

KINROSS

Great Bear

Great Bear Gold Project Impact Statement

Section 7: Analysis of Changes to Pathway Valued Components

**Human Environment pVCs and References
Section 7.13 to Section 7.17**



Table of Contents

7.0	Analysis of Changes to the Environment – Pathway Valued Components	7-1
7.1	Influence of Consultation and Engagement	7-1
7.1.1	Background	7-1
7.1.2	Influence of Consultation on Atmospheric pVCs	7-2
7.1.2.1	ANA	7-3
7.1.2.2	LSFN and WFN	7-3
7.1.2.3	NWOMC	7-4
7.1.2.4	General Public	7-4
7.1.3	Influence of Consultation on Water pVCs	7-4
7.1.3.1	ANA	7-5
7.1.3.2	LSFN and WFN	7-6
7.1.3.3	NWOMC	7-7
7.1.3.4	Government Agencies	7-7
7.1.3.5	General Public	7-8
7.1.4	Influence of Consultation on Biological pVCs	7-8
7.1.4.1	LSFN	7-9
7.1.4.2	LSFN and WFN	7-9
7.1.4.3	NWOMC	7-9
7.1.4.4	WFN	7-10
7.1.5	Influence of Consultation on Socio-cultural pVCs	7-10
7.1.5.1	ANA	7-10
7.1.5.2	LSFN and WFN	7-10
7.1.5.3	NWOMC	7-11
7.1.5.4	LSFN, NWOMC, WFN and General Public	7-11
7.2	Analysis of Changes to Air Quality	7-12
7.2.1	Pathway Linkages to other Valued Components	7-12
7.2.1.1	Pathway Linkages to Air Quality	7-12
7.2.1.2	Pathway Linkages from Air Quality to fVCs	7-12
7.2.2	Assessment Approach	7-12
7.2.2.1	Regulatory Setting	7-12
7.2.2.1.1	Federal	7-12
7.2.2.1.2	Provincial	7-13
7.2.2.2	Spatial and Temporal Boundaries	7-13
7.2.2.3	Assessment Criteria	7-14
7.2.2.4	Analytical Methods	7-15
7.2.3	Assumptions and the Use of the Conservative Approach	7-16
7.2.4	Existing Conditions	7-17
7.2.5	Identification of Potential Effects	7-18
7.2.5.1	Construction Phase	7-18
7.2.5.2	Operations Phase	7-19
7.2.5.3	Closure Phase	7-20
7.2.6	Mitigation and Enhancement Measures	7-20

7.2.7	Assessment of Changes.....	7-21
7.2.7.1	Changes in Particulate and Trace Metal Concentrations	7-22
7.2.7.1.1	Construction Phase	7-22
7.2.7.1.2	Operations Phase	7-22
7.2.7.1.3	Closure Phase	7-22
7.2.7.2	Changes in Air Parameter Concentrations related to Fuel Combustion	7-22
7.2.7.2.1	Construction Phase	7-22
7.2.7.2.2	Operations Phase	7-23
7.2.7.2.3	Closure Phase	7-23
7.2.7.3	Change in Other Air Parameter Concentrations Related to Ore Mining and Processing.....	7-23
7.2.7.3.1	Construction Phase	7-23
7.2.7.3.2	Operations Phase	7-23
7.2.7.3.3	Closure Phase	7-23
7.2.8	Change Pathway Outcome.....	7-23
7.2.8.1	Summary of Changes after Mitigation	7-23
7.2.8.2	Change Management.....	7-24
7.2.8.3	Confidence	7-24
7.3	Analysis of Changes to Sound.....	7-55
7.3.1	Pathway Linkages to other Valued Components.....	7-55
7.3.1.1	Pathway Linkages to Sound	7-55
7.3.1.2	Pathway Linkages from Sound to fVCs	7-55
7.3.2	Assessment Approach.....	7-55
7.3.2.1	Regulatory Setting	7-55
7.3.2.1.1	Federal.....	7-55
7.3.2.1.2	Provincial	7-56
7.3.2.2	Spatial and Temporal Boundaries.....	7-57
7.3.2.3	Assessment Criteria	7-58
7.3.2.4	Analytical Methods	7-58
7.3.2.4.1	Sound Source Summary.....	7-58
7.3.2.4.2	Sound Assessment Methodology	7-59
7.3.3	Assumptions and the Use of the Conservative Approach	7-60
7.3.4	Existing Conditions	7-60
7.3.5	Identification of Potential Effects	7-61
7.3.5.1	Construction Phase	7-61
7.3.5.2	Operations Phase.....	7-62
7.3.5.3	Closure Phase.....	7-62
7.3.6	Mitigation and Enhancement.....	7-62
7.3.7	Assessment of Changes.....	7-63
7.3.7.1	Construction Phase	7-63
7.3.7.2	Operations Phase.....	7-64
7.3.7.3	Closure Phase.....	7-64
7.3.8	Change Pathway Outcome.....	7-65

7.3.8.1	Summary of Changes after Mitigation	7-65
7.3.8.2	Change Management	7-65
7.3.8.3	Confidence	7-65
7.4	Analysis of Changes to Vibration	7-76
7.4.1	Pathway Linkages to other Valued Components.....	7-76
7.4.1.1	Pathway Linkages to Vibration	7-76
7.4.1.2	Pathway Linkages from Vibration to fVCs	7-76
7.4.2	Assessment Approach.....	7-76
7.4.2.1	Regulatory Setting	7-76
7.4.2.1.1	Federal.....	7-77
7.4.2.1.2	Provincial	7-77
7.4.2.2	Spatial and Temporal Boundaries.....	7-77
7.4.2.3	Assessment Criteria	7-78
7.4.2.4	Analytical Methods	7-78
7.4.2.4.1	Ground Vibration and Air Overpressure.....	7-78
7.4.2.4.2	Water Overpressure.....	7-79
7.4.3	Assumptions and the Use of the Conservative Approach	7-80
7.4.4	Existing Conditions	7-80
7.4.5	Identification of Potential Effects	7-81
7.4.5.1	Construction Phase	7-81
7.4.5.2	Operations Phase.....	7-81
7.4.5.3	Closure Phase.....	7-81
7.4.6	Mitigation and Enhancement.....	7-81
7.4.7	Assessment of Changes.....	7-82
7.4.7.1	Changes to Ground Vibration and Air Overpressure	7-82
7.4.7.1.1	Construction Phase and Operations Phase	7-82
7.4.7.1.2	Closure Phase	7-83
7.4.7.2	Changes to Underwater Ground Vibration and Water Overpressure	7-83
7.4.7.2.1	Construction Phase	7-83
7.4.7.2.2	Operations Phase.....	7-84
7.4.7.2.3	Closure Phase	7-84
7.4.8	Change Pathway Outcome.....	7-84
7.4.8.1	Summary of Changes after Mitigation	7-84
7.4.8.2	Change Management.....	7-84
7.4.8.3	Confidence	7-84
7.5	Analysis of Changes to Groundwater	7-100
7.5.1	Pathway Linkages to other Valued Components.....	7-100
7.5.1.1	Pathway Linkages to Groundwater	7-100
7.5.1.2	Pathway Linkages from Groundwater to fVCs.....	7-100
7.5.2	Assessment Approach.....	7-100
7.5.2.1	Regulatory Setting	7-100
7.5.2.1.1	Federal.....	7-101

7.5.2.1.2	Provincial	7-101
7.5.2.2	Spatial and Temporal Boundaries.....	7-101
7.5.2.3	Assessment Criteria	7-102
7.5.2.4	Analytical Methods	7-102
7.5.2.4.1	Conceptual Hydrogeological Model.....	7-103
7.5.2.4.2	Numerical Model.....	7-104
7.5.3	Assumptions and the Use of the Conservative Approach	7-105
7.5.4	Existing Conditions	7-106
7.5.5	Identification of Potential Effects	7-109
7.5.5.1	Construction Phase	7-109
7.5.5.2	Operations Phase.....	7-110
7.5.5.3	Closure Phase.....	7-110
7.5.6	Mitigation and Enhancement.....	7-111
7.5.7	Assessment of Changes.....	7-112
7.5.8	Change Pathway Outcome.....	7-113
7.5.8.1	Summary of Changes after Mitigation	7-113
7.5.8.2	Change Management.....	7-113
7.5.8.3	Confidence	7-114
7.6	Analysis of Changes to Surface Water Flows and Levels	7-130
7.6.1	Pathway Linkages to other Valued Components.....	7-130
7.6.1.1	Pathway Linkages to Surface Water Flows and Levels.....	7-130
7.6.1.2	Pathway Linkages from Surface Water Flows and Levels to fVCs.....	7-130
7.6.2	Assessment Approach.....	7-130
7.6.2.1	Regulatory Setting.....	7-130
7.6.2.1.1	Federal.....	7-131
7.6.2.1.2	Provincial	7-131
7.6.2.2	Spatial and Temporal Boundaries.....	7-132
7.6.2.3	Assessment Criteria	7-133
7.6.2.4	Analytical Methods	7-133
7.6.3	Assumptions and the Use of the Conservative Approach	7-134
7.6.4	Existing Conditions	7-134
7.6.4.1	Overview of Regional Hydrology	7-134
7.6.4.2	Local Hydrology.....	7-135
7.6.4.2.1	Surface Water Flows.....	7-135
7.6.4.2.2	Surface Water Levels.....	7-136
7.6.5	Identification of Potential Effects	7-137
7.6.5.1	Construction Phase	7-137
7.6.5.2	Operations Phase.....	7-138
7.6.5.3	Closure Phase.....	7-138
7.6.6	Mitigation and Enhancement Measures	7-139
7.6.7	Assessment of Effects	7-140
7.6.7.1	Change in Surface Water Flows.....	7-140
7.6.7.1.1	Construction Phase	7-140

7.6.7.1.2	Operations Phase	7-141
7.6.7.1.3	Closure Phase	7-142
7.6.7.2	Change in Surface Water Levels	7-143
7.6.7.2.1	Construction Phase	7-143
7.6.7.2.2	Operations Phase	7-143
7.6.7.2.3	Closure Phase	7-144
7.6.8	Change Pathway Outcome	7-144
7.6.8.1	Summary of Changes after Mitigation	7-144
7.6.8.2	Change Management	7-145
7.6.8.3	Confidence	7-145
7.7	Water Quality	7-161
7.7.1	Pathway Linkages to other Valued Components	7-161
7.7.1.1	Pathway Linkages to Water Quality	7-161
7.7.1.2	Pathway Linkages from Water Quality to fVCs	7-161
7.7.2	Assessment Approach	7-161
7.7.2.1	Regulatory Setting	7-162
7.7.2.1.1	Federal	7-162
7.7.2.1.2	Provincial	7-162
7.7.2.2	Spatial and Temporal Boundaries	7-164
7.7.2.3	Assessment Criteria	7-165
7.7.2.4	Analytical Methods	7-165
7.7.3	Assumptions and the Use of the Conservative Approach	7-168
7.7.4	Existing Conditions	7-169
7.7.4.1	Surface Water Quality	7-169
7.7.4.1.1	Dixie Creek	7-171
7.7.4.1.2	Chukuni River	7-171
7.7.4.1.3	Unnamed Watercourses and Unnamed Waterbodies	7-172
7.7.4.1.4	Other Locations	7-172
7.7.4.2	Groundwater Quality	7-173
7.7.5	Identification of Potential Effects	7-174
7.7.5.1	Construction Phase	7-175
7.7.5.2	Operations Phase	7-176
7.7.5.3	Closure Phase	7-177
7.7.6	Mitigation and Enhancement Measures	7-177
7.7.7	Assessment of Effects	7-180
7.7.7.1	Construction Phase	7-181
7.7.7.2	Operations Phase	7-182
7.7.7.3	Closure Phase	7-185
7.7.8	Change Pathway Outcome	7-186
7.7.8.1	Summary of Changes after Mitigation	7-186
7.7.8.2	Change Management	7-187
7.7.8.3	Confidence	7-187

7.8	Analysis of Changes to Vegetation Communities.....	7-221
7.8.1	Pathway Linkages to other Valued Components.....	7-221
7.8.1.1	Pathway Linkages to Vegetation Communities	7-221
7.8.1.2	Pathway Linkages from Vegetation Communities to fVCs	7-221
7.8.2	Assessment Approach.....	7-221
7.8.2.1	Regulatory Setting.....	7-221
7.8.2.1.1	Federal.....	7-222
7.8.2.1.2	Provincial	7-222
7.8.2.2	Spatial and Temporal Boundaries.....	7-222
7.8.2.3	Assessment Criteria	7-223
7.8.2.4	Analytical Methods	7-223
7.8.2.4.1	Direct Effects.....	7-224
7.8.2.4.2	Indirect Effects	7-224
7.8.3	Assumptions and the Use of the Conservative Approach	7-225
7.8.4	Existing Conditions	7-225
7.8.5	Identification of Potential Effects	7-227
7.8.6	Mitigation and Enhancement Measures	7-229
7.8.7	Assessment of Changes.....	7-229
7.8.7.1.1	Construction Phase	7-230
7.8.7.1.2	Operations Phase	7-231
7.8.7.1.3	Closure Phase	7-231
7.8.7.2.1	Construction Phase	7-232
7.8.7.2.2	Operations Phase	7-232
7.8.7.2.3	Closure Phase	7-232
7.8.7.3.1	Construction Phase and Operations Phase	7-233
7.8.7.3.2	Closure Phase	7-234
7.8.8	Change Pathway Outcome.....	7-234
7.8.8.1	Summary of Changes after Mitigation	7-234
7.8.8.2	Change Management.....	7-235
7.8.8.3	Confidence	7-235
7.9	Analysis of Changes to Wild Rice.....	7-263
7.9.1	Pathway Linkages to other Valued Components.....	7-263
7.9.1.1	Pathway Linkages to Wild Rice	7-263
7.9.1.2	Pathway Linkages from Wild Rice to Federal Valued Components	7-263
7.9.2	Assessment Approach.....	7-263
7.9.2.1	Regulatory Setting.....	7-263
7.9.2.2	Spatial and Temporal Boundaries.....	7-264
7.9.2.3	Assessment Criteria	7-264
7.9.2.4	Analytical Methods	7-264
7.9.3	Assumptions and the Use of the Conservative Approach	7-265
7.9.4	Existing Conditions	7-266
7.9.4.1	Wild Rice Stand at Unnamed Waterbody 1	7-266
7.9.4.2	Other Wild Rice Stands	7-267

7.9.5	Identification of Potential Effects	7-267
7.9.5.1	Construction Phase	7-268
7.9.5.2	Operations Phase	7-268
7.9.5.3	Closure Phase	7-269
7.9.6	Mitigation and Enhancement	7-269
7.9.7	Assessment of Changes	7-270
7.9.7.1	Relative Abundance of Wild Rice Stands	7-270
7.9.7.1.1	Construction Phase	7-270
7.9.7.1.2	Operations Phase	7-270
7.9.7.1.3	Closure Phase	7-270
7.9.7.2	Change in the Quality of Wild Rice Stands	7-271
7.9.7.2.1	Construction and Operations Phase	7-271
7.9.7.2.2	Closure	7-271
7.9.8	Change Pathway Outcome	7-271
7.9.8.1	Summary of Changes after Mitigation	7-271
7.9.8.2	Change Management	7-271
7.9.8.3	Confidence	7-271
7.10	Analysis of Changes to Moose	7-280
7.10.1	Pathway Linkages to other Valued Components	7-280
7.10.1.1	Pathway Linkages to Moose	7-280
7.10.1.2	Pathway Linkages from Moose to fVCs	7-280
7.10.2	Assessment Approach	7-280
7.10.2.1	Regulatory Setting	7-281
7.10.2.1.1	Federal	7-281
7.10.2.1.2	Provincial	7-281
7.10.2.2	Spatial and Temporal Boundaries	7-281
7.10.2.3	Assessment Criteria	7-282
7.10.2.4	Analytical Methods	7-282
7.10.2.4.1	Direct Effects	7-283
7.10.2.4.2	Indirect Effects	7-283
7.10.2.4.3	Moose Density	7-285
7.10.2.4.4	Moose Population Modelling	7-285
7.10.3	Assumptions and the Use of the Conservative Approach	7-286
7.10.4	Existing Conditions	7-287
7.10.4.1	Moose Habitat	7-288
7.10.4.2	Moose Density	7-288
7.10.5	Identification of Potential Effects	7-288
7.10.5.1	Construction Phase	7-289
7.10.5.2	Operations Phase	7-290
7.10.5.3	Closure Phase	7-290
7.10.6	Mitigation and Enhancement Measures	7-291
7.10.7	Assessment of Changes	7-292

7.10.7.1	Change in Relative Abundance of Habitat.....	7-292
7.10.7.1.1	Construction Phase	7-292
7.10.7.1.2	Operations Phase	7-292
7.10.7.1.3	Closure Phase	7-292
7.10.7.2	Change Habitat Quality	7-293
7.10.7.2.1	Construction Phase	7-293
7.10.7.2.1	Operations Phase	7-293
7.10.7.2.2	Closure Phase	7-294
7.10.7.3	Change in Risk of Mortality.....	7-294
7.10.7.4	Change in Moose Density	7-295
7.10.7.4.1	Construction Phase	7-295
7.10.7.4.2	Operations Phase	7-296
7.10.7.4.3	Closure Phase	7-296
7.10.8	Change Pathway Outcome.....	7-296
7.10.8.1	Summary of Changes after Mitigation	7-296
7.10.8.2	Change Management.....	7-297
7.10.8.3	Confidence	7-297
7.11	Analysis of Changes to Other Wildlife	7-320
7.11.1	Pathway Linkages to Other Valued Components.....	7-320
7.11.1.1	Pathway Linkages to Other Wildlife.....	7-320
7.11.1.2	Pathway Linkages from Other Wildlife to fVCs.....	7-320
7.11.2	Assessment Approach.....	7-320
7.11.2.1	Regulatory Setting.....	7-321
7.11.2.1.1	Federal.....	7-321
7.11.2.1.2	Provincial	7-321
7.11.2.2	Spatial and Temporal Boundaries.....	7-322
7.11.2.3	Assessment Criteria	7-323
7.11.2.4	Analytical Methods	7-323
7.11.2.4.1	Direct Effects.....	7-324
7.11.2.4.2	Indirect Effects	7-324
7.11.3	Assumptions and the Use of the Conservative Approach	7-325
7.11.4	Existing Conditions	7-326
7.11.4.1	Furbearers.....	7-327
7.11.4.2	Large Mammals.....	7-328
7.11.4.3	Herptiles	7-329
7.11.4.4	Raptors.....	7-330
7.11.4.5	Species of Importance to Indigenous People.....	7-330
7.11.5	Identification of Potential Effects	7-331
7.11.5.1	Construction Phase	7-332
7.11.5.2	Operations Phase.....	7-332
7.11.5.3	Closure Phase.....	7-333
7.11.6	Mitigation and Enhancement Measures	7-334
7.11.7	Assessment of Changes.....	7-334

7.11.7.1	Change in Relative Abundance of Habitat.....	7-334
7.11.7.1.1	Construction Phase	7-335
7.11.7.1.1.1	Furbearer.....	7-335
7.11.7.1.1.2	Large Mammals.....	7-335
7.11.7.1.1.3	Herptiles.....	7-335
7.11.7.1.1.4	Raptors	7-335
7.11.7.1.1.5	Species of Importance to Indigenous People.....	7-335
7.11.7.1.2	Operations Phase	7-336
7.11.7.1.3	Closure Phase	7-336
7.11.7.2	Change Habitat Quality	7-336
7.11.7.2.1	Construction Phase	7-336
7.11.7.2.2	Operations Phase.....	7-337
7.11.7.2.3	Closure Phase	7-338
7.11.7.3	Change in Risk of Mortality.....	7-338
7.11.7.3.1	Construction Phase and Operations Phase	7-338
7.11.7.3.2	Closure Phase	7-339
7.11.8	Change Pathway Outcome.....	7-339
7.11.8.1	Summary of Changes after Mitigation	7-339
7.11.8.2	Change Management.....	7-340
7.11.8.3	Confidence	7-340
7.12	Analysis of Changes to Species at Risk	7-374
7.12.1	Pathway Linkages to other Valued Components.....	7-374
7.12.1.1	Pathway Linkages to SAR.....	7-374
7.12.1.2	Pathway Linkages from SAR to fVCs.....	7-374
7.12.2	Assessment Approach.....	7-374
7.12.2.1	Regulatory Setting.....	7-375
7.12.2.1.1	Federal.....	7-375
7.12.2.1.1.1	Migratory Birds Convention Act.....	7-375
7.12.2.1.1.2	Species at Risk Act.....	7-375
7.12.2.1.1.3	Conservation Agreement for Boreal Caribou in Ontario.....	7-375
7.12.2.1.1.4	Federal Action Plan for Boreal Caribou.....	7-376
7.12.2.1.2	Provincial	7-376
7.12.2.1.2.1	Endangered Species Act and the Species Conservation Act	7-376
7.12.2.1.2.2	Fish and Wildlife Conservation Act.....	7-377
7.12.2.2	Spatial and Temporal Boundaries.....	7-378
7.12.2.3	Assessment Criteria	7-379
7.12.2.4	Analytical Methods	7-379
7.12.2.4.2	Indirect Effects	7-380
7.12.2.4.3	Mortality	7-382
7.12.2.4.4	Range Scale Considerations for Boreal Caribou.....	7-382
7.12.2.4.5	Change in Population Demography for Boreal Caribou	7-383
7.12.3	Assumptions and the Use of the Conservative Approach	7-383



7.12.4 Existing Conditions	7-384
7.12.4.1 Boreal Caribou	7-385
7.12.4.2 SAR Bats	7-386
7.12.4.3 Wolverine.....	7-387
7.12.4.4 Rusty Blackbird	7-388
7.12.4.5 Short-eared Owl	7-388
7.12.4.6 Common Snapping Turtle.....	7-388
7.12.4.7 Yellow-banded Bumblebee.....	7-389
7.12.5 Identification of Potential Effects	7-389
7.12.6 Mitigation and Enhancement Measures	7-392
7.12.7 Assessment of Changes.....	7-393
7.12.7.1 Change in Relative Abundance of Habitat.....	7-393
7.12.7.1.1 Construction Phase	7-393
7.12.7.1.1.1 Boreal Caribou.....	7-394
7.12.7.1.1.2 SAR Bats	7-394
7.12.7.1.1.3 Wolverine.....	7-394
7.12.7.1.1.4 Rusty Blackbird.....	7-395
7.12.7.1.1.5 Short-eared Owl	7-395
7.12.7.1.1.6 Snapping Turtle	7-395
7.12.7.1.1.7 Yellow-banded Bumblebee.....	7-395
7.12.7.1.2 Operations Phase	7-395
7.12.7.1.3 Closure Phase	7-396
7.12.7.2 Change in Habitat Quality	7-396
7.12.7.2.1 Construction Phase	7-397
7.12.7.2.1.1 Boreal Caribou.....	7-397
7.12.7.2.1.2 SAR Bats	7-398
7.12.7.2.1.3 Wolverine.....	7-399
7.12.7.2.1.4 Rusty Blackbird, Short-eared Owl, Snapping Turtle and Yellow-banded Bumblebee	7-400
7.12.7.2.2 Operations Phase	7-400
7.12.7.2.2.1 Boreal Caribou.....	7-400
7.12.7.2.2.2 SAR Bats	7-400
7.12.7.2.2.3 Wolverine.....	7-401
7.12.7.2.2.4 Rusty Blackbird, Short-eared Owl, Snapping Turtle and Yellow-banded Bumblebee	7-401
7.12.7.2.3 Closure Phase	7-402
7.12.7.3 Change in Risk of Mortality.....	7-402
7.12.7.3.1 Construction Phase and Operations Phase	7-403
7.12.7.3.2 Closure Phase	7-404
7.12.7.4 Change in Range Conditions for Boreal Caribou	7-404
7.12.7.4.1 Construction Phase	7-404
7.12.7.4.2 Operations Phase	7-405
7.12.7.4.3 Closure Phase	7-405

7.12.7.5	Change in Population Demography for Boreal Caribou	7-405
7.12.7.5.1	Construction Phase and Operations Phase	7-405
7.12.7.5.2	Closure Phase	7-405
7.12.8	Change Pathway Outcome.....	7-406
7.12.8.1	Summary of Changes after Mitigation	7-406
7.12.8.2	Change Management.....	7-406
7.12.8.3	Confidence	7-407
7.13	Analysis of Changes to Land and Resources Use	7-445
7.13.1	Pathway Linkages to Other Valued Components.....	7-445
7.13.1.1	Pathway Linkages to Land and Resource Use	7-445
7.13.1.2	Pathway Linkages from Land and Resource Use to fVCs.....	7-445
7.13.2	Assessment Approach.....	7-446
7.13.2.1	Regulatory Setting.....	7-447
7.13.2.1.1	Federal.....	7-447
7.13.2.1.2	Provincial	7-447
7.13.2.1.3	Municipal.....	7-447
7.13.2.2	Spatial and Temporal Boundaries.....	7-448
7.13.2.3	Assessment Criteria	7-449
7.13.2.4	Analytical Methods	7-449
7.13.3	Assumptions and the Use of the Conservative Approach	7-449
7.13.4	Existing Conditions	7-449
7.13.4.1	Methods.....	7-449
7.13.4.2	Description of Existing Conditions	7-450
7.13.4.3	Recreational Use of Land and Resources.....	7-450
7.13.4.3.1	Waterbodies and Watercourses.....	7-450
7.13.4.3.2	Recreational Trails	7-452
7.13.4.3.3	Traplines	7-452
7.13.4.3.4	Campgrounds, Lodges, Tourist Cabins, Resorts, and Other Wilderness Establishments.....	7-452
7.13.4.3.5	Recreational Fishing	7-452
7.13.4.3.6	Hunting.....	7-453
7.13.4.3.7	Protected Environmental Areas	7-453
7.13.4.4	Commercially Based Use of Land and Resources	7-453
7.13.4.4.1	Aggregate Resources	7-453
7.13.4.4.2	Mining	7-453
7.13.4.4.3	Forestry.....	7-454
7.13.4.4.4	Bait Harvesting.....	7-454
7.13.4.4.5	Energy.....	7-454
7.13.4.5	Visual Setting.....	7-454
7.13.4.6	Light Environment	7-455
7.13.4.7	Navigation	7-455
7.13.5	Identification of Potential Effects	7-455

7.13.5.1 Construction Phase	7-455
7.13.5.2 Operations Phase.....	7-456
7.13.5.3 Closure Phase.....	7-457
7.13.6 Mitigation	7-457
7.13.7 Assessment of Changes.....	7-458
7.13.7.1 Change in Recreational Land and Resource Use	7-458
7.13.7.1.1 Change in the Availability of Hunting Areas, and Wildlife	7-458
7.13.7.1.2 Change in the Availability of Fishing Areas or Change in Fish Abundance.....	7-458
7.13.7.1.3 Change in Recreational Areas or Change in Access.....	7-459
7.13.7.1.4 Sensory Disturbance to Recreational Users.....	7-459
7.13.7.2 Change in Commercially Based Land and Resource Use	7-460
7.13.7.2.1 Trapping, Guide Outfitting, and Bait Harvesting	7-460
7.13.7.2.2 Timber Harvesting and Resource Extraction Activities.....	7-461
7.13.7.2.3 Sensory Disturbance to Commercially Based Land and Resource Users	7-462
7.13.7.3 Change in Navigation	7-463
7.13.8 Change Pathway Outcome.....	7-463
7.13.8.1 Summary of Changes after Mitigation	7-463
7.13.8.2 Change Management.....	7-464
7.13.8.3 Confidence	7-464
7.14 Analysis of Changes to Cultural Heritage	7-487
7.14.1 Pathway Linkages to other Valued Components.....	7-487
7.14.1.1 Pathway Linkages to Cultural Heritage	7-487
7.14.1.2 Pathway Linkages from Cultural Heritage to fVCs	7-487
7.14.2 Assessment Approach.....	7-487
7.14.2.1 Regulatory Setting	7-487
7.14.2.1.1 Federal.....	7-488
7.14.2.1.2 Provincial	7-488
7.14.2.2 Spatial and Temporal Boundaries.....	7-489
7.14.2.3 Assessment Criteria	7-490
7.14.2.4 Analytical Methods	7-490
7.14.2.4.1 Cultural Heritage Screening.....	7-490
7.14.2.4.2 Cultural Heritage Evaluation.....	7-491
7.14.3 Assumptions and the Use of the Conservative Approach	7-491
7.14.4 Existing Conditions	7-491
7.14.5 Identification of Potential Effects	7-492
7.14.6 Mitigation and Enhancement Measures	7-492
7.14.7 Assessment of Changes.....	7-493
7.14.7.1 Changes to Protected BHRs or CHLs	7-493
7.14.7.2 Changes to Potential BHRs and CHLs - 40 years or Older.....	7-493
7.14.7.2.1 Construction Phase	7-493
7.14.7.2.2 Operations Phase.....	7-493
7.14.7.2.3 Closure Phase	7-493
7.14.7.3 Alteration or Destruction of a Protected or Potential BHR or CHL	7-494

7.14.7.3.1	Construction Phase	7-494
7.14.7.3.2	Operations Phase	7-494
7.14.7.3.3	Closure Phase	7-494
7.14.8	Change Pathway Outcome.....	7-494
7.14.8.1	Summary of Changes after Mitigation	7-494
7.14.8.2	Change Management.....	7-494
7.14.8.3	Confidence	7-494
7.15	Analysis of Changes to Archaeology	7-503
7.15.1	Pathway Linkages to other Valued Components.....	7-503
7.15.1.1	Pathway Linkages to Archaeology	7-503
7.15.1.2	Pathway Linkages from Archaeology to fVCs.....	7-503
7.15.2	Assessment Methodology	7-503
7.15.2.1	Regulatory Setting	7-503
7.15.2.1.1	Federal.....	7-504
7.15.2.1.2	Provincial	7-504
7.15.2.2	Spatial and Temporal Boundaries.....	7-505
7.15.2.3	Assessment Criteria	7-506
7.15.2.4	Analytical Methods	7-506
7.15.2.4.1	Terrestrial Archaeology	7-506
7.15.2.4.2	Marine Archaeology	7-507
7.15.3	Assumptions and the Use of the Conservative Approach	7-508
7.15.4	Existing Conditions	7-508
7.15.5	Identification of Potential Effects	7-509
7.15.6	Mitigation and Enhancement Measures	7-509
7.15.7	Assessment of Changes after Mitigation	7-510
7.15.7.1	Construction Phase	7-510
7.15.7.1.1	Operations Phase	7-510
7.15.7.1.2	Closure Phase	7-510
7.15.8	Change Pathway Outcome.....	7-510
7.15.8.1	Summary of Changes after Mitigation	7-510
7.15.8.2	Change Management.....	7-510
7.15.8.3	Confidence	7-510
7.16	Analysis of Changes to the Local and Regional Economy	7-517
7.16.1	Pathway Linkages to other Valued Components.....	7-517
7.16.1.1	Pathway Linkages to Cultural Heritage	7-517
7.16.1.2	Pathway Linkages from Local and Regional Economy to fVCs.....	7-517
7.16.2	Assessment Approach.....	7-517
7.16.2.1	Regulatory Setting	7-517
7.16.2.2	Spatial and Temporal Boundaries.....	7-518
7.16.2.3	Assessment Criteria	7-519
7.16.2.4	Analytical Methods	7-519
7.16.3	Assumptions and the Use of the Conservative Approach	7-519
7.16.4	Existing Conditions	7-520

7.16.4.1 Labour Force	7-520
7.16.4.2 Economic Sector Overview	7-520
7.16.4.3 Government Revenues	7-521
7.16.5 Identification of Potential Effects	7-521
7.16.6 Mitigation and Enhancement	7-521
7.16.7 Assessment of Changes.....	7-522
7.16.7.1 Change in Employment Levels and Labour Income.....	7-523
7.16.7.2 Change in Business Opportunities and Business Income.....	7-524
7.16.7.3 Change in Demand for Training.....	7-524
7.16.7.4 Change in Government Revenues	7-525
7.16.8 Change Pathway Outcome.....	7-525
7.16.8.1 Summary of Changes after Mitigation	7-525
7.16.8.2 Confidence	7-525
7.17 References	7-532

Tables

Table 7.2-1:	Baseline Air Quality Concentrations and Standards.....	7-26
Table 7.2-2:	Assessment Criteria, Indicators and Rationale.....	7-28
Table 7.2-3:	Potential Interactions of Project Components with Air Quality	7-30
Table 7.2-4:	Mitigation Measures for Changes to Air Quality	7-32
Table 7.2-5:	Construction Phase - Predicted POI Concentrations	7-34
Table 7.2-6:	Construction Phase - Predicted POR Concentrations.....	7-36
Table 7.2-7:	Operations Phase - Predicted POI Concentrations	7-38
Table 7.2-8:	Operations Phase - Predicted POR Concentrations	7-40
Table 7.2-9:	Construction Phase - Predicted POI Results with varying Road Dust Control .	7-42
Table 7.2-10:	Operations Phase - Predicted POI Results with varying Road Dust Control....	7-42
Table 7.3-1:	Health Canada Noise Guidance	7-66
Table 7.3-2:	Provincial Noise Impact Criteria Based on NPC-300 Guidelines	7-66
Table 7.3-3:	Points of Reception Summary	7-67
Table 7.3-4:	Baseline Sound Conditions	7-68
Table 7.3-5:	Potential Interactions of Project Components with Sound.....	7-69
Table 7.3-6:	Mitigation Measures for Changes to Sound	7-71
Table 7.3-7:	Noise Modelling Results ($L_{Aeq-1hr}$ and HC Guidance)	7-72
Table 7.3-8:	Noise Modelling Results (L_{dn} and Change in %HA)	7-73
Table 7.3-9:	Noise Modelling Results ($L_{Aeq-1hr}$ and NPC-300 Guidelines).....	7-73
Table 7.4-1:	Health Canada Noise Guidance Applicable to Air-overpressure.....	7-85
Table 7.4-2:	Fisheries and Oceans Canada Guidelines for Blasting near Fisheries	7-85
Table 7.4-3:	Provincial Vibration Impact Criteria based on NPC-119 Guidelines.....	7-85
Table 7.4-4:	Points of Reception Summary	7-86
Table 7.4-5:	Baseline Ground Vibration	7-87
Table 7.4-6:	Potential Interactions of Project Components with Vibration.....	7-88
Table 7.4-7:	Predicted Peak Particle Velocity at nearest PORs from Open Pits.....	7-90
Table 7.4-8:	Predicted Peak Particle Velocity at nearest PORs from Quarries	7-90
Table 7.4-9:	Predicted Air Overpressure at nearest PORs from Open Pits.....	7-90
Table 7.4-10:	Predicted Air Overpressure at nearest PORs from Quarries.....	7-91
Table 7.4-11:	Fish Bearing Waterbodies and Watercourses Evaluated for Vibration Change	7-91
Table 7.4-12:	Setback Distances to be within DFO Guidelines	7-91

Table 7.4-13: Mitigation Measures for the Control of Blasting Vibration and Overpressure...	7-92
Table 7.5-1: Assessment Criterion, Indicators and Rationale.....	7-115
Table 7.5-2: Groundwater Model Simulations	7-116
Table 7.5-3: Potential Interactions of Project Components with Groundwater	7-117
Table 7.5-4: Mitigation Measures for Changes to Groundwater	7-119
Table 7.6-1: Assessment Criteria, Indicators and Rationale.....	7-147
Table 7.6-2: Existing Monthly Surface Water Flows at Assessment Nodes	7-148
Table 7.6-3: Potential Interactions of Project Activities with Surface Water Flows and Levels	7-149
Table 7.6-4: Mitigation Measures for Changes to Surface Water Flows and Levels	7-151
Table 7.6-5: Annual Percent Change in Flow – Average Climate Conditions	7-152
Table 7.7-1: Water Quality Guidelines for the Protection of Aquatic Life.....	7-188
Table 7.7-2: Assessment Criteria, Indicators and Rationale.....	7-189
Table 7.7-3: Dixie Creek Baseline Water Quality	7-190
Table 7.7-4: Chukuni River Baseline Water Quality	7-191
Table 7.7-5: Unnamed Watercourses and Waterbodies Baseline Water Quality	7-192
Table 7.7-6: Pakwash Lake Baseline Water Quality	7-193
Table 7.7-7: Potential Interactions of Project Activities with Water Quality	7-194
Table 7.7-8: Mitigation Measures for Changes to Water Quality	7-196
Table 7.7-9: Dixie Creek (DIX-2) Water Quality Model Results, Operations	7-198
Table 7.7-10: Dixie Creek (DIX-2) Water Quality Model Results, Final Closure Period	7-199
Table 7.7-11: Dixie Creek (DIX-3) Water Quality Model Results, Operations	7-200
Table 7.7-12: Dixie Creek (DIX-3) Water Quality Model Results, Final Closure Period	7-201
Table 7.7-13: Dixie Creek (DIX-4) Water Quality Model Results, Operations	7-202
Table 7.7-14: Dixie Creek (DIX-4) Water Quality Model Results, Post-Closure	7-203
Table 7.7-15: Dixie Creek (DIX-5) Water Quality Model Results, Operations	7-204
Table 7.7-16: Dixie Creek (DIX-5) Water Quality Model Results, Final Closure Period	7-205
Table 7.7-17: Chukuni River (CHK-1) Water Quality Results, Operations	7-206
Table 7.7-18: Chukuni River (CHK-1) Water Quality Model Results, Final Closure Period..	7-207
Table 7.7-19: Chukuni River (CHK-2) Water Quality Results, Operations	7-208
Table 7.7-20: Chukuni River (CHK-2) Water Quality Results, Final Closure Period	7-209
Table 7.7-21: Pakwash Lake (PAK-OUT) Water Quality Results, Operations	7-210
Table 7.7-22: Pakwash Lake (PAK-OUT) Water Quality Results, Final Closure Period	7-211
Table 7.8-1: Assessment Criteria, Indicators and Rationale.....	7-236



Table 7.8-2:	Land Cover by Ecological Classification Ecosite Code	7-238
Table 7.8-3:	Direct Effects on Vegetation Communities in the LSA	7-242
Table 7.8-4:	Direct Effects on Vegetation Communities in the RSA.....	7-245
Table 7.8-5:	Indirect Effects for Riparian Vegetation Communities by Stressor.....	7-248
Table 7.8-6:	Indirect Effects for Wetland Vegetation Communities by Stressor	7-251
Table 7.8-7:	Indirect Effects for Upland Vegetation Communities by Stressor.....	7-252
Table 7.8-8:	Potential Interactions of Project Activities with Vegetation Communities	7-254
Table 7.8-9:	Mitigation Measures for Potential Changes to Vegetation Communities.....	7-256
Table 7.9-1:	Assessment Criteria, Indicators and Rationale.....	7-273
Table 7.9-2:	Area and Potential Direct Impact on Wild Rice Stands	7-273
Table 7.9-3:	Potential Interactions of Project Activities with Wild Rice	7-274
Table 7.9-4:	Mitigation Measures for Changes to Wild Rice.....	7-276
Table 7.10-1:	Assessment Criteria, Indicators and Rationale.....	7-298
Table 7.10-2:	Moose Population Model Parameters and Sources	7-300
Table 7.10-3:	Baseline Moose Habitat Availability by Type.....	7-301
Table 7.10-4:	Potential Interactions of Project Activities with Moose and Moose Habitat	7-302
Table 7.10-5:	Mitigation Measures for Changes to Moose	7-304
Table 7.10-6:	Moose Habitat Fragmentation	7-309
Table 7.10-7:	Direct and Indirect Effects on Moose Habitat Availability and Type	7-310
Table 7.10-8:	Direct and Indirect Effects on Moose Density.....	7-311
Table 7.11-1:	Assessment Criteria, Indicators and Rationale.....	7-341
Table 7.11-2:	Wildlife Groupings and Rationale for Selection of Proxy Species	7-342
Table 7.11-3:	Baseline Proxy Species Habitat in the PA, LSA and RSA.....	7-345
Table 7.11-4:	Baseline Fragmentation within the PA.....	7-346
Table 7.11-5:	Potential Interactions of Project Activities with Other Wildlife.....	7-347
Table 7.11-6:	Mitigation Measures for Changes to Other Wildlife	7-349
Table 7.11-7:	Direct Effects on Proxy Species in PA, LSA and RSA	7-353
Table 7.11-8:	Indirect Effects, Groundwater and Air, on Proxy Species Habitat in the PA, LSA and RSA	7-354
Table 7.11-9:	Indirect Effects, Noise, on Proxy Species Habitat in the PA, LSA and RSA ..	7-355
Table 7.11-10:	Habitat Fragmentation from PA Impact on Other Wildlife.....	7-356
Table 7.12-1:	Assessment Criteria, Indicators and Rationale.....	7-408
Table 7.12-2:	Baseline SAR Habitat in the PA, LSA and RSA	7-411
Table 7.12-3:	Direct Effects on SAR Habitat in the LSAs and RSAs.....	7-413

Table 7.12-4: Indirect Effects for Boreal Caribou and Wolverine.....	7-415
Table 7.12-5: Indirect Effects, Groundwater and Air ZOI, on SAR Bat, Bird and Insect Habitat	7-416
Table 7.12-6: Indirect Effects, Noise ZOI on SAR Bat, Bird and Insect Habitat	7-417
Table 7.12-7: Potential Interactions of Project Activities with SAR and SAR Habitat.....	7-418
Table 7.12-8: Mitigation Measures for Changes to SAR	7-420
Table 7.12-9: Habitat Fragmentation for PA Effect for Boreal Caribou.....	7-423
Table 7.12-10: Habitat Fragmentation from PA Effect for Select SAR	7-424
Table 7.13-1: Assessment Criteria, Indicators and Rationale.....	7-465
Table 7.13-2: Recreational Trails within the RSA.....	7-466
Table 7.13-3: Trapline Areas in the LSA	7-467
Table 7.13-4: Campgrounds, Lodges, Tourist Cabins, Resorts and Other Wilderness Establishments in the LSA	7-468
Table 7.13-5: Conservation Reserves and Distance from the PA	7-469
Table 7.13-6: Local Provincial Parks and Distance from the PA	7-469
Table 7.13-7: Active Aggregate Operations in the LSA.....	7-470
Table 7.13-8: Active Mine Claims within the LSA.....	7-471
Table 7.13-9: Forest Management Areas in the LSA	7-471
Table 7.13-10: Potential Interactions of Project Components with Land and Resource Use	7-472
Table 7.14-1: Assessment Criteria, Indicators and Rationale.....	7-496
Table 7.14-2: Potential Interactions of Project Components with Cultural Heritage	7-497
Table 7.14-3: Mitigation Measures for Changes to Cultural Heritage.....	7-499
Table 7.15-1: Potential Interactions of Project Components with Archaeology	7-511
Table 7.15-2: Mitigation Measures for Changes to Archaeology.....	7-513
Table 7.16-1: Assessment Criteria, Indicators and Rationale.....	7-526
Table 7.16-2: Potential Interactions of Project Components with Local and Regional Economy	7-527
Table 7.16-3: Estimated Economic Effects.....	7-529

Figures

Figure 7.2-1:	Air Quality Spatial Boundaries and POR	7-43
Figure 7.2-2:	Representative Wind Rose (1996 to 2000)	7-44
Figure 7.2-3:	Operations – SPM Concentration Contours (24-Hour; 90% Dust Control)....	7-45
Figure 7.2-4:	Construction – PM ₁₀ Concentration Contours (24-Hour; 90% Dust Control) .	7-46
Figure 7.2-5:	Construction – PM _{2.5} Concentration Contours (Annual; 90% Dust Control) ..	7-47
Figure 7.2-6:	Construction – Mn in PM ₁₀ Concentration Contours (24-Hour; 90% Dust Control).....	7-48
Figure 7.2-7:	Construction – NO ₂ Concentration Contours (24-Hour)	7-49
Figure 7.2-8:	Construction – SO ₂ Concentration Contours (1-Hour).....	7-50
Figure 7.2-9:	Operations – Benzene Concentration Contours (Annual)	7-51
Figure 7.2-10:	Operations – B(a)P Concentration Contours (Annual)	7-52
Figure 7.2-11:	Construction – PM ₁₀ Concentration Contours (24-Hour; 50% Dust Control) .	7-53
Figure 7.2-12:	Construction – PM ₁₀ Concentration Contours (24-Hour; 0% Dust Control) ...	7-54
Figure 7.3-1:	Point of Reception Locations	7-74
Figure 7.3-2:	Noise Contour During Daytime Underground Production.....	7-75
Figure 7.4-1:	Study Areas and Point of Reception Locations	7-93
Figure 7.4-2:	Summary of Fisheries Resources	7-94
Figure 7.4-3:	General Blast Locations during Construction Phase	7-95
Figure 7.4-4:	General Blast Locations during Operations Phase.....	7-96
Figure 7.4-5:	Ground Vibration Propagation Curve – Open Pits.....	7-97
Figure 7.4-6:	Air Overpressure Propagation Curve – Open Pits.....	7-98
Figure 7.5-1:	Local and Regional Study Areas for Groundwater	7-120
Figure 7.5-2:	Hydrogeological Conceptual Model.....	7-121
Figure 7.5-3:	Hydrostratigraphic Model.....	7-122
Figure 7.5-4:	Model Boundary Conditions	7-123
Figure 7.5-5:	Numerical Model Cross Section	7-124
Figure 7.5-6:	Site Topography	7-125
Figure 7.5-7:	Local Quaternary Geology.....	7-126
Figure 7.5-8:	Hydraulic Conductivity Testing Locations.....	7-127
Figure 7.5-9:	Monitoring Well and Borehole Locations	7-128
Figure 7.5-10:	Simulated Drawdown Contours	7-129
Figure 7.6-1:	Local Study Area for Surface Water Flows and Levels	7-153

Figure 7.6-2:	Regional Study Area for Surface Water Flows and Levels.....	7-154
Figure 7.6-3:	Regional Watershed Boundaries.....	7-155
Figure 7.6-4:	Dixie Creek and Chukuni River Watersheds	7-156
Figure 7.6-5:	Local Watersheds.....	7-157
Figure 7.6-6:	Existing Conditions Watersheds at Assessment Nodes.....	7-158
Figure 7.6-7:	Operations / Closure Watersheds at Assessment Nodes	7-159
Figure 7.6-8:	Zone of Changes – Surface Water Flow	7-160
Figure 7.7-1:	Local Study Area for Water Quality	7-212
Figure 7.7-2:	Regional Study Area for Water Quality.....	7-213
Figure 7.7-3:	Water Quality Assessment Nodes.....	7-214
Figure 7.7-4:	Surface Water Quality Monitoring Stations.....	7-215
Figure 7.7-5:	Regional Watershed Area	7-216
Figure 7.7-6:	Groundwater Quality Monitoring Stations, 2022 to 2023.....	7-217
Figure 7.7-7:	Groundwater Quality Monitoring Stations, 2024.....	7-218
Figure 7.7-8:	CORMIX Model Results, Average Flow Conditions	7-219
Figure 7.7-9:	Zone of Changes, Water Quality	7-220
Figure 7.8-1:	Spatial Boundaries for Vegetation Communities	7-261
Figure 7.8-2:	Indirect Effects Vegetation Communities.....	7-262
Figure 7.9-1:	Spatial Boundaries for Wild Rice.....	7-277
Figure 7.9-2:	Groundwater and Surface Water Zone of Influence	7-278
Figure 7.9-3:	Wild Rice Existing Conditions.....	7-279
Figure 7.10-1:	Spatial Boundaries for Moose	7-312
Figure 7.10-2:	Indirect Effects for Moose.....	7-313
Figure 7.10-3:	Relative Moose Habitat Capability.....	7-314
Figure 7.10-4:	Moose Foraging Habitat	7-315
Figure 7.10-5:	Moose Winter Habitat.....	7-316
Figure 7.10-6:	Moose Reproductive Habitat	7-317
Figure 7.10-7:	Simulated Moose Populations	7-318
Figure 7.10-8:	Estimates of Additional Parameters for the Simulated Moose Populations.....	7-319
Figure 7.11-1:	Spatial Boundaries for Other Wildlife.....	7-357
Figure 7.11-2:	Indirect Effects for Other Wildlife.....	7-358
Figure 7.11-3:	American Marten Suitability Analysis Results	7-359
Figure 7.11-4:	Snowshoe Hare Suitability Analysis Results	7-360

Figure 7.11-5: Canada Lynx Suitability Analysis Results.....	7-361
Figure 7.11-6: Beaver Suitability Analysis Results	7-362
Figure 7.11-7: Black Bear Suitability Analysis Results	7-363
Figure 7.11-8: Gray Wolf Suitability Analysis Results.....	7-364
Figure 7.11-9: Wood Frog Suitability Analysis Results.....	7-365
Figure 7.11-10: Great-horned Owl Suitability Analysis Results	7-366
Figure 7.11-11: Boreal Owl Suitability Analysis Results	7-367
Figure 7.11-12: Osprey Suitability Analysis Results	7-368
Figure 7.11-13: American Kestrel Suitability Analysis Results	7-369
Figure 7.11-14: Bald Eagle Suitability Analysis Results	7-370
Figure 7.11-15: Spruce Grouse Suitability Analysis Results.....	7-371
Figure 7.11-16: Ruffed Grouse Suitability Analysis Results	7-372
Figure 7.11-17: Sharp-tailed Grouse Suitability Analysis Results.....	7-373
Figure 7.12-1: Spatial Boundaries for Boreal Caribou	7-425
Figure 7.12-2: Spatial Boundaries for Species at Risk Bats, Birds and Others	7-426
Figure 7.12-3: Spatial Boundaries for Wolverine	7-427
Figure 7.12-4: Indirect Effects and LSA for Species at Risk.....	7-428
Figure 7.12-5: Category 1, 2 and 3 Caribou Habitat Summary for Sydney Range.....	7-429
Figure 7.12-6: Summary of Known Caribou Activity within the Sydney Caribou Range.....	7-430
Figure 7.12-7: Forest Management of Dynamic Caribou Habitat Schedule Blocks within the Sydney Caribou Range	7-431
Figure 7.12-8: Boreal Caribou Refuge / Mature Coniferous Forest Habitat within the Sydney Caribou Range	7-432
Figure 7.12-9: Non-migratory Bat Maternity Habitat	7-433
Figure 7.12-10: Migratory Bat Maternity Habitat.....	7-434
Figure 7.12-11: Bat Foraging Habitat.....	7-435
Figure 7.12-12: Bat Hibernacula Habitat.....	7-436
Figure 7.12-13: Wolverine Home Ranges (Minimum Convex Polygon) in the Red Lake Area	7-437
Figure 7.12-14: Wolverine Habitat Suitability Mapping - Foraging / Movement.....	7-438
Figure 7.12-15: Wolverine Habitat Suitability Mapping - Denning	7-439
Figure 7.12-16: Wolverine Movement Analysis (Circuitscape)	7-440
Figure 7.12-17: Rusty Blackbird Suitability Analysis Results.....	7-441
Figure 7.12-18: Short-eared Owl Suitability Analysis Results.....	7-442

Figure 7.12-19: Snapping Turtle Suitability Analysis Results	7-443
Figure 7.12-20: Yellow-banded Bumblebee Suitability Analysis Results	7-444
Figure 7.13-1: Spatial Boundaries for Land and Resource Use	7-474
Figure 7.13-2: Ontario Crown Land Use Policy	7-475
Figure 7.13-3: Trails within the LSA.....	7-476
Figure 7.13-4: Trapline Areas in the LSA.....	7-477
Figure 7.13-5: Recreational Sites, Tourist Cabins and Tourist Areas in the LSA	7-478
Figure 7.13-6: Tourism Establishment Locations.....	7-479
Figure 7.13-7: Fisheries Management Zones	7-480
Figure 7.13-8: Wildlife Management Areas and Bear Management Areas in the LSA	7-481
Figure 7.13-9: Environmentally Protected Areas	7-482
Figure 7.13-10: Aggregate Operations in the LSA.....	7-483
Figure 7.13-11: Mining Land Tenure in the LSA.....	7-484
Figure 7.13-12: Forest Management Areas in the LSA	7-485
Figure 7.13-13: Planned Forest Harvesting in the LSA	7-486
Figure 7.14-1: Local and Regional Study Area for Cultural Heritage Resources.....	7-500
Figure 7.14-2: Identified Potential Cultural Heritage Resources	7-501
Figure 7.14-3: Location of Proposed Mine Features in Relation to Potential Cultural Heritage Resources	7-502
Figure 7.15-1: Local and Regional Study Area for Archaeology.....	7-514
Figure 7.15-2: Identified Terrestrial Archaeological Sites and Areas of Marine Archaeology Potential.....	7-515
Figure 7.15-3: Location of Proposed Mine Features in Relation to Terrestrial Archaeological Sites and Areas of Marine Archaeology Potential.....	7-516
Figure 7.16-1: Spatial Boundaries	7-530
Figure 7.16-2: Estimated Economic Effects per Year	7-531

Acronyms and Abbreviations

λ	Population growth rate
%HA	Percent highly annoyed
AAQC	Ambient Air Quality Criteria
AEX	Advanced Exploration
ANA	Asubpeeschoseewagong Netum Anishinabek
asl	Above sea level
ATV	All-terrain vehicle
BC WQG	British Columbia Long-term Exposure Guidelines, Freshwater
BHR	Built Heritage Resource
BSR	Baseline receptor
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CHER	Cultural Heritage Evaluation Report
CHIA	Cultural Heritage Impact Assessment
CHL	Cultural Heritage Landscape
CHVI	Cultural Heritage Value or Interest
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWQG	Canadian Water Quality Guidelines for protection of aquatic life
DFO	Fisheries and Oceans Canada
DPM	Diesel particulate matter
E2 plan	Environmental emergency plan
ECCC	Environment and Climate Change Canada
ESA	<i>Endangered Species Act</i>
FEQG	Federal Environmental Quality Guidelines
FMU	Forest Management Unit
FMZ	Fisheries Management Zones
FRI	Forest Resource Inventory
fVC	Valued component under federal jurisdiction
FWCA	<i>Fish and Wildlife Conservation Act</i>
GIS	Geographic information system
Great Bear Resources	Great Bear Resources Ltd.
HC	Health Canada
iPWQO	Interim Provincial Water Quality Objectives for protection of aquatic life
ISEE	International Society of Explosive Engineers
ISID	Impact segment identification
L_{Aeq}	A-weighted, equivalent sound level
$L_{Aeq-1hr}$	Average cumulative A-weighted, equivalent sound level over a 1-hour period
L_{dn}	Day-night sound level
L_{LM}	Logarithmic mean impulse sound level
LGO	Low grade ore
LiDAR	Light Detection and Ranging
LPeak	Peak pressure level
LSA	Local study area
LSFN	Lac Seul First Nation
LWCB	Lake of the Woods Control Board
MBCA	<i>Migratory Birds Convention Act</i>
MCM	Ministry of Citizenship and Multiculturalism
MDMER	Metal and Diamond Mining Effluent Regulations of the <i>Fisheries Act</i>
MECP	Ministry of the Environment, Conservation and Parks
MEM	Ministry of Energy and Mines

ML / ARD	Mine leaching and acid rock drainage
MNR	Ministry of Natural Resources
MRS	Mine rock stockpile
MTO	Ministry of Transportation
MWP	Mine water pond
na	Not applicable
NAPS	National Air Pollutant Surveillance Program
NPAG	Non-potentially acid generating
NWOMC	Northwestern Ontario Métis Community
OLT	Ontario Landscape Tool
OVB	Overburden stockpile
P-P	Peak-production period
PA	Project Area
PAG	Potentially acid generating
PAH	Polycyclic aromatic hydrocarbon
PM ₁₀	Particulate matter less than 10 micrometres in diameter
PM _{2.5}	Particulate matter less than 2.5 micrometres in diameter
POI	Point of impingement
POR	Point of reception
PPeak	Peak pressure
PPV	Peak particle velocity
Project	Great Bear Project
Property	Great Bear Property
pVC	Pathway valued component
PWL	Sound power level
PWQO	Provincial Water Quality Objectives for protection of aquatic life
Q1	Quarry 1
Q2	Quarry 2
R	Average recruitment rate
ROM	Run of mine
RPD	Relative percent difference
RSA	Regional study area
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
SCA	<i>Species Conservation Act</i>
SDW	Specially Designated Waters
SEQG	Saskatchewan Environmental Quality Guidelines
SFL	Sustainable Forest License
SOCC	Species of Conservation Concern
SPM	Suspended particulate matter
TC	Transport Canada
TISG	Tailored Impact Statement Guidelines
TMF	Tailings management facility
U-P	Underground production period
UTM	Universal Transverse Mercator
VMF	Viggo management facility
VOC	Volatile organic compound
WFN	Wabauskang First Nation
WHO	World Health Organization
WMU	Wildlife Management Unit
WQG PAL	Water Quality Guideline for the Protection of Aquatic Life
WSC	Water Survey of Canada
WSP	WSP Canada Inc.

WTP
ZOI

Water treatment plant
Zone of influence

7.13 Analysis of Changes to Land and Resources Use

The pVC land and resource use encompasses activities and associated infrastructure in relation to the non-Indigenous use of land, waterways and any resources for the purposes of recreation, commercial usage, and navigation. Land and resource use is included as a pVC for this Impact Statement due to its contribution to the quality of life and livelihoods of local community members.

The TISG note that the Impact Statement must describe the local and regional economic conditions and trends including any use of lands and water bodies for economic activity, by any people in the applicable study areas including recreational and commercial fishing, baitfish harvesting, trapping, outdoor recreation, use of seasonal cabins, and outfitters. The TISG also noted that the Project location must be described, including the geographical and socioeconomic context in which the Project is to take place. Navigable waters were included as the TISG noted this as important information to further understand the potential environmental, health, social, and economic changes and effects of the Project, alongside appropriate mapping.

Land and resource use activities considered are as follows:

- Recreational uses: recreational hunting, recreational fishing, use of recreational trails for snowmobiling, snowshoeing, skiing, walking, cycling, and / or hiking, camping, and boating and canoeing
- Commercial uses: trapping, guide outfitting, bait harvesting, forestry, and mining and aggregate extraction
- Navigation.

It is noted that Indigenous land and resource use is assessed in the Indigenous Peoples fVC in Sections 10.6, 11.6, 12.6, 13.6 and 14.6 of this Impact Statement (current use of land and resources for traditional purposes).

7.13.1 Pathway Linkages to Other Valued Components

7.13.1.1 Pathway Linkages to Land and Resource Use

There are linkages from the following pVCs to land and resource use: air quality (Section 7.2), sound (Section 7.3), vibration (Section 7.4), surface water flows and levels (Section 7.6), water quality (Section 7.7), vegetation communities (Section 7.8), moose (Section 7.10), other wildlife (Section 7.11), and local and regional economy (Section 7.16).

7.13.1.2 Pathway Linkages from Land and Resource Use to fVCs

The potential changes in land and resource use in the absence of mitigation are directly linked to fVCs, and inform the following sections:

- Analysis of Changes to Fish and Fish Habitat (Section 8): Potential changes to fish and fish habitat such as changes in quantity and quality of aquatic resources may indirectly affect baitfish harvesting activities as well as recreational fishing during the construction and operation of the Project.

- Analysis of Changes to Migratory Birds (Section 9): Project related activities may create changes which affect migratory birds and bird habitat, which may result in changes to recreational hunting, guide outfitting, and trapping.
- Analysis of Changes to Indigenous Peoples (Sections 10.6, 11.6, 12.6, 13.6 and 14.6): Potential changes to land and resource use (particularly changes in land use, access and navigation) may affect the current use of land and resources for traditional purposes described in those sections, and the quality of experience while practicing their traditional activities for the Indigenous communities of LSFN, WFN, ANA and NWOMC, as well as the Indigenous people living in the Red Lake and Ear Falls area.

7.13.2 Assessment Approach

The pVC land and resource use has the potential to be impacted by the Project. In undertaking the assessment of changes to land and resource use, the following three criteria were used:

- Change in recreational land and resource use: Potential for changes in recreational land and resource use due to Project construction, operations, and closure may restrict access and reduce use and enjoyment of land and resources by non-Indigenous people, such as fishing, hunting and trapping and use of seasonal cabins and outfitters.
- Change in commercially based land and resource use: Potential for construction and operational activities may change commercially based land and resource use, such as forestry, mining, commercial hunting and trapping, through restricted access, and potential for change in land tenure or use.
- Change in navigation: Potential for Project construction and operation activities to affect watercourses and waterbodies that may be used for navigation, either for recreational purposes or as a means of participating in associated activities such as fishing, hunting, trapping or bait harvesting.

The assessment of potential changes to land and resource use is supported by a description of the existing conditions for the pVC (Section 7.13.4), the identification and description of potential effects on the pVC (Section 7.13.5), and a description of applicable mitigation measures for the pVC (Section 7.13.6). An outline of the analytical methods used for the assessment and the key assumptions and / or conservative approach is found in Section 7.13.3.

The approach to the assessment of potential changes to land and resource use includes:

- Description of the relevant regulatory and policy setting
- Description of the spatial and temporal boundaries used for this pVC
- Identification of criteria and indicators along with the associated rationale
- An outline of the analytical methodology conducted for the assessment and the key assumptions and use of the conservative approach.

The changes to the land and resource pVC following the application of mitigation are then characterized in Section 7.13.7.

7.13.2.1 Regulatory Setting

Government policies, objectives, standards or guidelines most relevant to land and resource use are summarized below. Further information regarding anticipated approval requirements is provided in Section 19.

7.13.2.1.1 Federal

Potential effects of Project activities on navigation are subject to the Common Law right to navigation. Navigable waters are defined by the *Canadian Navigable Waters Act* as a body of water, including a canal or any other body of water created or altered as a result of the construction of any work, that is used or where there is a reasonable likelihood that it will be used by vessels, in full or in part, for any part of the year as a means of transport or travel for commercial or recreational purposes, or as a means of transport or travel for Indigenous peoples of Canada exercising rights recognized and affirmed by section 35 of the *Constitution Act, 1982*. The Act prohibits the construction or placement of any works in, on, over, under, or through a navigable waterway that may interfere with the public right to navigation without complying with the requirements of the *Canadian Navigable Waters Act*. The Project may require approval(s) from TC under the Act (Section 19).

7.13.2.1.2 Provincial

The Project will also need to comply with the applicable provincial acts and regulations, including the need to obtain certain permits and approvals in order for the Project to proceed. These permits and approvals, listed in Section 19, include but are not limited to the *Public Lands Act*, the *Crown Forest Sustainability Act*, the FWCA, the *Aggregate Resources Act*, the *Mining Act* and the *Planning Act*.

Ontario's Living Legacy Land Use Strategy (Government of Ontario 1999) governs land uses on Crown land. The land use policy area that the Project falls within is outlined in the Crown Land Use Policy Atlas as General Use Area (G2514: Red Lake - General Use Area). The following management units apply to land and resource use, with further information on each management units and how the policies apply in the respective existing conditions sections:

- FMU (Section 7.13.4.2.2.3)
- Bait Harvesting Zones (Section 7.13.4.2.2.4)
- Fisheries Management Zones (FMZ; Section 7.13.4.2.1.5)
- Wildlife Management Zones and Bear Management Areas (Section 7.13.4.2.1.6).

7.13.2.1.3 Municipal

Although the Project itself is not located in an incorporated area and thus not directly subject to municipal plans, policies or guidelines, the following municipal plans, policies, and guidelines may apply to portions of the LSA or RSA (defined below).

The municipal plans of Red Lake and Ear Falls focus on areas zoned in their respective territories, with a majority of the RSA situated outside of both these municipal plans, a majority of the land within the RSA used for non-traditional land and resource use is not governed by either of the municipal plans.

7.13.2.2 Spatial and Temporal Boundaries

Three spatial study areas have been defined for this pVC. The spatial boundaries used for the assessment of land and resource use are shown in Figure 7.13-1 and are defined as follows:

- The PA is defined as the footprint of the Project including all temporary and permanent areas associated with the mine site, as well as a buffer to allow flexibility for design optimizations prior to construction and over the mine life (Section 6.4). The PA is approximately 3,349 ha in size.
- The LSA for land and resource use extends beyond the PA and corresponds to the area in the vicinity of the Project where most of the direct and indirect changes of the Project on land and resource use are expected to occur and can be predicted with a reasonable degree of accuracy and confidence. This area is defined as a 10 km radius surrounding the PA. The LSA is approximately 68,997 ha in area and includes the PA.
- The RSA encompasses the PA and LSA and where appropriate, extends further to support a regional context in the assessment of potential Project changes. The RSA for land and resource use is defined as the land encompassing the Municipality of Red Lake, the Town of Ear Falls, and the area between the two towns. The RSA is approximately 214,182 ha in area.

The purpose of a temporal boundary is to identify when a change may occur in relation to specific Project phases and activities. The temporal boundaries for the assessment as defined in Section 6.5 are:

- Construction phase:
 - Years -3 to -1 representing the primary period of Project construction
 - Mining of the Viggo pit will be completed during this phase and will be initiated in the last year of construction in the LP Central pit
- Operations phase:
 - Years 1 to 26; during year 1 the Project will transition from construction into operations and will not be at full capacity
- Closure phase:
 - Years 27 to 29 represent the active closure period when the majority of the decommissioning and reclamation of the PA is completed
 - Year 30 is a passive closure period while the site is on care and maintenance as the mine workings while the mine workings are filled with water (water treatment infrastructure will remain in place)
 - Year 31 is the final close out period when water treatment infrastructure is removed, after the LP Central pit is filled with water, and site waters are acceptable for passive release to the environment.

Changes to the land and resource use pVC were assessed for each Project phase (i.e., construction, operations and closure).

7.13.2.3 Assessment Criteria

The specific criteria, indicators, and the rationale for the selection of the criteria are described in Table 7.13-1.

7.13.2.4 Analytical Methods

The assessment of the potential changes to land and resource use arising from the Project has been completed in accordance with standard methods, using a quantitative comparison of the areas of the land and resource use that could be affected by Project activities.

Specifically, the proportions of recreational land, forestry management areas and navigable waters that could be affected by the Project were assessed by comparing their total areas with the portions affected by the Project.

The extent of sensory disturbances caused by the Project were assessed using the results of the noise and vibration assessment, the visual effects assessment, and the air quality assessment.

7.13.3 Assumptions and the Use of the Conservative Approach

For the purpose of this assessment, a conservative approach has been adopted in order so that potential effects on land and resource use have been predicted and that adequate mitigation measures are in place. The following assumptions have been made for land and resource use:

- Baseline information has been collected from a wide range of land and resource uses occurring including commercial land and resource use, recreational land and resource use, and navigation
- Where practical, maintain trees and other vegetation in the PA to provide a buffer for the view of Project components
- Great Bear Resources will maintain communication with local resource users where identified in addition to signage within the surrounding area to inform resource users of the possibility of disturbances
- The Chukuni River is considered to be navigable based on the assessment TC.

7.13.4 Existing Conditions

The existing conditions for land and resource use are described in this section.

7.13.4.1 Methods

The existing conditions presented were informed by primary and secondary (desktop) research using a broad range of information sources including:

- Targeted consultation with recreational and commercial users
- Municipal, provincial and federal government publications (e.g., policy and planning materials and municipal websites)
- Relevant publicly available information (e.g., community organization websites and business websites)

- Socio-economic interviews undertaken by SLR consulting with key stakeholders identified
- Statistical publications (e.g., Statistics Canada)
- Media articles, including websites and social media.

Data presented in the existing conditions setting was derived from these sources, as well as from the socio-economic baseline report (Appendix O-1) which examined the results of the Statistics Canada 2011, 2016 and 2021 censuses, and the Statistics Canada 2011 National Household Survey.

As Statistics Canada is prohibited by law from releasing any information it collects that could identify any respondent, data may be suppressed for geographic areas with populations below a specified threshold to prevent unlawful publication or disclosure of information.

7.13.4.2 Description of Existing Conditions

The PA consists primarily of forested areas designated for forest harvesting, previously harvested areas, and commercial aggregate resource extraction operations that are not part of the Project.

Land use within the LSA includes commercial aggregate resource extraction operations, forestry harvesting, cottaging and resource-based tourism operators. Tourism within the LSA is serviced by fishing and hunting lodges accessed via road, or more remote fly-in fly-out camps. Within the RSA, the primary uses include mining, forestry, cottaging, tourism, Crown land recreation, fishing, hunting, and fur harvesting. The major communities within the region include the Municipality of Red Lake, the Town of Balmertown, the Town of Cochenour, and the Township of Ear Falls, and the prevalent industries are mining, forestry, service and institutional organizations, and resource-based tourism. The tourism industry is serviced by lodges accessed via road, as well as remote outpost camps.

The LSA is entirely within the Red Lake District, which is an area encompassing approximately 14,176 km². The Crown Land Use designations for the LSA are shown in Figure 7.13-2. The Project is located in the General Use Area (G2514: Red Lake - General Use Area) per the Crown Land Use Policy Atlas, which includes 98% of the LSA. This land use code encourages mineral exploration and development with some limitations. Pakwash Provincial Park (Natural Environment Class; P2528) which is also located in the LSA has an area of 1,057 ha.

7.13.4.3 Recreational Use of Land and Resources

7.13.4.3.1 Waterbodies and Watercourses

Various lakes play a key role in the promotion of tourism in the area. In addition, there are fly-in cabins and outfitter lodges that provide recreational fishing opportunities in the LSA, and boats can be rented at such facilities. There are two portages on the Chukuni River in the LSA: north of Highway 105, and at the base of the rapids going north.

The MNR is responsible for managing Ontario's natural resources, and this includes lakes designated for tourism purposes. These are no lakes located within the PA designated for tourism. The following lakes within the LSA and RSA are designated by the MNR as tourism lakes (Appendix O-1; Figure 17.3-3):

Tourism Lakes in LSA:

Bruce Lake	Dixie Lake	East Lake
Geneese Lake	Gullrock Lake	Hiewall Lake
Keg Lake	Pakwash Lake	Petersen Lake
Snail Lake	Sparks Lake	Stone Lake
Sully Lake	Tote Road Lake	Two Island Lake
Willians Lake		

Other Tourism Lakes in LSA:

Aerofoil Lake	Allison Lake	Bear Paw Lake
Bertha Lake	Betty Lake	Birch Lake
Bluffy Lake	Coli Lake	Confederation Lake
Confusion Lake	Cook Lake	Copilot Lake
Cristene Lake	Deaddog Lake	Detour Lake
Grace Lake	Gullrock Lake	Hailstone Lake
Jeanette Lake	Joyce Lake	Jubilee Lake
Keg Lake	Latrielle Lake	Little Shabumeni Lake
Little Vermillion Lake	Longlegged Lake	Margaret Lake
Medicine Stone Lake	Nungessor Lake	Okanse Lake
Papaonga Lake	Parker Lake	Perrigo Lake
Pilot Lake	Pineneedle Lake	Red Lake
Ruddy Lake	Seagrave Lake	Sesikinaga Lake
Shabu Lake	Springpole Lake	Stone Lake
Swain Lake	Two Island Lake	Uchi Lake
Una Lake	Underbrush Lake	Upper Medicine Stone Lake
Wakeman Lake	Wenasaga Lake	Woman Lake
Woman River Lake		

According to the Ontario Hydrographic Network, the listed watercourses within the LSA include the following (MNR 2025):

Boyden Creek	Bug River
Caribou Creek	Chukuni River
Dixie Creek	Stone Creek
Sully Creek	Trout Lake River

Within the PA, there are a number of watercourses and waterbodies, the majority are relatively small and unnamed. Dixie Creek flows through the PA.

7.13.4.3.2 Recreational Trails

Recreational and snowmobile trails have been identified by Ear Falls and Red Lake which are within the RSA. Ear Falls and Red Lake have trails used for walking, hiking, all-terrain vehicle (ATV) access, snowmobiling and snowshoeing and are presented in Table 7.13-2 (Township of Ear Falls 2022). Recreational trails within the LSA can be seen in Figure 7.13-3.

7.13.4.3.3 Traplines

There are four traplines within the LSA as listed in Table 7.13-3, two of which overlap the PA: RL068 and RL059 both owned by LSFN. A non-Indigenous trapper is active in RL068.

In addition to the above, trapline areas located within the LSA but outside the PA include RL061 (which is owned by an ANA member) and RL073 (which is owned by a non-Indigenous individual). The locations of trapline areas are shown in Figure 7.13-4. In addition, there are three trapper cabins in the LSA, but none are located within the PA.

7.13.4.3.4 Campgrounds, Lodges, Tourist Cabins, Resorts, and Other Wilderness Establishments

No lodges or wilderness resorts are found in the PA; however, there are many outpost cabins, outfitters, lodges and wilderness resorts are available for rent by anglers and hunters within the LSA. Guide outfitter activities such as guided fishing and hunting take place in the LSA. Not all campgrounds, lodges, cabins, resorts and other wilderness establishments provided adequate information online pertaining to capacity or available services. Recreational sites, trails, cabins, and tourist areas in the LSA are listed in Table 7.13-4 and are shown as PORs³ in Figure 7.13-5. Figure 7.13-6 provides information regarding tourism establishments in the LSA.

7.13.4.3.5 Recreational Fishing

The LSA is located in FMZ 4 as shown in Figure 7.13-7. FMZ 4 has a total area of 60,441 km² (MNR 2025). There are 27 commercial fisheries licenses in FMZ 4 and 19 of these licenses are active (MNR 2023). There is 690 km² of overlap between FMZ 4 and the LSA.

Walleye is the most popular sport fish in FMZ 4 and is limited to being fished from January 1 to April 14 and from the third Saturday in May to December 31 (MNR 2024). Walleye abundance is highest in FMZ 4 compared to the rest of Ontario.

In Ontario, Specially Designated Waters (SDWs) are lakes or areas with high biological, social and economic value that may require more intensive management approaches. There are some SDWs that have been identified in FMZ 4 for more intensive management. The SDW within the RSA include the Red Lake and Gullrock Lake System SDW (MNR 2023). Gullrock Lake is the only SDW that is located in the LSA. There are non-SDW lakes within the LSA and PA which have exceptions or more regulations. The Chukuni River within the LSA and PA is also included under the Red Lake and Gullrock System SDW and is under waterbody exceptions which include no fishing from April 1 to June 14, only permits the use of artificial lures, with the use of one single-pointed barbless hook being permitted when angling for lake trout.

³ POR is defined as a location with human activity.

7.13.4.3.6 Hunting

The MNR manages hunting and fishing activities in part by means of WMU, which are areas to manage human interactions with wildlife to support ecosystem sustainability. There are specific hunting periods for species and WMUs are aimed at specific species. The LSA overlaps with WMU 3 as seen in Figure 7.13-8. WMU 3 has a total area of 12,492 km². The entirety of the LSA is located within WMU 3 (Ontario Geohub 2025).

Bear Management Areas are areas of Crown land licensed to a tourist outfitter for providing black bear hunting opportunities to non-residents (Land Information Ontario 2022). Ontario has a framework for managing the current black bear population, estimated at 85,000 to 105,000 (MNRF 2020). The regulations consider wildlife management as well as tourism and its economic role and impact. There are seven Bear Management Areas that are overlapped by the LSA, as shown on Figure 7.13-8.

WMU 3, in which PA is located, falls within Cervid Ecological Zone B (MNR 2009). The goal of the Cervid Ecological Framework is to ensure a sustainable Cervid population, which includes caribou, white-tailed deer, moose, and elk. The intent of Cervid Ecological Zone B is to maintain low to moderate populations with an emphasis on caribou and moose habitat. Aspects covered under the Cervid Ecological Framework include social, cultural and economic benefits, population management, habitat management, climate change, disease, and human-cervid conflicts management (MNR 2009).

7.13.4.3.7 Protected Environmental Areas

There are no federal protected environmental areas in the PA, LSA or RSA.

Provincial parks, conservation, and other protected areas are intended to maintain and conserve ecological integrity, cultural resources and sustainable outdoor recreation and tourism values. Only Trout Lake Conservation Reserve is partially located in the LSA. Table 7.13-5 lists protected areas located within the RSA, also shown on Figure 7.13-9.

There are two provincial parks located partially within the LSA: Pakwash Lake Provincial Park and Woodland Caribou Provincial Park (Table 7.13-6).

7.13.4.4 Commercially Based Use of Land and Resources

7.13.4.4.1 Aggregate Resources

There are 17 active aggregate operations, which are not part of the Project, located within the LSA. Of these, six are located within the PA. The locations of the active aggregate operations in the LSA, as well as their distance to the PA, are listed in Table 7.13-7 and shown in Figure 7.13-10.

7.13.4.4.2 Mining

Mining is a key economic activity in northwestern Ontario. Mineral land tenure and mining activities are controlled by the MEM under the *Mining Act*. Mineral land tenure is managed by means of surface and mineral rights, mining claims, leases and patent lands. As of March 2025, some Great Bear Resources claims have been, or are in the process of being converted to mining leases (Figure 2.1-1).

Active mineral lands holders within the LSA as current to April 2024 include as listed in Table 7.13-8 (MEM 2024). Figure 7.13-11 summarizes mining land tenure in the LSA.

7.13.4.4.3 Forestry

The MNR manages Crown forests by through FMU, managed by individual forest companies under a five-year renewable Sustainable Forest License (SFL). The LSA is located within the Red Lake Forest FMU 840 and the Trout Lake FMU 120 (MNRF 2019a). These FMUs are administered through Red Lake District Office. The total managed Crown productive forest land area for Red Lake FMU is 184,000 ha managed under SFL#542548, while the Trout Lake FMU 120 has 741,750 ha of Crown productive forest under SFL#542461 (MNRF 2019b). The managing agent for FMU 840 is Red Lake Forest Management Company Ltd. who entered into a ten-year contract (2020 to 2030) with MNR. The Red Lake Forest Management Company Ltd. is responsible for all renewal and maintenance activities to maintain a sustainable forest (Red Lake Forest Management Company Ltd. 2020). The managing agent for Trout Lake FMU 120 is Dryden Fibre Canada, is entered in a ten-year contract (2021 to 2031) with MNR, with Dryden Fibre Canada responsible for all renewal and maintenance activities (Dryden Fibre Canada 2024)

Table 7.13-9 describes the total area of the FMUs in the LSA (Ontario Geohub 2025). The FMUs in the LSA are shown in Figure 7.13-12.

7.13.4.4.4 Bait Harvesting

Commercial bait harvesting is the capture and sale of baitfish and / or leeches to retailers who supply bait to the recreational fishing industry. Commercial operators must obtain licenses associated with defined bait harvesting areas, with operators able to hold licenses for several bait harvesting areas consecutively. There are six Bait Harvest Zones that overlap the LSA (MNR 2022): RL0040, RL0041, RL0042, RL0027, RL0028, RI0029, with RL0041, RL0028, RL0029 each intersecting with the PA (Figure 7.13-7).

7.13.4.4.5 Energy

The Hydro One Networks E2R 115 kV transmission line crosses the northern portion of PA and connects northwestern Ontario to the Provincial electrical grid. A regional Enbridge natural gas pipeline is also present in the LSA, situated alongside Highway 105.

Great Bear Resources understands that grid infrastructure upgrades in the region by Hydro One Networks may be completed as early as 2031, with early study work in progress for a regional solution that would expand the currently available capacity.

7.13.4.5 Visual Setting

The existing visual character of the PA is described from four vantage points located within the LSA, with these vantage points selected based on the common vantage points of the Project (Appendix O-3).

- Southwest shore of Gullrock Lake at a cottage / residential site and main base lodge
- Southwest shore of Gullrock Lake near trapper cabin
- Southwest shore of Gullrock Lake near cottage / cabin location
- Chukuni River shoreline near cottage / cabin sites and canoe route

- Northeast shore of Pakwash Lake near cottage / cabin location
- East shore of Pakwash Lake in Pakwash Provincial Park (canoe route)
- East shore of Pakwash Lake in Pakwash Provincial Park camp area and main base lodge.

The existing visual character of the LSA consists of Highway 105 and the adjacent regional transmission line which sits just north of the PA within and throughout the LSA, with the transmission line intersecting with the PA, deciduous and coniferous forest cover along the north and south sides of the highway, sparse residential areas and cottages, Chukuni River and Pakwash Lake. Vegetation north of the PA is quite dense but has been altered through past and present forestry activities. Pakwash Lake and Pakwash Provincial Park are northwest of Ear Falls and offer serene natural landscapes.

7.13.4.6 Light Environment

Existing light levels within the LSA were monitored to assess the current atmospheric light levels in the LSA. Due to the rural nature and few residents in the LSA, the ambient lighting is considered to be a lower brightness, with dark nighttime skies and stars appearing large and bright in the night sky due to low measurements of light in the area (Appendix G).

7.13.4.7 Navigation

The navigability of waterways is assessed by TC for each watercourse and waterbody, including in consideration of the physical characteristics, accessibility and past and current use from transport or travel purposes. Information regarding the watercourses and waterbodies that may be affected by the Project (i.e., flow or level) was provided to TC in 2024 and is included as Appendix V.

The Chukuni River also includes several portage points for the Pakwash-Trout-Bruce Lake Loop designated by the MNR within the LSA and outside of the PA. As it currently stands, the MNR does not undertake maintenance to the portage routes, nor are the MNR responsible for the personal safety of persons using the designated route.

7.13.5 Identification of Potential Effects

The initial step in the assessment process is to identify interactions between the Project and the pVC that can result in pathways to potential effects. The professional judgment of technical experts experienced with mining projects in Ontario and Canada, as well as input from Indigenous communities, government agencies and the public, informed the identification of those interactions that are likely to result in a pathway to a potential effect due to a measurable change to sound. These pathways are summarized in Section 7.13.5.1 to Section 7.13.5.3 for each phase of the Project and Table 7.13-10. Section 7.13.6 provides a description of the mitigation measures applied to these pathways to potential effects during all phases of the Project. The changes after the application of the mitigation measures, are then described and further evaluated in Section 7.13.7.

7.13.5.1 Construction Phase

The construction phase of the Project is expected to occur over a three-year period and will include preparation of the site and the construction of mine infrastructure (Section 5). Project

construction activities that will cause changes to land and resource use include the following representative activities:

- Site preparation activities: restricting access to the PA prior to construction can affect land and resource use within the PA
- Establishment and operation of water management and treatment facilities: construction activities and discharge of treated water in the Chukuni can affect navigation
- Open pit and underground mining: land and resource use may be affected through the additional sound and vibration created during this phase
- Management of rock and unconsolidated materials in stockpiles: land and resource use may be affected through the additional sound and vibration created during this phase
- Establishment of onsite fish habitat and compensation measures: can positively affect land and resource use through creation of improved or equal fish habitats
- Establishment of onsite aggregate operations: land and resource use may be affected through the additional sound and vibration created during this phase
- Construction of the starter embankments for the TMF: construction of starter embankments can create changes to nearby water levels and affect land and resource use
- Construction and operation of buildings and infrastructure: construction activities may affect land and resource use through creating additional sound and vibration
- Power supply: construction activities associated with the creation of a power supply may create additional sound and vibration and potentially affect land and resource use.

7.13.5.2 Operations Phase

The operations phase is anticipated to occur over a 26-year period, with both open pit and underground mining occurring during the first 9 years, and only underground mining for the remainder of the operations phase. During the operations phase, the following key activities could cause changes to land and resource use:

- Underground mining: use of heavy equipment and mining activities may affect land and resource use through additional sound and vibration created
- Mining of the LP central pit: mining activities may affect land and resource use through additional sound and vibration created
- Management of rock and unconsolidated materials in stockpiles: use of heavy equipment for management may cause additional noise, and vibration, and may cause result in changed to the visual landscape which may affect land and resource use
- Process plant operation: operation of the process plant may cause additional noise and vibration and affect land and resource use
- Management of desulphurized tailings in the TMF: tailings management operations will result in seepage that will be treated and released into the Chukuni River, which may affect land and resource use activities

- Operation of water management and treatment facilities: treated water discharge into the Chukuni River may affect navigation
- Construction of a MWP: construction may create additional sound and vibration which can affect land and resource use.

7.13.5.3 Closure Phase

Activities during the active closure phase are expected to occur over a three-year period and will commence immediately after operations cease. Active closure, passive closure, and final reclamation are all likely to have effects on land and resource use through additional sound and vibration from salvage and filling activities and navigation as the filling of the open pit mine may affect water levels and flow in the Chukuni River.

7.13.6 Mitigation

To avoid, reduce, minimize, or eliminate the potential change, the following mitigation and enhancement measures will be considered and implemented during all applicable phases of the Project. Key mitigation measures utilized include the following in addition to those listed for other pVCs that may have a pathway to land and resource use:

- Maintaining regular communication with trapline holders (RL061, RL073, RL059 and RL068) regarding activities and opportunities to facilitate their land use activities and determine alternative options for trapline losses for RL068 and RL059 (owned by LSFN)
- Maintaining vegetative buffers around the mine site where practical to minimize the view of the mine from recreational users, and revegetation of stockpiles when at maximum extent as reasonable
- Access will be maintained to the LSA via the existing road and trail network or planned forestry roads as supported by Great Bear Resources although this aspect is not fully under their control (there will be no access within the PA as it will be an active mine site due to safety)
- Prohibiting fishing and hunting within the controlled access portion of the PA by Project personnel including employees, suppliers, and contractors while working or residing on site
- Ensuring access is maintained to the surrounding active aggregate extraction facilities located within the PA
- Posting signage around the PA to alert local resource users of the presence of Project facilities and activities
- Providing open and transparent reporting information to resource users
- Development of a compact mine site to limit the removal of merchantable timber and overprinting of traplines or bait areas
- Practice progressive rehabilitation as areas are no longer required where practical and Regular consultation with outfitters, trappers, and recreational users to keep them updated on the Project and understand changes to how land is used.

7.13.7 Assessment of Changes

With the mitigation measures in place as outlined above and including the mitigation measures proposed for pathway pVCs, interactions between the Project and land and resource use can still result in potential changes to land and resource use. These potential changes from the various phases of the Project may be adverse or positive, direct or indirect changes as they relate to land and resource use.

The professional judgment of technical experts experienced with mining projects in Ontario and Canada, as well as input from Indigenous communities, government agencies and the public, informed the identification of those interactions that are likely to result in a pathway to a potential impact due to a measurable change to land and resource use. The potential changes to land and resource use arising from the Project after applying the mitigation measures are discussed in the sections below.

7.13.7.1 Change in Recreational Land and Resource Use

7.13.7.1.1 Change in the Availability of Hunting Areas, and Wildlife

Public access to the PA will be prohibited from the onset of the construction phase until following active closure so that construction, mining, and closure activities can be carried out safely.

In addition, the development of the Project during construction will result in the loss of terrestrial habitat in the PA. Access to the PA will continue to be prohibited until final reclamation is complete, after which access to the PA will be restored and wildlife habitat may re-establish. Despite this loss of hunting area and habitat, the PA is 3,349 ha in area and therefore represents approximately 5% of the area of the LSA (66,997 ha) and approximately 1.6% of the RSA (214,182 ha). Access to the remainder of the LSA and RSA will continue to be available to practice hunting activities where it is lawful to do so. Access to the LSA will be maintained via the existing road and trail network or planned forestry road.

In addition, sensory disturbance caused by emissions of noise, light, and vibration may adversely affect the availability of birds and wildlife in the LSA in the immediate vicinity of the PA, potentially causing wildlife to avoid the area. However, habitat outside the PA is expected to retain value for wildlife, despite sensory disturbance. As noted in Section 7.2 (air quality), Project-related emissions of air contaminants are predicted to meet regulatory requirements for all Project phases. In addition, predicted increases in Project-related sound (Section 7.3) and vibration (Section 7.4) will comply with applicable regulations at all PORs. Maintaining a treed buffer as reasonable recognizing the potential need for fire breaks around key facilities, will further reduce potential sensory disturbance in the LSA. The change is predicted to start in construction and continue throughout operations until the end of active closure, and will be reversed following completion of active closure, when new movement patterns are established within the PA due to limited human activity during passive closure and beyond.

Great Bear Resources will regularly consult with outfitters, trappers and recreational users to keep updated on the Project and understand and changes to how land is used.

7.13.7.1.2 Change in the Availability of Fishing Areas or Change in Fish Abundance

As with hunting, although there are no confirmed uses of fishing areas within the PA, access to the PA for fishing will be prohibited throughout the construction and operations phases, and until

the end of the active closure period, so that mining and decommissioning can be carried out safely. Access to the remainder of the LSA will continue to be available for fishing. Further, any fish habitat that is altered or lost as a result of the Project will be offset by creating new habitat as part of the process to obtain a *Fisheries Act* authorization for harmful alteration, disruption, or destruction of fish habitat that may occur. As part of the offsetting requirements, a greater area of new habitat will be created than the area lost or altered, thus providing a conservative approach to addressing the habitat loss. Further detail is provided in Section 8 and Appendix L-2.

The establishment of fish habitat offsetting measures may positively change the on site fish habitats by providing monitoring so that the fish habitats stay at the same quality, or better. Fish resources may see a corresponding positive change due to the fish habitat enhancement measures. Overall, it is expected that there will be no net loss of areas for fishing as a result of the Project.

As discussed in Section 8, no Project-related effects on sustainability and productivity of fisheries within the LSA are anticipated. Therefore, no changes to fish as a resource in the LSA are predicted.

7.13.7.1.3 Change in Recreational Areas or Change in Access

Other than for hunting and fishing as discussed above, the PA is not known to be used as a recreational area. There are no recreational trails, snowmobile trails, or ATV trails in the PA. However, the Project may affect recreational use of the portions of the LSA near the PA through sensory disturbance and may result in a change in the use of the land and resources by recreational users. As noted above, Project-related emissions of air contaminants, sound and vibration are predicted to meet regulatory requirements for all Project phases.

Access to land and waterways within the PA will be prohibited during construction, operations, and active closure. Users will be notified through use of signage posted at the edge of the PA. Access to the remainder of the LSA outside the PA will be maintained via the existing road and trail network or planned forestry roads.

7.13.7.1.4 Sensory Disturbance to Recreational Users

As noted in Section 7.2, Project-related air emissions are predicted to meet regulatory air quality requirements at all PORs for all Project phases. In addition, Project-related sound (Section 7.3) and vibration (Section 7.4) emissions will meet regulatory requirements at all PORs. Additionally, ambient lighting arising from the Project is predicted to be below the relevant guideline levels of the Commission Internationale de l'Éclairage at all the assessed receptors. A forested buffer will be maintained around the PA where reasonable to further attenuate Project sound levels and reduce the effect of Project plant lighting and mobile equipment. The forested buffer around the mine site will also minimize the view of the mine from recreational users.

Even when compliant with regulatory standards and guidelines, emissions of noise, light, and vibration may affect recreational land and resource users' enjoyment of the land in the LSA. There is no recreational land use in the PA. Sensory disturbance would be expected to begin during construction and continue through operations and into the active closure period, but will be cease thereafter. Mitigation measures for air contaminant emissions, noise and vibration will minimize sensory disturbance to users in the LSA, as described in Section 7.2.6, Section 7.3.6

and Section 7.4.6, respectively. Additionally, directional lighting will be used to minimize lighting effects (Appendix G).

Changes to the visual setting will commence during construction and will continue throughout all phases of the Project. The TMF and mine rock stockpile continue to increase in geographic extent, although their height is expected to remain largely below the surrounding tree line. Progressive and final reclamation, including active and passive revegetation, will minimize visual effects. A viewshed analysis conducted for the Project (Appendix O-3) concluded that there will be very limited viewing of the Project facilities even at their maximum extent and height, generally later in operations and only in the far distance. Once progressive and final reclamation activities are completed, supplemented by natural regrowth after closure, the residual stockpiles are expected to visually blend into the natural landscape in the limited location where they are visible in the far distance.

Overall, despite no confirmed recreational use of the PA, the Project may affect recreational land and resource use in the LSA during construction, operations, and into closure, but those disruptions are expected to remain within regulatory guidelines such that the changes experienced by users in the LSA in proximity to the Project, is not expected to be substantive. No changes to the RSA beyond the LSA are expected.

7.13.7.2 Change in Commercially Based Land and Resource Use

7.13.7.2.1 Trapping, Guide Outfitting, and Bait Harvesting

Trapping of furbearers is known to occur in the PA. Although there are no guide outfitters operating in the PA, it is possible that some guide outfitters may be hosting clients in the LSA, near the PA. As with recreational land and resource use, the Project will result in the restricted access to, and loss of (due to clearing of the site), areas for harvesting for license holders in the PA in order for mining to be carried out safely.

Great Bear Resources will consult regularly with outfitters, trappers, and other commercial users to keep them updated on the Project and understand changes to how land is used and to find ways of minimizing effects to their operations.

As discussed in Section 7.13.4.2.1.3, the PA intersects with four trapline areas in the LSA (i.e., trapline areas RL061, RL073, RL068, and RL059; Table 7.13-3 and Figure 7.13-4), potentially affecting these activities if they are practiced in the PA. Great Bear Resources will maintain regular communication with trapline holders (RL061, RL073, RL059 and RL068) regarding activities and opportunities to facilitate their land use activities and determine alternative options for trapline losses for RL068 and RL059 (owned by LSFN).

Bait harvesting would be affected in a similar way, as the PA intersects with three bait harvesting areas (RL0041, RL0028, RL0029) with bait harvesting being practiced in the LSA. The loss of area will vary for each of the affected trapline and bait harvesting area, and will continue throughout construction, operations, and active closure.

Traplines RL059 and RL068 intersect with the PA, and with the PA no longer being accessible from the onset of construction until following active closure, the entirety of the portions of those traplines that intersect with the PA will be lost, representing 3,349 ha of trapline loss. However, overall, the loss of 3,349 ha in the PA represents approximately 2.3% of the total area of trapline areas RL068 and RL059 combined (1,440 km²; Table 7.13-3), representing a measurable but relatively small loss of areas used for trapping or bait harvesting. The LSA outside of the PA will

not be affected by the Project in terms of access or use so that the remaining portions of those traplines will not be affected, although potential wildlife avoidance near the PA due to sensory disturbance is possible and considered below. Access restrictions to the PA will occur continuously through construction, operations, and active closure, but will resume following active closure; wildlife habitat may begin to re-establish after this time, enabling wildlife to resume use of the PA. No changes in access will occur to the LSA.

The Project is predicted to change the availability of wildlife resources in direct proximity to the PA due to sensory disturbance and movement patterns, potentially reducing the ability to undertake hunting and trapping in the LSA which may, in turn, may affect commercial trapping and guide outfitting. However, habitat outside the PA is expected to retain value for wildlife, despite sensory disturbance. As noted in Section 7.2, Project-related emissions of air contaminants are predicted to meet regulatory requirements for all Project phases.

Predicted increases in Project-related sound (Section 7.3) and vibration (Section 7.4) will also comply with applicable regulations. Maintaining a treed buffer will further reduce potential sensory disturbance in LSA and RSA. This change will begin at the onset of construction and continue throughout operations and active closure. The loss of availability of wildlife resources will be reversed following completion of active closure when sensory disturbance declines and new movement patterns across the PA are established.

Once active closure activities are completed, most areas will become accessible again for commercially based harvesting. Wildlife is expected to return to the PA following active closure, increasing the availability of resources for trapping and bait harvesting compared to construction and operations. Once closure is complete, it is expected there would be no restrictions on access.

7.13.7.2.2 Timber Harvesting and Resource Extraction Activities

The PA is located entirely within the Red Lake FMU, and overlaps several planned forest harvesting areas as per the 2020-2030 Forest Management Plan for the Red Lake Forest as shown in Figure 7.13-13. The PA will need to be cleared during construction to make way for Project facilities, thereby affecting planned forest harvesting activities as defined by the Annual Work Schedule under the Forest Management Plan. However, since those areas were planned for harvesting already, the clearing activity for the Project will simply accelerate the planned harvesting of some of these areas, thereby resulting in the same changes as was previously planned (although sooner than planned in some cases). In addition 324 ha have already been cleared within the PA (as part of the AEX Program), which equates to 9.7% of the PA.

Great Bear Resources will obtain a Release of Tree Reservation under the *Public Lands Act* prior to initiating tree clearing and will allow the existing forest harvesting businesses holding the harvesting rights in these areas to harvest the trees within the PA on its behalf. Great Bear Resources will also work closely with local forest harvesting businesses and forest management authorities to carry out the harvesting of the PA in a manner consistent with existing forest management plans and planned harvesting activities (although in some cases sooner than previously planned). The loss of timber resources in the PA will continue throughout construction, operations, and active closure, but forest regrowth is expected to resume following active closure as new vegetation takes hold, allowing timber harvesting to resume in the area formerly covered by the PA once trees have again matured. The loss of harvesting area in the PA is not considered to be substantive in the context of the Red Lake FMU, since the PA as a

whole represents only approximately 1.8% of the total managed Crown productive forest land area for the Red Lake FMU.

As discussed in Section 7.13.3.2.2.1, there are 17 aggregate operations with active approvals within and around the LSA, with seven active aggregate operations located within (or intersecting part of) the PA. Great Bear Resources has committed that it will maintain access to the six active aggregate extraction facilities located within the PA boundary so that those activities are unaffected by the Project. No adverse change to aggregate operations is expected.

In addition to holding the necessary mining leases covering the PA, Great Bear Resources holds all active mining claims immediately surrounding the PA (the Property); as such, other mining claims are not expected to be affected by the Project. Since it holds the necessary mining leases covering the PA, Project components will be constructed within the area for which Great Bear Resources holds the surface and mineral rights. No adverse change to surface and mineral rights is anticipated.

These changes will occur in the context of a local environment that has been disturbed by forestry, aggregate extraction, and development over several decades. From this perspective, commercial users have been operating in a socio-economic context that is similar to that which will be present throughout the Project.

Overall, the Project may affect commercially based land and resource use during construction, operations, and into closure, but those disruptions to commercial users will cease following active closure.

7.13.7.2.3 Sensory Disturbance to Commercially Based Land and Resource Users

Commercially based harvesting activities may be affected by sensory disturbance, in particular to trappers, bait harvesters, and clients of guide outfitting services offering services in the LSA. However, as noted in Section 7.2, Project-related emissions of air contaminants are predicted to meet regulatory requirements for all Project phases. In addition, predicted increases in Project-related sound (Section 7.3) and vibration (Section 7.4) will comply with applicable regulations. Maintaining a treed buffer will further reduce potential sensory disturbance in LSA and RSA. There will be limited changes in the visual setting in the LSA, with limited viewing of the Project facilities even at their maximum extent and height, generally later in operations and only in the far distance.

As with sensory disturbance to recreational land and resource users, emissions, noise, light, and vibration may affect commercially based land and resource users in the LSA, particularly if guide outfitting occurs near the PA since the quality of the outfitting experience tends to be diminished with nearby human activity. Commercially based land and resource users in the area may occasionally experience emission levels that disrupt their enjoyment of the land and resources, although this is not expected to be frequent. Emission levels will be compliant with regulatory guidelines and standards.

Sensory disturbance in and near the PA would be expected to begin during construction and continue through operations and active closure, but will be reversed following active closure when little human activity is expected on the PA. Mitigation measures for sound, vibration, and light will minimize sensory disturbance to users in the LSA near the PA.

Sensory disturbance to users due to Project-related emissions (e.g., light, noise and vibration) in the LSA (away from the PA) is not anticipated.

7.13.7.3 Change in Navigation

None of the watercourses in the PA, LSA or RSA are listed on the schedule of navigable waters in the *Canadian Navigable Waters Act*. There are several lakes, small ponds, and small watercourses located within the PA. Dixie Creek intersects part of the southern portion of the PA, and a small portion of the Chukuni River intersects part of the northeast portion of the PA (Figure 7.13-6).

Great Bear Resources provided information to TC regarding the local area watercourses and waterbodies in 2024 and 2025 (Appendix V). TC has identified that the following unnamed watercourses and waterbodies within the PA do not meet the requirement of navigable water as defined under the *Canadian Navigable Waters Act*: Unnamed Waterbody 1, Unnamed Waterbody 2, Unnamed Waterbody 5, Unnamed Watercourse 1, Unnamed Watercourse 2, Unnamed Watercourse 3, Unnamed Watercourse 4 and Unnamed Watercourse 6.

The Project will include a treated effluent discharge pipeline and diffuser in the Chukuni River as well as an intake pipeline, which will be anchored to the bed of the river. Additional mitigation such as markings or buoys may be required to safeguard navigation at the inwater pipelines. Installation and removal of the pipeline intakes and outfalls in the Chukuni River may create a short-term disruption to navigation in a small area along the shoreline during construction and during closure. Installation and removal may result in an exclusion area for boats while workers and equipment are present; however, navigation will be able to continue in the Chukuni River around the exclusion area. Following construction, the treated effluent discharge locations and freshwater structures will be marked according to regulatory requirements. At the end of passive closure, the treated effluent discharge locations and freshwater intake would be removed, and navigation could resume in these areas.

The collection of contact waters for management and treatment facilities will change the level and flow of some of the waterbodies and watercourses within the PA (Section 7.6). The change to flows are expected to be minor, and generally within the range of natural variation.

Ongoing monitoring of flow and actual changes that are observed during operations will inform the need for additional mitigation, if warranted.

7.13.8 Change Pathway Outcome

7.13.8.1 Summary of Changes after Mitigation

As discussed above, changes after mitigation are expected to be localized to the PA. There will be no public access to lands within the active mine site due to safety considerations during construction, operations, and active closure, but access will be permitted to resume, when it is safe to do so following closure. Access to the remainder of the LSA and RSA will be unaffected by the Project. Sensory disturbance in the LSA will be limited to the area in immediate proximity to the PA. There will be very limited viewing of the Project facilities even at their maximum extent and height, generally later in operations and only in the far distance. Changes to land and resource use are not expected to affect commercial users except for trapline holders and baitfish harvesters. Great Bear Resources will consult regularly with outfitters, trappers, and recreational users to keep them updated on the Project and understand changes to how land is used and to find ways of minimizing effects to their operations.

With the exception that mining activity associated with the Project will deplete the mineral resource within the PA (which is the purpose of the Project), no long-term changes are expected to land and resource use.

Reclamation of the Project progressively during operations and during the closure phase is proposed to return affected lands to a naturalized and productive condition. The terms naturalized and productive are interpreted to mean a rehabilitated site without infrastructure (unless otherwise negotiated), that is capable of supporting plant, wildlife and fish communities, and other applicable land uses, although it may be different from the existing baseline conditions. Any changes to navigation which may occur due to the Project will be authorized by TC as needed. The level of confidence in the prediction of no lasting effects on land and resource use after mine closure is considered to be high, as there are no changes to land and resource use.

7.13.8.2 Change Management

Great Bear Resources will maintain regular communication with trapline holders (RL061, RL073, RL059 and RL068) regarding activities and opportunities to facilitate their land use activities and determine alternative options for trapline losses for RL068 and RL059 (owned by LSFN).

7.13.8.3 Confidence

The level of confidence in the effects predictions for land and resource use is high. The direct effects as well as possible indirect effects are well understood and noted for recreational, commercial, and navigation uses. Due to the use of the conservative assumptions throughout this assessment, it is believed that any possible effects to land and resource use have been identified and are well understood.

Table 7.13-1: Assessment Criteria, Indicators and Rationale

Criteria	Indicators	Rationale
Change in Recreational Land and Resource Use	<ul style="list-style-type: none"> • Change in the total land area used for recreational purposes (ha) • Access to recreational areas (number of trails accessible and the total length) • Effects on fish / wildlife and their habitat may impact availability of resource (change in population) • Potential sensory disturbance / quality of experience (increased dust, noise, vibration or lighting) and change in viewscape 	<ul style="list-style-type: none"> • Community concerns surrounding water quality and fish, and fish habitat • Noise, vibration, light, and air contaminant emissions could influence general use and enjoyment of outdoor space for the community providing a variety of recreational uses • TISG requests use of lands and water bodies in the applicable study areas including recreational fishing, trapping, outdoor recreation, and use of seasonal cabins
Change in Commercially Based Land and Resource Use	<ul style="list-style-type: none"> • Change in total area for commercial use and / or changes in access • Number of outfitters working in the area • Potential sensory disturbance and quality of experience (increased dust, noise, vibration or lighting) and change in viewscape 	<ul style="list-style-type: none"> • As the Project moves into the construction and operations phase, areas that were previously available for commercial activities within the area will no longer be able to access the land on the site; this may be reversed following final reclamation of the site • TISG for the Project requires a description of the local and regional economic conditions and trends including any use of lands and water bodies in the applicable study areas including commercial fishing, baitfish harvesting, trapping, outdoor recreation, use of seasonal cabins, and outfitters
Change in Navigation	<ul style="list-style-type: none"> • Number of publicly available areas for boat launches • Ability of the watercourse or waterbody to be navigated for recreational or commercial purposes. 	<ul style="list-style-type: none"> • The Project intersects watercourses and waterbodies that may be used for navigation, either for recreational purposes or as a means of participating in associated activities such as fishing, hunting, trapping and bait harvesting

Table 7.13-2: Recreational Trails within the RSA

Name of Trail	Location	Trail Distance (km)	Distance from PA (km)	Activities
Cross Country Ski Trails	Ear Falls	6	31	Hiking, walking, cross country skiing
Griffith Mine Interpretive Trails	Ear Falls	20	9	Hiking, walking, cycling-off road, snowshoeing and backcountry
Pakwash Provincial Park Nature Trail	Ear Falls	5.1	10	Hiking, walking, canoeing, kayaking, backpacking and camping
Red Lake Golf and Country Club	Red Lake	4	18	Hiking, walking, cross country skiing
Centennial Park	Red Lake	1	16	Hiking, walking, cross country skiing
McKenzie Island	Red Lake	> 25	22	Hiking, walking, cross country skiing
Red Lake Millennium Trail	Red Lake	3.4	16	Hiking, walking, snowshoeing, backcountry and ATV access
Howey Peninsula Loop	Red Lake	3.2	18	Hiking, walking, backcountry, forest, and ATV access.
L301 Ear Falls to Red Lake	Ear Falls / Red Lake	> 25	6	Snowmobiling
L401	Red Lake	> 25	8	Snowmobiling
L402	Red Lake	> 25	21	Snowmobiling

Table 7.13-3: Trapline Areas in the LSA

Trapline Area	Trapline Total Area (km²)	Overlap with PA (km²)	Overlap with LSA (km²)
RL061	215.3	0	108.6
RL073	360.8	0	44.7
RL059	650.8	7.3	173
RL068	789.2	26.2	363.5

Table 7.13-4: Campgrounds, Lodges, Tourist Cabins, Resorts and Other Wilderness Establishments in the LSA

Establishment	Distance from the PA (km)
1561250 Ontario Inc.	15
Bluffy Lake Lodge	34
Brownlee's Holiday North	6
Butch's Point Outpost	38
Chukuni River Campground	14
Deschamp Resort	6
Five Lakes Lodge Inc.	7
Franklin's On Stone Lake	4
Gawley's Little Beaver Lodge	37
Golden Hook Camps	0.5
Gullrock Lake Lodge	5
Jette's Adventures	3
Lac Seul Evergreen Lodge	30
Lac Seul's Reel Inn	37
Lac Seul Whitewing Lodge	38
Lac Seul Wilderness Resort	38
Lac Seul's Scout Lake Resort	30
Little Canada Camp	31
Pakuni Lodge	19
Pakwash Lake Camp	10
Poplar Point Resort	6.6
Procyk's Anglers Paradise Lodge	2
Showalter's Fly-In Outpost	6
Snake Falls Camp	3
Sunset Lodge	10
Timberlane Lodge	31
Wright's Wilderness Camp	8

Table 7.13-5: Conservation Reserves and Distance from the PA

Conservation Reserve	Approximate Distance from PA (LP Central Pit Centroid) (km)
Bruce Lake Conservation Reserve	11
Trout Lake Conservation Reserve	24
Hammell Lake Conservation Reserve	30
Lac Seul Islands Conservation Reserve	32

Table 7.13-6: Local Provincial Parks and Distance from the PA

Provincial Parks	Approximate Distance from Project Area (LP Central Pit Centroid) (km)
Pakwash Provincial Park	6.7
Trout Lake Provincial Park	23
Woodland Caribou Provincial Park	40

Table 7.13-7: Active Aggregate Operations in the LSA

Active Aggregate Operations in LSA	Distance from PA (km)
Municipality of Red Lake	Inside the PA boundary
H. Moncrief and Son Contracting	Inside the PA boundary
Lafarge Canada ⁽¹⁾	Inside the PA boundary
Ministry of Transportation (MTO) AP 500 138	Inside the PA boundary
Shewchuk Enterprises	Inside the PA boundary
William Saskosky Logging	Inside the PA boundary
MTO AP 500 311	0.2
William Saskosky Logging	0.2
P. Spinelli Trucking	0.6
Larry Herbert and Nathan Herbert	1.5
Moncrief Construction	1.5
MTO AP 500 310	1.5
MTO AP 500 137	2
Draco (1985)	2.6
Snake Falls Camp	2.6
MTO AP 500 136	3.7
MTO AP 500 183	3.8

Notes:

1. Company name was changed in 2025 to Amrize Canada Inc.

Table 7.13-8: Active Mine Claims within the LSA

Company	Area of Active Claims in LSA (km²)	Number of Active Claims in LSA
Bounty Gold Corp.	22.5	128
BTU Metals Corp.	113.8	572
D2 Gold Inc.	50.7	261
Dixie Gold Inc.	208.1	1,038
EMX Properties (Canada) Inc.	33.2	31
Evolution Mining Gold Operations Ltd.	0.4	6
Goldon Resources Ltd.	18.6	6
GOLD REA Resources Corp	1.6	8
Gravel Ridge Resources Ltd.	1.0	1
Greg William Smith	0.7	5
Griffith Iron Metallica Inc.	12.9	72
LP Gold Corp.	19.2	94
Michael A Tremblay and Philip Escher	0.3	4
Pacton Gold Inc.	44.6	238
Prime Meridian Resources Corp.	0.6	3
Red Lake Gold Inc.	30.8	160
Silver Dollar Resources Inc.	2.2	4
Trillium Gold Mines Inc	2.1	15

Source:
MEM (2024).

Table 7.13-9: Forest Management Areas in the LSA

Forest Management Unit (FMU)	FMU Total Area (km²)	FMU Overlap with LSA (km²)	FMU Overlap with PA (km²)
Red Lake Forest	3,155.3	581	33.49
Trout Lake Forest	10,320.2	108	-

Table 7.13-10: Potential Interactions of Project Components with Land and Resource Use

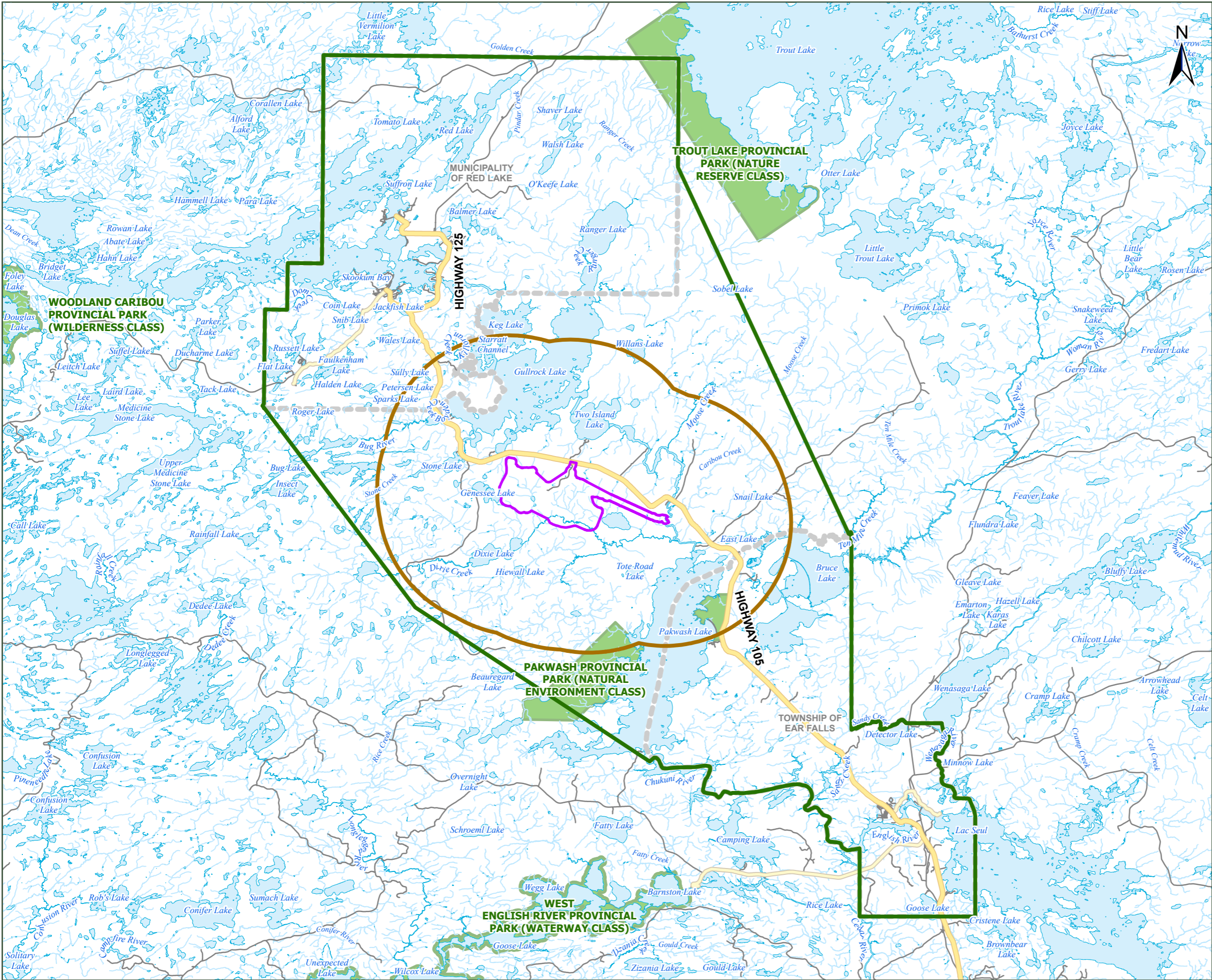
Project Component / Activity	Land and Resource Use
Construction Phase	
Site preparation activities	Yes
Establishment and operation of water management and treatment facilities	Yes
Open pit mining	Yes
Underground mining	Yes
Management of rock and unconsolidated materials in stockpiles	Yes
Establishment of onsite fish habitat and compensation measures	Yes
Establishment of onsite aggregate operations	Yes
Construction of the starter embankments for the TMF	Yes
Construction and operation of buildings and infrastructure	Yes
Waste management	-
Commissioning of the process plant	-
Power supply	Yes
Employment and expenditures	-
Operations Phase	
Underground mining	Yes
Mining of the LP Central pit	Yes
Management of rock and unconsolidated materials in stockpiles	Yes
Process plant operation	Yes
Management of desulphurized tailings in the TMF	Yes
Management of concentrate tailings and contact water in the Viggo Management Facility	Yes
Operation of water management and treatment facilities	Yes
Construction of a MWP	Yes
Operation and maintenance of buildings and infrastructure	-
Waste management	-
Power supply	-
Progressive reclamation activities	Yes
Employment and expenditures	-
Closure Phase	
Active closure period	Yes



Project Component / Activity	Land and Resource Use
Passive closure period	Yes
Final reclamation period	Yes
Employment and expenditures	-

Notes:

- : The interaction is not expected to be material, and no further assessment is warranted.



- LEGEND:**
- PROJECT AREA
 - LOCAL STUDY AREA FOR LRU
 - REGIONAL STUDY AREA FOR LRU
 - HIGHWAY
 - MAJOR ROAD
 - LOCAL ROAD
 - WATERCOURSE
 - WATERBODY
 - MUNICIPAL BOUNDARY (LOWER TIER)



NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.

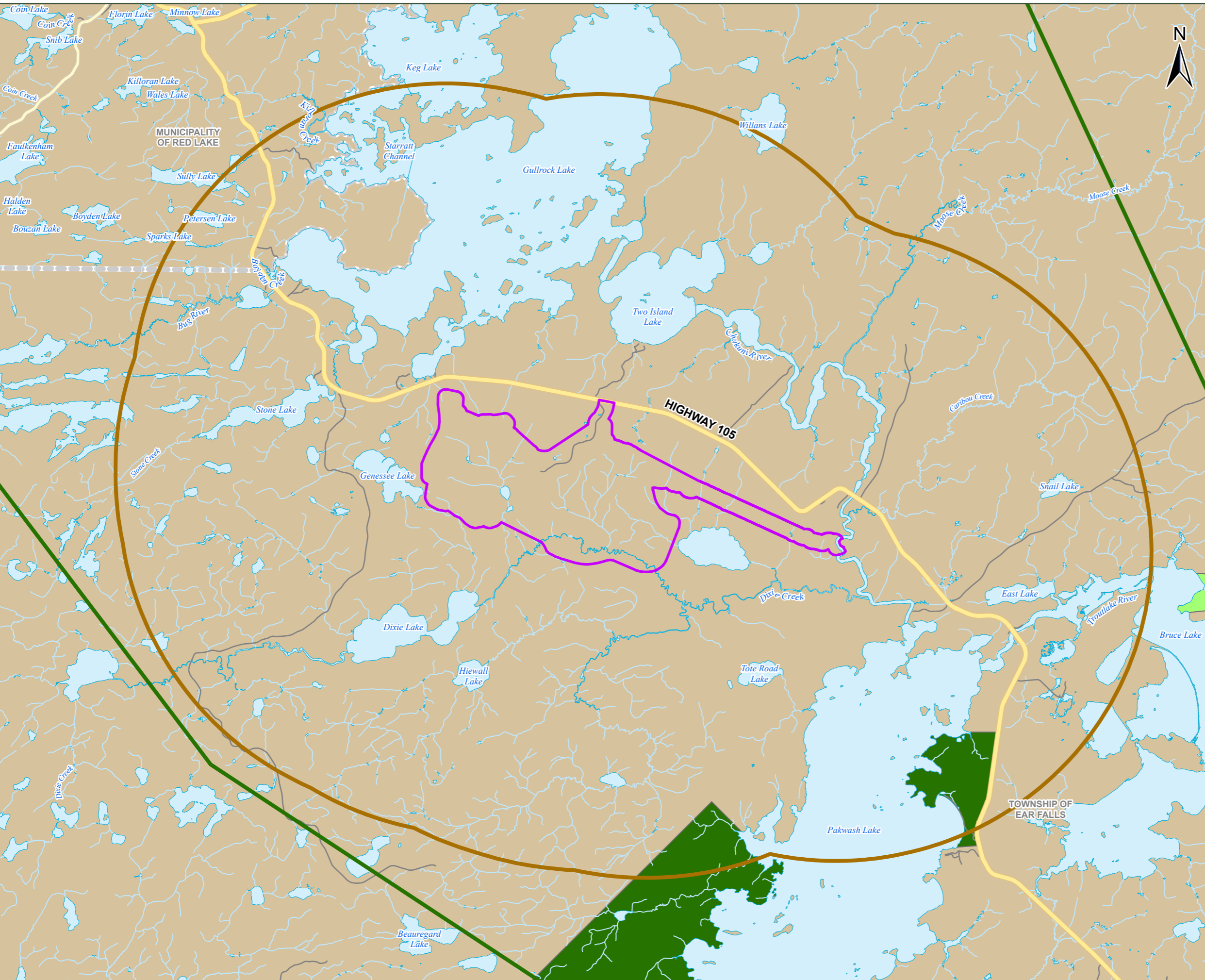
0 1.25 2.5 5 7.5 km
SCALE 1:300,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

SPATIAL BOUNDARIES FOR LAND AND RESOURCE USE (LRU)

SLR FIGURE NO:
7.13-1



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- MUNICIPAL BOUNDARY (LOWER TIER)

ONTARIO CROWN LAND USE POLICY ATLAS (MNR)

- CONSERVATION RESERVE
- GENERAL USE AREA
- PROVINCIAL PARK

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



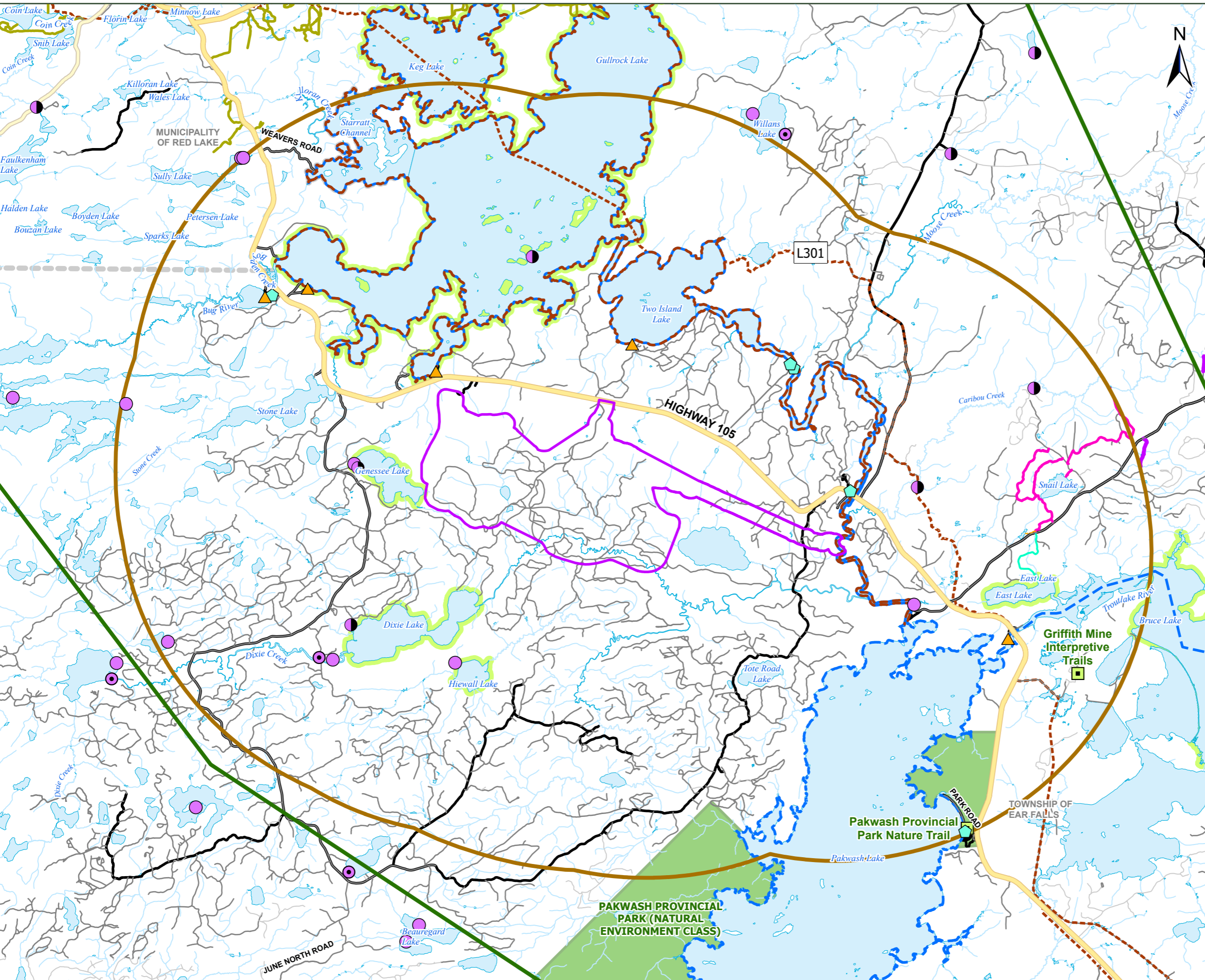
SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

ONTARIO CROWN LAND USE POLICY

SLR FIGURE NO:
7.13-2



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- PROVINCIAL PARK
- RECREATIONAL TRAILS
- TOURISM LAKES

FORESTRY ROADS (MNR)

- FORESTRY ROAD - PRIMARY (4X4 PASSABLE)
- FORESTRY ROAD - BRANCH AND OPERATIONAL (4X4 PASSABLE)
- OTHER FORESTRY ROAD (NOT 4X4 PASSABLE)

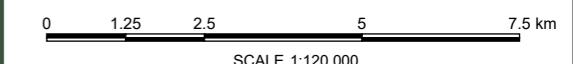
TRAILS (LIO)

- CANOE ROUTE
- MARK SOBCHUK TRAPPING TRAIL
- TRAPPING TRAIL SEVEN/ EIGHT
- SNOWMOBILE TRAIL
- CANOE ROUTE \ SNOWMOBILE TRAIL
- EAST LAKE TRAIL
- MINING TRAIL
- PORTAGE
- TRAIL TO KILOMETER 3 LAKE

RECREATION POINT (LIO)

- ◆ ACCESS POINT
- BOAT CACHE, COMMERCIAL
- BOAT CACHE, PRIVATE
- ◐ BOAT CACHE, RESOURCE HARVEST
- ▲ DESIGNATED CAMPING SITE

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

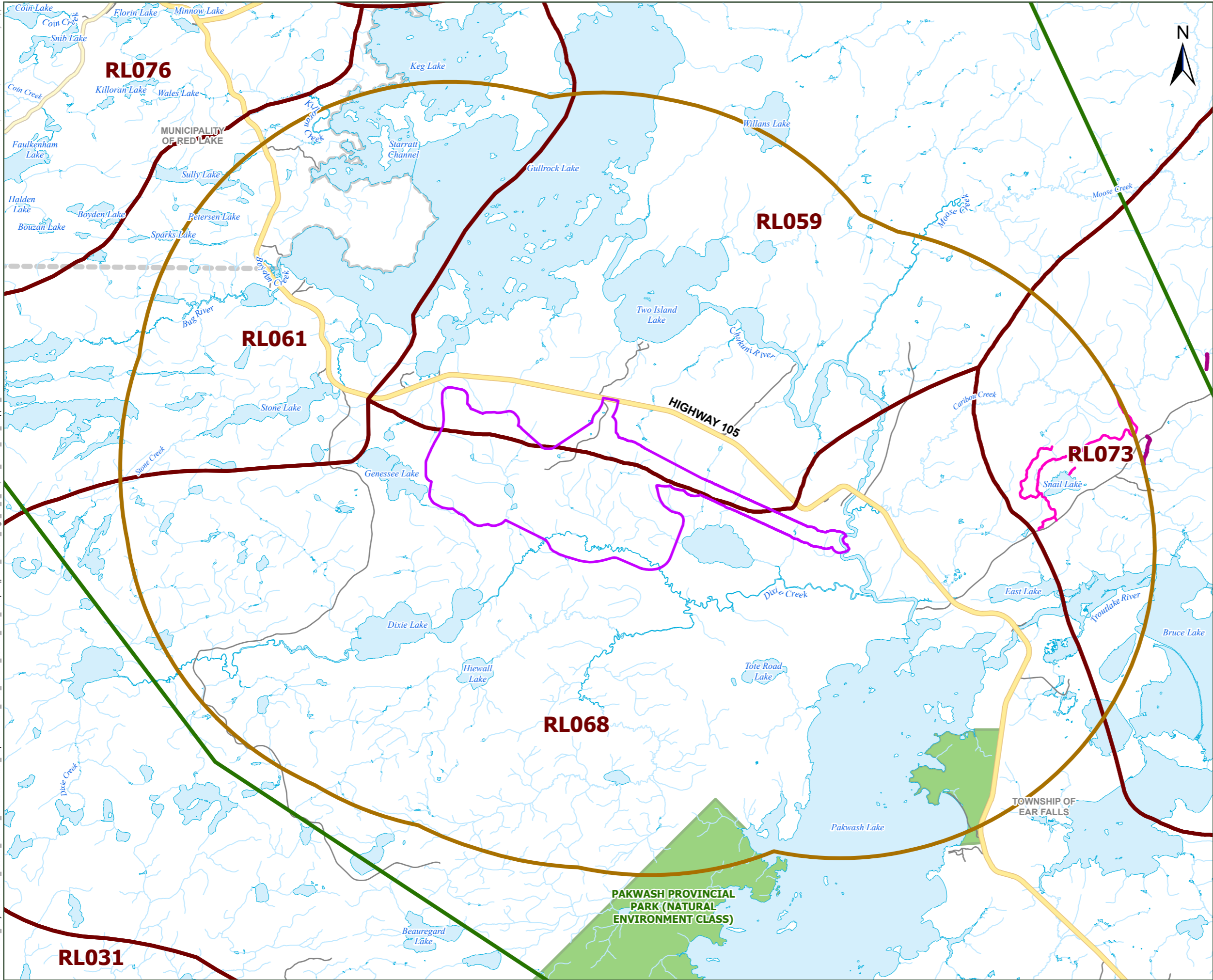
GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

TRAILS AND RECREATIONAL AREAS

SLR

FIGURE NO:
7.13-3



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- TRAPLINE AREA
- MARK SOBCHUK TRAPPING TRAIL
- TRAPPING TRAIL SEVEN/ EIGHT
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- PROVINCIAL PARK
- WATERBODY
- MUNICIPAL BOUNDARY (LOWER TIER)

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



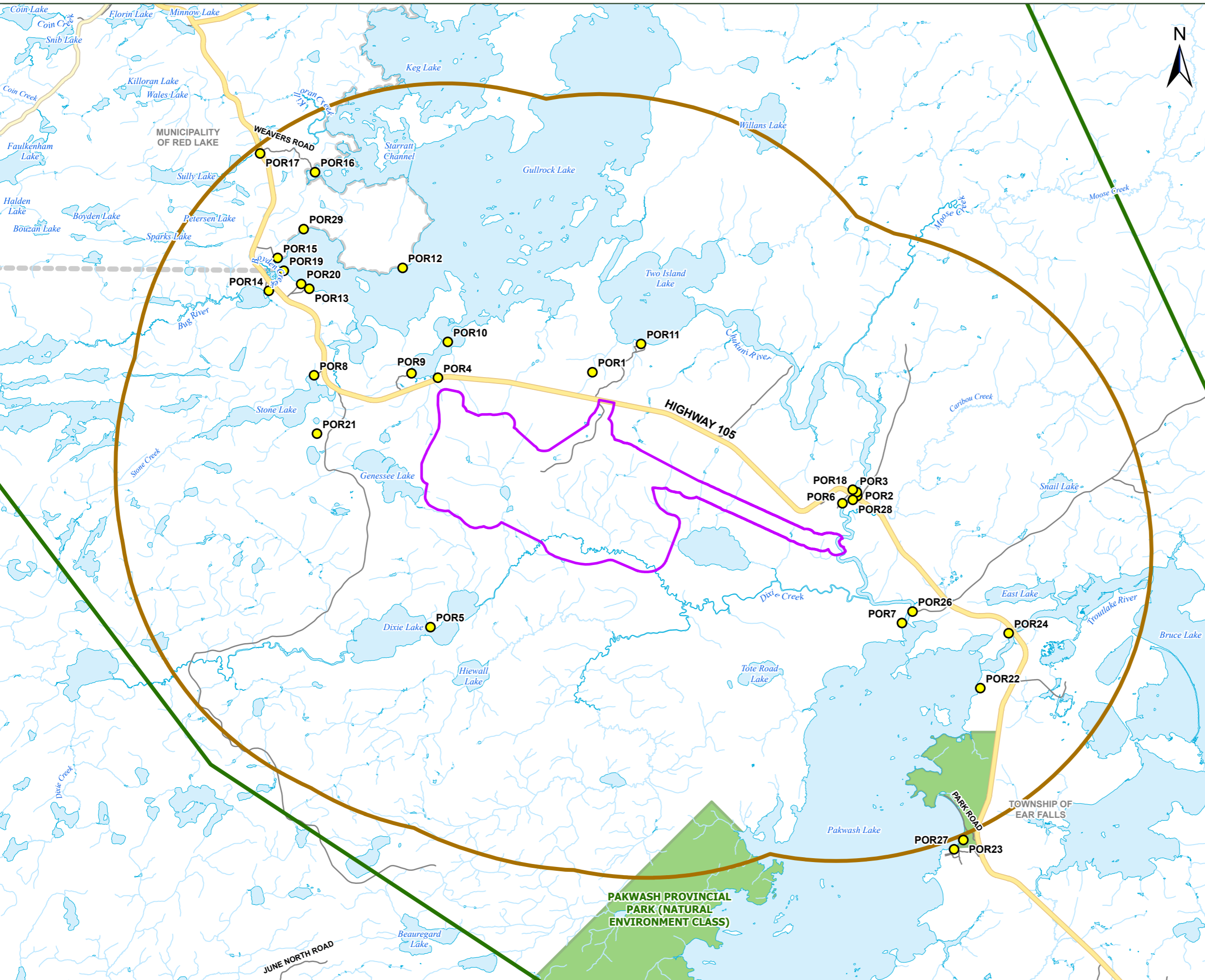
SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 18N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

TRAPLINE AREAS

SLR FIGURE NO:
7.13-4



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- PROVINCIAL PARK
- MUNICIPAL BOUNDARY (LOWER TIER)
- POR (WSP)

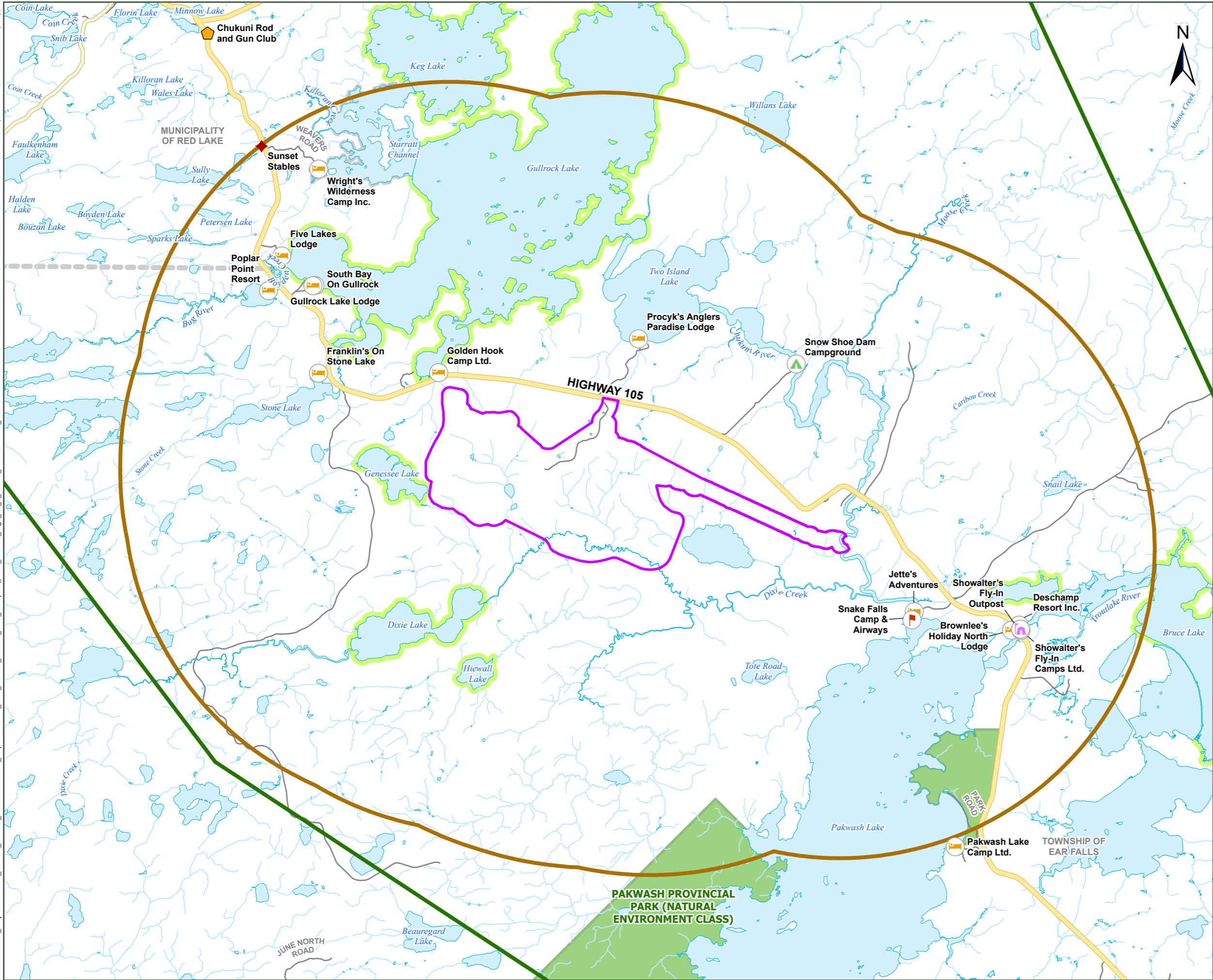
NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES
GREAT BEAR GOLD PROJECT
POINTS OF RECEPTION (POR)

SLR	FIGURE NO: 7.13-5
DATE: September 25, 2025	PROJECT NO: 241.030825



LEGEND:

	PROJECT AREA		COMMERCIAL CAMPGROUND
	LOCAL STUDY AREA FOR LRU		COMMERCIAL PARKING LOT
	REGIONAL STUDY AREA FOR LRU		HORSE RIDING STABLE
	HIGHWAY		MAIN BASE LODGE
	MAJOR ROAD		OUTPOST CAMP
	LOCAL ROAD		SHOOTING RANGE
	PROVINCIAL PARK		TOURISM LAKES
	MUNICIPAL BOUNDARY (LOWER TIER)		

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



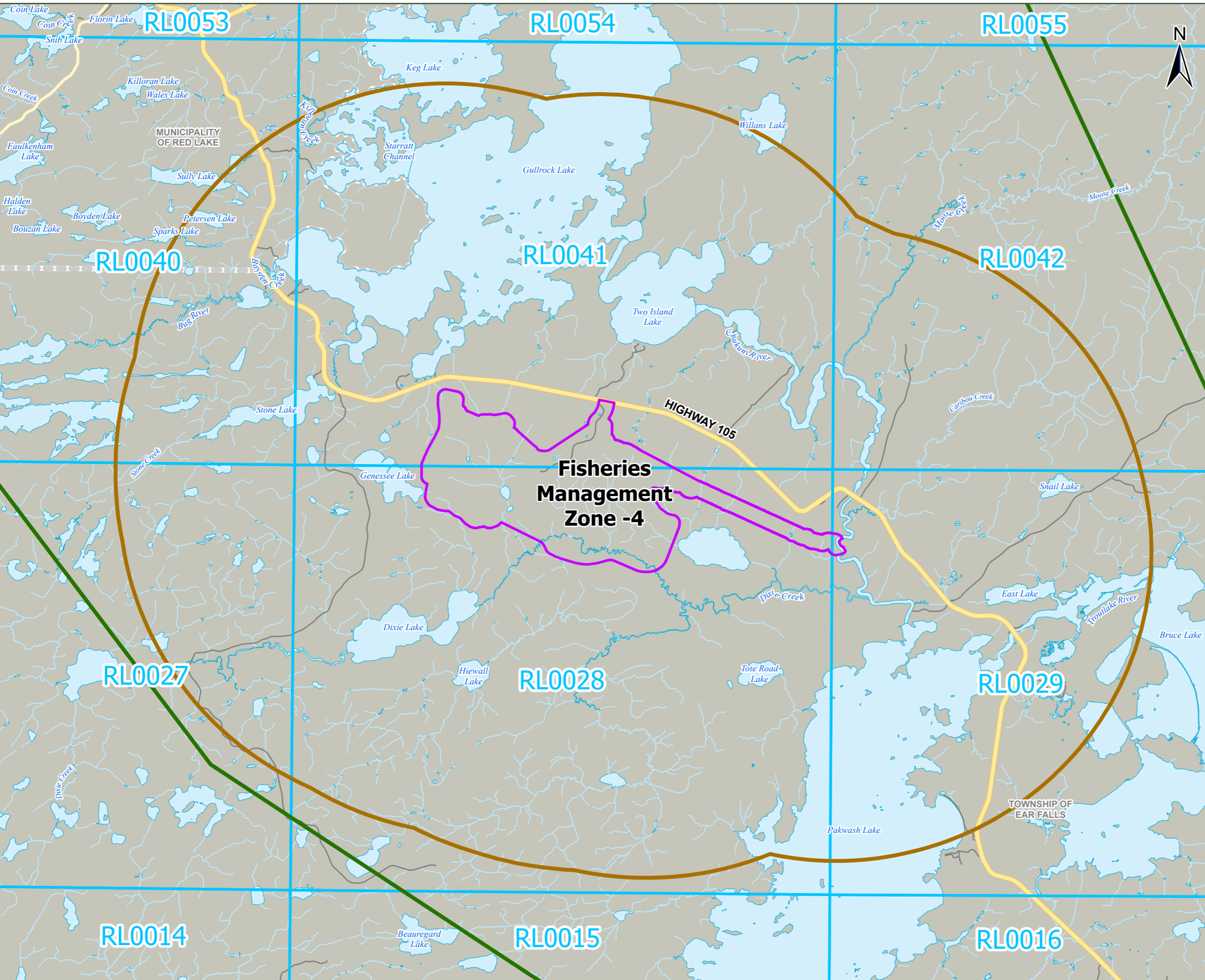
SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES
GREAT BEAR GOLD PROJECT

TOURISM ESTABLISHMENT LOCATIONS

SLR FIGURE NO:
7.13-6

GIS PATH: G:\Projects\241\241_Kinross_GreatBearLake1_Maps\RPT\RPT_LRU_V0\241_031748_LRU_V0.aprx || 241_030825_Fig_13_7_FisheriesMgmtZones_BaitHarvest



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- BAIT HARVEST AREAS
- FISHERIES MANAGEMENT ZONES
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- MUNICIPAL BOUNDARY (LOWER TIER)

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

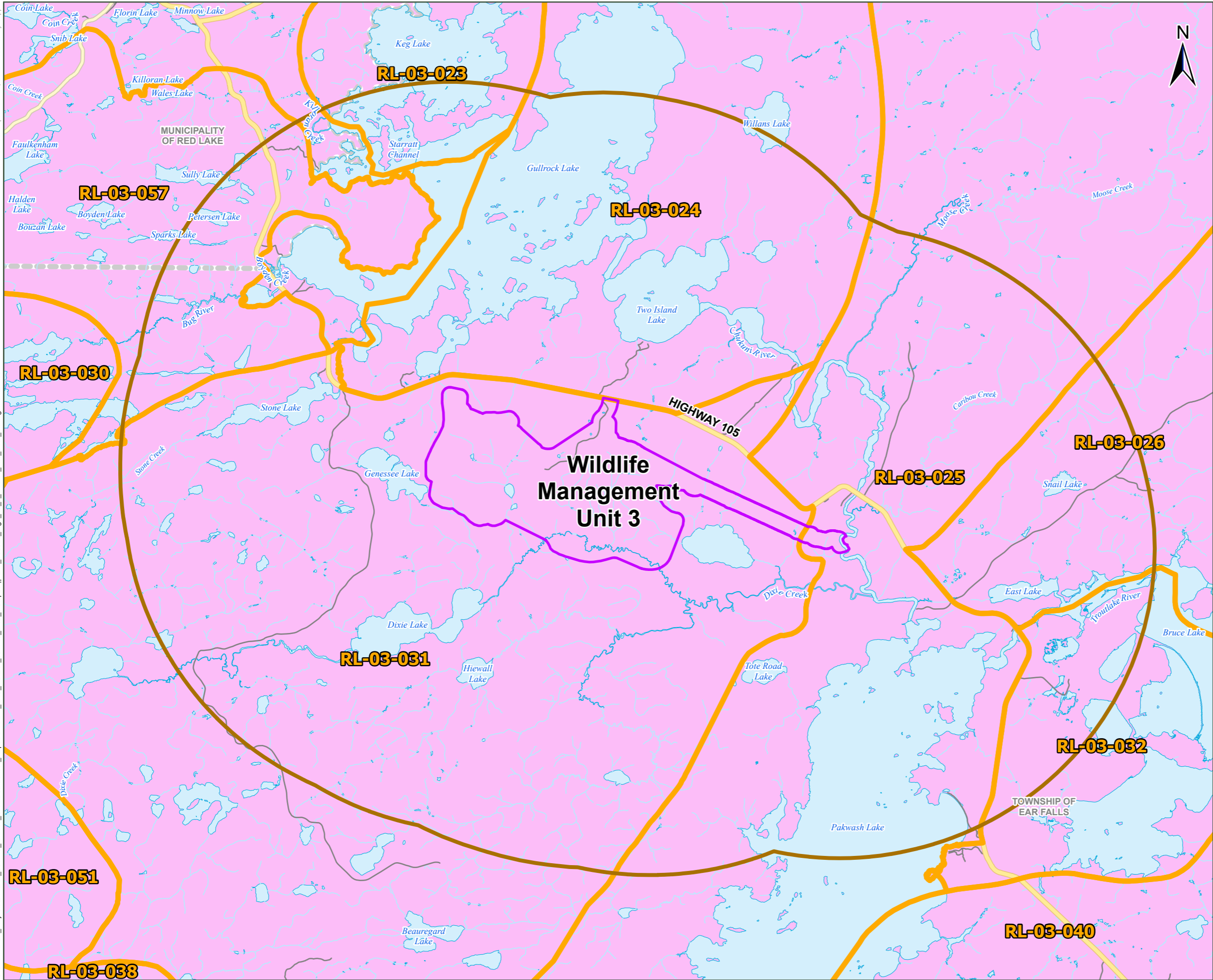
GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

**FISHERIES MANAGEMENT ZONES
AND BAIT HARVEST AREAS**

SLR

FIGURE NO:
7.13-7



- LEGEND:**
-  PROJECT AREA
 -  LOCAL STUDY AREA FOR LRU
 -  REGIONAL STUDY AREA FOR LRU
 -  BEAR MANAGEMENT AREA
 -  WILDLIFE MANAGEMENT UNIT
 -  HIGHWAY
 -  MAJOR ROAD
 -  LOCAL ROAD
 -  WATERCOURSE
 -  WATERBODY
 -  MUNICIPAL BOUNDARY (LOWER TIER)

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



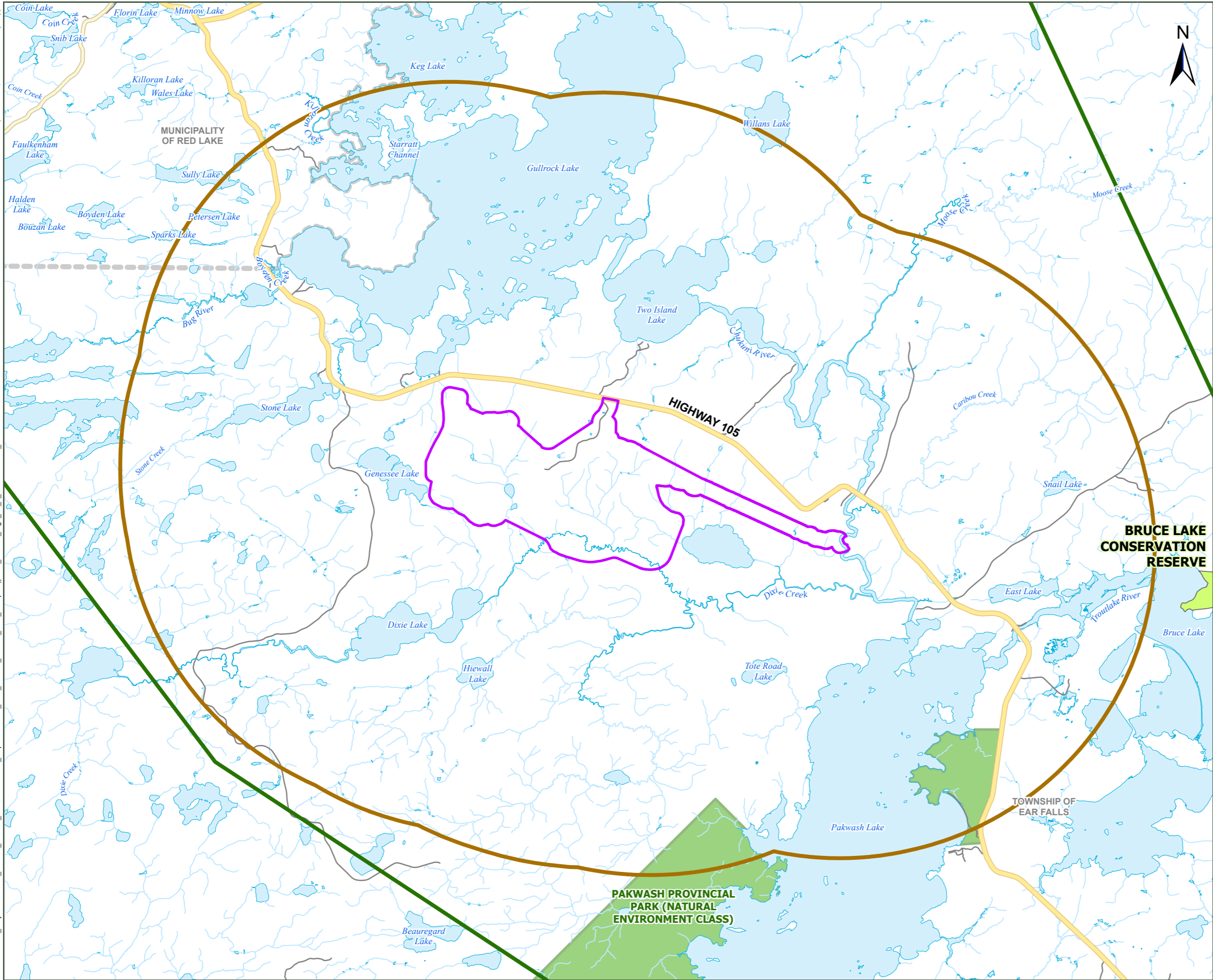
SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

**WILDLIFE MANAGEMENT AND
BEAR MANAGEMENT AREAS**

 **FIGURE NO:
7.13-8**



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- CONSERVATION RESERVE
- PROVINCIAL PARK
- WATERBODY
- MUNICIPAL BOUNDARY (LOWER TIER)

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



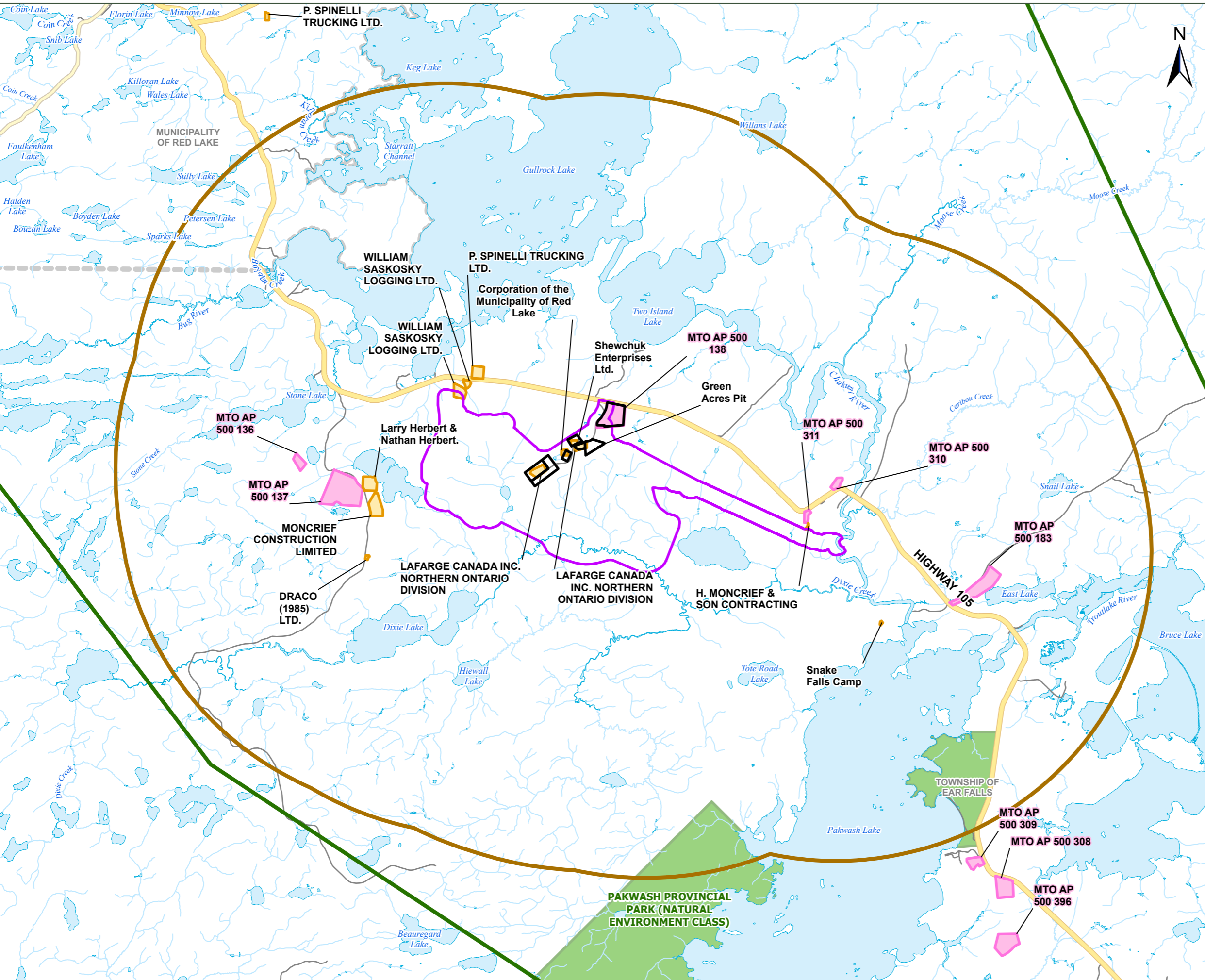
SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 18N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

ENVIRONMENTAL PROTECTED AREAS

SLR FIGURE NO:
7.13-9



- LEGEND:**
- PROJECT AREA
 - LOCAL STUDY AREA FOR LRU
 - REGIONAL STUDY AREA FOR LRU
 - HIGHWAY
 - MAJOR ROAD
 - LOCAL ROAD
 - WATERCOURSE
 - PROVINCIAL PARK
 - WATERBODY
 - MUNICIPAL BOUNDARY (LOWER TIER)
 - ACTIVE AGGREGATE SITE (LIO/ MNRF)
 - MTO AGGREGATE SITE (LIO)
 - PERMITTED AGGREGATE SITE BOUNDARIES (KINROSS)

NOTES:
NOTE1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



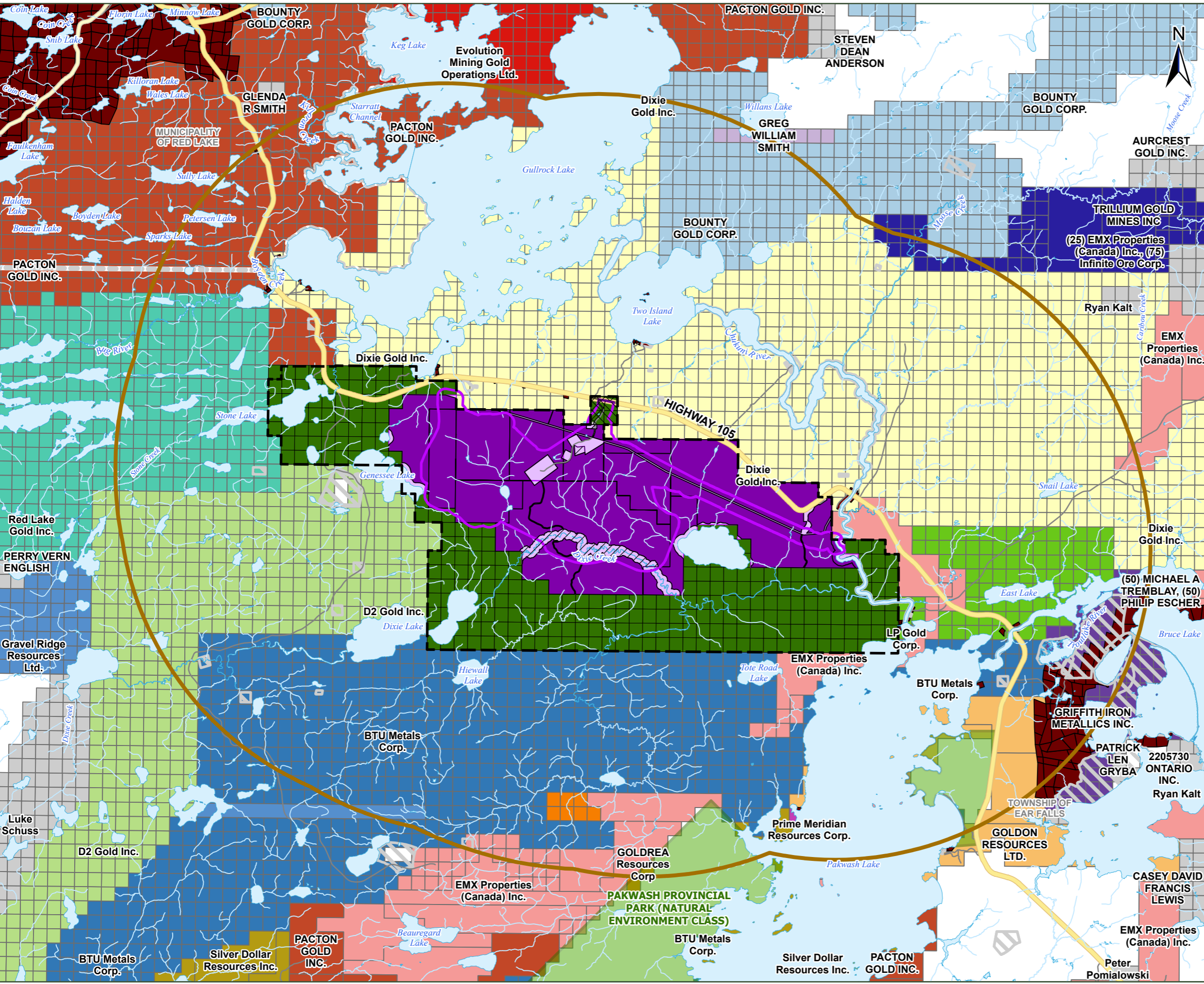
SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

ACTIVE AGGREGATE OPERATIONS

SLR FIGURE NO:
7.13-10



LEGEND:

	PROJECT AREA		ALIENATION OF CROWN LAND (ACTIVE WITHDRAWALS AND NOTIFICATIONS)
	LOCAL STUDY AREA FOR LRU		ACTIVE CLAIM AREA OF CROWN LAND (ACTIVE STAKED CLAIM)
	REGIONAL STUDY AREA FOR LRU		(50) MICHAEL A TREMBLAY, (50) PHILIP ESCHER
	HIGHWAY		BOUNTY GOLD CORP.
	MAJOR ROAD		BTU METALS CORP.
	LOCAL ROAD		D2 GOLD INC.
	WATERCOURSE		DIXIE GOLD INC.
	PROVINCIAL PARK		EMX PROPERTIES (CANADA) INC.
	WATERBODY		EVOLUTION MINING GOLD OPERATIONS LTD.
	MUNICIPAL BOUNDARY (LOWER TIER)		GOLDON RESOURCES LTD.
	GREAT BEAR RESOURCES MINING TENURE		GOLDREA RESOURCES CORP.
	LEASE (MINING RIGHTS)		GREG WILLIAM SMITH
	LEASE (SURFACE AND MINING RIGHTS)		GRIFFITH IRON METALLICS INC.
	REQUESTED LEASE SURFACE RIGHTS		GRAVEL RIDGE RESOURCES LTD.
	REQUESTED LEASE (SURFACE RIGHTS AND MINING RIGHTS)		LP GOLD CORP.
	REQUESTED LEASE (SURFACE RIGHTS)		PACTION GOLD INC.
	REQUESTED LEASE (MINING RIGHTS)		PRIME MERIDIAN RESOURCES CORP.
	GREAT BEAR RESOURCES ACTIVE CLAIM		RED LAKE GOLD INC.
	PROPERTY BOUNDARY		SILVER DOLLAR RESOURCES INC.
	CROWNLAND MINING TENURE		TRILLIUM GOLD MINES INC.
	DISPOSITION AREA OF CROWN LAND (ACTIVE PATENT, LEASE OR LICENSE OF OCCUPATION)		OTHER CLAIM HOLDER

NOTES:
 NOTE 1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.
 NOTE 2: MINING TENURE EXTRACTED FROM MLAS IN 2024

0 1.25 2.5 5 7.5 km

SCALE 1:120,000
 PAGE SIZE 11 x 17
 NAD 1983 UTM Zone 15N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

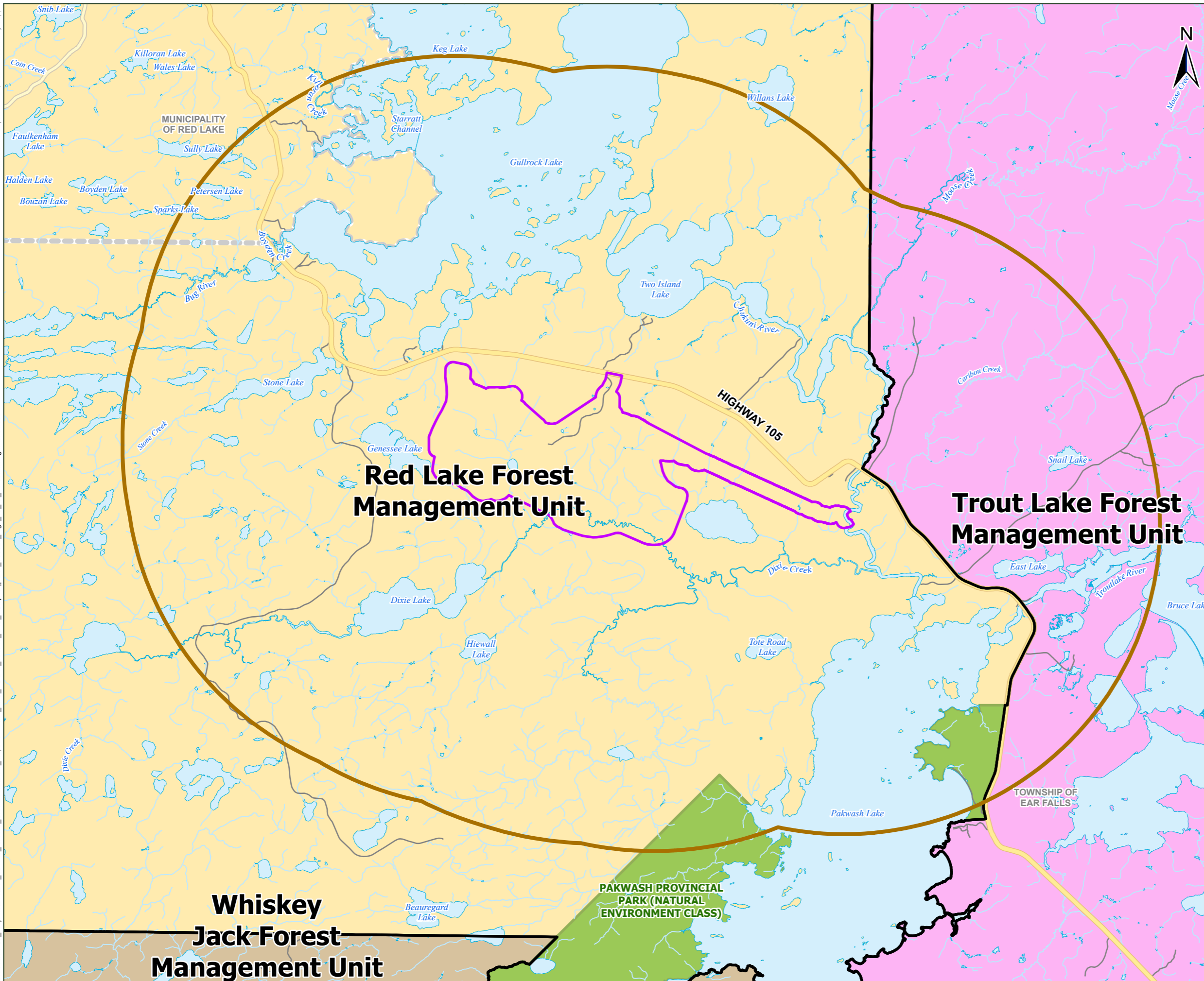
GREAT BEAR GOLD PROJECT

MINING TENURE

FIGURE NO: 7.13-11

SLR

DATE: March 18, 2026 PROJECT NO: 241.030825



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- PROVINCIAL PARK
- WATERBODY
- MUNICIPAL BOUNDARY (LOWER TIER)

FOREST MANAGEMENT UNIT

- WHISKEY JACK FOREST
- RED LAKE FOREST
- TROUT LAKE FOREST

NOTES:
NOTE 1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.



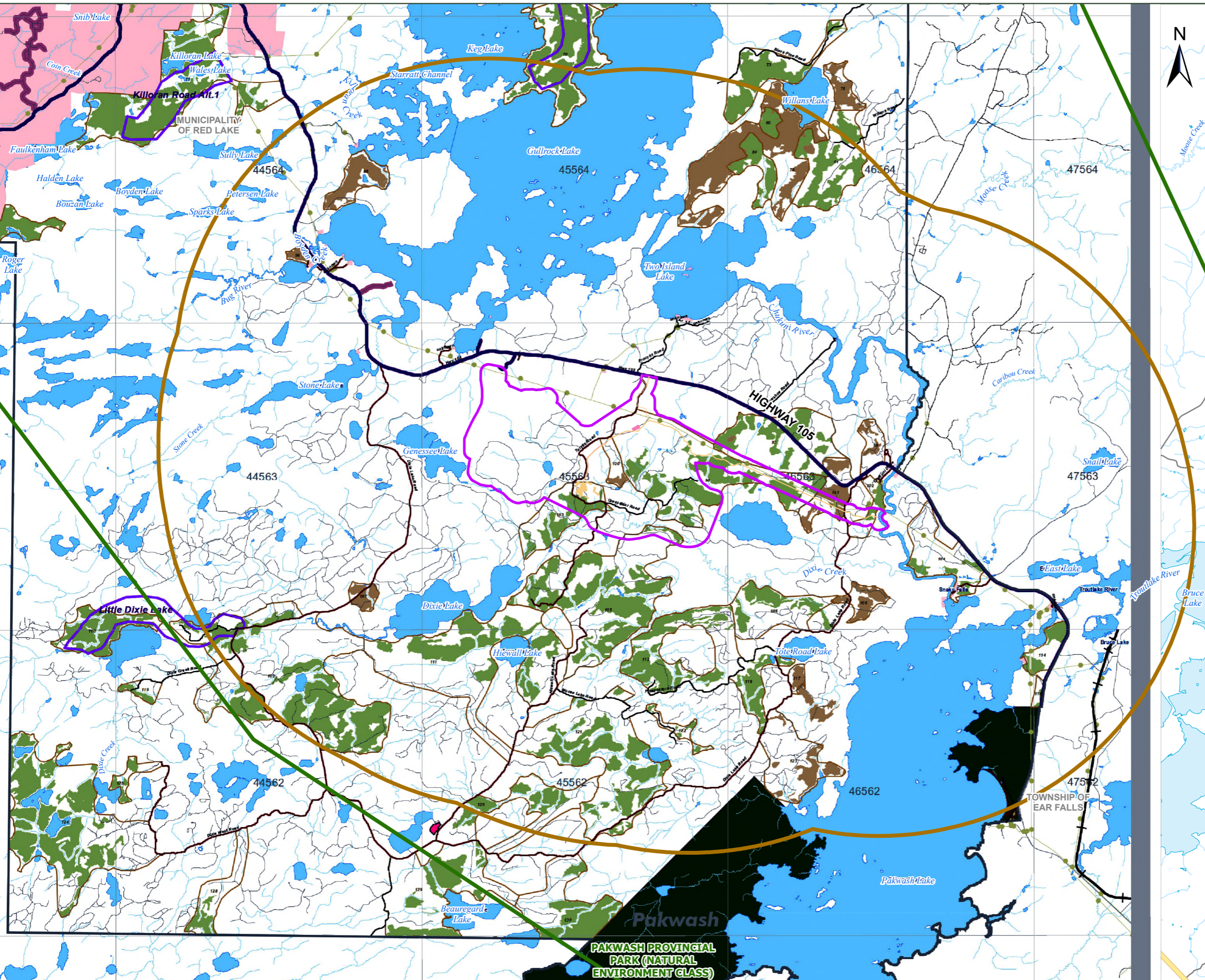
SCALE 1:120,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 15N
THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES

GREAT BEAR GOLD PROJECT

FOREST MANAGEMENT AREAS

SLR FIGURE NO:
7.13-12



LEGEND:

- PROJECT AREA
- LOCAL STUDY AREA FOR LRU
- REGIONAL STUDY AREA FOR LRU
- SUBSTATION CLEARING AREA (2025)
- INITIAL PROPOSED CLEARING AREA (2025)
- CHINUKI CLEARING AREA (2025)
- FORESTRY ACTIVITIES PROHIBITED

Harvest Category

- REGULAR
- BRIDGING
- CONTINGENCY

- Red Lake Forest boundary
- Proposed 10-Year Primary and Branch Road Corridors
- Tree Improvement Areas
- Operational Road Boundaries
- Highway
- Primary
- Branch
- Operational
- Controlled Access Restriction

NOTES:
 NOTE 1: BASE DATA ACQUIRED FROM LAND INFORMATION ONTARIO.
 NOTE 2: FOREST MANAGEMENT PLAN ACTIVITIES HAVE BEEN ADAPTED FROM THE 2020-2030 FOREST MANAGEMENT PLAN FOR THE RED LAKE FOREST, RED LAKE FOREST MANAGEMENT COMPANY LTD.



SCALE 1:120,000
 PAGE SIZE 11 x 17
 NAD 1983 UTM Zone 15N
 THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
 AND SHOULD NOT BE USED FOR NAVIGATION

GREAT BEAR RESOURCES
 GREAT BEAR GOLD PROJECT

FOREST MANAGEMENT PLAN ACTIVITIES

SLR FIGURE NO:
7.13-13

7.14 Analysis of Changes to Cultural Heritage

Cultural heritage has been identified as a pVC in recognition of the interests of government agencies, responsible for the effective management of these resources, and potentially affected Indigenous communities and parties that have an interest in resources related to their history and culture. Cultural heritage is inclusive of built heritage resources (BHR) which are constructed features associated with a property's cultural heritage value, cultural heritage landscapes (CHL) which are geographic areas identified as having cultural heritage value, and archaeological resources. Archaeological resources are considered as a separate pVC (Section 7.15).

7.14.1 Pathway Linkages to other Valued Components

7.14.1.1 Pathway Linkages to Cultural Heritage

There is a pathway to effects to cultural heritage from the pVC archaeology (Section 7.15). In addition, cultural heritage for this Project is also related to the pVC Wild Rice (Section 7.9).

7.14.1.2 Pathway Linkages from Cultural Heritage to fVCs

Changes to cultural heritage may have a linkage to and informs the analysis of potential effects to the fVC Indigenous Peoples, through current use of lands and resources for traditional purposes (Sections 10.6, 11.6, 12.6, 13.6 and 14.6), physical, cultural heritage, structures, sites or things (Sections 10.7, 11.7, 12.7, 13.7 and 14.7) and health (Sections 10.9, 11.9, 12.9, 13.9 and 14.9), as manoomin (Wild Rice) is an integral part of an identified CHL and has been identified as a traditional food for Indigenous Peoples.

7.14.2 Assessment Approach

The approach to the assessment of potential changes to cultural heritage includes:

- Description of the relevant regulatory and policy setting
- Description of the spatial and temporal boundaries used for this pVC
- Identification of criteria and indicators along with the associated rationale
- An outline of the analytical methodology conducted for the assessment and the key assumptions and use of the conservative approach.

The assessment of potential effects is supported by a description of the existing conditions for the pVC (Section 7.14.4), the identification and description of potential effects on the pVC (Section 7.14.5) and a description of applicable mitigation measures for the pVC (Section 7.14.6). With the application of mitigation measures to the potential effects on the pVC, the potential changes are then characterized in Section 7.14.7.

7.14.2.1 Regulatory Setting

The Project is located in Ontario and must meet applicable federal and provincial legislation and regulatory requirements. Provincial and federal regulatory agencies have prescribed criteria, benchmarks and standards. Government policies, objectives, standards or guidelines most relevant to cultural heritage are summarized below. Further information regarding anticipated approval requirements is provided in Section 16.

7.14.2.1.1 Federal

Adverse effects within federal jurisdiction under the *Impact Assessment Act*, with respect to the Indigenous peoples of Canada, include non-negligible adverse impacts to (i) physical and cultural heritage, (ii) the current use of lands and resources for traditional purposes, or (iii) any structure, site or thing that is of historical, archaeological, paleontological, or architectural significance. Accordingly, consideration of BHRs and CHLs is required for the Project.

During the preparation of the cultural heritage technical studies the following federal guidance documents were used:

- Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing (Government of Canada 2015)
- Standards and Guidelines for the Conservation for the Conservation of Historic Places in Canada (Canada's Historic Places 2010).

7.14.2.1.2 Provincial

The Government of Ontario recognizes the importance of conserving BHRs and CHLs in the *Ontario Heritage Act*. The Act provides a framework for the protection of cultural heritage resources in the province and gives municipalities and the provincial government powers to identify and designate properties of heritage significance; provide standards and guidelines for the conservation of provincial heritage properties; and enhance protection of heritage conservation districts, marine heritage sites, and archaeological resources.

The Ministry of Citizenship and Multiculturalism (MCM) is responsible for the administration of the *Ontario Heritage Act* and has developed checklists, information bulletins, standards and guidelines, and policies to support the conservation of cultural heritage resources. The MCM fulfills a lead role in directly conserving and protecting BHRs and CHLs in Ontario, which is triggered through other legislated processes.

In the event that changes are anticipated on potential BHRs and CHLs, the subject property is to be evaluated to determine the cultural heritage value or interest (CHVI) of the property, in accordance with Ontario Regulation 9/06 (as amended by Ontario Regulation 569/22) and Ontario Regulation 10/06. Under Ontario Regulation 9/06, criteria are described to determine the CHVI of a property at a local level, while under Ontario Regulation 10/06, criteria are described to determine if a property has CHVI of provincial significance.

For properties that have been evaluated using the criteria of Ontario Regulation 9/06 and/or 10/06 and determined to not have CHVI, no further mitigation measures or studies are required. If the property is determined to have CHVI, a Cultural Heritage Impact Assessment (CHIA), or other equivalent study, is to be prepared, identifying specific mitigation measures to be implemented, which may include documentation, salvage, applying buffer zones, and / or ecological restoration, as appropriate (MCM 2006, 2014).

The MCM has developed a series of information sheets to support the assessment of BHRs and CHLs. During the preparation of the technical studies for the Project, the following MCM guidance documents were used:

- Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes Checklist (MCM 2022)

- The Checklist supports the screening of known (or recognized) heritage properties and properties with potential CHVI, including consideration for local or Indigenous Knowledge (MCM 2022)
- Standards and Guidelines for the Conservation of Provincial Heritage Properties – Heritage Identification & Evaluation Process (MCM 2014)
 - The Standards and Guidelines provides detailed direction on the application of Ontario Regulation 9/06
- Heritage Resources in the Land Use Planning Process, InfoSheet #5, Heritage Impact Assessments and Conservation Plans (MCM 2006)
 - InfoSheet #5 outlines the process for identifying direct effects (such as destruction or alteration) and indirect effects (such as shadows, isolation, obstruction of views, change in land use and land disturbance) to BHRs and CHLs
- Info Bulletin #3: Heritage Impact Assessments for Provincial Heritage Properties (MCM 2017)
 - Info Bulletin #3 provides detailed guidance on the contents of a CHIA.

7.14.2.2 Spatial and Temporal Boundaries

The spatial boundaries used for the assessment of cultural heritage are shown in Figure 7.14-1 and are defined as follows:

- PA: is defined as the footprint of the Project including all temporary and permanent areas associated with the mine site, as well as a buffer to allow flexibility for design optimizations prior to construction and over the mine life (Section 6.4). The PA is where direct effects to BHRs and CHLs are expected.
- LSA: extends beyond the PA and corresponds to the area in the vicinity of the Project where most of the indirect effects of the Project on BHRs and CHLs are expected to occur. The LSA is defined as a 1 km buffer around the PA.
- RSA: for Cultural Heritage is defined as the same as the LSA, as Project interactions are not anticipated to extend beyond the LSA.

Potential effects were assessed for each Project phase (i.e., construction, operations and closure). The temporal boundaries for the assessment as defined in Section 6.5 are:

- Construction phase:
 - Years -3 to -1 representing the primary period of Project construction
- Operations phase:
 - Years 1 to 26, during year 1 the Project will transition from construction into operations and will not be at full capacity
- Closure phase:
 - Years 27 to 29 represent the active closure period when the majority of the decommissioning and reclamation of the PA is completed

- Year 30 is a passive closure period while the site is on care and maintenance as filling of the mine workings with water is completed, and excess water is treated
- Year 31 is the final close out period when water treatment infrastructure is removed, and site waters are acceptable for passive release to the environment.

7.14.2.3 Assessment Criteria

In undertaking the assessment of cultural heritage effects, the following criteria were used:

- Presence of protected BHRs or CHLs
- Presence of potential BHRs and CHLs that are 40 years old or older
- Alteration or destruction of a protected or potential BHR or CHL.

No known or potential BHRs are present in the spatial boundaries considered. Five potential CHLs are present in the spatial boundaries considered (Appendix P-1).

Table 7.14-1 outlines the measurable parameters and rationale for selection of each criterion.

7.14.2.4 Analytical Methods

In keeping with best practice, the Standards and Guidelines for the Conservation of Historic Places in Canada: A Federal, Provincial and Territorial Collaboration (Canadas Historic Places 2010) were considered during the preparation of the technical studies of BHRs and CHLs.

7.14.2.4.1 Cultural Heritage Screening

A high-level screening for properties with CHVI in line with best practices was used to identify protected and potential BHRs and CHLs during the preparation of the Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment Report (Appendix P-1). The assessment approach includes background research, information gathering, and a field review of the Cultural Heritage Investigation Area and Buffer identified in Appendix P-1.

Background research was carried out to gain a thorough understanding of the historical context of the Cultural Heritage Investigation Area and Buffer. Primary sources, secondary sources, historical maps, and aerial photographs were consulted, as appropriate, to identify historical themes relevant to the Cultural Heritage Investigation Area and Buffer. Specifically, research was completed regarding the physiography, survey and settlement, and 19th and 20th century land use of the Cultural Heritage Investigation Area and Buffer.

Information gathering was carried out to identify protected and potential BHRs and CHLs in the Cultural Heritage Investigation Area and Buffer. For this Cultural Heritage Report, the District of Kenora, MCM, Ontario Heritage Trust and the MNR were contacted directly via email or telephone to determine the presence of listed, designated, or protected heritage properties within, and adjacent to, the Cultural Heritage Investigation Area and Buffer. Indigenous engagement was completed by Great Bear Resources as part of the Project and confidential information provided by local Indigenous Nations through Indigenous knowledge studies has been incorporated as available.

Following the completion of the background research, information gathering, and review of field review results, an inventory of BHRs or CHLs within the Cultural Heritage Investigation Area and Buffer was created. To assist in the creation of the inventory, the 40-year threshold was used to identify properties and landscapes with the potential to have CHVI. The 40-year rule is

generally accepted by federal and provincial agencies as a best practice preliminary screening measure for CHVI. It should be noted, however, that the 40-year threshold is a guide only and does not imply that all properties of 40 years of age have CHVI. Nor does it exclude properties that are less than 40 years of age and exhibit CHVI. The professional judgement of the WSP cultural heritage specialist consultants were used during the creation of the inventory to apply the 40-year rule and identify properties with potential CHVI.

The approach to the assessment of potential changes to BHRs and CHLs follows guidance outlined in MCM (2006). In addition, mitigation measures outlined in MCM (2006) were used to guide the preparation of considered alternatives, mitigation and conservation methods. These include methods of minimizing or avoiding a negative impact or changes to BHRs or CHLs.

7.14.2.4.2 Cultural Heritage Evaluation

BHRs or CHLs that may be directly impacted by the Project and which have not been subject to an evaluation against the criteria of Ontario Regulation 9/06 of the OHA were evaluated in a Cultural Heritage Evaluation Report (CHER; Appendix P-2). The purpose of a CHER is to determine if a potential BHR or CHL possesses CHVI through an evaluation of the property against the criteria of Ontario Regulation 9/06 of the OHA, informed by MCM (2014). The CHER contained in Appendix P-2 provides the results of the background research, evaluation of the property, and a draft statement of CHVI.

Indigenous engagement was completed by Great Bear Resources as part of the Project and confidential information provided by local Indigenous Nations through Indigenous knowledge studies has been incorporated as available.

7.14.3 Assumptions and the Use of the Conservative Approach

No known or protected heritage properties were identified in the PA, LSA or RSA.

Potential BHRs and CHLs were identified within the PDA and LSA. A 40-year criterion was used to identify properties with the potential to have CHVI, generally accepted by federal and provincial agencies as a preliminary screening measure.

Although BHRs and CHLs have been researched, investigated and documented during baseline data collection, the possibility remains that undocumented features may still exist.

7.14.4 Existing Conditions

The Cultural Heritage Report was conducted between 2023 and 2024 to develop an inventory of protected and potential BHRs and CHLs in the LSA based on the background research and fieldwork. This investigation did not identify any protected or potential BHRs, but identified the following potential CHLs:

- Chukuni River (CHR 1)
- Genessee Lake (CHR 2)
- Manoomin (Wild Rice) stand between Unnamed Waterbodies 1 and 2 (CHR 3)
- Gullrock Lake Camp (CHR 4)
- Manoomin stand within Unnamed Waterbody 6 (CHR 5).

The locations of these potential CHLs inventoried in the Cultural Heritage Report (Appendix P-1) are depicted in Figure 7.14-2. Further information regarding the Wild Rice stand at Unnamed Waterbody 1 and Unnamed Waterbody 6 is provided in Section 7.9 and Appendix M-1.

While the PA falls within several trapline areas, it is understood based on information available that there are no interactions with historic or present day traplines.

The Cultural Heritage Report determined that further work was required for resources located within the PA (CHR 3: manoomin stand). No further assessments were recommended for four CHRs located outside of the PA (CHRs 1, 2, 4 and 5), although these locations will be identified on Project mapping as appropriate.

CHR 3 (manoomin stand) was evaluated for CHVI in a standalone CHER (Appendix P-2). The CHER determined that CHR 3 meets three of the criteria per Ontario Regulation 9/06, for its historical or associative value and contextual value. Accordingly, per provincial requirements, a CHIA must be prepared at the outset of the detailed design phase of the Project and prior to construction (Appendix P-3).

7.14.5 Identification of Potential Effects

The manoomin (Wild Rice) stand of CHR 3 is located between Unnamed Waterbodies 1 and 2 (CHR 3; Figure 7.14-3). This CHR 3 will be directly affected by the Project development. The TMF will be developed upgradient of Unnamed Waterbodies 1 and 2. The need to manage contact water from the facility will result in a change to the hydrology of both waterbodies, which will affect the ability to sustain Wild Rice. In addition, Unnamed Waterbody 1 will be covered over by the MWP proposed to be developed during the operations phase, later in the mine life. Further information is provided in Section 7.9. Table 7.14-2 provides a summary of potential interactions of the Project with CHR 3.

7.14.6 Mitigation and Enhancement Measures

The application of mitigation measures for the pathways for potential effects is illustrated in Table 7.14-3. Mitigation measures described in this section are expected to be effective for their intended purposes given their effective implementation at similar projects. Measures to be implemented to avoid or minimize the effects of the Project on cultural heritage include the following:

- Potential CHLs identified in Appendix P-1 will be noted on applicable Project mapping to identify the heritage status on the Property to Project personnel.
- CHR 3 was evaluated for CHVI using Ontario Regulation 9/06 and found to meet three criteria. Based on this evaluation, a CHIA has been completed for CHR 3 informed by the Information Bulletin 3: Heritage Impact Assessments for Provincial Heritage Properties (MCM 2017; Appendix P-3). As CHR 3 is a resource of value to local Indigenous Nations, the CHIA considered consultation with the Indigenous Nations participating in the *Impact Assessment Act* process to gather insight on conservation and mitigation strategies.

Great Bear Resources has funded a Wild Rice Enhancement Project at the request of LSFN and WFN, as a form of mitigation of the effect of the Project on Wild Rice, as creating a replacement Wild Rice stand(s) on the Property is not considered feasible (Section 7.9). This study aims to address the decline in historic Wild Rice production on Wabauskang Lake. The Wild Rice enhancement site, located on the WFN reserve, has been recommended by the WFN

and supported by the LSFN. The project will develop potential enhancement options for implementation in 2026. In addition to restoring habitats, the project will include education and knowledge-sharing on sustainable harvesting practices, fostering long-term stewardship by community members. This collaborative effort could support broader revitalization projects for Wild Rice in the future and may be shared with other Indigenous communities in the area if there is interest, thereby advancing understanding and recovery of this culturally and ecologically important plant. Collectively, these initiatives will promote a more comprehensive understanding of Wild Rice habitats, cultural values, and their ongoing significance to the region.

7.14.7 Assessment of Changes

The assessment of changes to the identified CHLs after application of mitigation measures is presented in the following sections.

7.14.7.1 Changes to Protected BHRs or CHLs

There are no protected BHRs or CHLs in the PA, LSA or RSA. Therefore, no changes to this criterion are anticipated during all Project phases.

7.14.7.2 Changes to Potential BHRs and CHLs - 40 years or Older

7.14.7.2.1 Construction Phase

A preliminary impact assessment for identified CHLs was completed as part of the Cultural Heritage Report (Appendix P-1).

No changes to CHRs 1, 2, 4 and 5 are anticipated as they are located outside the PA. The heritage status of these CHLs will be identified on applicable Project maps to Project personnel.

The preliminary impact assessment determined that CHR 3 (manoomin stand between Unnamed Waterbody 1 and Unnamed Waterbody 2) will be affected by the Project through alteration or demolition. As an early mitigative strategy, CHR 3 was subject to a property-specific CHER and found to meet the requirements of Ontario Regulation 9/06. The CHER recommended that a property-specific CHIA be conducted at the outset of the detailed design phase of the Project and in advance of construction, which has been completed. The CHIA recommends conservation guidance to mitigate potential effects. Through the completion of a CHIA for CHR 3, and the implementation of appropriate conservation guidance, the potential for changes to CHR 3 will be mitigated.

7.14.7.2.2 Operations Phase

The operations phase will not result in additional changes. Once follow up programs for the construction phase are complete, and mitigative measures identified in the CHIA are implemented as required, no changes after mitigation to BHRs and CHLs are anticipated.

7.14.7.2.3 Closure Phase

The closure phase will not result in additional changes. Once follow up programs for the construction phase are complete, and mitigative measures identified in the CHIA are implemented as required, no changes after mitigation to BHRs and CHLs are anticipated.

7.14.7.3 Alteration or Destruction of a Protected or Potential BHR or CHL

7.14.7.3.1 Construction Phase

A preliminary impact assessment for identified CHLs was completed as part of the Cultural Heritage Report (Appendix P-1). No changes to CHRs 1, 2, 4 and 5 are anticipated as they are located outside the PA and the heritage status of these properties will be identified on applicable Project maps to Project personnel.

The preliminary impact assessment conducted determined that CHR 3 (manoomin stand between Unnamed Waterbodies 1 and 2) will be affected by the Project through alteration or demolition. As an early mitigative strategy, CHR 3 was subject to a property-specific CHER and found to meet Ontario Regulation 9/06. The CHER recommended that a property-specific CHIA be conducted at the outset of the detailed design phase of the Project and in advance of construction, which has been completed. The CHIA recommends conservation guidance to mitigate potential effects. Through the completion of a CHIA for CHR 3 (Appendix P-3), and the implementation of appropriate conservation guidance, the potential for changes to CHR 3 will be mitigated.

7.14.7.3.2 Operations Phase

The operations phase will not result in additional changes. Once follow up programs for the construction phase are complete, and mitigative measures identified in the CHIA are implemented as required, no changes to BHRs and CHLs are anticipated.

7.14.7.3.3 Closure Phase

The closure phase will not result in additional changes. Once follow up programs for the construction phase are complete, and mitigative measures identified in the CHIA are implemented as required, no changes to BHRs and CHLs are anticipated.

7.14.8 Change Pathway Outcome

7.14.8.1 Summary of Changes after Mitigation

Changes are not anticipated to the identified BHRs and CHLs with the proposed design and mitigation measures.

7.14.8.2 Change Management

The changes to BHRs and CHLs are managed through the provincial regulatory process, including protection as applicable through application of tools such as checklists, guidelines, and policies associated with the *Ontario Heritage Act*.

7.14.8.3 Confidence

A comprehensive background research and field work program was completed to identify protected and potential BHRs and CHLs in the LSA / RSA. Further, a Cultural Heritage Report (Appendix P-1) was prepared to assess the potential effects of interactions between the Project and identified BHRs and CHLs. Of the five potential CHLs, four will not be directly or indirectly impacted by the Project and do not require further cultural heritage work. A property-specific CHER was completed for CHR 3 (manoomin stand between Unnamed Waterbodies 1 and 2)

and CHR 3 was found to meet Ontario Regulation 9/06. A property-specific CHIA needs completed prior to construction (Appendix P-3).

The existing cultural heritage work has been prepared according to applicable guidance documents and legislative requirements. Accordingly, the level of confidence in the effects prediction is high.

Table 7.14-1: Assessment Criteria, Indicators and Rationale

Criteria	Indicator	Rationale for Selection
Presence of protected BHRs or CHLs	<ul style="list-style-type: none"> Change in number of protected BHRs and CHLs in the PA and LSA 	<ul style="list-style-type: none"> Including protected BHRs or CHLs is required according to MCM (2022). This measure is also considered best practice by federal agencies.
Presence of potential BHRs or CHLs that are 40 years old or older	<ul style="list-style-type: none"> Change in number of potential BHRs and CHLs in the PA and LSA 	<ul style="list-style-type: none"> Preliminary screening measure for CHVI, that is required according to and required according to MCM (2022). This measure is also considered best practice by federal agencies.
Alteration or destruction of a protected or potential BHR or CHL	<ul style="list-style-type: none"> Changes in the quality, quantity, or access to BHRs or CHLs 	<ul style="list-style-type: none"> The indicator is consistent with the guidance provided by the MCM (2006).

Table 7.14-2: Potential Interactions of Project Components with Cultural Heritage

Project Component / Activity	Cultural Heritage ⁽¹⁾
Construction Phase	
Site preparation activities	Yes
Establishment and operation of water management and treatment facilities	No
Open pit mining	No
Underground mining	No
Management of rock and unconsolidated materials in stockpiles	No
Establishment of onsite fish habitat and compensation measures	No
Establishment of onsite aggregate operations	No
Construction of the starter embankments for the TMF	No
Construction and operation of buildings and infrastructure	No
Waste management	No
Commissioning of the process plant	No
Power supply	No
Employment and expenditures	No
Operations Phase	
Underground mining	No
Mining of the LP Central pit	No
Management of rock and unconsolidated materials in stockpiles	No
Process plant operation	No
Management of desulphurized tailings in the TMF	No
Management of concentrate tailings and contact water in the Viggo Management Facility	No
Operation of water management and treatment facilities	No
Construction of a MWP	No
Operation and maintenance of buildings and infrastructure	No
Waste management	No
Power supply	No
Progressive reclamation activities	No
Employment and expenditures	No



Project Component / Activity	Cultural Heritage ⁽¹⁾
Closure Phase	
Active closure period	No
Passive closure period	No
Final reclamation period	No
Employment and expenditures	No

Note:

1. Potential interactions with CHR3 only occur during the early construction phase when the Wild Rice stand must be removed for the Project to proceed.

Table 7.14-3: Mitigation Measures for Changes to Cultural Heritage

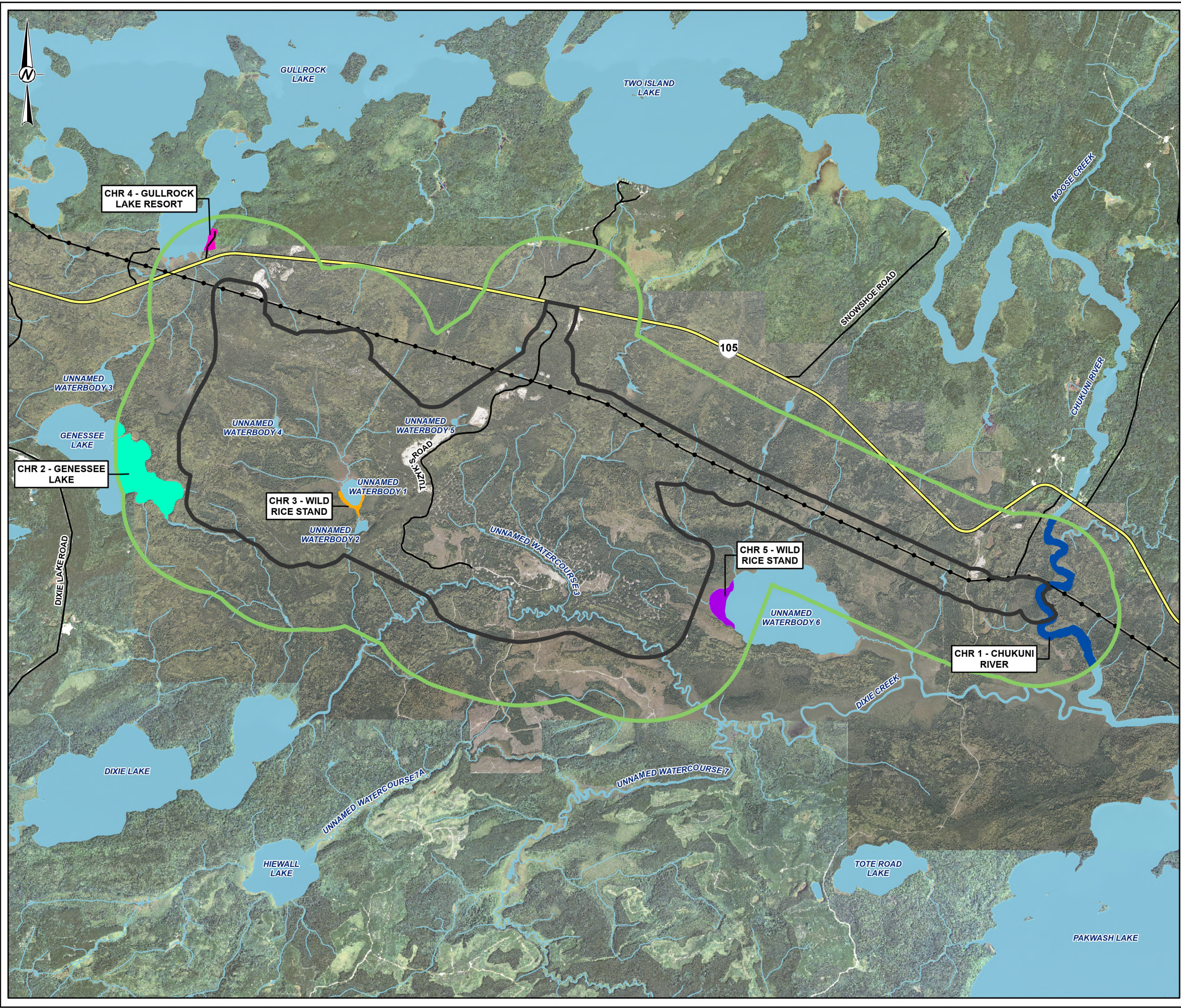
Pathways to Potential Effects / Criteria	Project Phase			Proposed Mitigation Measure
	Con	Op	CI	
Change in the presence of protected BHRs or CHLs	●	–	–	Potential heritage properties in the LSA will be noted on applicable Project maps to identify the heritage status of the property to Project personnel.
Change in the presence potential BHRs or CHLs that are 40 years old or older	●	–	–	Potential heritage properties in the LSA will be noted on applicable Project maps to identify the heritage status of the Property to Project personnel.
Alteration or destruction of a protected or potential BHR or CHL	●	–	–	If potential heritage properties may be directly impacted, the property will be evaluated in a CHER (Appendix P-2). If that report determines that the property has cultural heritage value or interest, a CHIA will be prepared to determine specific mitigation measures to be implemented, such as documentation, salvaging or applying buffer zones, as appropriate (Appendix P-3).

Notes:

Con: construction phase; Op: operations phase; CI: closure phase

● : mitigation is applicable.

– : mitigation is not applicable.



LEGEND

- PROJECT AREA
- LOCAL AND REGIONAL STUDY AREA FOR CULTURAL HERITAGE RESOURCES
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY

IDENTIFIED POTENTIAL CULTURAL HERITAGE RESOURCES

- CHR 1 - CHUKUNI RIVER
- CHR 2 - GENESSEE LAKE
- CHR 3 - WILD RICE STAND
- CHR 4 - GULLROCK LAKE RESORT
- CHR 5 - WILD RICE STAND

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022)
3. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
IDENTIFIED POTENTIAL CULTURAL HERITAGE RESOURCES

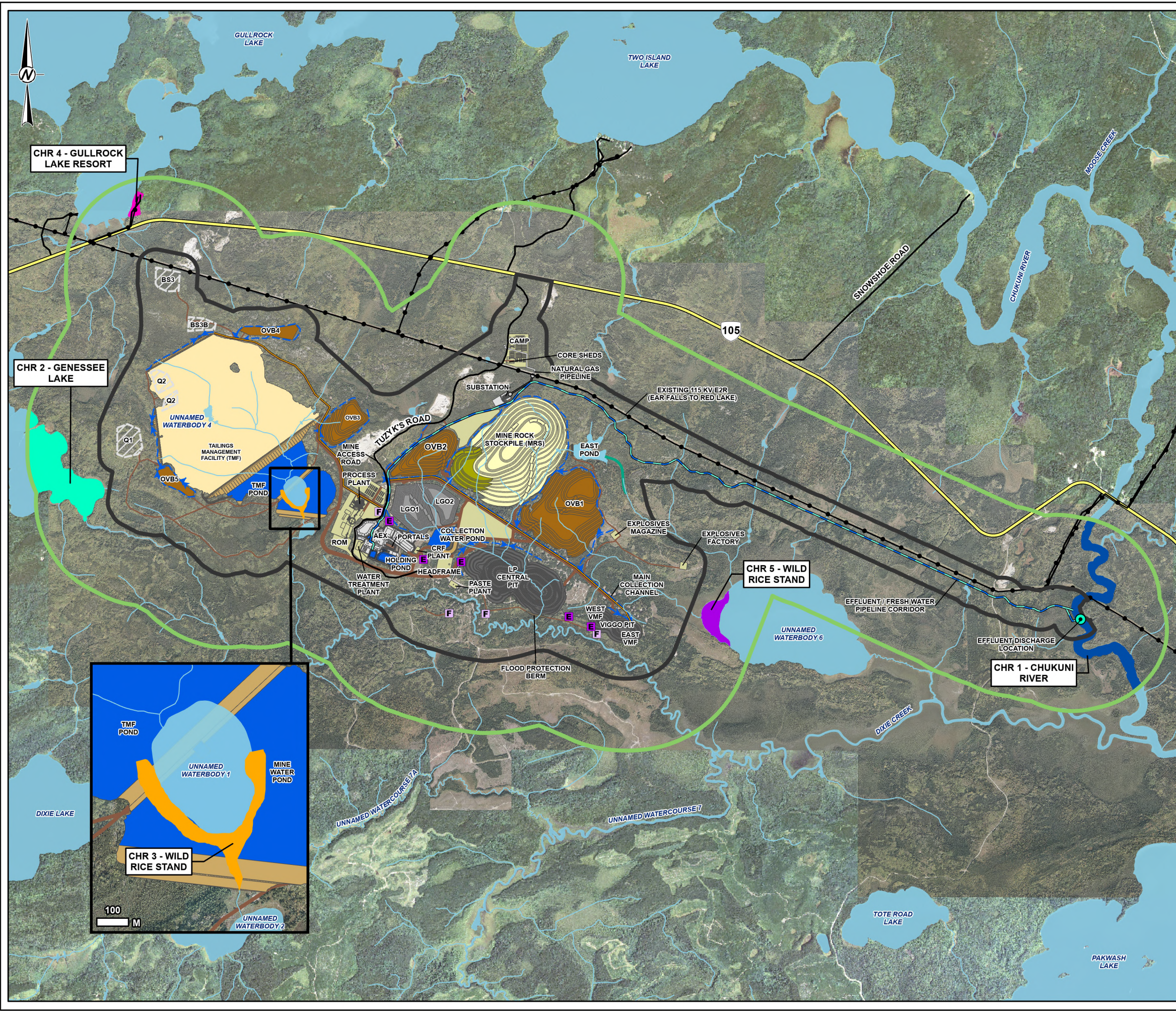
CONSULTANT	YYYY-MM-DD	2026-03-31
	DESIGNED	----
	PREPARED	MD
	REVIEWED	----
	APPROVED	SD

PROJECT NO. CA0031271 CONTROL 0001 REV. A FIGURE 7.14-2

0 0.5 1 2 3
1:60,000 KILOMETRES

PRINT: X:\CA\CA0031271-01\Projects\2023\Projects\01\Map\Map_01\Map_01.aprx PRINTED ON: AT: 8:46:16 AM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D



LEGEND

- PROJECT AREA
- LOCAL AND REGIONAL STUDY AREA FOR CULTURAL HERITAGE RESOURCES
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY

IDENTIFIED POTENTIAL CULTURAL HERITAGE RESOURCES

- CHR 1 - CHUKUNI RIVER
- CHR 2 - GENESSEE LAKE
- CHR 3 - WILD RICE STAND
- CHR 4 - GULLROCK LAKE RESORT
- CHR 5 - WILD RICE STAND

PROPOSED MINE FEATURE

- OPEN PIT
- MINE ROCK STOCKPILE (NPAG)
- MINE ROCK STOCKPILE (PAG)
- LOW GRADE ORE STOCKPILE (LGO)
- OVERBURDEN STOCKPILE (OVB)
- TAILINGS MANAGEMENT FACILITY (TMF)
- DAM
- POND
- COLLECTION DITCH
- MINE FACILITIES / INFRASTRUCTURE
- ROAD
- PORTAL
- ADVANCED EXPLORATION SITE (AEX)
- ROCK QUARRY (Q) / SAND AND GRAVEL PIT (B)
- DIVERSION CHANNEL
- FRESH AIR VENT RAISE
- EXHAUST VENT RAISE
- TRANSMISSION LINE
- TAILINGS PIPELINE
- PASTE PLANT PIPELINE
- EFFLUENT / FRESH WATER PIPELINE CORRIDOR
- EFFLUENT DISCHARGE LOCATION

0 0.5 1 2 3
1:53,000 KILOMETRES

NOTE(S)

- ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

- CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
- AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022)
- ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022
- SITE PLAN BASED ON INFORMATION PROVIDED BY GREAT BEAR RESOURCES, DECEMBER 2024 / JUNE 2025
- COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
LOCATION OF PROPOSED MINE FEATURES IN RELATION TO POTENTIAL CULTURAL HERITAGE RESOURCES

CONSULTANT	YYYY-MM-DD	2026-03-31
DESIGNED	----	
PREPARED	MD	
REVIEWED	----	
APPROVED	SD	

PROJECT NO. CA0031271 CONTROL 0001 REV. A FIGURE 7.14-3

PRINT: X:\CA\CA\CA\0300-CA\KMS-FS1-Project\2025\Projects\GMR\Map\2025_Kinross_Great_Bear_Emir_Z_GS\Map\2025\Statement\PRO\CulturalHeritage_Section\CA\Map\Heritage_Section.aprx PRINTED ON: AT: 8:54:00 AM

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

7.15 Analysis of Changes to Archaeology

Archaeology as a cultural heritage element has been identified as a pVC in recognition of the interests of government agencies responsible for the effective management of these resources, and potentially affected Indigenous Peoples and parties that have an interest in resources related to their history and culture. Cultural heritage is inclusive of archaeological resources, built heritage resources, and cultural heritage landscapes. BHR and CHL are considered as a separate pVC (Section 7.14).

7.15.1 Pathway Linkages to other Valued Components

7.15.1.1 Pathway Linkages to Archaeology

Pathways to effects to archaeology are listed in the related sections of the Impact Statement, and summarized as follows:

- Cultural heritage (Section 7.14).

7.15.1.2 Pathway Linkages from Archaeology to fVCs

Changes to cultural heritage may have a linkage to and inform the analysis of potential effects to Indigenous Peoples, through current use of lands and resources for traditional purposes (Sections 10.6, 11.6, 12.6, 13.6 and 14.6), and physical, cultural heritage, structures, sites or things (Sections 10.7, 11.7, 12.7, 13.7 and 14.7).

7.15.2 Assessment Methodology

The approach to the assessment of potential changes to archaeology includes:

- Description of the relevant regulatory and policy setting
- Description of the spatial and temporal boundaries used for this pVC
- Identification of criteria and indicators along with the associated rationale
- An outline of the analytical methodology conducted for the assessment and the key assumptions and use of the conservative approach.

The assessment of potential effects is supported by a description of the existing conditions for the pVC (Section 7.15.4), the identification and description of potential effects on the pVC (Section 7.15.5) and a description of applicable mitigation measures for the pVC (Section 7.15.6). With the application of mitigation measures to the potential effects on the pVC, the potential changes are then characterized in Section 7.15.7.

7.15.2.1 Regulatory Setting

The Project is located in Ontario and must meet applicable federal and provincial legislation and regulatory requirements. Provincial and federal regulatory agencies have prescribed criteria, benchmarks and standards. Government policies, objectives, standards or guidelines most relevant to archaeology are summarized below. Further information regarding anticipated approval requirements is provided in Section 19.

7.15.2.1.1 Federal

Under Section 7(1) of the *Impact Assessment Act*, the proponent of a project “*must not do any act or thing...if that act or thing may cause any adverse effects within federal jurisdiction*” which includes per and Section 2 (e) (i and iii) with respect to the Indigenous Peoples of Canada, physical and cultural heritage, and any structure, site or thing that is of historical, archaeological, palaeontological or architectural significance (Government of Canada 2019). Consideration of archaeology is therefore required for the Project.

During the preparation of the archaeology technical studies, the following federal guidance documents were used:

- Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural Significance under the *Canadian Environmental Assessment Act, 2012* (Government of Canada 2015)
- Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition (Canada’s Historic Places 2010).

7.15.2.1.2 Provincial

The Government of Ontario recognizes the importance of conserving, protecting, and preserving cultural heritage resources, including archaeological resources, through the *Ontario Heritage Act*. The *Ontario Heritage Act* defines the role and responsibilities of the Ontario Heritage Trust, enables the provincial government to provide standards and guidelines for the conservation of provincial heritage properties, and empowers municipalities and prescribed public bodies to identify, designate, and protect properties or districts of CHVI. The *Ontario Heritage Act* also outlines the Province’s requirements for archaeological licensing, conducting fieldwork, reporting on assessments, protecting archaeological sites and objects, and maintaining a register of archaeological reports.

The MCM is responsible for the administration of the *Ontario Heritage Act* and has developed checklists, information bulletins, standards and guidelines, and policies to support the conservation of cultural heritage resources. For archaeology, the MCM also plays a lead role in conserving and protecting archaeological resources and sites in Ontario. The MCM issues licences to qualified individuals to conduct terrestrial and marine archaeological fieldwork on non-federal lands in Ontario, and for each terrestrial archaeological assessment requires and issues a project-specific Project Information Form. The MCM also maintains a restricted-access database of registered archaeological sites (the Ontario Archaeological Sites Database), advises licenced archaeologists on assessment methods, and reviews marine and terrestrial archaeological reports. When the MCM has deemed a report compliant with the Standards and Guidelines for Consultant Archaeologists (MCM 2011), they issue a letter to licensees, proponents, and approval authorities indicating that the report has been filed in the Ontario Public Register of Archaeological Reports.

During the preparation of the technical studies for the Project, the following MCM documents were used:

- Criteria for Evaluating Archaeological Potential: A Checklist for the Non-Specialist (MCM 2015)

- The Checklist supports screening to determine if terrestrial archaeological assessment is required for a development project and includes consideration for local or Indigenous Knowledge
- Criteria for Evaluating Marine Archaeological Potential: A Checklist for the Non-Specialist (MCM 2016)
 - The Checklist supports screening to determine if marine archaeological assessment is required for a development project and includes consideration for local or Indigenous Knowledge.
- Standards and Guidelines for Consultant Archaeologists (MCM 2011)
 - This document prescribes the field and analytical methods and reporting requirements for the sequential, four-stage process to identify, evaluate and mitigate effects to terrestrial archaeological resources and sites (see Section 7.15.2.4.2).

7.15.2.2 Spatial and Temporal Boundaries

The spatial boundaries used for the assessment of archaeology are shown in Figure 7.15-1 and are defined as follows:

- PA: is defined as the footprint of the Project including all temporary and permanent areas associated with the mine site, as well as a buffer to allow flexibility for design optimizations prior to construction and over the mine life (Section 6.4). The PA is where direct effects to archaeological resources are expected.
- LSA: extends beyond the PA and corresponds to the area in the vicinity of the Project where most of the indirect effects of the Project on archaeological resources are expected to occur. The LSA is defined as a 1 km buffer around the PA.
- RSA: for archaeology is defined as the same as the LSA, as Project interactions are not anticipated to extend beyond the LSA.

Potential effects were assessed for each Project phase (i.e., construction, operations and closure). The temporal boundaries for the assessment as defined in Section 6.5 are:

- Construction phase:
 - Years -3 to -1 representing the primary period of Project construction
- Operations phase:
 - Years 1 to 26, during year 1 the Project will transition from construction into operations and will not be at full capacity
- Closure phase:
 - Years 27 to 29 represent the active closure period when the majority of the decommissioning and reclamation of the PA is completed
 - Year 30 is a passive closure period while the site is on care and maintenance as filling of the mine workings with water is completed
 - Year 31 is the final close out period when water treatment infrastructure is removed, and site waters are acceptable for passive release to the environment.

7.15.2.3 Assessment Criteria

In undertaking the assessment of archaeology effects, the following criteria were used, recognizing that only terrestrial archaeological sites are known to be locally present:

- Changes to terrestrial archaeological sites
- Changes to areas of marine archaeological potential
- Alteration or destruction of terrestrial archaeological sites or areas of marine archaeological potential.

Five terrestrial archaeological sites are located within the spatial boundaries considered for the assessment.

7.15.2.4 Analytical Methods

7.15.2.4.1 Terrestrial Archaeology

Per the Ontario provincial requirements for terrestrial archaeology on non-federal lands, the technical studies were conducted according to the Standards and Guidelines for Consultant Archaeologists (MCM 2011). The Standards and Guidelines for the Consultant Archaeologists (MCM 2011) prescribe a sequential, four-stage process for the identification, evaluation and mitigation of effects on archaeological resources in development. These stages are:

- Stage 1 Archaeological Assessment (background study and optional field inspection): a Stage 1 archaeological assessment provides information on local geography, history, previous archaeological fieldwork, and current land condition, and from this information evaluates the archaeological potential in the investigation area. The evaluation may also be informed by a field inspection that documents the current conditions and identifies areas of archaeological potential or where archaeological potential may have been removed during past land alterations. Based on the evaluation for potential, the Stage 1 archaeological assessment recommends appropriate Stage 2 assessment strategies for all or portions of the investigation area.
- Stage 2 Archaeological Assessment (field survey): Stage 2 assessment involves field survey of those portions of the investigation area identified to have archaeological potential in the Stage 1 archaeological assessment. Fieldwork for Stage 2 archaeological assessment is usually conducted through excavating test pits at regular intervals or systematic fieldwalking of ploughed fields. The objectives of Stage 2 archaeological assessment are to document archaeological resources present and determine whether these resources constitute an archaeological site that requires further assessment through Stage 3 archaeological assessment. If Stage 3 archaeological assessment is required, the Stage 2 archaeological assessment will recommend appropriate strategies to assess the archaeological site.
- Stage 3 Archaeological Assessment (site-specific assessment): Stage 3 archaeological assessment generally involves hand excavating 1 m square units at 5 m or 10 m intervals, with the objectives of determining the extent and characteristics of the archaeological site, collecting a representative sample of artifacts, and assessing the CHVI of the site. From the results of the fieldwork, the Stage 3 archaeological assessment will recommend appropriate strategies for Stage 4 Mitigation.

- Stage 4 Mitigation: this stage outlines how identified effects to an archaeological site will be managed. Mitigation can be through avoidance and protection, or excavation, or a combination of both, depending on the conditions. If avoidance is possible, Stage 4 Mitigation will outline the specific measures to conserve the archaeological site over the short and long term. Stage 4 excavation is required when the project cannot viably avoid the archaeological site; in these cases, the archaeological site is fully excavated, with all finds documented and cultural material collected to preserve information about the site for future study. The methods used for a Stage 4 excavation depend on several variables, such as site type and size, but generally involve hand excavation of contiguous units.

Two Stage 1 archaeological assessments with field inspections have been conducted for the Project. The initial Stage 1 archaeological assessment covered a smaller investigation area, which was expanded upon in the second Stage 1 archaeological assessment. Only the first assessment evaluated several areas to have archaeological potential and require Stage 2 archaeological assessment (Appendix Q-1).

The subsequent Stage 2 archaeological assessment identified five archaeological sites within the archaeology LSA: EfKj-1, EfKj-2, EfKj-3, EfKj-4 and EeKj-4. Each of these sites was recommended for Stage 3 archaeological assessment (Appendix Q-1).

Stage 3 archaeological assessments have been completed for three of these sites where Project-related effects may occur:

- EfKj-1
- EfKj-3
- EfKj-4 (Appendix Q-1).

Based on discussions with Great Bear Resources and local Indigenous Nations, each site was recommended for Stage 4 mitigation through avoidance and protection.

Indigenous engagement was completed by Great Bear Resources throughout the terrestrial archaeological studies, and the confidential information provided by local Indigenous Nations through Indigenous knowledge studies has been incorporated as available.

7.15.2.4.2 Marine Archaeology

The technical study for marine archaeology (Appendix Q-2) used the Criteria for Evaluating Marine Archaeological Potential: A Checklist for the Non-Specialist (MCM 2016) in the absence of specific provincial standards and guidelines for marine archaeological assessment, and considered the Standards and Guidelines for the Consultant Archaeologists (MCM 2011), as well as the UNESCO Convention on the Protection of Underwater Cultural Heritage (UNESCO 2001), and the ICOMOS Charter on the Protection and Management of Underwater Cultural Heritage (ICOMOS 1996).

The marine archaeological assessment conducted for the Project involved a review of environmental data, and primary and secondary historical sources, including aerial imagery and maps, and the analysis of bathymetry, LiDAR, and the results of a borehole drilling program. It also included visual inspections using a waterproof camera, remotely operated vehicle, and aquascope / bathyscope within the investigation areas in the Chukuni River and Unnamed Waterbody 1 (Appendix Q-2). Indigenous engagement was completed by Great Bear Resources

as part of the Project and confidential information provided by local Indigenous communities through Indigenous knowledge studies has been incorporated as available.

7.15.3 Assumptions and the Use of the Conservative Approach

Five terrestrial archaeological sites were identified in the PA, LSA or RSA. Areas of potential for marine archaeological resources were identified within the PA and LSA. Although terrestrial archaeological sites have been identified and evaluated during baseline data collection, there is also potential for undiscovered terrestrial or archaeological resources to be present in the LSA. Chance find / inadvertent discovery procedures for both terrestrial and marine archaeological resources are in place to guide Great Bear Resource staff and contractors regarding actions to be taken in that occurrence.

7.15.4 Existing Conditions

Baseline information on existing conditions for archaeological resources summarized below, is detailed in the technical reports provided in Appendix Q-1 (terrestrial archaeology assessment reports; prepared by Northwest Archaeological Assessments Ltd.) and Appendix Q-2 (marine archaeology assessment report; prepared by WSP).

Stage 1 archaeological assessment for the Project was initiated in 2022 to identify areas of archaeological potential of the property at the time. The assessment, which included a targeted field inspection, determined that approximately 350 ha of the 1,900 ha property, primarily associated with watercourses and waterbodies, had archaeological potential that required Stage 2 archaeological assessment.

Additional Stage 1 archaeological assessment was undertaken in 2023 for an infrastructure corridor between the property at the time and Highway 105, east of Tuzyk's Road. This Stage 1 archaeological assessment with field inspection determined that the 3.5 ha linear corridor had no or low archaeological potential and required no further assessment.

In 2024, a Stage 2 archaeological assessment was conducted for the areas identified to have archaeological potential. Test pit survey at 5 m intervals identified archaeological resources in five locations, which were subsequently registered with the MCM as archaeological sites: EfKj-1 (near Unnamed Waterbody 2), EfKj-2 (at Dixie Creek west of the Chukuni River), EfKj-3 (southern shore of Unnamed Waterbody 6), EfKj-4 (southern shore of Unnamed Waterbody 6), and EeKj-4 (northern shore of Pakwash Lake). Archaeological sites EfKj-1 and EfKj-2 were identified from scatters of chipped stone that could only be generally assigned to Indigenous inhabitations during the pre-contact or early post-contact period. The two sites on Unnamed Waterbody 6 (EfKj-3 and EfKj-4) were interpreted as Late Paleo period campsites (circa 7,000 years before present), while EeKi-4 is a Woodland period Indigenous site dated to between 2,200 and 400 years Before Present. All five sites were evaluated to have further CHVI and recommended for Stage 3 archaeological assessment.

Subsequent Stage 3 archaeological assessments have been conducted or underway for EfKj-1, EfKj-2, EfKj-3 and EfKj-4, and EeKj-4. All archaeological sites identified during the Stage 2 archaeological assessment will be fully avoided by the Project.

Stage 3 test unit excavations at EfKj-1 in 2024 recovered 72 cultural materials from an 11 m square area. From the presence of Blackduck-type ceramics, the site's age could be refined to the late Woodland period, circa 1200 to 1700 Common Era. From these results, archaeological site EfKj-1 was considered to have further CHVI and requires Stage 4 mitigation.

Stage 3 fieldwork at the Unnamed Waterbody 6 archaeological sites EfKj-3 and EfKj-4 was conducted concurrently in 2024. At EfKj-3, test unit excavation at 5 m and 10 m intervals recovered 80 cultural materials from a 23 m by 11 m area. Although the cultural materials were limited to the chipped stone refuse from tool manufacture, the site was interpreted to have a Late Paleo occupation (9,000 to 7,000 Before Present) based on its proximity to EfKj-4, where a fragment of a Late Paleo spear point was recovered during the Stage 2 archaeological assessment. From this interpretation, EfKj-3 was evaluated to have further CHVI and recommended for Stage 4 mitigation.

Test unit excavation at 5 m and 10 m intervals at EfKj-4 recovered 580 cultural materials, primarily chipped stone refuse, along with two informal stone tools. These cultural materials were distributed in a discontinuous pattern over a 30 m by 23 m area. On the basis of the spear point fragment collected during the Stage 2 test pit survey, EfKj-4 was interpreted to be a Late Paleo period site (9,000 to 7,000 Before Present), and evaluated to have further CHVI. Stage 4 mitigation was also recommended for EfKj-4.

Stage 3 archaeological assessment of EeKj-4 is currently underway.

The marine archaeological assessment conducted in 2025 evaluated the archaeological potential of the watercourses and waterbodies in the LSA, and included visual inspections with a remotely operated vehicle and aquascope where Project effects are expected (pipeline locations below the high water mark of the Chukuni River and Unnamed Waterbody 1 (Appendix Q-2). No marine archaeological resources or areas of marine archaeological potential were found and the marine archaeological assessment determined that no further work was required for the locations assessed.

7.15.5 Identification of Potential Effects

The initial step in the assessment process is to identify interactions between the Project and the pVC that can result in pathways to potential effects. Table 7.15-1 includes the potential interactions of the Project with archaeological resources, prior to the application of the mitigation measures. The changes after the application of the mitigation measures, are then described and further evaluated in Section 7.15.7.

7.15.6 Mitigation and Enhancement Measures

The application of mitigation measures for the pathways for potential effects is illustrated in Table 7.15-2. Mitigation measures described in this section are expected to be effective for their intended purposes given their effective implementation at similar projects. Measures to be implemented to avoid or minimize the effects of the Project on archaeology include the following:

- Archaeological sites identified in Appendix Q-1 will be noted on applicable Project mapping with associated buffers to identify the management requirements for Project personnel and support the avoidance and protection of the identified sites
- Areas of marine archaeological potential identified in Appendix Q-2 will be noted on applicable Project mapping to identify the management requirements for Project personnel
- Terrestrial and marine chance find / inadvertent discovery procedures have been established for the Project, and will be implemented through training and collaboration with Indigenous Nations.

7.15.7 Assessment of Changes after Mitigation

The assessment of changes to terrestrial archaeological sites or areas of marine archaeological potential after application of mitigation measures is presented in the following sections.

7.15.7.1 Construction Phase

With implementation of proposed mitigative measures, no changes to terrestrial archaeological sites or areas of marine archaeological potential are anticipated after mitigation.

7.15.7.1.1 Operations Phase

No changes to terrestrial archaeological sites or areas of marine archaeological potential are anticipated with implementation of proposed mitigative measures during the operations phase.

7.15.7.1.2 Closure Phase

The closure phase will not result in additional changes that could affect archaeological resources. No changes to terrestrial archaeological sites or areas of marine archaeological potential are anticipated during the closure phase.

7.15.8 Change Pathway Outcome

7.15.8.1 Summary of Changes after Mitigation

Potential for changes to terrestrial archaeological sites or areas of marine archaeological potential are confined to the PA, as illustrated in Figure 7.15-3. With the proposed design and mitigation measures, no changes to the terrestrial archaeological sites or areas of marine archaeological potential are expected.

7.15.8.2 Change Management

The changes to terrestrial archaeological sites or areas of marine archaeological potential are managed through the provincial regulatory process, including protection as applicable through application of tools such as checklists, guidelines, and policies associated with the *Ontario Heritage Act*.

Terrestrial and marine chance find procedures have also been established for the Project.

7.15.8.3 Confidence

Comprehensive background research and fieldwork were undertaken to identify archaeological resources in the PA and LSA where effects from the Project may occur. To address terrestrial archaeological resources and sites, two Stage 1 archaeological assessments with field inspections, and one Stage 2 archaeological assessment with test pit survey, have been completed. Stage 3 archaeological assessments with test unit excavation have also been prepared for three of the terrestrial archaeological sites identified during the Stage 2 archaeological assessment that may be affected by the Project. Marine archaeological resources have been addressed through a marine archaeological assessment with targeted visual inspection, which included using ROV and aquascopes.

The archaeological fieldwork and reporting for the Project have been conducted according to applicable standards and guidelines and legislative requirements. Consequently, there is a high level of confidence in the effects prediction.

Table 7.15-1: Potential Interactions of Project Components with Archaeology

Project Component / Activity	Archaeology ⁽¹⁾
Construction Phase	
Site preparation activities	Yes
Establishment and operation of water management and treatment facilities	-
Open pit mining	Yes
Underground mining	No
Management of rock and unconsolidated materials in stockpiles	No
Establishment of onsite fish habitat and compensation measures	-
Establishment of onsite aggregate operations	Yes
Construction of the starter embankments for the TMF	-
Construction and operation of buildings and infrastructure	No
Waste management	No
Commissioning of the process plant	No
Power supply	No
Employment and expenditures	No
Operations Phase	
Underground mining	No
Mining of the LP Central pit	No
Management of rock and unconsolidated materials in stockpiles	No
Process plant operation	No
Management of desulphurized tailings in the TMF	No
Management of concentrate tailings and contact water in the Viggo Management Facility	No
Operation of water management and treatment facilities	No
Construction of a MWP	-
Operation and maintenance of buildings and infrastructure	No
Waste management	No
Power supply	No
Progressive reclamation activities	No
Employment and expenditures	No



Project Component / Activity	Archaeology ⁽¹⁾
Closure Phase	
Active closure period	-
Passive closure period	No
Final reclamation period	-
Employment and expenditures	No

Notes:

- : The interaction is not expected to be material, and no further assessment is warranted.

1. Potential interactions are identified where disturbance of the near subsurface is anticipated to occur.

Table 7.15-2: Mitigation Measures for Changes to Archaeology

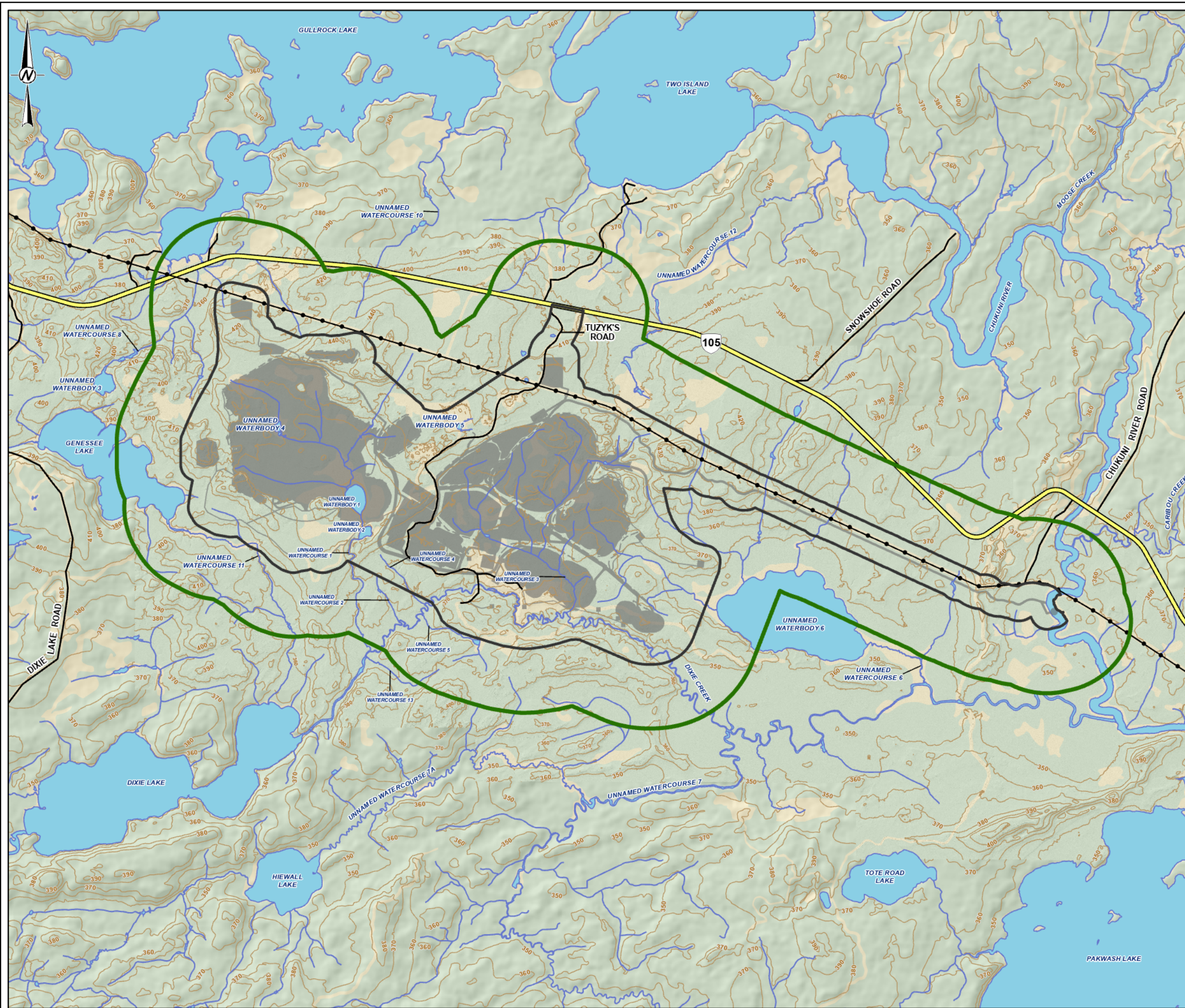
Pathways to Potential Effects / Criteria	Project Phase			Proposed Mitigation Measure
	Con	Op	Cl	
Changes to terrestrial archaeological sites	●	-	-	<ul style="list-style-type: none"> Archaeological sites and associated management buffers in the LSA will be noted on applicable Project maps provided to Project personnel
Changes to areas of marine archaeological potential	●	-	-	<ul style="list-style-type: none"> Areas of marine archaeological potential in the LSA will be noted on applicable Project maps provided to Project personnel
Alteration or destruction of an archaeological site or area of marine archaeological potential	-	-	-	<ul style="list-style-type: none"> Chance find (archaeology) procedures have been established for the Project to help prevent alteration or destruction of an undocumented archaeological site (terrestrial or marine) Avoidance and protection of sites EfKj-1 (Unnamed Waterbody 2), EfKj-2 (Dixie Creek), EfKj-3 and EfKj-4 (Unnamed Waterbody 6) is proposed Great Bear Resources will continue to work with LSFN and WFN to identify appropriate buffers to be implemented for the Project If this becomes unworkable, Stage 4 mitigation through controlled excavation, ensuring that cultural materials are fully documented and preserved for future study may be considered in discussion with LSFN and WFN If areas of marine archaeological assessment may be directly affected, a Marine Archaeological Assessment will be required

Notes:

Con: construction phase; Op: operations phase; Cl: closure phase

● : mitigation is applicable.

- : mitigation is not applicable.



LEGEND

- GREAT BEAR PROJECT FOOTPRINT
- PROJECT AREA
- LOCAL AND REGIONAL STUDY AREA FOR ARCHAEOLOGY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- CONTOURS (10 M INTERVAL)
- WATERCOURSE
- WATERBODY



NOTE(S)
 1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
 1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. CONTOURS ACQUIRED FROM LAND INFORMATION ONTARIO (LMRF), 2022 AND DERIVED FROM 2022 LIDAR PROVIDED BY GREAT BEAR RESOURCES
 3. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
 4. SITE PLAN BASED ON INFORMATION PROVIDED BY GREAT BEAR RESOURCES, DECEMBER 2024 / JUNE 2025.
 5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
 GREAT BEAR RESOURCES

PROJECT
 GREAT BEAR PROJECT

TITLE
LOCAL AND REGIONAL STUDY AREA FOR ARCHAEOLOGY

CONSULTANT	DATE	REVISION
	YYYY-MM-DD	2026-03-31
	DESIGNED	---
	PREPARED	MD
	REVIEWED	---
	APPROVED	SD

PROJECT NO. CA0031271 CONTROL 0001 REV. A FIGURE 7.15-1

PATH: X:\CA0031271\2025\Projects\CA0031271_Kentia_Kentia_Great_Bear_EIR\GIS\Output\Map\Archaeology\Archaeology_SitePlan.aprx PRINTED ON: AT: 11:36:24 AM

28mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

7.16 Analysis of Changes to the Local and Regional Economy

Local and regional economy has been identified as a pVC in recognition of the interests of government agencies, Indigenous communities and the public.

7.16.1 Pathway Linkages to other Valued Components

7.16.1.1 Pathway Linkages to Cultural Heritage

Pathways to effects to the local and regional economy are listed in the related sections of the Impact Statement, and summarized as follows:

- Land and Resource Use (Section 7.13).

7.16.1.2 Pathway Linkages from Local and Regional Economy to fVCs

Changes to the local and regional economy may have a linkage and informs the analysis of potential effects to Indigenous Peoples, through community well being (Sections 10.8, 11.8, 12.8, 13.8 and 14.8).

7.16.2 Assessment Approach

The approach to the assessment of potential changes to the local and regional economy includes:

- Identification of potential pathway to pVC from other valued components (Section 7.16.1)
- Description of the relevant regulatory and policy setting (Section 7.16.2.1)
- Description of the temporal and spatial boundaries used for this pVC (Section 7.16.2.2)
- Identification of criteria and indicators along with the associated rationale (Section 7.16.2.3)
- An outline of the analytical methods used for the assessment (Section 7.16.2.4)
- Key assumptions and / or conservative approach (Sections 7.16.2.5).

The assessment of potential effects is supported by an assessment of the input obtained through consultation and engagement specific to this pVC (summarized in Section 7.1), existing conditions documented for the pVC (Section 7.16.4), and a description of applicable mitigation and enhancement measures for the pVC (Section 7.16.6).

With the application of mitigation measures to the potential effects on the pVC, the changes to the pVC are then characterized in Section 7.16.7 and a change pathway outcome summarized in Section 7.16.8.

7.16.2.1 Regulatory Setting

The Project is located in Ontario and will need to meet applicable federal and provincial legislation and regulatory requirements. There are no permitting or other regulatory requirements specifically related to this pVC. The 2011 Growth Plan for Northern Ontario (MNDMF 2011) however, sets out a 25-year plan to guide and align provincial policy and investment for economic and population growth in northern Ontario. The plan stipulates that the Province will focus economic development strategies on a set of priority economic sectors,

which include the Minerals Sector and Mining Supply and Services. The plan outlines the following measures for this sector:

Efforts by the Province, industry and, where appropriate, other partners, to grow and diversify the minerals and mining supply and services sectors should include:

- a. marketing that showcases Ontario as a global leader in environmentally sustainable mineral development and stewardship*
- b. creating new value-added resource sector opportunities through research, development and application of advanced processing and manufacturing technologies*
- c. expanding the mining supply and services industry, increasing exports, and supporting particular areas of competitive advantage including deep mining techniques and clean technologies*
- d. improving timeliness and clarity in regulatory processes, supported by a one window, co-ordinated process for approvals*
- e. expanding geoscience mapping and data collection and public access to resource information to expedite the discovery and development of new minerals and other resources*
- f. investing in research and innovation that improves the efficiency of industry operations, with an emphasis on extraction and exploration technologies, environmental technologies, and mine closure and rehabilitation processes*
- g. enabling new mining opportunities*
- h. facilitating partnerships among communities and industry to optimize community employment and benefits*
- i. facilitating the entry of new participants and entrepreneurs, including Aboriginal businesses, co-operatives and commercial developers.*

7.16.2.2 Spatial and Temporal Boundaries

The spatial boundaries used for the assessment of the pVC Local and Regional Economy are shown in Figure 7.16-1 and are defined as follows:

- PA: is defined as the footprint of the Project including all temporary and permanent areas associated with the mine site, as well as a buffer to allow flexibility for design optimizations prior to construction and over the mine life (Section 6.4).
- LSA: corresponds to the anticipated area that could be influenced by the Project, and includes Indigenous Nations as identified by the federal and provincial government for the Project, and non-Indigenous communities within a reasonable community distance to the Project (approximately 100 to 150 km). This includes the Municipality of Red Lake, the Township of Ear Falls, LSFN, WFN, ANA and NWOMC, as well as the District of Kenora. These communities are likely to provide key services and benefit from business opportunities resulting from the Project, are located along major travel and service corridors, and are part of Statistics Canada reporting units.
- RSA: for the local and regional economy is a broader scale that provides a regional setting that could be influenced by the Project and defined by the District of Kenora, in which the Project, identified Indigenous Nations and municipalities are situated within.

Potential effects were assessed for each Project phase (i.e., construction, operations and closure). The temporal boundaries for the assessment of local and regional economy as defined in Section 6.5 are:

- Construction phase:
 - Year -4 involves procurement and engineering ahead of onsite construction
 - Years -3 to -1 representing the primary period of Project construction
- Operations phase:
 - Years 1 to 26, during year 1 the Project will transition from construction into operations and will not be at full capacity
- Closure phase:
 - Years 27 to 29 represent the active closure period when the majority of the decommissioning and reclamation of the PA is completed (the passive closure period and final reclamation period are not considered in detail).

7.16.2.3 Assessment Criteria

In undertaking the assessment of local and regional economic effects, the following criteria were used:

- Change in employment levels
- Change in labour income
- Change in business opportunities
- Change in business income
- Change in demand for training
- Change in government revenues.

The specific criteria, measurable indicators and the rationale for the selection of criteria are described in Table 7.16-1.

7.16.2.4 Analytical Methods

The assessment of economic effects required the quantitative modelling of the effects of the Project-related expenditures. The modelling used a model developed by Dungan and Murphy (2014). The Dungan and Murphy model was scaled to represent the Project. The assessment of the effects on the local and regional economy was done by comparing the modelled economic effects with current local and regional economic conditions quantitatively and qualitatively based on the understanding of local and regional conditions from published sources, details of the Project execution, and professional judgment of the WSP experienced consultants.

7.16.3 Assumptions and the Use of the Conservative Approach

The modelling of economic effects is based on the Project expenditures and Project labour requirements as planned by the proponent. Unexpected changes to the global or Canadian macroeconomic conditions, notably a falling gold price, could affect the Project economics and therefore lead to reduced Project expenditures and Project labour requirements, which would in

turn reduce the economic effects. This is considered unlikely because Project economics are based on conservative assumptions, including a conservative ⁴ gold price of United States \$1,800 per ounce.

The Dugan and Murphy (2014) model was assumed to be representative of new gold mines in Ontario and the model was scalable to reflect the details of the Project. The model was also designed to be conservative in its approach and output. While Dugan and Murphy did not model the economic effects of closure; it was assumed that effects similar to mine construction would apply when relative spending levels were applied. It was also assumed that local and regional individuals and businesses will choose to participate in the Project through employment of contracting, which is consistent with the understanding of Great Bear Resources based on the results of ongoing consultation and engagement, including as summarized in Section 3.

It should also be noted that the model by Dugan and Murphy was based on the data available at the time, and therefore reflects the structure of the economy of northern Ontario and its interconnections with the wider Canadian economy from 2014. This introduces a certain level of uncertainty when applying the model to a contemporary project, as changes in the economy since 2014 are not considered. The fundamental relationships in the economy are, however, reasonably similar today, and that the model is still appropriate and accurate to use in the economic effect assessment of the Project.

7.16.4 Existing Conditions

A summary of the existing conditions is presented below to support an understanding of the effects assessment. Further details, including methodology and detailed references, are provided in Appendix O-1.

7.16.4.1 Labour Force

The employment income for the Indigenous Nations (as per Statistics Canada data) in the LSA, was below the Ontario average, and a higher share of income came from government transfers (where data was available). The main industries were public administration, health care and social assistance, education, and construction (and for WFN also included manufacturing).

In Red Lake and Ear Falls, employment income was above the Ontario average, and significantly higher for men+ than for women+ ⁵. The main industries were mining, health care and social assistance, and retail (and for Ear Falls, manufacturing).

Childcare costs were identified as a major barrier to participation in the labour force, especially for women.

7.16.4.2 Economic Sector Overview

Red Lake is known for its long-standing gold mining industry that is critical to the success of the region. The increase in possible mining opportunities directly provides access to future

⁴ The global gold price fluctuated around United States dollar (USD)1,800/oz between August 2020 and October 2023. The price grew substantially since then, constantly remaining well above USD1,800/oz, and stands at over USD3,300/oz as of July 2025 (Trading Economics 2025), and much higher in March 2026.

⁵ In the 2021 Census, the category men+ includes men, as well as some non-binary persons; the category women+ includes women, as well as some non-binary persons.

employment and business opportunities for the region. Historically, Ear Falls was known for its mining industry, fur trade and recently developed tourism industry.

All communities in the LSA (including Indigenous Nations) are involved to varying degrees in major projects, mining, forestry, construction, infrastructure, tourism, and the provision of other goods and services.

7.16.4.3 Government Revenues

In 2024, Red Lake incurred a revenue of \$19.0 million and a budget deficit of \$1.6 million, while Ear Falls achieved a revenue of \$6.6 million and a budget surplus of \$1.2 million (Corporation of the Municipality of Red Lake 2025; Township of Ear Falls 2025). The main sources of revenue in both municipalities were taxation and user fees and charges.

7.16.5 Identification of Potential Effects

Metal mining is a major economic driver for Ontario and Canada through employment and expenditures, as well as government income. Accordingly, development of the Project may affect the local and regional economy.

7.16.6 Mitigation and Enhancement

Effects to the local and regional economy can be beneficial or adverse. The following measures will be implemented to avoid, minimize, or manage adverse effects or to enhance beneficial effects to the local and regional economy

The following measures are proposed as applicable to the individual circumstances. To enhance positive effects, especially to the local and regional labour force and businesses during the construction and operations phases, the following is proposed:

- Early posting of job qualifications
- Provide information regarding or relevant training is available
- Establish and maintain a process to track local and regional subcontracting and procurement opportunities
- Work with local and Indigenous businesses to enhance the opportunity to supply the Project
- Implement the Project's labour and training framework including partnerships with Indigenous communities
- Offer work and volunteer opportunities to youth
- Give preference to local and Indigenous labour and suppliers where reasonable
- Implement the Project Diversity, Equity and Inclusion approach (Kinross 2024).

At the time of writing, Great Bear Resources and Indigenous Nations within the LSA were in the process of developing confidential agreements concerning the implementation of the enhancement measures noted above, at the sole discretion of both parties.

To mitigate any adverse effects on the local and regional housing market during all Project phases, Great Bear Resources propose to:

- Communicate Project schedule, labour demand and potential sources with local municipalities for housing planning purposes
- Provide onsite accommodations and transportation to central Project locations.

Great Bear Resources proposes the following to prepare and support the transition to other employment opportunities when the Project employment decreases at the closure of the Project:

- Support re-training programs to establish transferable skills for employees during the latter part of the operations phase
- Provide job search assistance to employees, at closure phase.

7.16.7 Assessment of Changes

The initial step in the assessment process is to identify interactions between the Project and the pVC that can result in pathways to potential effects. These potential effects may be direct, indirect and / or positive effects, where applicable. Table 7.16-2 summarizes the potential interactions of the Project with the local and regional economy, prior to the application of the mitigation measures. The professional judgment of technical experts experienced with mining projects in Ontario and Canada, as well as input from Indigenous communities, government agencies and the public, informed the identification of those interactions that are likely to result in a pathway to a potential effect due to a measurable change to the local and regional economy. These pathways are discussed in more detail below.

The Project involves both open pit and underground mining, and a combination of different expenditures: initial capital expenditures to develop the Project and growth capital expenditures for growing the Project; operational expenditures and sustaining capital expenditures to maintain the operations of the Project; and closure costs, which have been assumed to lead to similar economic effects as construction (see Section 7.16.3).

These Project expenditures trigger a demand for labour, goods and services that may increase local and regional employment levels and labour income, and create opportunities for local and regional business to participate in the Project through contracting and procurement. The distribution of the labour income would be a function of the home communities of the employees. The additional employment may attract an influx of workers and create an increased demand for housing, which could lead to housing shortages and housing cost increases, if not properly mitigated. Opportunities may be provided to subcontracted businesses from the LSA for supply goods and services to the Project. The demand for subcontractors may extend to other regional communities and Indigenous communities depending on local availability. The increase in opportunities for local and regional business may increase business income in the local and regional communities.

Through the spending of income generated by the Project, additional indirect and induced effects may be generated. The availability of jobs at the Project may also encourage more individuals to seek additional training to become qualified for Project employment, including through available employment funding programs. The Project and the income generated by the Project may also contribute to government income (notably taxes).

Economic modelling was undertaken to estimate the potential direct, indirect and induced economic effects based on the Project expenditures. The economic effects estimates, as

calculated by the model, are presented in Table 7.16-2. The effects generated during the assessment period include a total of \$18.9 billion in additional gross domestic product (on average \$570 million per year), 113,130 person-years of employment (3,430 persons employed in an average year), \$9.2 billion in labour compensation (on average \$280 million per year), and \$6.3 billion in government revenues (on average \$190 million per year). Of these total economic effects, up to 85,720 person-years of employment (2,600 persons employed in an average year) and up to \$7.4 billion in labour compensation (on average \$230 million per year) are expected to occur in the local area⁶. The provincial government earns an additional \$3.2 billion (on average \$100 million per year) and local governments earn an additional \$720 million (on average \$20 million per year).

Figure 7.16-2 shows the estimated annual economic effects over the assessment period. This shows that the economic effects are expected to increase from year -4 to year -1, reflecting increasing initial capital expenditure over this period. High levels of economic effects are then expected to be maintained during the operation of the Project over the period from year 1 to year 29. The highest values for most indicators are estimated for the year 6, when total (direct, indirect and induced) employment is expected to reach 5,200 persons, labour compensation to reach \$390 million, and gross domestic product to reach \$870 million. Total government revenues are estimated to be highest in year 8, at \$340 million. From 2050, economic effects slowly decrease, as the operation of the Project ramps down and closure of the Project is undertaken.

Further detail, including detailed annual results and a breakdown into direct, indirect and induced effects is provided in Appendix O-2.

7.16.7.1 Change in Employment Levels and Labour Income

The Project demand for labour during construction and operations phases will increase local and regional employment levels and labour income, including for Indigenous communities. In total all across Canada, the Project will create 113,130 person-years of employment and \$9.2 billion in labour compensation (including direct, indirect and induced effects) through all Project phases.

The extent to which this employment effect will benefit the local, regional and Indigenous labour force would depend on the decisions of individuals, which are uncertain. Employment opportunities have been discussed directly between Great Bear Resources, and LSFN and WFN. A confidential report prepared for the NWOMC indicated some interest from community members. The relatively low numbers of unemployed workers in the local communities and the low level of involvement of the workforce in the mining industry suggests the expected direct, indirect, and induced employment will not be completely fulfilled from the local communities. Labour demands will extend to at least the regional centres of Kenora and Dryden. Up to 85,720 person-years of employment and up to \$7.4 billion in labour compensation could occur in this region (in total over the whole assessment period). Enhancement measures like preferentially employing local and Indigenous workers are designed to maximize the benefits for the local and regional economy, and Indigenous people.

⁶ For the purposes of the economic modelling, local area impacts are expected to extend until including the nearest major town or city that would have significant public (including a hospital and schools) and private facilities available. Further detail is provided in Appendix O-2.

The additional employment may attract an influx of workers and create an increased demand for housing. This was discussed directly amongst Great Bear Resources, and LSFN and WFN, and was also raised in a confidential report prepared for the NWOMC. Mitigation measures such as onsite accommodation, engagement with local municipalities to support housing planning, and preferential employment of local and regional labour, are expected to avoid housing shortages and minimize housing cost increases.

Employment levels and labour income will decrease to pre-Project levels during the closure phase, after the active closure period. Mitigation measures are designed to ease the transition to other employment opportunities. There are no adverse change to the local and regional economy predicted due to a change in the demand for labour and labour income.

7.16.7.2 Change in Business Opportunities and Business Income

The Project demand for goods and services during construction and operations phases will create opportunities for local and regional business with experience in the mining industry to participate in the Project through contracting and procurement. A confidential report prepared for the NWOMC indicated that some community members hope for opportunities for local businesses. This positive effect will be enhanced by preferentially contracting local and regional businesses. The spending of Project-related labour income will have induced positive effects on local businesses through the spending of the labour income at local and regional businesses. In total across all of Canada, the Project will increase gross domestic product by \$18.9 billion through direct, indirect, and induced effects (over the whole assessment period). This is equivalent to an average of about \$570 million per year.

The level of business opportunities and income will decline during the closure phase, and particularly after the active closure period.

Confidential reports prepared for LSFN and WFN indicate concerns about possible negative economic effects of the Project on tourism, hunting camps and guides, camping, fishing and traditional economic activities. The potential effects of the Project on recreational and commercial land uses including hunting, camping, fishing and outfitting are assessed in Section 7.13, which concludes that changes after mitigation are expected to be localized to the PA. Sensory disturbance in the LSA will be limited to the area in immediate proximity to the PA. Changes to land and resource use are not expected to affect commercial users except for trapline holders and baitfish harvesters, which Great Bear Resources will attempt to minimize through regular consultation and collaboration with trapline holders and harvesters. Indigenous land and resource use for traditional purposes is assessed in the Indigenous Peoples fVCs in Sections 10.6, 11.6, 12.6, 13.6 and 14.6 of this Impact Statement.

There are no adverse changes to the local and regional economy predicted due to a change in business opportunities and income.

7.16.7.3 Change in Demand for Training

The availability of jobs at the Project may encourage more individuals to seek additional training to become qualified for Project employment, including through available employment funding programs, particularly during the construction phase. A confidential report prepared for the NWOMC indicated some interest from locals. Training opportunities have also been discussed directly amongst Great Bear Resources, and LSFN and WFN. Mitigation measures are aimed at ensuring the awareness and availability of suitable training and funding programs are

maximized. There are no adverse changes to the local and regional economy predicted due to a change in the demand for training.

7.16.7.4 Change in Government Revenues

Government revenues will increase through taxes and fees paid by the Project and by individuals and businesses that participate in the Project. Additional revenues are generated through indirect and induced effects. In total over the whole assessment period, the Project will generate \$6.3 billion in government revenues, of which the provincial government earns \$3.2 billion and local governments earn an additional \$720 million.

These revenues will decline during the closure phase. There are no adverse changes to the local and regional economy predicted due to a change in government revenue.

7.16.8 Change Pathway Outcome

7.16.8.1 Summary of Changes after Mitigation

The Project will have a net positive effect on the local and regional economy through employment and labour income, opportunities and income for local and regional businesses, and increased revenues to local and regional municipalities, Ontario and Canada.

These results are carried forward to the analysis of changes to the fVC Indigenous Peoples in Section 10 to Section 14, as appropriate.

The zone of changes is dominantly within the RSA. As discussed in Section 7.16.7, the economic modelling has estimated that up to 85,720 person-years of employment (2,600 persons employed in an average year) and up to \$7.4 billion in labour compensation (on average \$230 million per year) are expected to occur in the RSA. The remainder of the potential direct, indirect and induced economic effects are expected to occur in the rest of Ontario and Canada.

7.16.8.2 Confidence

The level of confidence in the prediction is considered to be moderate due to the inherent uncertainties in economic modelling (as discussed in more detail in Appendix O-2), as well as the personal choices made by the local labour force and businesses in seeking employment and opportunities with the Project that are not under the control of Great Bear Resources.

Table 7.16-1: Assessment Criteria, Indicators and Rationale

Criteria	Indicators	Interactions of the Project with the pVC / Rationale
Change in employment levels in municipalities	<ul style="list-style-type: none"> • Project generated employment numbers • Home communities of Project employees 	<ul style="list-style-type: none"> • The direct, indirect, and induced employment effects of the Project may result in increased employment of local, regional, and Indigenous workers. • Project employment may result in changes to the availability of local skilled labour.
Change in labour income	<ul style="list-style-type: none"> • Project generated income 	<ul style="list-style-type: none"> • Increased employment and labour income will contribute to local and regional economies by increasing local spending.
Change in business opportunities	<ul style="list-style-type: none"> • Contracts with local businesses from the Project 	<ul style="list-style-type: none"> • The Project may result in increased business contracts for local, regional, and Indigenous-owned companies
Change in business income	<ul style="list-style-type: none"> • Dollars paid to local businesses from the Project 	<ul style="list-style-type: none"> • Increased business income will contribute to local and regional economies increasing local business spending.
Change in demand for training	<ul style="list-style-type: none"> • Enrolment in Project relevant training 	<ul style="list-style-type: none"> • Increased employment opportunities may increase interest in and availability of training.
Change in government revenues	<ul style="list-style-type: none"> • Taxes and fees paid from the Project 	<ul style="list-style-type: none"> • Taxes and royalties associated with the Project will contribute to government revenue.

Table 7.16-2: Potential Interactions of Project Components with Local and Regional Economy

Project Component / Activity	Local and Regional Economy ⁽¹⁾
Construction Phase	
Site preparation activities	Yes
Establishment and operation of water management and treatment facilities	Yes
Open pit mining	Yes
Underground mining	Yes
Management of rock and unconsolidated materials in stockpiles	Yes
Establishment of onsite fish habitat and compensation measures	Yes
Establishment of onsite aggregate operations	Yes
Construction of the starter embankments for the TMF	Yes
Construction and operation of buildings and infrastructure	Yes
Waste management	Yes
Commissioning of the process plant	Yes
Power supply	Yes
Employment and expenditures	Yes
Operations Phase	
Underground mining	Yes
Mining of the LP Central pit	Yes
Management of rock and unconsolidated materials in stockpiles	Yes
Process plant operation	Yes
Management of desulphurized tailings in the TMF	Yes
Management of concentrate tailings and contact water in the VMF	Yes
Operation of water management and treatment facilities	Yes
Construction of a MWP	Yes
Operation and maintenance of buildings and infrastructure	Yes
Waste management	Yes
Power supply	Yes
Progressive reclamation activities	Yes
Employment and expenditures	Yes



Project Component / Activity	Local and Regional Economy ⁽¹⁾
Closure Phase	
Active closure period	Yes
Passive closure period	Yes
Final reclamation period	Yes
Employment and expenditures	Yes

Notes:

1. All Project components interact in some manner.

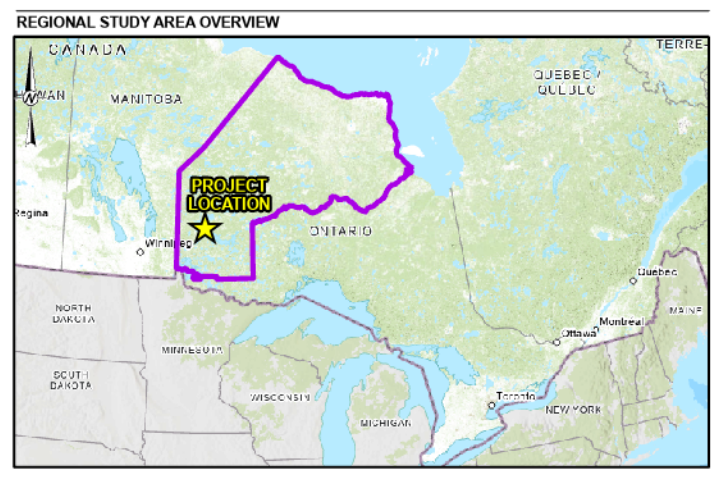
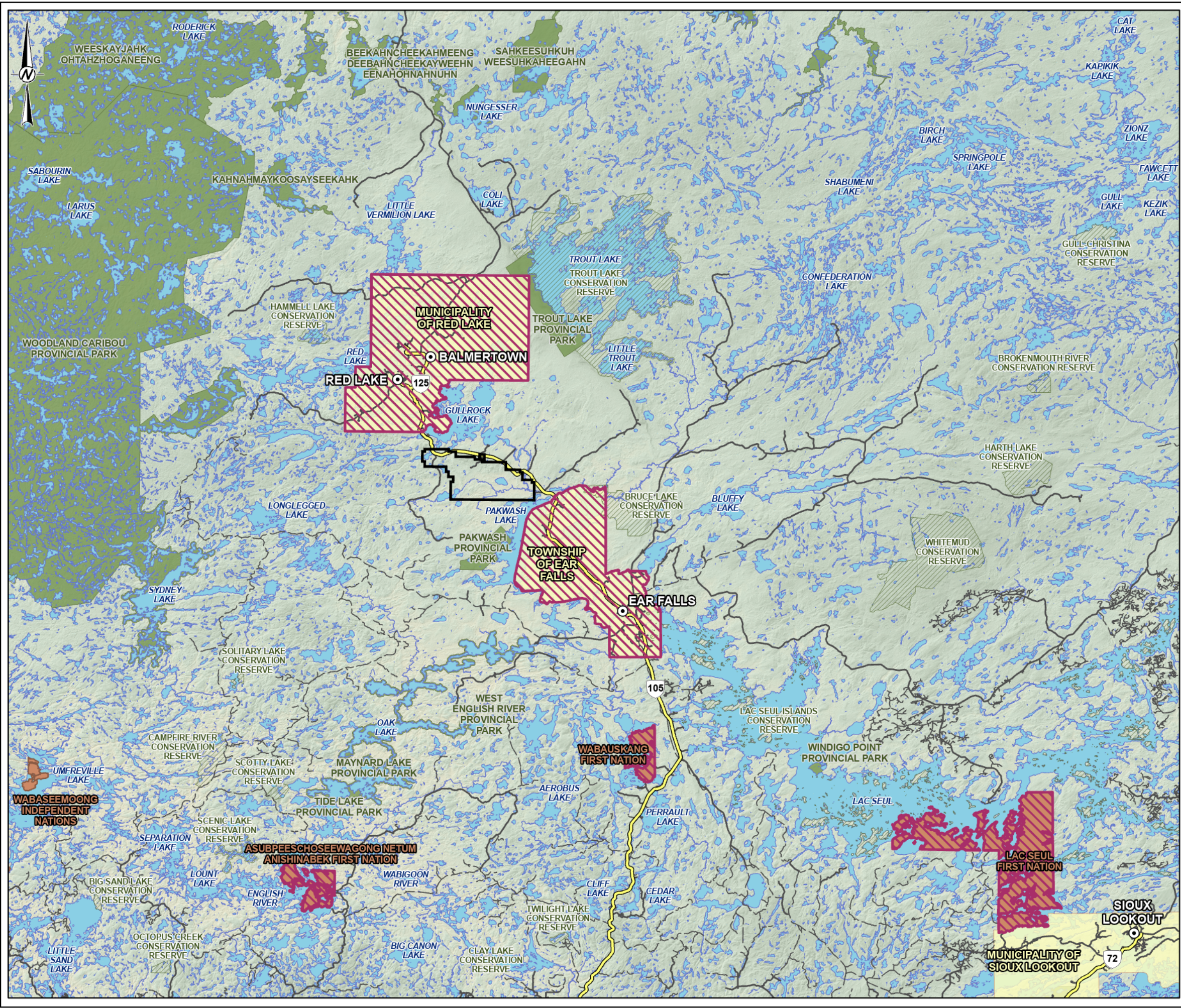
Table 7.16-3: Estimated Economic Effects

Indicator	Unit	Total	Average per year
Total Direct, Indirect and Induced Effects			
Employment	Person-years	113,130	3,430
Total Labour Compensation	\$ millions	9,200	280
Gross Domestic Product	\$ millions	18,900	570
Government revenues	\$ millions	6,320	190
Of which: Local Area Effects			
Employment	Person-years	85,720	2,600
Total Labour Compensation	\$ millions	7,430	230
Gross Domestic Product	\$ millions	15,100	460
Provincial taxes	\$ millions	3,210	100
Local taxes	\$ millions	720	20

Notes:

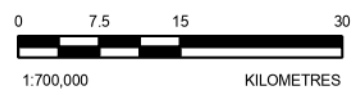
All \$ values are in Canadian Dollars in 2024 prices. All values are rounded to closest 10 person-years or closest \$10 million.

For the purposes of the economic modelling, local area effects are expected to extend until including the nearest major town / city that would have significant public (including a hospital and schools) and private facilities available. Further detail is provided in Appendix O-2.



SCALE: 1:30,000,000

- LEGEND**
- PROPERTY BOUNDARY
 - TOWN
 - FIRST NATION RESERVE
 - LOWER TIER MUNICIPAL BOUNDARY
 - CONSERVATION RESERVE
 - PROVINCIAL PARK
 - HIGHWAY
 - LOCAL ROAD
 - RESOURCE / RECREATION ROAD
 - WATERBODY
 - SOCIO-ECONOMIC LOCAL STUDY AREA (LSA)
 - LAC SEUL FIRST NATION
 - WABAUSKANG FIRST NATION
 - ASUBPEESCHOSEEWAGONG NETUM ANISHINABEK FIRST NATION
 - TOWNSHIP OF EAR FALLS
 - MUNICIPALITY OF RED LAKE
 - SOCIO-ECONOMIC REGIONAL STUDY AREA (RSA) (SHOWN IN OVERVIEW MAP)
 - DISTRICT OF KENORA



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

- REFERENCE(S)**
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
 3. WATERCOURSES AND WATERBODY ACQUIRED FROM LAND INFORMATION ONTARIO (MNR) AND MODIFIED TO MATCH AERIAL IMAGERY AND LIDAR.
 4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
 5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
SOCIO-ECONOMIC LOCAL AND REGIONAL INVESTIGATION AREAS

CONSULTANT	YYYY-MM-DD	2026-03-31
DESIGNED		---
PREPARED		MD
REVIEWED		---
APPROVED		SD

PROJECT NO. CA0031271 CONTROL 0001 REV. A FIGURE 7.16-1



PATH: X:\CA0031271-00\CA0031271-00\Projects\2023\Projects\CA0031271-00\GIS\Map_Series\01_01\Map_Series_01_01.aprx PRINTED ON: AT: 10:59:17 AM
 28mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

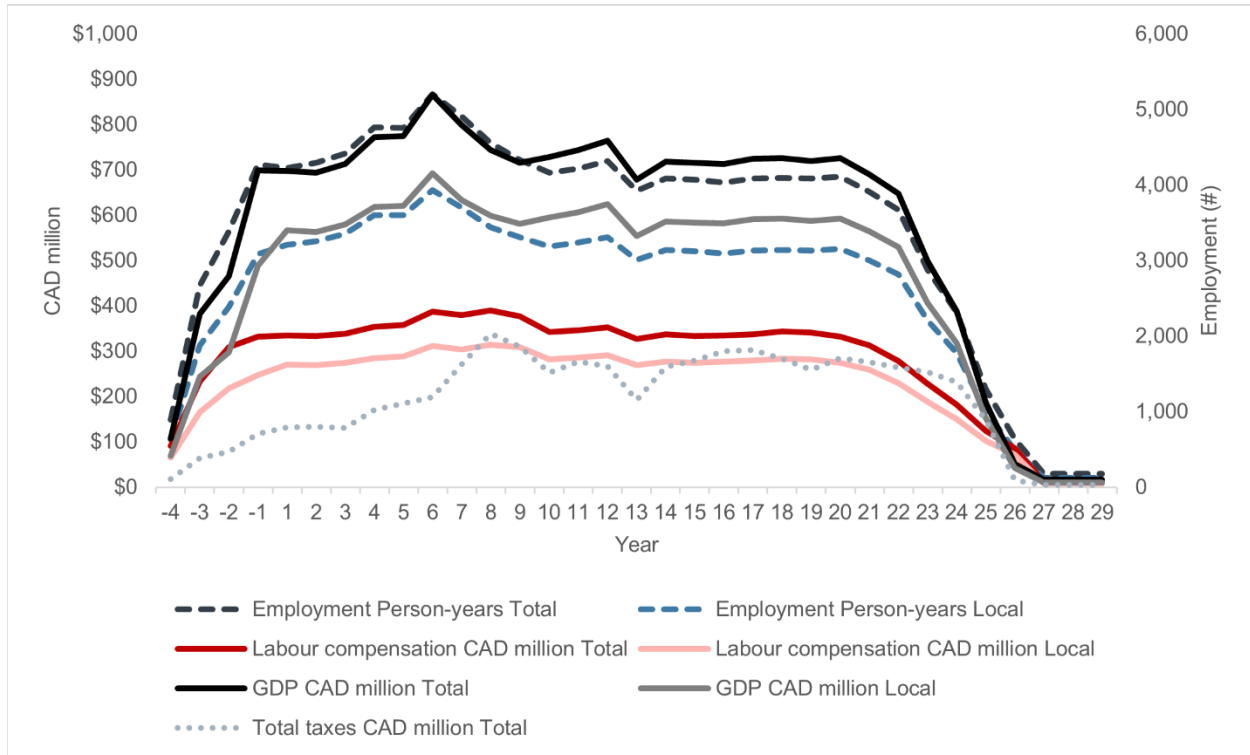


Figure 7.16-2: Estimated Economic Effects per Year

7.17 References

- Anantharaman, R., Hall, K., Shah, V. B. and A. Edelman. 2020. Circuitscape in Julia: High Performance Connectivity Modelling to Support Conservation Decisions. *Proceedings of the JuliaCon Conferences*, 1(1), 58. Accessed from: <https://doi.org/10.21105/jcon.00058>
- Armstrong, T. 2014. Management Plan for the Bald Eagle (*Haliaeetus leucocephalus*) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vii + 53 pp.
- Artuso, C., Houston, C.S., Smith, D.G. and C. Rohner. 2022. Great Horned Owl (*Bubo virginianus*), version 1.1. In *Birds of the World* (N. D. Sly, Editor). Cornell Lab of Ornithology, Ithaca, New York.
- Bergerud, A.T. 1974. Decline of Boreal Caribou in North America Following Settlement. *J. Wildl. Manage.* 38:757-770.
- Bernier, P. Y., Gauthier, S., Jean, P.-O., Manka, F., Boulanger, Y., Beaudoin, A., and L. Guindon. 2016. Mapping local effects of forest properties on fire risk across Canada. *Forests*, 7(8), 157.
- Bhardwaj, M., Lodnert, D., Olsson, M., Winsvold, A., Eilertsen, S.M., Kjellander, P. and A. Seiler. 2022. Inducing fear using acoustic stimuli—A behavioral experiment on moose (*Alces alces*) in Sweden. *Ecology and Evolution*, 12, e9492. Accessed June 11, 2025 from: <https://doi.org/10.1002/ece3.9492>.
- Bierregaard, R. O., Poole, A.F., Martell, M.S., Pyle, P. and M. A. Patten. 2016. Osprey (*Pandion haliaetus*), version 2.0. In *The Birds of North America* (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. Accessed April 8, 2025 from: <https://doi.org/10.2173/bna.683>.
- Boulanger, Y., Gauthier, S. and P.J. Burton. 2014. A refinement of models projecting future Canadian fire regimes using homogeneous fire regime zones. *Canadian Journal of Forest Research*, 44(4), 365–376.
- British Columbia Ministry of the Environment (BC MOE). 2001. Ambient Water Quality Guidelines for Mercury, Overview Report – First update. Accessed from: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_mercury_waterqualityguideline_overview.pdf.
- British Columbia Ministry of the Environment (BC MOE). 2013. Part A Quality Control and Quality Assurance. Field Sampling Manual. Accessed from: https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/manuals/field-sampling-manual/bc_field_sampling_manual_part_a.pdf.
- British Columbia Ministry of the Environment (BC MOE). 2016. Fact Sheet, Long-Term Average vs. Short-Term Maximum Water Quality Guidelines Accessed from: <https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/max-vs-long-term-wq-guidelines-fs.pdf>.
- Brown, G.S., Mallory F.F. and W.J. Rettie. 2003. Range Size and Seasonal Movement for Female Woodland Boreal Caribou in the Boreal Forest of Northeastern Ontario. *Rangifer Special Issue No. 14*: 227-233.

-
- Cadman, M.D., Sutherland, D.A., Beck, G.G., Lepage D. and A.R. Couturier (eds.). 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, Ontario, xxii + 706 pp.
- Canada's Historic Places. 2010. Standards and Guidelines for the Conservation of Historic Places in Canada: A Federal, Provincial and Territorial Collaboration. 2nd ed. Ottawa: Parks Canada.
- Canadian Council of Ministers of the Environment (CCME). 2002. From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water produced jointly by the Federal-Provincial-Territorial Committee on Drinking Water and the CCME Water Quality Task Group; ISBN 1-896997-48-1.
- Canadian Council of Ministers of the Environment (CCME). 2004. Canadian water quality guidelines for the protection of aquatic life: Phosphorus: Canadian Guidance Framework for the Management of Freshwater Systems. In: Canadian environmental quality guidelines, Canadian Council of Ministers of the Environment, Winnipeg.
- Canadian Council of Ministers of the Environment (CCME). 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment. Volume 4 Analytical Methods. Accessed from: https://ccme.ca/en/res/guidancemanual-environmentalsitecharacterization_vol_4_epn1557.pdf.
- Canadian Council of Ministers of the Environment (CCME). 2025. Canada's Air – CAAQS. Accessed July 7, 2025 from: <https://ccme.ca/en/air-quality-report>.
- Carleton, T.J. 2000. Vegetation responses to the managed forest landscape of central and northern Ontario. In A.H. Perera, D.L. Euler, and I.D. Thompson (Eds.), Ecology of a managed terrestrial landscape: Patterns and processes of forest landscapes in Ontario (pp. 141–152). University of British Columbia Press. Accessed June 11, 2025 from: <https://doi.org/10.59962/9780774852067-012>.
- Claireau, F., Bas, Y., Pauwels, J., Barré, K., Machon, N., Allegrini, B., Puechmaille, S. J. and C. Kerbiriou. 2019. Major roads have important negative effects on insectivorous bat activity. *Biological Conservation*, 235, 53–62. <https://doi.org/10.1016/j.biocon.2019.04.004>
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2008. COSEWIC assessment and status report on the Snapping Turtle (*Chelydra serpentina*) in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa. vii + 47 pp.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2015. COSEWIC assessment and status report on the Yellow-banded Bumble Bee *Bombus terricola* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 60 pp.
- Corporation of the Municipality of Red Lake. 2025. Consolidated Financial Statements For the year ended December 31, 2024. Accessed July 22, 2025 from: <https://www.doc.redlake.ca/pdf/other/2024fs.pdf>
- Cott, P. and B. Hanna. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, NWT 2000-2002. Proceedings of the Offshore Oil and Gas Environmental Effects Monitoring Workshop: Approaches and Technologies. Columbus.

-
- Diersch, H. 2014. FEFLOW - Finite element modeling of flow, mass and heat transport in porous and fractured media. Springer.
- Dobbyn, J. 1994. Atlas of the Mammals of Ontario. Don Mills: Federation of Ontario Naturalists.
- Dodge, W.B., Winterstein, S.R., Beyer Jr, D.E. and H. Campa III. 2004. Survival, reproduction, and movements of moose in the western upper peninsula of Michigan. *Alces*, 40, 71-85.
- Donato, D.B., Nichols, O., Possingham, H., Moore, M., Ricci, P.F. and B.N. Noller. 2007. A Critical Review of the Effects of Gold Cyanide-bearing Tailings Solutions on Wildlife. *Environment International*. Vol. 33, Issue 7, October 2007. Pages 974-984.
- Dryden Fibre Canada. 2024. Trout Lake Forest FMU 120 - SFL: 542461. Accessed July 22, 2025 from: <https://www.dfcforestry.ca/trout-lake-forest>
- Dungan, P. and S. Murphy. 2014. An Au-thentic Opportunity: The Economic Impacts of a New Gold Mine in Ontario. Rotman School of Management, University of Toronto. Submitted to: Ontario Mining Association. With assistance from the Ontario Ministry of Northern Development and Mines.
- Elkie, P., Gluck, M., Elliott, J., Hooper, G., Kushneriuk, R., Rempel, K., Ride, K. and A. Smiegielski. 2018. Science and Information in support of Ontario's Forest Management Guides for Landscapes: Science Package - Series B: Results: Landscape Guide Region 3W. Ontario Ministry of Natural Resources, Forest Policy Section.
- Environment and Climate Change Canada (ECCC) and the Canadian Wildlife Federation (CWF). 2005. Hinterland's Who's Who Snowshoe Hare. Accessed from: <https://www.hww.ca/wildlife/mammals/snowshoe-hare/> Accessed on 23 September 2025.
- Environment and Climate Change Canada (ECCC). 2018. Action Plan for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada – Federal Actions. Species at Risk Act Action Plan Series. Environment and Climate Change Canada, Ottawa. vii + 28 pp. Accessed from: https://publications.gc.ca/collections/collection_2018/eccc/CW69-21-51-2018-eng.p.
- Environment and Climate Change Canada. (ECCC). 2019. Great horned owl (*bubo virginianus*). Accessed from: <https://wildlife-species.canada.ca/bird-status/oiseau-bird-eng.aspx?sY=2019&sL=e&sM=a&sB=GHOW>
- Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus Caribou*), Boreal Population, in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. xi + 138 pp.
- Farmer, A. M. 1993. The effects of dust on vegetation - a review. *Environmental Pollution*, 79(1), 63–75. Accessed from: [https://doi.org/10.1016/0269-7491\(93\)90135-L](https://doi.org/10.1016/0269-7491(93)90135-L).
- Fearer, T.M. and D.F. Stauffer. 2004. Relationship of ruffed grouse *bonasa umbellus* to landscape characteristics in southwest Virginia, USA. *Wildlife Biology*, 10(2), 81–89. Accessed from: <https://doi.org/10.2981/wlb.2004.012>
- Federal Highway Administration. 2006. Construction Noise Handbook. Washington, DC: U.S. Department of Transportation.

-
- Ferguson, S. and P. Elkie. 2004. Habitat Requirements of Boreal Forest Boreal Caribou during the Travel Seasons. *Basic and Applied Ecology* 5:465-474.
doi:10.1016/j.baae.2004.04.011.
- Fisheries and Oceans Canada (DFO) 2013. Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada. Accessed from:
https://publications.gc.ca/collections/collection_2013/mpo-dfo/Fs70-6-2013-017-eng.pdf
- Fisheries and Oceans Canada (DFO). 2023. Enclosure 1: Federal Authority Advice Record.
- Folliott, P.F., Gottfried, G.J. and W.H. Kruse. 2003. Vegetation management practices: Past and present. In: McClaran, Mitchel P.; Folliott, Peter F.; Edminster, Carleton B., tech. coords. Santa Rita Experimental Range: 100 years (1903 to 2003) of accomplishments and contributions; conference proceedings; 2003 October 30-November 1; Tucson, AZ. Proc. RMRS-P-30. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 48-58.
- Frid, A. and L.M Dill. 2002. Human-caused disturbance stimuli as a form of predation risk. *Conservation Ecology*, 6(1), 11. Accessed June 11, 2025 from:
<http://www.consecol.org/vol6/iss1/art11>.
- Gelbard, J.L. and S. Harrison. 2003. Roadless habitats as refuges for native grasslands: interaction with soil, aspect, and grazing. *Ecological Applications*. 13(2): 404-415.
- Government of Canada. 1991. Federal policy on wetland conservation. Government of Canada.
- Government of Canada. 2015. Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing. <https://laws.justice.gc.ca/eng/acts/l-2.75/FullText.html>. (Accessed March 4, 2025).
- Government of Ontario, 1999. Ontario's Living Legacy - Proposed Land Use Strategy.
- Government of Ontario. 2014. Provincial Policy Statement. Accessed May 20, 2025 from:
<https://www.ontario.ca/page/provincial-policy-statement-2014>.
- Government of Ontario. 2023. Ontario Wetland Evaluation System. Accessed May 20, 2025 from: <https://www.ontario.ca/page/wetlands-evaluation>
- Hanson, A., Swanson, L., Ewing, D., Grabas, G., Meyer, S., Ross, L., Watmough, M. and J. Kirby. 2008. Wetland Ecological Functions Assessment: An Overview of Approaches. Canadian Wildlife Service Technical Report Series No. 497. Atlantic Region. 59 pp.
- Hatch Energy (Hatch). 2009. Snowshoe Rapids Dam Operation, Maintenance, Surveillance and Safety Manual. Report prepared for the Ontario Ministry of Natural Resources – Northwest Regional Dams.
- Health Canada (HC). 2016. Human Health Risk Assessment for Diesel Exhaust.
- Health Canada (HC). 2017. Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE.
- Hixon M, Johnson D. 2009. Density dependence and independence. In: *Encyclopedia of Life Sciences (ELS)*. John Wiley & Sons, Ltd. Chichester. Accessed September 9, 2025 from: <https://doi.org/10.1002/9780470015902.a0021219>.
- Hopky, G. and D. Wright. 1998. Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters. Ottawa: Department of Fisheries and Oceans. iv + 34p.

-
- Hughes, J., Endicott, S., Simpkins, C., Michelletti, T. and E. McIntire. 2025. caribouMetrics: Models and Metrics of Boreal Caribou Demography and Habitat Selection. R package version 0.4.0. Accessed June 11, 2025 from: <https://landscitech.github.io/caribouMetrics>.
- iNaturalist. 2025. A Community for Naturalists. iNaturalist, California, USA. Accessed May 23, 2025 from: <https://www.inaturalist.org/>.
- International Council on Monuments and Sites (ICOMOS). 1996. Charter on the Protection and Management of Underwater Cultural Heritage Paris: ICOMOS.
- International Cyanide Management Institute (ICMI). 2021. The International Cyanide Management Code. Accessed from: <https://cyanidecode.org/wp-content/uploads/2021/06/01-The-Cyanide-Code-JUNE-2021.pdf>.
- International Organization for Standardization (ISO). 1996. ISO-9613-2. Acoustics – Attenuation of Sound during propagation outdoors. Part 2 – General method of calculation.
- International Organization for Standardization (ISO). 2003. ISO 1996-1:2003 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment measurement and assessment of environmental noise.
- International Society of Explosives Engineers (ISEE). 2011. ISEE Blasters' Handbook, 18th Edition.
- Jaeger, J.A. 2000. Landscape division, splitting index, and effective mesh size: new measures of landscape fragmentation. *Landscape Ecology* 15, 115-130. Accessed from: <https://doi.org/10.1023/A:1008129329289>.
- Johnson, C.A., Sutherland, G.D., Neave, E., Leblond, M., Kirby, P., Superbie, C. and P.D. McLoughlin. 2020. Science to inform policy: Linking population dynamics to habitat for a threatened species in Canada. *Journal of Applied Ecology*, 57(7), 1314-1327. Accessed June 11, 2025 from: <https://doi.org/10.1111/1365-2664.13637>.
- Johnson, C.J. and R.V. Rea. 2024. Response of moose to forest harvest and management: a literature review. *Canadian Journal of Forest Research*, 54(4), 366–388. Accessed June 11, 2025 from: <https://doi.org/10.1149/cjfr-2023-0158>.
- Joly, M., Bertrand, P., Gbangou, R.Y., White, M., Dubé, J. and C. Lavoie. 2011. Paving the Way for Invasive Species: Road Type and the Spread of Common Ragweed (*Ambrosia artemisiifolia*). *Environ Manage.* 2011 Sep;48(3):514-22. doi: 10.1007/s00267-011-9711-7. Epub 2011 Jun 28.
- Jones J. and G.E. Grant 1996. Peak flow responses to clear-cutting and roads in small and large basins, western Cascades, Oregon. *Water Resour. Res.* 32(4): 959–974.
- Kaufman, K. 1996. *Lives Of North American Birds*. Houghton Mifflin Harcourt.
- Kennedy-Slaney, L.J., Bowman, A.A., Walpole, M. and P.A. Pond. 2018. Northward bound: The distribution of white-tailed deer in Ontario under a changing climate. *Wildlife Research* 45(3):220-228.
- Kilgo, J.C., Labisky, R.F. and D.E. Fritzen. 1998. Influences of hunting on the behavior of white-tailed deer: implications for conservation of the Florida panther. *Conservation Biology*, 12, 1359–1364.

-
- Kinross Gold Corporation (Kinross). 2024. Management Approach: Diversity, Equity and Inclusion (DEI). Accessed May 1, 2025 from:
https://s2.q4cdn.com/496390694/files/doc_downloads/map_docs/workforce/Inclusion-and-Diversity.pdf
- Lake of the Wood Control Board (LWCB). 2000. Winnipeg River Drainage Basin.
https://www.lwcb.ca/permpdf/detail_map.pdf.
- Land Information Ontario (LIO). 2019. Wildlife Management Unit. Published June 1, 2006, and last updated September 20, 2019. Accessed from:
<https://geohub.lio.gov.on.ca/datasets/wildlife-management-unit/explore?location=50.151379%2C-84.745000%2C4.70>.
- Land Information Ontario (LIO). 2022. Bear management area. Accessed August 6, 2025 from:
<https://geohub.lio.gov.on.ca/datasets/lio::bear-management-area/about>.
- Larsen, D.G., Gauthier, D.A. and R.L. Markel. 1989. Causes and rate of moose mortality in the southwest Yukon. *Journal of Wildlife Management*, 53(3), 548. Accessed June 11, 2025 from: <https://doi.org/10.2307/3809175>.
- Locke, A. and A. Paul. 2011. A Desk-top Method for Establishing Environmental Flows in Alberta Rivers and Streams. Accessed from: <https://open.alberta.ca/dataset/0fd085a9-3a3e-457e-acb9-72d7b5716084/resource/6cb96f82-5e8b-4b0f-876d-a34b581ecd1c/download/establishingenvironmentalflows-apr2011.pdf>
- Maier, J. A., Ver Hoef, J. M., McGuire, A. D., Bowyer, R. T., Saperstein, L., & Maier, H. A. 2005. Distribution and density of moose in relation to landscape characteristics: Effects of scale. *Canadian Journal of Forest Research*, 35(9), 2233-2243.
<https://doi.org/10.1139/x05-123>.
- Marzluff J.M., Millsbaugh, J.J., Cedar, K.R., Oliver, C.D., Withey, J., McCarter, J.B., Mason C.L. and J. Cornick. 2002. Modelling changes in wildlife habitat and timber revenues in response to forest management. *Forest Science* 48(2):191-202.
- May, R., Landa, A., van Dijk, J., Linnell, J.D.C. and R. Andersen. 2006. Impact of infrastructure on habitat selection of wolverines *Gulo gulo*. *Wildlife Biology*, 12(3), 285–295.
- Mine Environment Neutral Drainage (MEND). 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND report 1.20.1. December 2009.
- Ministry of Citizenship and Multiculturalism (MCM). 2006. Heritage Resources in the Land Use Planning Process, InfoSheet #5, Heritage Impact Assessments and Conservation Plans.
- Ministry of Citizenship and Multiculturalism (MCM). 2011. Standards and Guidelines for Consultant Archaeologists. Toronto: MCM.
- Ministry of Citizenship and Multiculturalism (MCM). 2014. Standards and Guidelines for the Conservation of Provincial Heritage Properties – Heritage Identification & Evaluation Process.
- Ministry of Citizenship and Multiculturalism (MCM). 2015. Criteria for Evaluating Archaeological Potential: A Checklist for the Non-Specialist. Toronto: MCM.
- Ministry of Citizenship and Multiculturalism (MCM). 2016. Criteria for Evaluating Marine Archaeological Potential: A Checklist for the Non-Specialist. Toronto: MCM.

-
- Ministry of Citizenship and Multiculturalism (MCM). 2017. Info Bulletin #3: Heritage Impact Assessments for Provincial Heritage Properties.
- Ministry of Citizenship and Multiculturalism (MCM). 2022. Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes. Accessed October 20, 2023 from: <https://forms.mgcs.gov.on.ca/en/dataset/021-0500>.
- Ministry of Energy and Mines (MEM). 2024. MLAS: Mining Lands Administration System. Accessed April 22, 2024 from: <https://www.mlas.mndm.gov.on.ca/>.
- Ministry of Environment and Energy (MOEE). 1994. B-1-5, Deriving Receiving Water Based Point Source Effluent Requirements for Ontario Waters, last updated July 2021.
- Ministry of Natural Resources (MNR). 2005. Trout Lake Conservation Reserve (C2334) Resource Management Plan. Accessed April 8, 2025 from: https://files.ontario.ca/environment-and-energy/parks-and-protected-areas/mnr00_bcr0155.pdf.
- Ministry of Natural Resources (MNR). 2009. Ontario's Woodland Caribou Conservation Plan. Queen's Printer for Ontario, Toronto, Ontario. 32 pp. Accessed from: <https://www.ontario.ca/page/woodland-caribou-conservation-plan>.
- Ministry of Natural Resources (MNR). 2019. Moose Resource Report: Wildlife Management Unit 3. Queen's Printer for Ontario. Report #MNR 51953. Accessed from: https://files.ontario.ca/environment-and-energy/fish-and-wildlife/stdprod_103669.pdf.
- Ministry of Natural Resources (MNR). 2025a. Moose population management. Queen's Printer for Ontario. Accessed September 9, 2025 from: <https://www.ontario.ca/page/moose-population-management> originally published July 18, 2014.
- Ministry of Natural Resources (MNR). 2025b. Ontario GeoHub: Wildlife Values Site. Accessed from: <https://geohub.lio.gov.on.ca/datasets/wildlife-values-site/explore>.
- Ministry of Natural Resources (MNR). 2025c. Ontario GeoHub: Wildlife Values Area. Accessed from: <https://geohub.lio.gov.on.ca/datasets/lio::wildlife-values-area/explore>.
- Ministry of Natural Resources (MNR). n.d. Canoe Route #75 Red Lake District Pakwas-Red-Nungesser-Trout-Bruce Lakes Circle. Accessed on May 3, 2025 from: <https://www.myccr.com/sites/default/files/storage/CCR%20pdf/Ontario/CanoeRoutesofOntario/Route15.pdf>.
- Ministry of Natural Resources and Forestry (MNRF). 2014. Integrated Range Assessment for Woodland Caribou and their Habitat: Sydney Range 2012. Species at Risk Branch, Thunder Bay, Ontario, ix + 68pp.
- Ministry of Natural Resources and Forestry (MNRF). 2015. Caribou Conservation Plan: Sydney Range for Boreal Caribou. Queen's Printer for Ontario, Toronto, Ontario.
- Ministry of Natural Resources and Forestry (MNRF). 2018. Supplementary Documentation R Draft Wolverine Den Management Plan Trout Lake Forest: TLF-001-2018. 27 pp.
- Ministry of Natural Resources and Forestry (MNRF). 2019a. Stage Five: Inspection of 2020-2030 Ministry-Approved Forest Management Plan for the Red Lake Forest. Accessed December 12, 2024 from: <https://ero.ontario.ca/notice/019-0904>.
-

-
- Ministry of Natural Resources and Forestry (MNRF). 2019b. Landscape Guide Regions and Forest Management Units. Accessed December 12, 2024 from: <https://www.ontario.ca/document/forest-resources-ontario-2016/landscape-guide-regions-and-forest-management-units>.
- Ministry of Natural Resources and Forestry (MNRF). 2020. Ensuring the Long-Term Sustainability of the Black Bear Population in Bruce Peninsula and Provincewide. Accessed on March 16, 2025 from: <https://news.ontario.ca/en/backgrounder/55363/ensuring-the-long-term-sustainability-of-the-blackbear-population-in-bruce-peninsula-and-provincewide>.
- Ministry of Natural Resources and Forestry (MNRF). 2020a. Wolverine Den Management Plan Red Lake Forest: RLF-001-2020. 19 pp.
- Ministry of Natural Resources and Forestry (MNRF). 2020b. Wolverine Den Management Plan Red Lake Forest: RLF-001-2020. 18 pp.
- Ministry of Natural Resources and Forestry (MNRF). 2020c. Wolverine Den Management Plan Trout Lake Forest: TLF-001-2021. 32 pp.
- Ministry of Natural Resources and Forestry (MNRF). 2021. Addendum to Ontario Landscape Tool's 2021 Manual. Queen's Printer for Ontario. Accessed September 9, 2025 from: <https://www.ontario.ca/page/ontario-landscape-tool>.
- Ministry of Natural Resources and Forestry (MNRF). 2022. Ontario's Sustainable Bait Management Strategy, 2020. Accessed May 29, 2025 from: <https://www.ontario.ca/page/ontarios-sustainable-bait-management-strategy-2020#section-6>.
- Ministry of Natural Resources and Forestry (MNRF). 2023. Fisheries Management Zone 4 (FMZ 4). Accessed March 13, 2025 from: <https://www.ontario.ca/page/fisheries-management-zone-4-fmz-4>.
- Ministry of Natural Resources and Forestry (MNRF). 2024. Fisheries management plan (Fisheries Management Zone 4). Accessed March 13, 2025 from: <https://www.ontario.ca/page/fisheries-management-plan-fisheries-management-zone-4>.
- Ministry of Northern Development, Mines and Forestry (MNDMF). 2011. Growth Plan for Northern Ontario. Accessed January 7, 2025 from: <https://www.ontario.ca/document/growth-plan-northern-ontario>
- Ministry of the Environment (MOE). 1978a Publication NPC-103 Procedure for Measurement of Sound and Vibration due to Blasting Operations
- Ministry of the Environment (MOE). 1978b. Publication NPC-119 of Model Municipal Noise Control By-law.
- Ministry of the Environment (MOE). 2013. Publication NPC-300, Noise Assessment Criteria for Stationary Sources and for Land Use Planning.
- Ministry of the Environment and Climate Change (MECP). 2020. Ambient Air Quality Criteria. ISBN: 978-1-4868-4498-2.
- Ministry of the Environment and Climate Change (MECP). 2021. Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants. Version 3.0.

-
- Ministry of the Environment, Conservation and Parks (MECP). 2013. General habitat description for the woodland caribou (*Rangifer tarandus caribou*), Boreal population. Government of Ontario.
- Ministry of the Environment, Conservation and Parks (MECP). 2019. Range Management Policy in Support of Woodland Boreal Caribou Conservation and Recovery. Queen's Printer for Ontario, Toronto, Ontario.
- Minnesota Department of Natural Resources (MDNR). 2008. Natural Wild Rice in Minnesota: A Wild Rice Study Document Submitted to the Minnesota Legislature by the Minnesota Department of Natural Resources February 15, 2008. University of Minnesota; 113. Accessed on 16 July 2025. Accessed from: <https://www.lrl.mn.gov/docs/2008/mandated/080235.pdf>.
- Mumma, M.A. and M.P. Gillingham. 2019. Determining Factors that Affect Survival of Moose in Central British Columbia. Technical Report to the Habitat Conservation Trust Foundation.
- Murray, D.L., Hussey, K.F., Finnegan, L.A., Lowe, S.J., Price, G.N., Benson, J., Loveless, K.M., Middel, K.R., Mills, K., Potter, D., Silver, A., Fortin, M.-J., Patterson, B.R. and P.J. Wilson. 2012. Assessment of the status and viability of a population of moose (*Alces alces*) at its Southern Range Limit in Ontario. *Canadian Journal of Zoology*, 90(3), 422–434. Accessed June 11, 2025 from: <https://doi.org/10.1139/z2012-002>.
- National Wetlands Working Group. 1997. The Canadian Wetland Classification System (2nd ed.). Wetlands Research Centre, University of Waterloo.
- Nicholls, H.R., Johnson, C.F. and W.I. Duvall. 1971. Bulletin 656 Blasting Vibrations and Their Effects on Structures. United States Bureau of Mines.
- Partington, M. and C. Gillies, 2010. Resource roads and wetlands: opportunities to maintain hydrologic function. FPIInnovations Internal Report IR-2010-11-01.
- Pocock, Z. and R. Lawrence. 2005. How Far into a Forest does the Effect of a Road Extend? Defining Road Edge Effect in Eucalypt Forests of South-Eastern Australia. School of Outdoor Education and Environment, La Trobe University, Bendigo, Australia.
- Racey, G. D. and A.A. Arsenault. 2007. In search of a critical habitat concept for woodland caribou, boreal population. *Rangifer*, Special Issue No. 17, 29–37. Accessed from: <https://doi.org/10.7557/2.27.2.177>
- Ramsar Convention Secretariat. 2013. The Ramsar Convention Manual: a guide to the Convention on Wetlands (Ramsar, Iran, 1971), 6th ed. Ramsar Convention Secretariat, Gland, Switzerland.
- Ranta, W.B. and M. Lankester. 201. Moose and deer population trends in northwestern Ontario: A case history. *Alces*. 53:159-179.
- Ray, J.C. 2000. Mesocarnivores of northeastern North America: status and conservation issues (No. 15). Wildlife Conservation Society. 84 pp.
- Red Lake Forest Management Company Ltd. 2020. 2020 - 2030 Forest Management Plan for the Red Lake Forest. Retrieved from: https://ontariomnrf.app.box.com/preview/expiring_embed/gvoct6FE!pEQsYyINEgQqmCYQENgGFJP0Gg_VuuoPu3DSMv4kHZIFIHSANLU2H9VOgeWfH1w49IA5m7pRazFOK5

- nAhioQy7Cw3Qj74oLN9HdO7KaVxj5NRVvalvxPoPZJI2YnYyRkdSwkPKkvUJrnOpoH8F2NFbXpKhYcrA4ftS_0vXV df0EDF2mEXcXKnmWQWOHsq34.
- Rettie, W. J., and F. Messier. 2000. Hierarchical habitat selection by woodland caribou: Its relationship to limiting factors. *Ecography*, 23(5), 466–478. Accessed from: <https://doi.org/10.1111/j.1600-0587.2000.tb00303.x>
- Riley, J.L. and L. Michaud. 1989. Peat and peatland resources of northwestern Ontario; Ontario Geological Survey, Miscellaneous Paper 144, 175p. Accessed April 14, 2025 from: <https://www.geologyontario.mines.gov.on.ca/publication/MP144>.
- Rodgers, J.A. and S.T. Schwikert. 2002. Buffer-zone Distances to Protect Foraging and Loafing Waterbirds from Disturbance by Personal Watercraft and Outboard-powered Boats. *Conserv. Biol.* 16(1): 216-224
- Rogers, L. L. 1976. Effects of mast and berry crop failures on survival, growth, and reproductive success of black bears. *Transactions of the North American Wildlife and Natural Resources Conference*, 41, 431-438.
- Sandilands, A. 2005. *Birds of Ontario: Habitat Requirements, Limiting Factors and Status, Nonpasserines: Waterfowl through Cranes*. UBC Press, Vancouver, BC. 365 pp.
- Scrafford, M. A., Avgar, T., Abercrombie, B., Tigner, J., and M.S. 2017. Wolverine habitat selection in response to anthropogenic disturbance in the western Canadian boreal forest. *Forest Ecology and Management*, 395, 27-36.
- Scrafford, M. A., Avgar, T., Anderson, M. and M.S. Boyce. 2024. Density and distribution of wolverine (*Gulo gulo*) in boreal Canada: Insights from large-scale camera trap surveys. *Canadian Journal of Zoology*, 102(2), 123–137. Accessed from: <https://doi.org/10.1139/cjz-2023-0123>.
- Seneviratne, T., Dissanayake, M. and V. Sumanasekara. 2015. Review on use of amphibian taxa as a bio-indicator for watershed health and stresses. 6: 178.
- Shanley, C.S. and S. Pyare. 2011. Evaluating the road-effect zone on wildlife distribution in a rural landscape. *Ecosphere*, 2(2), art16. Accessed June 11, 2025 from: <https://doi.org/10.1890/ES10-00093.1>.
- Shannon, G., McKenna, M. F., Angeloni, L. M., Crooks, K.R., Frstrup, K.M., Brown E. and G. Wittemyer. 2016. A synthesis of two decades of research documenting the effects of noise on wildlife. *Biological Reviews*, 91(4), 982-1005.
- Siskind et al. 1979. Report Investigation 8485 Structure Response and Damage Produced by Airblast. United States Bureau of Mines.
- Siskind et al. 1980. Report Investigation 8507 Structure Response and Damage Produced by ground vibration. United States Bureau of Mines.
- Smallwood, J. A. and D. M. Bird. 2020. American Kestrel (*Falco sparverius*), version 1.0. In *Birds of the World* (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, New York.
- Statistics Canada. 2011. 2011 National Household Survey. Accessed March 13, 2025 from <https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/help-aide/aboutdata-aproposdonnees.cfm?Lang=E>.

-
- Statistics Canada. 2017. 2016 Census of Population: Age and sex release. Accessed March 13, 2025 from <https://www12.statcan.gc.ca/census-recensement/2021/ref/gendergenre-eng.cfm>.
- Statistics Canada. 2022. 2021 Census of Population. Accessed March 13, 2025 from <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E>.
- Stenhouse, G., Latour, P., Kutny, L., MacLean, N. and G. Glover. 1995. Productivity, survival, and movement of female moose in a low-density population, Northwest Territories, Canada. *Arctic*, 48(1). Accessed June 11, 2025 from: <https://doi.org/10.14430/arctic1224>.
- Stewart, A. and P.E. Komers. 2017. Conservation of wildlife populations: factoring in incremental disturbance. *Ecology and Evolution*, 7(12), 4266–4274. Accessed June 11, 2025 from: <https://doi.org/10.1002/ece3.3015>.
- Street, G.M., Rodgers, A.R., Avgar, T. and J.M. Fryxell. 2015. Characterizing demographic parameters across environmental gradients: A case study with Ontario moose (*Alces alces*). *Ecosphere*, 6(8), Article 130. Accessed June 11, 2025 from: <https://doi.org/10.1890/ES14-00383.1>.
- Suffice, P., Cheveau, M., Imbeau, L., Mazerolle, M.J., Asselin, H. and P. Drapeau. 2019. Habitat, Climate, and Fisher and Marten Distributions. *The Journal of Wildlife Management*. 84(2): 277-292. Accessed from: <https://doi.org/10.1002/jwmg.21795>.
- Swackhamer, D.L. and K.C. Hornbuckle. 2004. Assessment of air quality and air pollutant impacts in Isle Royale National Park and Voyageurs National Park. Prepared for the United States National Park Service. Accessed June 11, 2025 from: <http://www.npshistory.com/publications/air-quality/region/great-lakes.pdf>.
- Township of Ear Falls. 2015. Township of Ear Falls Official Plan, October 2015.
- Township of Ear Falls. 2022. Recreation Services. Accessed May 30, 2025 from: <https://ear-falls.com/residents/community-services/recreation-services/>.
- Township of Ear Falls. 2025. Consolidated Financial Statements For the year ended December 31, 2024. Accessed July 22, 2025 from: <https://ear-falls.com/wp-content/uploads/2025/06/Township-of-Ear-Falls-2024-Financial-Statements.pdf>.
- Trading Economic. 2025. Gold. Accessed July 24, 2025 from: <https://tradingeconomics.com/commodity/gold>.
- Tribal Manoomin Task Force. 2018. 2018 Tribal Manoomin Task Force Report. USA: Minnesota Tribal Wild Rice Task Force. Accessed May 8, 2025 from: <https://naturalalliesmn.com/wp-content/uploads/2019/02/TWRTF.Report.2018.pdf>.
- Trombulak S.C. and C.A. Frissell 2000. Review of ecological effects of roads on terrestrial and aquatic communities. *Conserv. Biol.* 14(1): 18–30.
- United Nations Educational, Scientific and Cultural Organization (UNESCO). 2001. Convention on the Protection of Underwater Cultural Heritage. Paris: UNESCO.
- Venier, L.A., Thompson, I.D., Fleming, R., Malcolm, J., Aubin, I., Trofymow, J.A., Langor, D., Sturrock, R., Patry, C., Outerbridge, R.O., Holmes, S.B., Haeussler, S., De Grandpré, L., Chen, H.Y.H., Bayne, E., Arsenault, A. and J.P. Brandt. 2014. Effects of natural resource

- development on the terrestrial biodiversity of Canadian boreal forests. *Environmental Reviews*, 22(4), 457-490. Accessed May 20, 2025 from: <https://doi.org/10.1139/er-2013-0075>.
- Wang, G., McClintic, L.F. and J.D. Taylor. 2019. Habitat selection by American beaver at multiple spatial scales. *Anim Biotelemetry* 7, 10.
- Watt, W.R., Baker, J.A., Hogg, D.M., McNicol, J.G., and B.J. Naylor. 1996. *Forest Management Guidelines for the Provision of Marten Habitat: Version 1.0*. Ontario Ministry of Natural Resources, Forest Management Branch, Forest Program Development Section, Sault Ste. Marie, Ontario.
- Webster, K.L., Beall, F.D., Creed, I.F. and D.P. Kreuzweiser. 2015. Impacts and prognosis of natural resource development on water and wetlands in Canada's boreal zone. *Environmental Reviews* 23(1):78-131.
- Wemple B.C., Swanson F.J. and J. Jones. 2001. Forest roads and geomorphic process interactions, Cascade Range, Oregon. *Earth Surf. Processes Landforms*, 26: 191–204.
- Wilson, S. F. 2016. Managing Zone-of-Influence Impacts of Oil and Gas Activities on Terrestrial Wildlife and Habitats in British Columbia. *Journal of Ecosystems and Management*, 16(1).
- World Health Organization (WHO). 1999. *Guidelines for Community Noise*.