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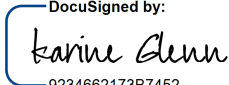
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NWMO Authorization

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EXECUTIVE SUMMARY

Overview

The Nuclear Waste Management Organization (NWMO) is responsible for implementing the Adaptive Phased Management Deep Geological Repository (DGR) (hereafter ‘the Project’), which is Canada’s plan for the safe, long-term management of used nuclear fuel, in a manner that protects both people and the environment. The NWMO has retained Zoetica™ Environmental Consulting Services (‘Zoetica’) to undertake Biodiversity Impact Studies (BIS) for the Project at the two remaining potential locations being considered for a DGR and associated infrastructure for the long-term disposal of Canada’s used nuclear waste. This BIS Baseline Report focuses on the Wabigoon Lake Ojibway Nation (WLON)-Ignace siting area¹ near the Township of Ignace and the community of the WLON in northwestern Ontario.

The BIS is focused on the study of biodiversity values (BVs) of known or predicted relevance to the potential Project, to ultimately enable impact predictions and optimal application of the mitigation hierarchy.² Initial scoping of BVs for the BIS, along with rationale for inclusion, is found in Section 3.1 of the *Biodiversity Impact Studies – Northwestern Ontario Region: Best Practices and Preferred Approach* (BPPA) Report (Zoetica 2021). The following BVs have been included in the scope of the BIS for baseline study to date:

1. Vegetation
2. Wetlands and Riparian Environments
3. Mammals – Ungulates, Carnivores, Small Terrestrial Mammals, Semi-Aquatic Mammals, Bats
4. Herpetofauna – Amphibians, Reptiles
5. Terrestrial Invertebrates
6. Birds (including migratory birds) – Upland Breeding Birds (including Game Birds), Shorebirds, Waterbirds, Raptors
7. Fish and Fish Habitat – Fish, Primary and Secondary Producers (including aquatic invertebrates)
8. Ecosystem Function and Services

Project Location and Study Areas

The exact location of Project infrastructure in the WLON-Ignace siting area is under development. For the BIS, several study areas were established to ensure that adequate but not extraneous information is collected to support the biodiversity impact assessment (IA). Study areas were designed to encompass the extent of anticipated Project activities and impacts (Area of Interest [AOI]) while considering the distribution of BVs across the landscape (Local Study Areas [LSAs]). Study areas were also designed to consider potential cumulative impacts that may occur in the region within the ranges of the BVs (Regional

¹ The ‘WLON-Ignace siting area’ refers to the broader area surrounding the defined area within which the Project may be located in northwestern Ontario. The WLON-Ignace siting area is located in Treaty #3 in the traditional territory of Wabigoon Lake Ojibway Nation, among other Indigenous communities. The other potential location for the Project is the ‘SON-South Bruce siting area’ near the Municipality of South Bruce and the traditional territory of the Saugeen Ojibway Nation (SON) in southwestern Ontario.

² The mitigation hierarchy is a tool designed to help limit the negative impacts of development on biodiversity and ecosystem services. Involves a sequence of four key actions – avoid, minimize, restore, and offset – and provides a best practice approach to aid in the sustainable management of environmental resources by establishing a mechanism to balance conservation needs with development priorities.

Study Areas [RSAs]). For the BIS, terrestrial and aquatic study areas were designed separately due to the unique considerations of each. Descriptions and rationale for developing these study areas can be found in Section 5.2 of the BPPA Report (Zoetica 2021). Figures showing these study areas for the BIS baseline studies further described below can be found at the end of this summary document.

Work Completed

The Project is in early phases of baseline data collection. The BIS follows a tiered approach (see Section 4.2 of the BPPA Report (Zoetica 2021)) and is currently in Tier 1 of study. Tier 1 is focused on collating existing data on species presence and known important habitats and collecting foundational habitat information through the following studies:

- Terrestrial Ecosystem Mapping (TEM)
- Aquatic Habitat Mapping (AHM)
- Environmental DNA (eDNA) metabarcoding studies in aquatic habitats
- Opportunistic identification of candidate Significant Wildlife Habitat (SWH) alongside TEM.

To date, Tier 1 field studies have focused on areas within the AOI and terrestrial and aquatic LSAs, as well as select locations within the aquatic RSA for AHM studies.

Summary of Findings

Species of Interest

Several types of species of interest were considered during baseline work, including i) species of conservation concern, ii) species of interest to stakeholders and rights-holders, and iii) invasive species.

Species of conservation concern include federally and provincially listed species at risk (SAR) and provincially rare species and are protected through various federal and provincial regulations. A total of 15 species of conservation concern, including 10 SAR and five provincially rare species, have been detected (or potentially detected) within relevant BIS study areas. Observations of species of conservation concern were collated through existing biodiversity databases, earlier field investigations of the WLON-Ignace siting area, a pilot study conducted by the Toronto Zoo's Native Bat Conservation Program, and Tier 1 eDNA metabarcoding studies. Eleven species of conservation concern have been detected within the AOI; these include two at-risk bats (little brown myotis, northern myotis), four at-risk birds (eastern whip-poor-will, eastern wood-pewee, common nighthawk, olive-sided flycatcher), two rare plants (Vasey's rush, green arrow arum), and three rare invertebrates (Macoun's arctic, Old World swallowtail, permanent marsh mosquito). The remaining four species of conservation concern – American eel, cougar, black ash, and bald eagle – have only been detected outside the AOI.

Species of interest to stakeholders and rights-holders include those that have been mentioned during engagement as important to include in the BIS (see Appendix B in the BPPA Report (Zoetica 2021)). Multiple species and groups of interest to stakeholders and rights-holders, including six mammals (moose, black bear, gray wolf, snowshoe hare, northern flying squirrel, and beaver), tree frogs, ducks and geese, grouse, five species of fish (walleye, lake trout, northern pike, white sucker, shiner species), wild rice, and other edible and medicinal plants, were detected within the relevant BIS study areas. All species of interest mentioned by stakeholders and rights-holders during engagement, with the exception of lake trout, were detected within the AOI during sampling and surveys efforts undertaken so far.

Invasive species are those that are not native to Ontario, or to a part of Ontario, and where its introduction or spread threatens the natural environment, human health, or socio-economic values. A total of five invasive species (spongy moth, octagonal-tail worm, red earthworm, feral hog, Canada thistle) and five other weedy and introduced vegetation species (meadowtail foxtail, pondwater starwort, purple iris, variable leaf pondweed, mountain ash) were detected within the relevant BIS study areas. Two invasive species (octagonal-tail worm, feral pig) were reported in the AOI based on eDNA results. However, detections made using eDNA metabarcoding analyses require further validation. For example, pig eDNA may have arisen from farming inputs upstream rather than feral hogs.

Important Habitat

Several types of important habitats were considered during baseline work, including candidate SWH, critical habitat for SAR, and important fish habitat. These habitats are components of the natural heritage features and areas that are protected by the Ontario Provincial Policy Statement under the *Planning Act* (MMAH 2020). SWH includes seasonal concentration areas, rare vegetation communities, specialized habitat for wildlife, habitat for species of conservation concern, and animal movement corridors. Critical habitat is habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in a federal recovery strategy or action plan for the species. Important fish habitat includes habitat required to fulfill important life history phases of fish species. It includes habitat used for spawning, rearing, overwintering and migration between seasonally important habitats.

Based on desk-based analyses of ecosites and other habitat criteria, Zoetica has identified one confirmed SWH type (Moose Aquatic Feeding Area) and six candidate SWH types (Rare Treed Type: Red and White Pine, Amphibian Breeding Habitat, Waterfowl Nesting Area, Bald Eagle and Osprey Nesting Habitat, Wild Rice Stand, Mammal Denning Site) within the BV-specific study areas. At this time, there is no known critical habitat occurring in the WLON-Ignace siting area.

Desk-based information collated to date and important fish habitats identified during field-based Tier 1 studies revealed important fish habitats within BIS study areas, including: walleye spawning and nursery areas, lake trout spawning areas, northern pike and muskellunge spawning areas, white sucker spawning areas, and potential overwintering and refuge areas for various species (e.g., deep pools within watercourses). The majority of these important fish habitats were recorded in the RSA, which is thought to be outside the zone of potential influence from the Project. However, potential spawning areas for walleye and unknown fish species were documented in the aquatic LSA. No potentially important fish habitat has been documented within the AOI.

Wetlands and Riparian Areas

Wetlands and riparian areas fulfill a wide range of ecological, hydrological, and biochemical functions and provide unique and specialized habitats for wildlife that depend on these features for various life-history phases and movement and migrations through connected, undisturbed habitat networks. In Ontario, wetlands are considered natural heritage features that require protection and sustainable management. Tier 1 studies within relevant BIS study areas included determining the distribution and prevalence of wetlands and riparian areas through desk-based analyses of ecosites and existing data for Provincially Significant Wetlands, and through mapping of various riparian buffer widths around watercourses and waterbodies that should be retained or enhanced to preserve wetland function into the future.

Ecosystem Function and Services

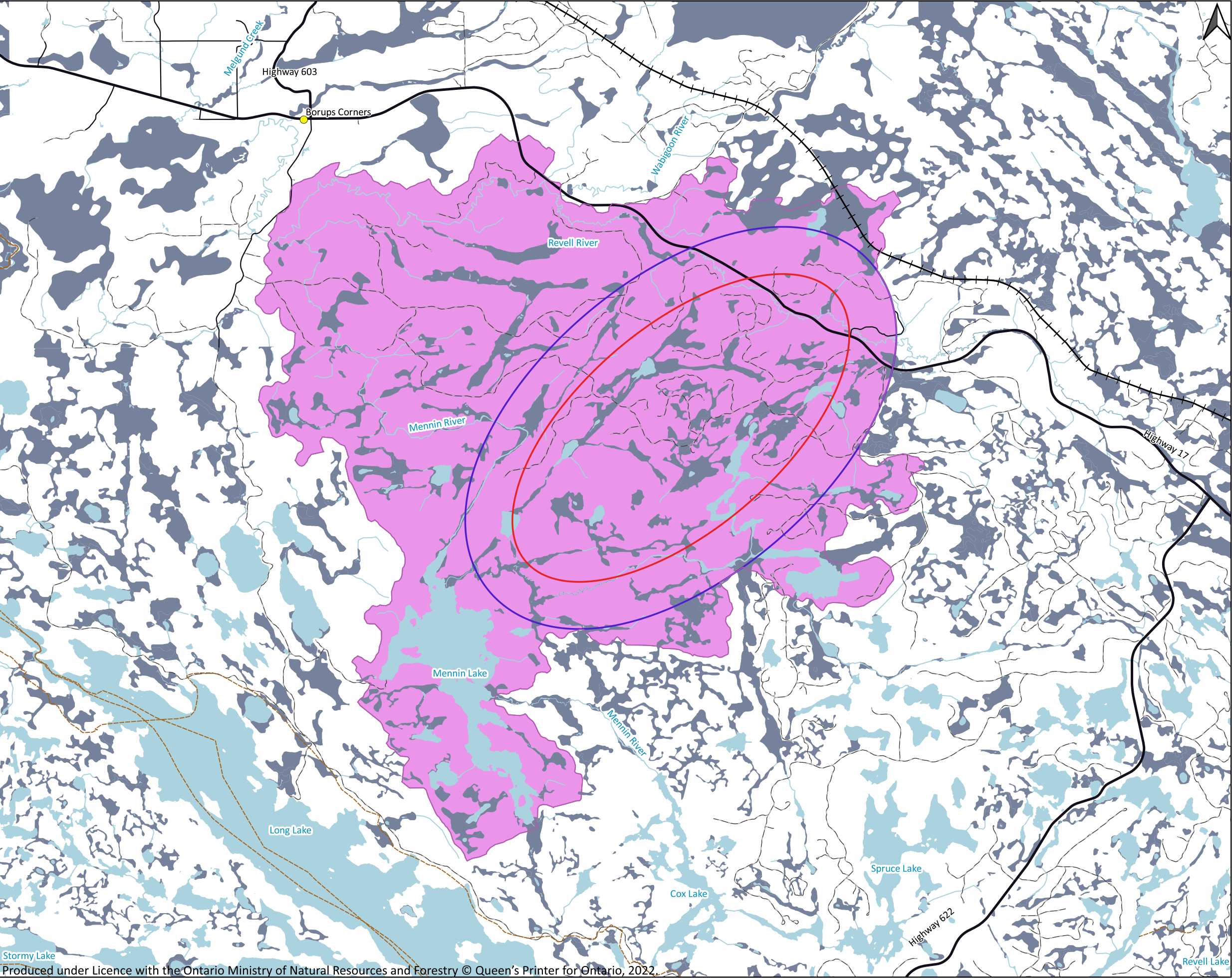
Ecosystem functions include the physical, chemical, and biological processes within the ecosystem to maintain biodiversity. Ecosystem services are the variety of benefits that nature provides to people, including regulating services (e.g., shading, pollutant removal, regulation of water), provisioning services (e.g., material benefits such as food, water, raw materials, and medicinal resources), and cultural services (e.g., non-material benefits including recreation and mental and physical health). A review of existing desk-based information collected to date, as well as feedback received during engagement specific to the BIS, revealed several components within the BIS study areas related to providing ecosystem functions and services to biodiversity and humans. These components include Provincial Parks, Conservation Reserves, or Wilderness Areas providing important habitats for sustaining biodiversity, as well as trail networks and important fishing lakes that provide recreational services to people. Except for one trail located within the AOI, these components were located primarily within the local and regional BIS study areas developed for ecosystem services.

Next Steps

Initial Tier 1 studies and select Tier 2 studies conducted as part of the BIS, along with other environmental studies conducted as part of the Environmental Media Baseline Program designed by CanNorth (CanNorth 2020a), and information collected through other studies on the human, social, and economic aspects, will aid in the site selection process for the Project. Once a site has been selected with a willing host community, the BIS will continue with additional Tier 1 studies and proceed with collecting Tier 2 biodiversity data at the selected site.

Additional Tier 1 studies may continue at the selected site to gather data required for the IA. These studies may include, for example, extending TEM to the RSA to collect relevant data for determining important species habitat associations for select species, and for determining the relative proportion of available high-quality habitat in the various BIS study areas. eDNA metabarcoding studies may be continued to include repeated seasonal sampling to enable occupancy modelling, identify biological hotspots within the BIS study areas, and provide for detections of cryptic species that may not be as easily detected through traditional methods.

Tier 2 studies at the selected site will focus on collecting data to understand community and population metrics for biodiversity (e.g., relative abundance, species richness or diversity) within relevant BIS study areas. These data will be important for determining the overall effects (impacts and positive effects) of the Project on biodiversity. Tier 2 studies will also prioritize data collection for species of interest including SAR, species of importance to stakeholders and rights-holders determined through engagement with the relevant communities, and species that can act as indicators of ecosystem health.



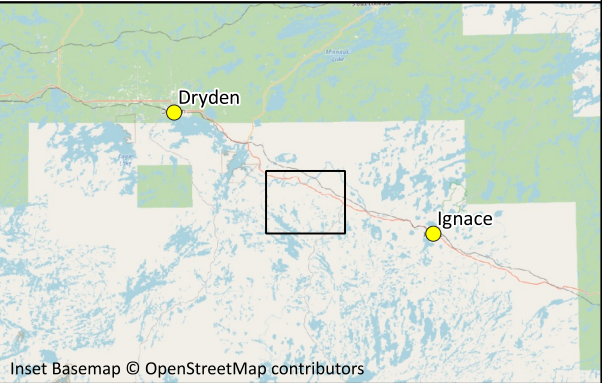
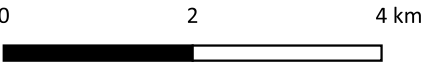
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NWMO Biodiversity Impact Studies

Area of Interest and Local Study Areas

- Area of Interest (AOI)
- Local Study Area (LSA_{TER})
- Local Study Area (LSA_{AQU})
- Lake
- Wetland
- Watercourse
- Highway or Arterial Road
- Local Road
- Resource/Recreation Road
- Railroad
- Trail
- Community

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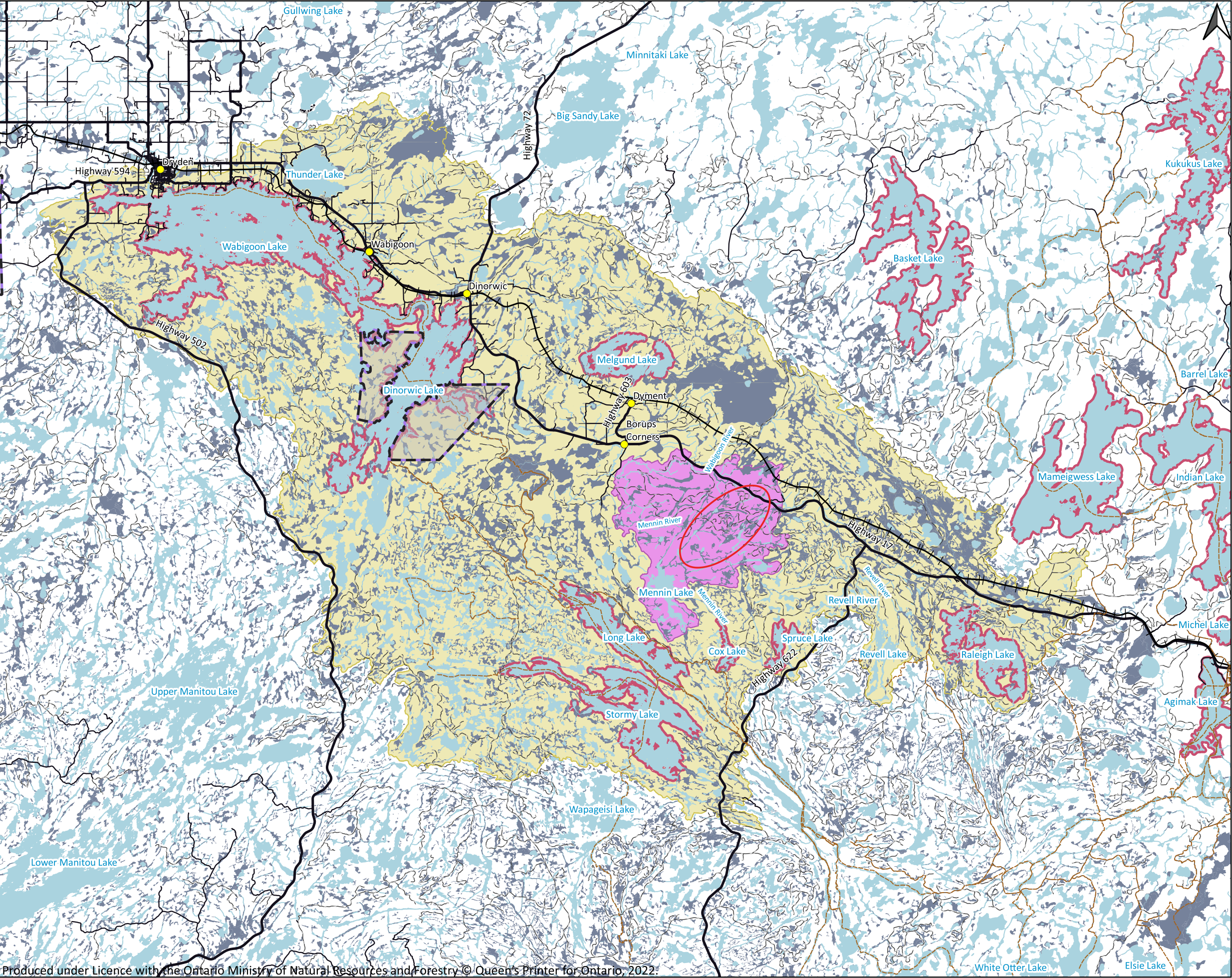
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ORWN Railway (MNRF); MNRF Road Segments (MNRF); Wetlands (MNRF)
NWMO — AOI; Trail Segments (MNRF)

Project CRS: NAD83 / UTM zone 15N

Author: AH Reviewed by: CC Approved by: HB

August 29, 2023 Map ID: NWMO_BIS_A007_IG

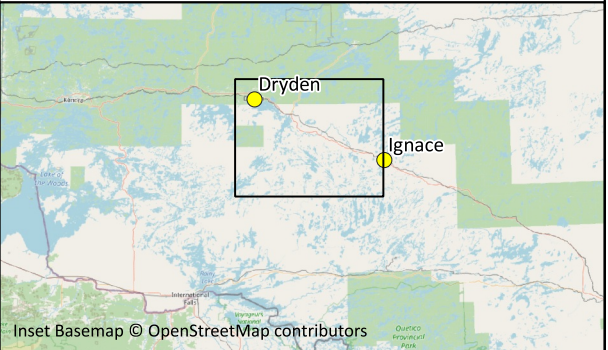


NWMO Biodiversity Impact Studies

Aquatic and Ecosystem Services (RSA_{AQU})

- Area of Interest (AOI)
- Local Study Area (LSA_{AQU})
- Regional Study Area (RSA_{AQU})
- Lake
- Lake Mentioned as Important for Fishing and/or Recreation
- Wetland
- Watercourse
- Highway or Arterial Road
- Local Road
- Resource/Recreation Road
- Trail
- Railroad
- Community
- Wabigoon Lake No. 27

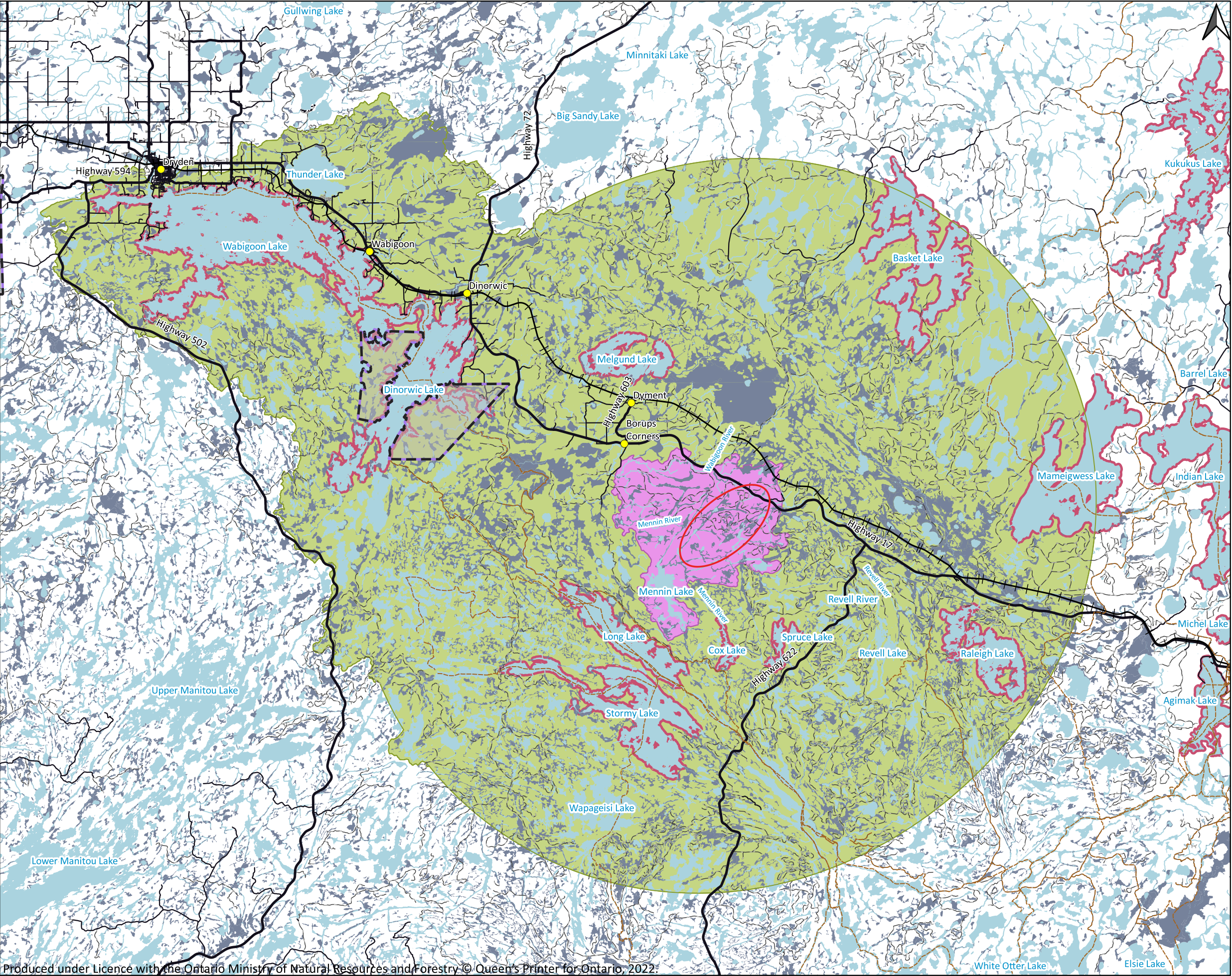
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NWMO — AOI; Trail Segments (MNR)

Project CRS: NAD83 / UTM zone 15N		
Author: AH	Reviewed by: CC	Approved by: HB
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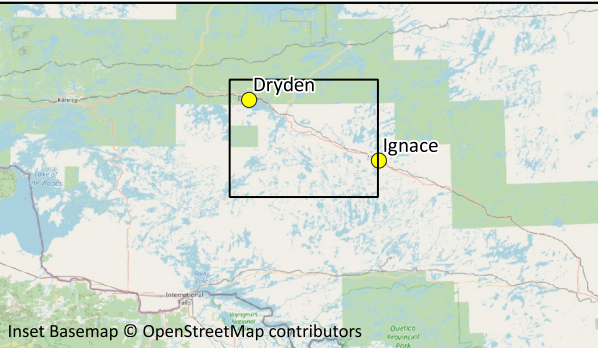
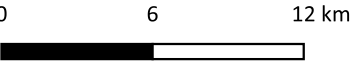


NWMO Biodiversity Impact Studies

Aquatic and Ecosystem Services (RSA_{ECO})

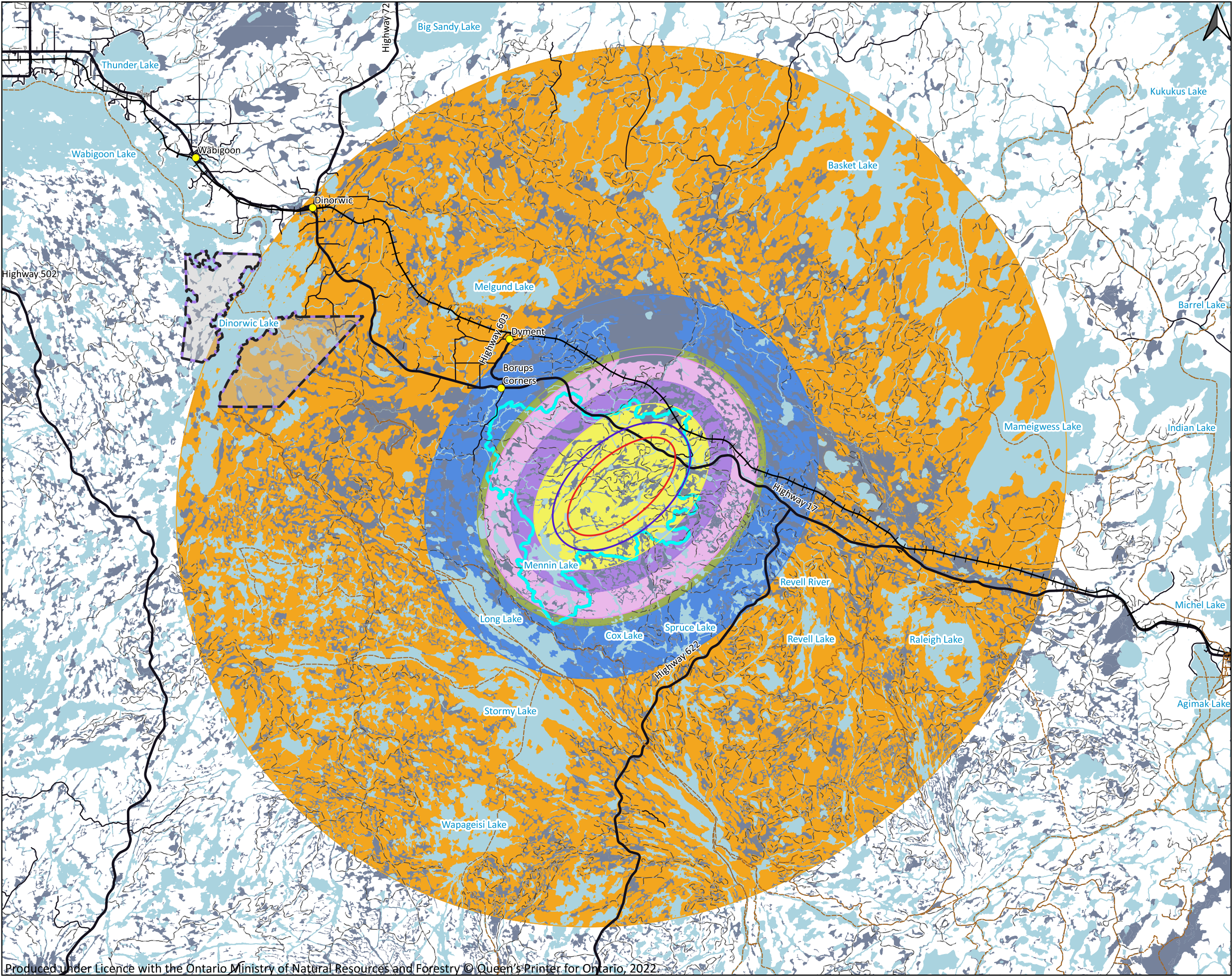
- Area of Interest (AOI)
- Local Study Area (LSA_{AQU})
- Regional Study Area (RSA_{ECO})
- Lake
- Lake Mentioned as Important for Fishing and/or Recreation
- Wetland
- Watercourse
- Highway or Arterial Road
- Local Road
- Resource/Recreation Road
- Trail
- Railroad
- Community
- Wabigoon Lake No. 27

The RSA_{ECO} includes the area covered by the RSA_{AQU} plus the area encompassed by the RSA_{CAR/UNG/VEG}



Data received from:
Ontario GeoHub — Indian Reserve (MNR); OHN Waterbody (MNR); OHN Watercourse (MNR); ORWN Railway (MNR); MNR Road Segments (MNR); Wetlands (MNR)
NWMO — AOI; Trail Segments (MNR)

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NWMO Biodiversity Impact Studies

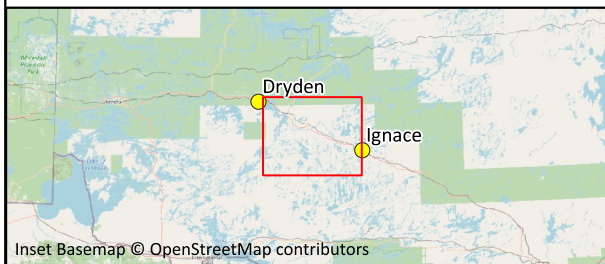
Terrestrial Regional Study Areas

- Area of Interest (AOI)
- Local Study Area (LSA_{TER})
- Local Study Area (LSA_{AQU})
- Regional Study Area (RSA_{STM})
- Regional Study Area (RSA_{AVI})
- Regional Study Area (RSA_{BAT})
- Regional Study Area (RSA_{HRP})
- Regional Study Area (RSA_{SAM})
- Regional Study Area (RSA_{UNG}, RSA_{CAR}, and RSA_{VEG})
- Lake
- Wetland
- Watercourse
- Highway or Arterial Road
- Local Road
- Resource/Recreation Road
- Railroad
- Trail
- Community
- Wabigoon Lake No. 27

Not shown here are the RSA_{HRP-AQU} and RSA_{AVI-AQU}, which will include the area covered by the RSA_{AVI/HRP} plus the area encompassed by the LSA_{AQU} used for aquatic biodiversity values.

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NWMO — AOI; Trail Segments (MNR)

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