms downstream from crossings	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Placement of crossing structures may change channel morphology, affecting fish habitat	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Placement of crossing structures may cause changes in fish access to habitats, affecting fish distribution and abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Distribution									
	Habitat availability	Changes to hydrology or groundwater may alter drainage patterns and increase or decrease drainage flows and surface water levels, which could affect fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Blasting can cause injury or mortality of fish in nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Changes to dust and air emissions resulting from the Project could lead to changes to constituent concentrations in water in the receiving environment, which could affect fish habitat quantity and quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to public access to recreational angling areas could affect fish abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to surface water and sediment quality from spills of fuel or other materials can affect fish and lower trophic organisms reproduction and survival, and as a result, abundance	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Habitat availability	Herbicide use during vegetation maintenance can affect fish habitat quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		

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				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Fish and Fish Habitat (cont'd)										
Lake sturgeon	Habitat availability	Physical alteration of water bodies can change fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Abundance	Instream construction can cause injury or mortality of fish	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Release of sediment during road construction at water body crossings and from land disturbance may cause a change in habitat quality, affecting fish and lower trophic organisms downstream from crossings	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Placement of crossing structures may change channel morphology, affecting fish habitat	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Placement of crossing structures may cause changes in fish access to habitats, affecting fish distribution and abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Distribution									
	Habitat availability	Changes to hydrology or groundwater may alter drainage patterns and increase or decrease drainage flows and surface water levels, which could affect fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Blasting can cause injury or mortality of fish in nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Changes to dust and air emissions resulting from the Project could lead to changes to constituent concentrations in water in the receiving environment, which could affect fish habitat quantity and quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to public access to recreational angling areas could affect fish abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Abundance	Changes to surface water and sediment quality from spills of fuel or other materials can affect fish and lower trophic organisms reproduction and survival, and as a result, abundance	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Habitat availability	Herbicide use during vegetation maintenance can affect fish habitat quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		
Aquatic ecosystems	Habitat availability	Physical alteration of water bodies can change fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Community composition	Instream construction can cause injury or mortality of fish	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Release of sediment during road construction at water body crossings and from land disturbance may cause a change in habitat quality, affecting fish and lower trophic organisms downstream from crossings	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Habitat availability	Placement of crossing structures may change channel morphology, affecting fish habitat	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Community composition	Placement of crossing structures may cause changes in fish access to habitats, affecting fish distribution and abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Distribution									
	Habitat availability	Changes to hydrology or groundwater may alter drainage patterns and increase or decrease drainage flows and surface water levels, which could affect fish habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
Community composition	Blasting can cause injury or mortality of fish in nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Fish and Fish Habitat (cont'd)										
Aquatic ecosystems (cont'd)	Habitat availability	Changes to dust and air emissions resulting from the Project could lead to changes to constituent concentrations in water in the receiving environment, which could affect fish habitat quantity and quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Community composition	Changes to public access to recreational angling areas could affect fish abundance	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Community composition	Changes to surface water and sediment quality from spills of fuel or other materials can affect fish and lower trophic organisms reproduction and survival, and as a result, abundance	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Wildlife and Wildlife Habitat										
Woodland caribou	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	<ul style="list-style-type: none"> ■ Category 1 (nursery habitat): no known nursery areas affected ■ Category 1 (travel corridors): one movement corridor affected (Neys / Kilalla linkage) ■ Winter habitat: approximately 119 ha (0.3% of available in LSCR); some avoidance due to sensory disturbance, but limited by paralleling Project to existing disturbances ■ Category 3 (remaining areas in the range): approximately 361 ha (0.2% of available in LSCR) and 2,395 ha (0.1% of available in discontinuous range); some avoidance due to sensory disturbance, but limited by paralleling Project to existing disturbances) ■ Disturbance(s): proportion of LSCR disturbed changes from 29.7% to 29.9%. Proportion of discontinuous range disturbed increases from 65.7% to 65.9% 	Local	Permanent	Continuous	<ul style="list-style-type: none"> ■ Category 1 (nursery areas): unlikely ■ Wildlife habitat: certain ■ Category 1 (travel corridors): probable ■ Refuge habitat: certain ■ Category 3 (remaining areas in the range): certain (direct loss); probably (avoidance) 	Significant
		Medium-term								
		Changes to hydrology may alter drainage patterns and increase/ decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)													
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance							
Biological Environment (cont'd)																	
Wildlife and Wildlife Habitat (cont'd)																	
Woodland caribou (cont'd)	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat connectivity	Primary	Negative	<ul style="list-style-type: none"> ■ Increase in linear feature density from approximately 0.19 km/km² to approximately 0.25 km/km² in LSCR and approximately 0.58 km/km² to approximately 0.61 km/km² in the discontinuous range ■ Loss of Category 1 habitat (travel corridor) is primarily associated with the preferred route ROW and access roads ■ Caribou habitat remains well connected in high use areas on islands; small reduction in movements among habitat patches on mainland 	<ul style="list-style-type: none"> ■ Local for movement among habitat patches intersected by the Project ■ Possibly regional if population connectivity is constrained between LSCR and discontinuous range 	Permanent	Continuous	Possible	Significant							
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat connectivity															
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat distribution									Secondary	n/a	n/a	n/a	n/a	n/a	n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution									No pathway	n/a	n/a	n/a	n/a	n/a	
	Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a										
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability	Primary	Negative	<ul style="list-style-type: none"> ■ Incremental increase in predation risk ■ Displacement of a few individuals with home ranges that overlap the wildlife and wildlife habitat LSA 	Local	Permanent	Continuous	Probable	significant						
												Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey					
												Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a								

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)									
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance			
Biological Environment (cont'd)													
Wildlife and Wildlife Habitat (cont'd)													
Woodland caribou (cont'd)	Survival and reproduction (cont'd)	Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a				
		Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a				
Moose	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 2,961 ha of moderate to high suitability habitat (2.1% of the wildlife and wildlife habitat LSA Base Case, 0.1% of the moose RSA Base Case); reduced quality of habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation	Local	Permanent	Continuous	Certain	Not significant			
		Medium-term					Probable						
		Changes to hydrology may alter drainage patterns and increase/ decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	Secondary	n/a			n/a	n/a	n/a		n/a		
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	No pathway	n/a			n/a	n/a	n/a		n/a		
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Secondary	n/a			n/a	n/a	n/a		n/a		
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility and ability to occupy fragmented landscapes	Local	Permanent	Continuous	Possible				
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability											
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability and distribution	Secondary	n/a					n/a		n/a	n/a	n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability and distribution	No pathway	n/a					n/a		n/a	n/a	n/a

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Moose (cont'd)	Survival and reproduction	Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability and distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant	
		Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may influence wildlife availability	Primary	Negative	Small increase in mortality after implementation of mitigation measures	Local	Permanent	Continuous	Probable		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting)									
		Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		n/a
American marten	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 1,210 ha of moderate and high suitability habitat (2.1% of the wildlife and wildlife habitat LSA Base Case; 0.8% of the marten RSA Base Case); reduced quality of habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation	Local	Permanent	Continuous	Certain	Not significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term		Probable		
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability and distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability and distribution	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability and distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
American marten (cont'd)	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility	Local	Permanent	Continuous	Probable	Not significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability								
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		
	Habitat distribution	Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small change in survival and reproduction after implementation of mitigation measures	Local	Permanent	Continuous	Probable	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability								
		Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Site preparation, construction and maintenance of the preferred route ROW may result in the destruction of American marten dens (incidental take)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Little brown myotis	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	<ul style="list-style-type: none"> Direct loss of 14 ha of potential winter habitat (1.4% of wildlife and wildlife habitat LSA Base Case or 0.8% of little brown myotis RSA Base Case); direct loss of approximately 1,342 ha (2.0%) of potentially suitable maternity roosting habitat; no avoidance due to sensory disturbance by adhering to setbacks 	Local	Permanent	Continuous	Unlikely (direct loss of winter habitat)	Significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term		Probable (direct loss and avoidance of maternity roosting habitat)		
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	Secondary	n/a		n/a	n/a	n/a	n/a	n/a	n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	No pathway	n/a		n/a	n/a	n/a	n/a	n/a	
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Secondary	n/a		n/a	n/a	n/a	n/a	n/a	
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Negligible change in movements among habitat patches due to high mobility and ability to occupy fragmented landscapes	Local	Permanent	Continuous	Possible	Significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat distribution	Secondary	n/a		n/a	n/a	n/a	n/a	n/a	n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution	No pathway	n/a		n/a	n/a	n/a	n/a	n/a	
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a		n/a	n/a	n/a	n/a	n/a	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Little brown myotis (cont'd)	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Neutral	n/a	n/a	n/a	n/a	n/a	Possible	Significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting/harvesting)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		Collisions with the transmission line causing injury or mortality to bats	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		Site preparation, construction and maintenance of the preferred route ROW may result in the destruction of roosting or hibernating bats (incidental take)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		Electrocution causing injury or mortality to bats	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a			

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Bald eagle	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 846 ha (2.4% of wildlife and wildlife habitat LSA Base Case; 0.7% of bald eagle RSA Base Case); reduced quality of nesting and roosting habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation	Local	Permanent	Continuous	Certain	Not significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term		Probable		
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility	Local	Permanent	Continuous	Probable	Not significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	No reduction in productive capacity in the wildlife and wildlife habitat LSA, reduction in productive capacity from 46 to 45 individuals in the bald eagle RSA compared to Base Case; possible reduction in productivity of home ranges overlapping the wildlife and wildlife habitat LSA; reduced survival and reproduction due to collisions with electrical lines	Local	Permanent	Continuous	Possible (direct habitat loss/sensory disturbance, collisions)	Not significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term				
		Collisions with the transmission line causing injury or mortality to birds					Permanent				
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting/harvesting)	Secondary	n/a	n/a	n/a	n/a	n/a			

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
Bald eagle (cont'd)	Survival and reproduction (cont'd)	Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
		Site preparation, construction and maintenance of the preferred route ROW may result in the destruction of nests, eggs, and individuals of raptors and migratory birds (incidental take)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Electrocution causing injury or mortality to birds	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Bobolink	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 1 ha (<1% loss of habitat in both wildlife and wildlife habitat LSA and bobolink RSA from Base Case); reduced quality of nesting habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation	Local	Permanent	Continuous	Certain	Not significant
		Medium-term					Probable			
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
Bobolink (cont'd)	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility	Local	Permanent	Continuous	Probable	Not significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability								
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss and sensory disturbance	Local	Permanent	Continuous	Possible	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term			
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting/harvesting)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Collisions with the transmission line causing injury or mortality to birds	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Site preparation, construction and maintenance of the preferred route ROW may result in the destruction of nests, eggs, and individuals of raptors and migratory birds (incidental take)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Electrocution causing injury or mortality to birds	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Canada warbler	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 2,883 ha (2.2% from wildlife and wildlife habitat LSA Base Case; 0.7% from warbler RSA Base Case); reduced quality of nesting habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation	Local	Permanent	Continuous	Certain	Not significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term		Probable		
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility	Local	Permanent	Continuous	Probable		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability							n/a		
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss, sensory disturbance; reduction in productive capacity of 37 individuals; negligible effect of brood parasitism	Local	Permanent	Continuous	Probable		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability							Medium-term		
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey							Permanent		Possible
		Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
Canada warbler (cont'd)	Survival and reproduction (cont'd)	Collisions with the transmission line causing injury or mortality to birds	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
		Site preparation, construction and maintenance of the preferred route ROW may result in the destruction of nests, eggs, and individuals of raptors and migratory birds (incidental take)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Electrocution causing injury or mortality to birds	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Eastern whip-poor-will	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 789 ha (2.0% of wildlife and wildlife habitat LSA Base Case and 0.6% of whip-poor-will RSA Base Case); reduced quality of nesting habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation	Local	Permanent	Continuous	Certain	Not significant
		Medium-term					Probable			
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability	Secondary	n/a		n/a	n/a	n/a	n/a	
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	No pathway	n/a		n/a	n/a	n/a	n/a	
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	Secondary	n/a		n/a	n/a	n/a	n/a	
	Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility	Local	Permanent	Continuous	Probable		
	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability									
Habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a			

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
Eastern whip-poor-will (cont'd)	Habitat distribution (cont'd)	Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss and sensory disturbance	Local	Permanent	Continuous	Probable	
							Medium-term			
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting/harvesting)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Collisions with the transmission line causing injury or mortality to birds	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Site preparation, construction and maintenance of the preferred route ROW may result in the destruction of nests, eggs, and individuals of raptors and migratory birds (incidental take)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Electrocution causing injury or mortality to birds	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a			

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Olive-sided flycatcher	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 1,489 ha (2.1% of wildlife and wildlife habitat LSA Base Case and 0.6% of olive sided flycatcher RSA Base Case); reduced quality of habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation	Local	Permanent	Continuous	Certain	Not significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term		Probable		
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		n/a
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		n/a
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility	Local	Permanent	Continuous	Probable		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability							n/a		
		Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
		Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat distribution	No pathway	n/a	n/a	n/a	n/a	n/a	n/a		
		Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat distribution	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss and sensory disturbance; reduction in productive capacity of 12 individuals	Local	Permanent	Continuous	Possible		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term				
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting/harvesting)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		
		Collisions with Project vehicles during construction and operation may cause injury or mortality to individual animals	Secondary	n/a	n/a	n/a	n/a	n/a	n/a		

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
Olive-sided flycatcher (cont'd)	Survival and reproduction (cont'd)	Collisions with the transmission line causing injury or mortality to birds	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
		Site preparation, construction and maintenance of the preferred route ROW may result in the destruction of nests, eggs, and individuals of raptors and migratory birds (incidental take)	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Attraction of wildlife to the Project (e.g., food waste, petroleum-based products, salt) during construction may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Fly rock from blasting may result in injury or mortality to wildlife	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Electrocution causing injury or mortality to birds	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Increase in public access could affect wildlife survival and reproduction through vehicle strikes	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
		Chemical or hazardous material stored in the Project footprint, or spills (e.g., petroleum products, ammonium nitrate) on site or along access or haul roads can affect wildlife survival and reproduction	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
Socio-economic Environment										
Archaeological Resources										
Archaeological resources	Number, type and location of known archaeological resources Area of archaeological potential	Loss of, or damage to, an archaeological resource	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cultural Heritage Resources										
Cultural heritage resources	Known cultural heritage resources Potential cultural heritage resources	Alteration, relocation, or demolition of a heritage resource	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Indigenous Current Use of Lands and Resources for Traditional Purposes										
First Nation Current Land and Resource Use										
Traditional wildlife harvesting	Resource availability	Site preparation, construction and operation activities can result in changes to wildlife or wildlife habitat leading to a change in the availability of wildlife for First Nations traditional wildlife harvesting and Métis harvesting	Primary	Negative	Low	Local	Medium-term to permanent	Continuous	Probable to certain	Not significant
	Sites or areas of use	Site preparation, construction and operation activities can result in the loss or alteration of currently available wildlife harvesting sites or areas for First Nations traditional wildlife harvesting	Primary	Negative	Low	Local	Medium-term to permanent	Frequent to continuous	Certain	
	Changes in access	Site preparation, construction and operation can result in the loss or alteration of access routes used for First Nations traditional wildlife harvesting	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Changes in environmental conditions	Site preparation, construction and operation activities can result in changes to the visual environment, acoustic environment and air quality, which can affect First Nations traditional wildlife harvesting	Primary	Negative	Low	Local	Long-term to permanent	Continuous	Probable	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Socio-economic Environment (cont'd)										
Indigenous Current Use of Lands and Resources for Traditional Purposes (cont'd)										
First Nations Current Land and Resource Use (cont'd)										
Traditional fish harvesting	Resource availability	Site preparation, construction and operation activities can result in changes to fish and fish habitat leading to a change in the availability of fish for First Nations traditional fish harvesting and Métis harvesting	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
	Sites or areas of use	Site preparation, construction and operation activities can result in the loss or alteration of currently available fishing sites or areas for First Nations traditional fish harvesting and Métis harvesting	Primary	Negative	Low	Local	Frequent to continuous	Medium-term to permanent	Probable	
	Changes in access	Site preparation, construction and operation can result in the loss or alteration access routes used for First Nations traditional fish harvesting	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Changes in environmental conditions	Site preparation, construction and operation activities can result in changes to the visual environment, acoustic environment and air quality, which can affect First Nations traditional fish harvesting	Primary	Negative	Low	Local	Long-term to permanent	Continuous	Probable	
Traditional plant and material harvesting	Resource availability	Site preparation, construction and operation activities can result in changes to vegetation and wetlands leading to a change in the availability of plants for First Nations traditional plant and material harvesting and Métis harvesting	Primary	Negative	Low	Local	Long-term to permanent	Continuous	Possible to certain	Not significant
	Sites or areas of use	Site preparation, construction and operation activities can result in the loss or alteration of currently available plant and material harvesting sites or areas for First Nations traditional plant and material harvesting	Primary	Negative	Low	Local	Medium-term to permanent	Continuous	Certain	
	Changes in access	Site preparation, construction and operation can result in the loss or alteration access routes used for First Nations traditional plant and material harvesting	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Changes in environmental conditions	Site preparation, construction and operation activities can result in changes to the visual environment, acoustic environment and air quality, which can affect First Nations traditional plant and material harvesting	Primary	Negative	Low	Local	Long-term to permanent	Continuous	Probable	
Use of culturally important sites and areas	Sites or areas of use	Site preparation, construction and operation can result in the loss or alteration culturally important sites and areas important for First Nations use of culturally important sites or areas	Primary	Negative	Low	Local	Permanent	Continuous	Certain	Not significant
	Changes in access	Site preparation, construction and operation can result in the loss or alteration access routes used for First Nations traditional use of culturally important sites and areas	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Changes in environmental conditions	Site preparation, construction and operation activities can result in changes to the visual environment, acoustic environment and air quality, which can affect First Nations use of culturally important sites and areas	Primary	Negative	Low	Local	Long-term to permanent	Continuous	Probable	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Socio-economic Environment (cont'd)										
Indigenous Current Use of Lands and Resources for Traditional Purposes (cont'd)										
Métis Current Land and Resource Use										
Way of Life	Disruption or loss of areas or routes critical to Métis mobility	Site preparation, construction and operation can result in the loss or alteration access routes used for Métis way of life	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
	Land use conflicts with familial or community teaching and transmission practices and qualitative disconnect from areas of sites of Métis tradition	Site preparation, construction and operation activities can result in changes to the visual environment, acoustic environment and air quality, which can affect Métis way of life	Primary	Negative	Low	Local	Permanent	Continuous	Probable	
	Damage or loss of key spiritual areas of Métis way of life	Site preparation, construction and operation can result in the loss or alteration of culturally important sites and areas important for Métis way of life	Primary	Negative	Low	Local	Permanent	Continuous	Certain	
Harvesting	Reduced access to preferred locations of harvest	Site preparation, construction and operation activities can result in the loss or alteration of currently available wildlife harvesting sites or areas for Métis harvesting	Primary	Negative	Low to moderate	Local	Medium-term to permanent	Frequent to continuous	Certain	Not significant
		Site preparation, construction and operation activities can result in the loss or alteration of currently available fishing sites or areas for Métis harvesting	Primary	Negative	Low to moderate	Local	Medium-term to permanent	Frequent to continuous	Certain	
		Site preparation, construction and operation activities can result in the loss or alteration of currently available plant and material harvesting sites or areas for Métis harvesting	Primary	Negative	Low to moderate	Local	Medium-term to permanent	Frequent to continuous	Certain	
	Loss or alteration of key cultural species harvested	Site preparation, construction and operation activities can result in changes to wildlife or wildlife habitat leading to a change in the availability of wildlife for Métis harvesting	Primary	Negative	Low	Local	Medium-term to permanent	Continuous	Possible to Certain	Not significant
		Site preparation, construction and operation activities can result in changes in vegetation and wetlands leading to a change in the availability of plants for Métis harvesting	Primary	Negative	Low	Local	Medium-term to permanent	Continuous	Possible to Certain	
	Changes to known harvesting conditions required for harvest	Site preparation, construction and operation activities can result in changes to the visual environment, acoustic environment and air quality, which can affect Métis harvesting	Primary	Negative	Low	Local	Long-term to permanent	Continuous	Probable	Not significant
Socio-economics										
Labour market	Employment and income generated by the Project	Project construction workforce hiring would generate direct, indirect and induced employment and income, and create employment opportunities	Primary	Positive	Low	Local to regional	Short-term	Continuous	Probable	n/a
Economic development	Business opportunities and revenues generated by the Project	Project procurement of materials, goods and services during construction could affect local and regional business revenues	Primary	Positive	Low	Local to regional	Short-term	Continuous	High	n/a
Government finances	Change in government tax and other revenues	The Project will potentially affect government expenditures through the use of services and infrastructure, will generate government revenues from income and other taxes during construction, and will generate property taxes to municipalities, and rights payments to government bodies and railway companies during operation	Primary	Positive	Low	Local to regional	Long-term	Continuous	Certain	n/a
Temporary accommodation	Changes in temporary accommodation demand (taking into consideration change in demand with respect to available supply)	Temporary in-migration of Project construction workforce and suppliers could increase demand for temporary accommodation	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Socio-economic Environment (cont'd)										
Socio-economics (cont'd)										
Services and infrastructure	Change in demand on emergency and protective services (taking into consideration change in demand with respect to available supply)	Temporary in-migration could increase demand for certain local services (including education, non-emergency healthcare, social services, recreation) and infrastructure (water, waste water, solid waste)	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
	Change in demand on water, waste and energy services (taking into consideration change in demand with respect to available supply)									
	Change in demand on emergency and protective services (taking into consideration change in demand with respect to available supply)	Project workforce and construction activities could increase demand on emergency and protective services	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Change in demand on water, waste and energy services (taking into consideration change in demand with respect to available supply)	Project direct use of power and water and generation of waste water and solid waste would increase demand on power, water, waste water and solid waste services	Primary	Negative	Low	Local	Short-term	Continuous	Probable	
	Change in road traffic volumes and operating capacity	Transportation of the Project construction workforce, materials and goods would increase use of and demand on local road transportation and shipping and port services	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Change in demand on air and shipping services									
Community well-being	Nuisance from exposure to noise and air quality emissions during construction	Project construction activities could affect air quality along the ROW; potential for nuisance effects	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Nuisance from exposure to noise and air quality emissions during construction	Project construction activities could affect ambient noise levels along the ROW; potential for nuisance effects	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Exposure of the public to physical hazards (including potential for traffic accidents) associated with Project construction	Project construction activities could expose the public to physical hazards, affecting public safety	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
Non-traditional Land and Resource Use										
Provincial and local land use policies and designations	Compatibility of the Project with land use designations and bylaws	The Project could be inconsistent with land use designations, plans, objectives and policies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Parks and protected areas	Changes in access to and use of parks and protected areas	Site preparation, construction and maintenance of the preferred route ROW could affect access to and use of parks and protected areas	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	Not significant
	Changes in parks and protected area user experience due to changes in environmental conditions (e.g., noise, air quality, visual resources)	Changes in environmental conditions (visual environment, acoustic environment, air quality) could affect parks and protected areas' user experience	Primary	Negative	Low to moderate	Local	Long-term (operation phase)	Continuous	Probable	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Socio-economic Environment (cont'd)										
Non-traditional Land and Resource Use (cont'd)										
Linear infrastructure	Changes in access to linear infrastructure	Site preparation, construction and maintenance of the preferred route ROW could affect access to and operation of linear infrastructure	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Changes in linear infrastructure operations									
Non-commercial recreational land and resource use	Changes in non-commercial recreational land and resource access and use	Site preparation, construction and maintenance of the preferred route ROW could affect non-commercial recreational land and resource access and use	Primary	Positive or negative, dependent on recreational user group and individual perception	Moderate	Local	Long-term (operation phase)	Continuous	Certain	Not significant
	Changes to non-commercial recreational harvest levels, due to change in fish and wildlife resources	Change in fish and wildlife resources and availability could affect non-commercial recreational harvest opportunities and levels	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Changes in non-commercial recreational experience due to changes in environmental conditions (e.g., visual resources, noise, air quality)	Changes in environmental conditions (visual environment, acoustic environment, air quality) could affect non-commercial recreational experience	Primary	Negative	Low to Moderate	Local	Long-term (operation phase)	Continuous	Probable	
Commercial land and resource use	Changes in commercial (consumptive and non-consumptive) land and resource use and access	Site preparation, construction and maintenance of the preferred route ROW could affect consumptive and non-consumptive commercial land and resource access and use	Primary	Positive or negative, dependent on commercial user group	Moderate	Local	Long-term	Continuous	Certain	Not significant
	Changes to commercial harvest levels due to change in fish and wildlife resources	Change in fish and wildlife resources and availability could affect commercial harvest opportunities and levels	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
	Changes in commercial (consumptive and non-consumptive) recreational experience due to changes in environmental conditions (e.g., noise, air quality, visual resources)	Changes in environmental conditions (visual environment, acoustic environment, air quality) could affect commercial (commercial recreational and tourism) experiences	Primary	Negative	Moderate	Local	Long-term (operation)	Continuous	Probable	
	Changes in commercial land and resource use and access	Site preparation, construction and maintenance of the preferred route ROW could affect commercial (industry) land and resource use and access	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	
Visual Environment										
Visual quality	Visibility of the Project	Removal of land cover, modification of land forms and the assembly of built structures related to the construction and/or operation of the Project is expected to introduce visible disturbances to the existing landscape that can adversely affect visual quality	Primary	Negative	Low	Local	Long-term/irreversible (operation)	Continuous	Probable	Not significant
	Visual contrast of the Project relative to the existing landscape	The character of land cover disturbances, modified land form and/or built structures related to the construction and/or operation of the Project is expected to contrast with the existing landscape and can adversely affect visual quality	Primary	Negative	Low	Local	Long-term/irreversible (operation)	Continuous	Probable	

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Table 22-1: Summary of Predicted Net Project Effects (Project Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/Reversibility	Frequency	Probability of Occurrence	Significance
Socio-economic Environment (cont'd)										
Human Health										
Human health	Changes in environmental quality, including surface water, groundwater and air quality, and specifically contaminant concentrations in these media that could affect human health	CAC and fugitive dust emissions from construction activities can result in changes in air quality (i.e., ambient air concentrations) that may affect human health	Secondary	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Changes to groundwater quality from spills of fuel or other materials may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Changes to groundwater quality from excavations for foundations and dewatering excavations may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Changes to groundwater quality from hardening of surfaces may disturb shallow soils with pre-existing contamination. Such movement of contaminated soils may lead to contamination of groundwater and may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Changes to groundwater quality from blasting may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Changes to groundwater quality associated with operation of construction camp water supply wells may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Local increases in suspended solids concentrations and changes in the chemical constituents in receiving water due to discharges of wastewater may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Local increases in the incidence of particulate matter from disturbed areas, concrete mixing, and vehicle/equipment exhausts with consequent changes in concentrations of suspended solids and chemical constituents in receiving water bodies may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Contamination of surface water with floating debris and chemical constituents as a result of the washoff of trash and leachate to nearby water bodies may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
	Changes in environmental quality, including surface water, groundwater and air quality, and specifically contaminant concentrations in these media that could affect human health (cont'd)	Contamination of surface water with chemical constituents through the washoff of spills and leaks to nearby water bodies may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Contamination of surface water with chemical constituents through the washoff of explosives spills and residues to nearby water bodies	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Contamination of surface water through washoff of organic debris and chemical constituents into nearby water bodies may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	
		Changes in soil, surface water, groundwater and food quality (e.g., berries) from use of herbicides may affect human health	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	

Note: n/a = not applicable; significance is only determined for criteria with non-negligible net adverse effects (Section 5.7).

a) Effects characteristics are described for primary pathways. Refer to Section 5 for a description of the effects assessment method.

CAC = Criteria Air Contaminants; CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; GHG = greenhouse gas; LSA = Local Study Area; LSCR = Lake Superior Coast Range; N₂O = nitrous oxide; PM_{2.5} = particulate matter less than 2.5 microns; PM₁₀ = particulate matter less than 10 microns; POR = point of reception; ROW = right-of-way; RSA = Regional Study Area; SPM = suspended particulate matter.

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance
Physical Environment										
Groundwater	Groundwater quantity	Changes to groundwater quantity from blasting	Primary	Negative	Negligible	Local	Permanent	Infrequent	Possible	Not significant
Biological Environment										
Vegetation and Wetlands										
Upland ecosystems	Ecosystem availability	Site preparation, construction and operation activities can result in the loss or alteration of upland ecosystem availability	Primary	Negative	Upland ecosystem availability would be reduced by approximately 12,007 ha (2.4%) in the vegetation and wetlands RSA relative to the Base Case. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Certain	Not significant
	Ecosystem distribution	Site preparation, construction and operation activities can result in the loss or alteration of upland ecosystem distribution	Primary	Negative	The distribution of upland ecosystems in the vegetation and wetlands LSA and RSA in the Cumulative Effects Case would be similar to the distribution in the Base Case. There would be some loss and fragmentation of upland ecosystems throughout the RSA. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Certain	
	Ecosystem composition	Site preparation, construction and operation activities can result in the loss or alteration of upland ecosystem composition	Primary	Negative	Edge effects and potential introduction of invasive species may alter upland species abundance and richness	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Possible	
Wetland ecosystems	Ecosystem availability	Site preparation, construction and operation activities can result in the loss or alteration of wetland ecosystem availability	Primary	Negative	Availability of wetlands in the vegetation and wetlands RSA is predicted to decrease by approximately 994 ha (1.7% of Base Case) relative to the Base Case. Predicted loss of <1 ha (0.7% of Base Case) to the uncommon NW43 ecosite. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Certain	Not significant
	Ecosystem distribution	Site preparation, construction and operation activities can result in the loss or alteration of wetland ecosystem distribution	Primary	Negative	The distribution of wetland ecosystems in the vegetation and wetlands LSA and RSA in the Cumulative Effects Case would be similar to the distribution in the Base Case. There would be some predicted loss and fragmentation of wetland ecosystems throughout the vegetation and wetland RSA. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Certain	
	Ecosystem composition	Site preparation, construction and operation activities can result in the loss or alteration of wetland ecosystem composition	Primary	Negative	Small changes in water quality and flow and potential introduction of invasive species may alter wetland species abundance and richness. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Possible	
Riparian ecosystems	Ecosystem availability	Site preparation, construction and operation activities can result in the loss or alteration of riparian ecosystem availability	Primary	Negative	Availability of riparian habitat in the vegetation and wetlands RSA is predicted to decrease by 1,223 ha (2.4% of Base Case) relative to the Base Case. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Certain	Not significant
	Ecosystem distribution	Site preparation, construction and operation activities can result in the loss or alteration of riparian ecosystem distribution	Primary	Negative	There would be some loss and fragmentation of riparian habitat throughout the vegetation and wetlands RSA relative to the Base Case, but riparian ecosystems remain well connected. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Certain	
	Ecosystem composition	Site preparation, construction and operation activities can result in the loss or alteration of riparian ecosystem composition	Primary	Negative	Small changes in water quality and flow and potential introduction of invasive species may alter riparian species abundance and richness. Magnitude will depend on influences from climate change	Beyond regional (due to climate change)	Permanent/long-term	Continuous	Possible	

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat										
Woodland caribou	Habitat availability	<p>Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability</p> <p>Sensory disturbance (lights, smells, noise, dust, human activity, electromagnetic field, viewscape) can change wildlife habitat availability</p>	Primary	Negative	<ul style="list-style-type: none"> Category 1 (nursery habitat): no known nursery areas affected Category 1 (travel corridors): one movement corridor affected (Neys / Kilalla linkage) by the Project and one RFD Winter habitat: 464 ha (1.3% of available in LSCR); some avoidance due to sensory disturbance, but limited by paralleling the Project and overlapping RFDs with existing disturbances) Refuge habitat: 1,596 ha (1.3% of available in LSCR); some avoidance due to sensory disturbance, but limited by paralleling the Project and overlapping RFDs with existing disturbances) Category 3 (remaining areas in the range): 3,670 ha (1.8% of available in LSCR) and 3,470 ha (0.1% of available in the discontinuous range); some avoidance due to sensory disturbance, but limited by paralleling the Project and overlapping RFDs with existing disturbances) Disturbance: proportion of LSCR disturbed changes from 29.7% to 30.3%. Proportion of discontinuous range disturbed increases from 65.7% to 66.7% Magnitude will depend on the influences from climate change 	Beyond regional (due to climate change)	<p>Permanent</p> <p>Medium- to long-term</p>	Continuous	<ul style="list-style-type: none"> Category 1 (nursery areas): unlikely Winter habitat: certain Category 1 (travel corridors): probable Refuge habitat: certain Category 3 (remaining areas in the range): Certain (direct loss); Probable (avoidance) 	Significant
	Habitat distribution	<p>Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat connectivity</p> <p>Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability</p>	Primary	Negative	<ul style="list-style-type: none"> Increase in linear feature density from 0.19 km/km² to approximately 0.25 km/km² in the LSCR and from approximately 0.58 km/km² to 0.62 km/km² in the discontinuous range Loss of Category 1 habitat (travel corridors) is primarily associated with the Project and Marathon mining project Caribou habitat remains well-connected in high-use areas on islands; small reduction in movements among habitat patches near RFDs Magnitude will depend on the influences from climate change 	Beyond regional (due to climate change)	Permanent	Continuous	Possible	
	Survival and reproduction	<p>Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability</p> <p>Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability</p> <p>Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting/harvesting)</p>	Primary	Negative	<ul style="list-style-type: none"> Increase in predation risk Possible reduction in gene flow if population connectivity is disrupted by the Project and an RFD Displacement of a few individuals with home ranges that overlap the Lake Superior Coast Range 	Beyond regional (due to climate change)	Permanent	Continuous	Probable	

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Moose	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 10,058 ha (0.2%) of the moose RSA Base Case; reduced quality of habitat and possible avoidance in the moose RSA from sensory disturbance during construction and reclamation; magnitude will depend on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous	Certain	Not significant	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term to long-term		Probable		
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to RFDs; contracted distribution due to climate change	Beyond regional (due to climate change)	Permanent	Continuous	Possible		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small increase in mortality due to RFDs, lower moose densities due to climate change	Beyond regional (due to climate change)	Permanent	Continuous	Probable		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey (including hunting/harvesting)									
	American Marten	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	<ul style="list-style-type: none"> ■ Direct loss of 3,912 ha (2.1%) of the marten RSA Base Case, reduced quality of habitat and possible avoidance in the marten RSA from sensory disturbance during construction and reclamation ■ Magnitude is influenced by climate change 	Beyond regional (due to climate change)	Permanent	Continuous		Certain
			Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium-term to long-term			Probable
Habitat distribution		Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to RFDs; contracted distribution due to climate change	Beyond regional (due to climate change)	Permanent	Continuous	Probable		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
Survival and reproduction		Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small increase in mortality due to RFDs, lower marten densities due to climate change	Beyond regional (due to climate change)	Permanent	Continuous	Probable		
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
		Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey									

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
Little brown myotis	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	<ul style="list-style-type: none"> ■ Direct loss of 86 ha (4.9%) of potential winter habitat in the little brown myotis RSA Base Case; no avoidance due to sensory disturbance by adhering to setbacks ■ Direct loss of 7,789 ha of potential maternity roosting habitat (3.5%) of little brown myotis RSA Base Case; avoidance of maternity roosting habitat due to sensory disturbance in the wildlife and wildlife habitat LSA ■ Magnitude depends on the influences from climate change 	Beyond regional (due to climate change)	Permanent	Continuous	Unlikely (direct loss of winter habitat)	Significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term		Probable (direct loss and avoidance of maternity roosting habitat)	
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat distribution	Primary	Negative	Small change in movements among habitat patches due to high mobility and ability to occupy fragmented landscapes; possible range expansion due to climate change	Beyond regional (due to climate change)	Permanent	Continuous	Possible	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat distribution								
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Mortality due to collision with wind turbines, extermination on private lands; reduced survival due to climate change	Beyond regional (due to climate change)	Long-term	Continuous	Possible	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability								
Bald eagle	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 3,167 ha (2.8% of bald eagle RSA Base Case); reduced quality of nesting and roosting habitat and possible avoidance in the RSA from sensory disturbance during construction and reclamation; magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous	Certain	Not significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term		Probable	
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to RFDs but populations remain well connected; possible range expansion due to climate change	Beyond regional (due to climate change)	Permanent	Continuous	Probable	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability								
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Reduction in productive capacity from 46 to 44 individuals in the bald eagle RSA compared to Base Case; possible reduction in productivity of home ranges overlapping the RSA; small increase in mortality from collisions with transmission lines	Beyond regional (due to climate change)	Permanent	Continuous	Possible	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term			
Collisions with the transmission line causing injury or mortality to birds		Primary	Negative	Permanent						

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance
Biological Environment (cont'd)										
Wildlife and Wildlife Habitat (cont'd)										
Bobolink	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Direct loss of 1 ha (<1% loss of habitat in both wildlife and wildlife habitat LSA and bobolink RSA from Base Case); reduced quality of nesting habitat and possible avoidance in the wildlife and wildlife habitat LSA from sensory disturbance during construction and reclamation; magnitude will depend on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous	Certain	Not significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term		Probable	
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to RFD. Magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous	Probable	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Probable			
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss, sensory disturbance, and mortality; magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous	Possible	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term			
Canada warbler	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Suitable habitat is predicted to decrease by 10,476 ha (2.6%) in the warbler RSA for the Cumulative Effects Case compared to the Base Case. Magnitude depends on the influences of climate change.	Beyond regional (due to climate change)	Permanent	Continuous	Certain	Not significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term		Probable	
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility; magnitude depends on the influences of climate change	Beyond regional (due to climate change)	Permanent	Continuous	Probable	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Probable			
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss, sensory disturbance, incidental mortality and nest parasitism; reduction in productive capacity of 136 individuals; magnitude depends on the influences of climate change	Beyond regional (due to climate change)	Permanent	Continuous	Probable	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term			
Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey		Primary	Negative	Permanent						

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)							
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance	
Biological Environment (cont'd)											
Wildlife and Wildlife Habitat (cont'd)											
Eastern whip-poor-will	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Suitable habitat is predicted to decrease by 2,647 ha (2.2%) in the whip-poor-will RSA for the Cumulative Effects Case compared to the Base Case. Magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous		Certain	Not significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term			Probable	
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility. Magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous		Probable	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss, sensory disturbance, and mortality. Magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous		Possible	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term				
Olive-sided flycatcher	Habitat availability	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Suitable breeding habitat is predicted to be reduced by 4,897 ha (2.1%) in the olive-sided flycatcher RSA in the Cumulative Effects Case relative to the Base Case; magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous		Certain	Not significant
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term			Probable	
	Habitat distribution	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in movements among habitat patches due to high mobility; magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous		Probable	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability									
	Survival and reproduction	Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability	Primary	Negative	Small reduction in productivity from habitat loss, sensory disturbance, and incidental mortality; reduction in productive capacity of 39 individuals; magnitude depends on the influences from climate change	Beyond regional (due to climate change)	Permanent	Continuous		Possible	
		Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability					Medium- to long-term				

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance
Socio-economic Environment										
Indigenous Current Use of Lands and Resources for Traditional Purposes										
First Nations Current Land and Resource Use										
Traditional wildlife harvesting	Resource availability	Disturbance, both direct and indirect may result in changes on resource availability (wildlife or vegetation) relied on by First Nations harvesters	Primary	Negative	Low to moderate	Beyond regional (due to climate change)	Medium-term to permanent	Continuous	Probable to certain	Not significant
	Sites and areas	Disturbance may remove currently available lands or site-specific locations that are relied on for First Nations harvesting	Primary	Negative	Moderate	Regional	Medium-term to permanent	Frequent to continuous	Certain	
	Changes in environmental conditions	Development or activities may result in visual disturbance that could affect First Nations land users while undertaking land use activities	Primary	Negative	Low to moderate	Local	Long-term	Continuous	Possible	
Traditional fish harvesting	Sites and areas	Disturbance may remove currently available lands or site-specific locations that are relied on for First Nations harvesting	Primary	Negative	Moderate	Regional	Medium-term to permanent	Frequent to continuous	Probable to certain	Not significant
	Changes in environmental conditions	Development or activities may result in visual disturbance that could affect First Nations land users while undertaking land use activities	Primary	Negative	Low to moderate	Local	Long-term	Continuous	Possible	
Traditional plant and material harvesting	Resource availability	Disturbance, both direct and indirect may result in changes on resource availability (wildlife or vegetation) relied on by First Nations harvesters	Primary	Negative	Low	Beyond regional (due to climate change)	Long-term to permanent	Continuous	Possible to certain	Not significant
	Sites and areas	Disturbance may remove currently available lands or site-specific locations that are relied on for First Nations harvesting	Primary	Negative	Moderate	Regional	Medium-term to permanent	Continuous	Certain	
	Changes in environmental conditions	Development or activities may result in visual disturbance that could affect First Nations land users while undertaking land use activities	Primary	Negative	Low to moderate	Local	Long-term	Continuous	Possible	
Use of Culturally Important Sites and Areas	Sites and areas	Disturbance may remove currently available lands or site-specific locations that are relied on for First Nations harvesting	Primary	Negative	Moderate	Regional	Permanent	Continuous	Probable to certain	Not significant
	Changes in environmental conditions	Development or activities may result in visual disturbance that could affect First Nations land users while undertaking land use activities	Primary	Negative	Low to moderate	Local	Long-term	Continuous	Possible	
Métis Current Land and Resource Use										
Metis Way of Life	Land use conflicts with familial or community teaching and transmission practices and qualitative disconnect from areas of sites of Métis tradition	Disturbance may remove currently available lands or site-specific locations that are relied on for Métis harvesting or cultural use	Primary	Negative	Low to moderate	Local	Long-term	Continuous	Possible	Not significant
	Damage or loss of key spiritual areas to Métis way of life	Development or activities may result in visual disturbance that could affect Métis land users while undertaking land use activities	Primary	Negative	Moderate	Regional	Permanent	Continuous	Probable to certain	
Metis Harvesting	Reduced access to preferred locations of harvest	Disturbance may remove currently available lands or site-specific locations that are relied on for Métis harvesting	Primary	Negative	Moderate	Regional	Medium-term to permanent	Frequent to continuous	Probable to certain	Not significant
	Loss or alteration of key cultural species harvested	Disturbance, both direct and indirect may result in changes on resource availability (wildlife or vegetation) relied on by Métis harvesters	Primary	Negative	Low to moderate	Beyond regional (due to climate change)	Medium-term to permanent	Continuous	Possible to certain	
	Changes to known harvesting conditions required for continued harvest	Development or activities may result in visual disturbance that could affect Métis land users while undertaking land use activities	Primary	Negative	Low to moderate	Local	Long-term	Continuous	Possible	
Socio-economics										
Services and infrastructure	Change in demand on water, waste and energy services (taking into consideration change in demand with respect to available supply)	Project direct use of power and water and generation of waste water and solid waste would increase demand on power, water, waste water and solid waste services	Primary	Negative	Low to moderate	Local	Short-term	Continuous	Probable	Not significant

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Table 22-2: Summary of Predicted Cumulative Effects (Cumulative Effects Case)

Criteria	Indicators	Effect Pathway	Pathway Type	Effects Characteristics ^(a)						
				Direction	Magnitude	Geographic Extent	Duration/ Reversibility	Frequency	Probability of Occurrence	Significance
Socio-economic Environment (cont'd)										
Non-traditional Land and Resource Use										
Parks and Protected Areas	Changes in parks and protected area experience due to changes in environmental conditions (e.g., noise, air quality, visual resources)	Changes in environmental conditions (visual environment, acoustic environment, air quality) could affect parks and protected areas' user experience	Primary	Negative	Low to moderate	Regional	Long-term (operation phase)	Continuous	Probable	Not significant
Non-commercial Recreational Land and Resource Use	Changes in non-commercial recreational land and resource access and use	Site preparation, construction and maintenance of the preferred route ROW could affect non-commercial recreational land and resource access and use	Primary	Negative (in the case of decreased access) Negative or Positive (in the case of increased access, dependent on the user group)	Moderate	Regional	Long-term (operation phase)	Continuous	Certain	Not significant
	Changes in non-commercial recreational experience due to changes in environmental conditions (e.g. visual resources, noise, air quality)	Changes in environmental conditions (visual environment, acoustic environment, air quality) could affect non-commercial recreational experience	Primary	Negative	Moderate	Regional	Long-term (operation phase)	Continuous	Probable	
Commercial Land and Resource Use	Changes in commercial (consumptive and non-consumptive) land and resource use and access	Site preparation, construction and maintenance of the preferred route ROW could affect consumptive and non-consumptive commercial land and resource access and use	Primary	Negative (in the case of decreased access) Negative or Positive (in the case of increased access, dependent on the user group)	Moderate	Regional	Long-term	Continuous	Probable	Not significant
	Changes in commercial (consumptive and non-consumptive) recreational experience due to changes in environmental conditions (e.g., noise, air quality, visual resources)	Changes in environmental conditions (visual environment, acoustic environment, air quality) could affect commercial (commercial recreational and tourism) experiences	Primary	Negative	Moderate	Regional	Long-term (operation phase)	Continuous	Probable	
Visual Environment										
Visual quality	Visibility of the Project	Removal of land cover, modification of land form and the assembly of built structures related to the construction and/or operation of the Project and RFDs are expected to introduce visible disturbances to the existing landscape that can adversely affect visual quality	Primary	Negative	Low to moderate	Local	Long-term/reversible	Continuous	Possible	Not significant
	Visual contrast of the Project relative to the existing landscape	The character of land cover disturbances, modified land form and/or built structures related to the construction and/or operation of the Project and RFDs are expected to contrast with the existing landscape and can adversely affect visual quality	Primary	Negative	Low to moderate	Local	Long-term/reversible	Continuous	Possible	

a) Effects characteristics are described for primary pathways. Refer to Section 5 for a description of the effects assessment method.