ONTARIO PARKS

WABAKIMI, KOPKA RIVER AND WHITESAND

Background Information

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Approval Statement

I am pleased to approve the background information document for the Wabakimi, Kopka River and Whitesand management plan. This background information document consolidates information about the parks' natural and cultural features, recreation activities, and park users. Preliminary identification of management topics is also summarized. This information is provided to support the management planning process through to the completion of the approved management plan as outlined by the Ontario Protected Area Planning Manual.

I invite you to review and comment on this document.

October 27, 2022

Kevin Leveque
Northwest Zone Manager

Date (27/10/2022)

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1 INTRODUCTION

Wabakimi, Kopka River and Whitesand provincial parks are in the heart of Northwestern Ontario, some 200 kilometres north of the city of Thunder Bay.

The root of the name 'Wabakimi' may be found in the Ojibway words Waubishkaugimi (whitewater) or Wabishkkegin (the sheet is white). Whitewater heralds the rapids on rivers with historic names such as Ogoki and Pikitigushi. The "sheet is white" may allude to the infinite sparkle of diamonds dancing across lakes with romantic names like Onamakawash and Shabuskwia. The variety and beauty of Wabakimi's many lakes and rivers surely permit either interpretation or some combination of both to reflect the true meaning of the name Wabakimi.

Wabakimi, Kopka River and Whitesand provincial parks are within the current and traditional land use areas of Whitesand First Nation, Eabametoong First Nation, Ojibway Nation of Saugeen, Mishkeegogamang First Nation, Gull Bay First Nation, Namaygoosisagagun (Collins) and the First Nation people represented by the Whitewater Lake Community Development Corporation. (Whitewater Lake)

The park waterways have been traveled for centuries and most portages in the region have evolved from this historic use. Traditional campsites, artifacts and pictograph (rock painting) sites are found throughout the protected areas. Evidence suggests that people have called Wabakimi 'home' for about 7000 years, ranging throughout the area in small family groups, stopping where fish and game were plentiful, or the berries ripe. To survive, an in-depth understanding and appreciation for their environment was necessary.

Indigenous peoples have contemporary and historic relationships with the park area(s) and use the land base for hunting, fishing, wild rice harvesting and other traditional activities. They will continue to exercise their Aboriginal and Treaty rights within the boundaries of these parks.

The Wabakimi-Kopka-Whitesand area is surrounded by the towns of Armstrong, Savant Lake and Pickle Lake (Appendix 1; Figure 1). Most of Wabakimi is encompassed by Treaty 9, while the southern area of Wabakimi including the Kopka River and Whitesand River are within the Robinson-Superior (1850) Treaty area. The Ojibway Nation of Saugeen is located within Treaty 3.

The parks are in relative proximity to several Métis Nation of Ontario (MNO) asserted harvesting territories. The associated community councils of Greenstone, Thunder Bay and Northwest (Dryden) may have an interest in this area. Red Sky Métis Independent Nation may also have an interest in this area.

1.1 Planning History

The original Wabakimi Provincial Park was identified as a candidate wilderness class park as part of the Northwestern Ontario regulated Strategic Land Use Plans (1982)

which included recommended new candidate parks, as well as clarification on resource policies and targets. The landscape unit in which Wabakimi is situated is commonly referred to as Ecoregion 3W. The candidate wilderness park that was selected for this area, and from which Wabakimi evolved, was called the *Whitewater Lake Candidate Wilderness Area*. In 1983, District Land Use Guidelines (DLUGs) were completed in 42 of MNR's 47 Districts, including Nipigon and Thunder Bay. In the DLUGs, candidates for each of the different park classifications were selected for each site region in Northwestern Ontario. The DLUG planning exercise for Wabakimi presented the public with four options of various sizes, ranging from 124,000 hectares to 790,000 hectares (ha).

When the final Nipigon District DLUG decision was made, the park was called *Wabakimi* because the boundary had shifted further west and encompassed Wabakimi Lake. The final delineation of Wabakimi Provincial Park wilderness class park was 155,000 ha, a modest size relative to many of the options presented during DLUG.

Following the establishment of Wabakimi Provincial Park in 1983 (Ontario Regulation 343/83), there remained considerable public interest and controversy regarding the park size and boundary delineation. Many park advocates felt that the 1983 boundary was inadequate for the following reasons:

- The park was considered far too small to be a self-regulating, fire-driven ecosystem,
- Important caribou habitat was still unprotected, and
- Many significant earth and life science features remained outside its boundary.

In 1992, the Ministry of Natural Resources (MNR), through the Wabakimi Park Boundary Committee, initiated a review of the park's size, shape and representation characteristics. The mandate of this committee was to define a park boundary that provided adequate landscape diversity and natural heritage representation, provided ecological and watershed integrity, and sustained the social and economic benefits of the surrounding land base. In 1995, the Ontario government announced plans for a significant expansion to Wabakimi Provincial Park. Extensive public consultation on the proposed boundary occurred, resulting in several minor boundary adjustments. On July 19, 1997, the current Wabakimi Provincial Park, encompassing 892,061 ha, was established by Ontario Regulation 257/97.

The expanded Wabakimi Provincial Park provides protection and representation of a wide range of natural and cultural heritage resources, as well as opportunities for wilderness recreation. Wabakimi incorporates a substantial area of prime woodland caribou habitat, representative landforms from the days of glacial Lake Agassiz, several pictograph sites, an enticing variety of scenic and challenging canoe routes and remote tourism opportunities that provide fly-in fishing, hunting opportunities.

It is important to note that broad support for this exceptionally large protected area was contingent on the continuation of many of the existing recreational uses and traditional activities within the expanded park area. As a result, the MNR made certain commitments to permit some existing activities to continue. For example, a commitment

was made to continue the moose hunt in the new expanded park area, where it was not seen to conflict with special values or features being protected. There was also a commitment to enhance the economic benefit of the park for local towns and Indigenous communities. The continuation of these uses and the recognition of local community needs are intended to maintain the spirit of the recommendations made by the Wabakimi Park Boundary Committee. The Park Management Plan will detail the extent and location of some of these activities.

The original Wabakimi Provincial Park, regulated in 1983 (155,000 ha) is classified as a Wilderness Park, and as such, contributes to the achievement of the Parks system target for wilderness parks in Ecoregion 3W. The expansion to Wabakimi was not classified when it was regulated in 1997 because of the commitments to the continuation of existing recreational uses and traditional activities that do not conform to wilderness class policies about hunting and mechanized travel. The Park Management Plan will evaluate the classification of the original park area and determine the classification of the Wabakimi expansion area. Presently the park is 892,940 ha.

Kopka River Provincial Park supports an outstanding canoe route that abuts the southern boundary of Wabakimi Provincial Park. Kopka River features historical sites, dramatic topography, caribou values and remote tourism operations.

Kopka River Provincial Park was recommended as a waterway class provincial park in 1983 by the DLUG planning process and was regulated at 16,200 ha in 1989. In 1999, *Ontario's Living Legacy Land Use Strategy* recommended a western and an eastern addition (constituting 3,879 ha) to the original park, consolidating the park land base and completing the park and waterway link to Lake Nipigon. In 2003, as part of the *Lake Nipigon Signature Site Strategy Ecological Land Use and Resource Management Strategy* (2004), another addition of 7,446 ha was recommended. This addition included the Wabinosh Bay shoreline (200 metres from waters' edge) and the bed of Wabinosh Bay, the east shore watershed of Wabinosh Lake and the Prisoner of War camp area. All of the Kopka River Provincial Park additions, encompassing 15,005 ha were regulated in 2003 (Ontario Regulation 238/03). Kopka River Provincial Park now extends approximately 160 kilometres east from Brightsand River Provincial Park, along the bottom of Wabakimi Provincial Park to Lake Nipigon with a total area of 31,303 ha.

Whitesand Provincial Park was also recommended as part of Ontario's Living Legacy Land Use Strategy. It was subsequently regulated in May 2003 as a waterway class park of 11,337 ha in recognition of its representative natural features and recreational water route. The park stretches in a northeast direction, 45 kilometres along a system of rivers and lakes from Jojo Lake to the south to Bad Medicine Lake / Dazzle Creek to the north. The park serves as an important travel corridor and winter habitat for woodland caribou, along the Whitesand and Pikitigushi River systems, specifically linking Wabakimi Provincial Park, Windigo Bay Provincial Park and Lake Nipigon. The park's main features include the Gooseneck Rapid and scenic terrain at Bad Medicine Lake. Recreation values include opportunities for remote tourism, backcountry

canoeing, wildlife viewing, as well as sport angling and hunting. There are a few backcountry campsites associated with canoeing.
Together, the parks constitute a vast wilderness area within a moderate travel distance of Thunder Bay and the Midwestern United States.

1.1.1 Park Management Planning related activities to date

Terms of reference for park management planning was approved in 2003 and the invitation to participate was issued. However, planning was deferred in 2005 to address challenges with capacity and approaches to engaging with the many Indigenous communities and groups having an interest in the area.

Park staff worked extensively with Whitesand First Nation for several years and the community developed two guiding documents: a *Whitesand First Nation/Wabakimi Provincial Park Framework Agreement* (2009) as well as the *Whitesand Engagement Strategy for Wabakimi Provincial Park Planning* (2009).

Park staff have also been engaging Eabametoong First Nation leadership over the years. A couple of local trappers participated in a Species at Risk trappers' diary projects in 2007 and again in 2009. Eabametoong First Nation has asked, and Ontario Parks agreed to include this information as part of the pre-consultation to ensure the information forms part of the background to park planning.

Park staff also continue to engage with Mishkeegogamang First Nation, Ojibway Nation of Saugeen, Kiashke Zaaging Anishinaabek (Gull Bay First Nation), Namaygoosisagagun (Collins) and the leadership of the Whitewater Lake Community Development Corporation, to discuss their interests in park planning.

In January 2011, a draft Terms of Reference (revised) for Wabakimi, Kopka River and Whitesand provincial parks was shared with Mishkeegogamang First Nation, Eabametoong First Nation, Whitesand First Nation, Gull Bay First Nation, The Ojibway Nation of Saugeen, Namaygoosisagagun and Whitewater Lake Develop Corporation. The comments received were incorporated into the Terms of Reference that were released for public comment in 2013.

The schematic below (Figure 1) was provided by Whitesand First Nation in 2009 to illustrate the relationship between the Canadian Constitution, Section 35 Aboriginal and Treaty rights and the park planning system. It was included in the Terms of Reference that were posted in 2013. The intent of this diagram is to demonstrate and affirm that park planning will not and cannot supersede Section 35 of the Canadian Constitution.

With the posting of the Terms of Reference, sixty written comments were received from park users, outfitters, remote tourism operators, environmental nongovernment organizations (ENGOs), and patent land holders, canoeing website forum bloggers, local residents and government agencies. Residents of northwestern and southern Ontario, Quebec, the Midwestern USA, the United Kingdom and Europe submitted comments.

Park staff have been also meeting regularly since 2013 with the remote tourism industry to discuss their interests in park planning and management.

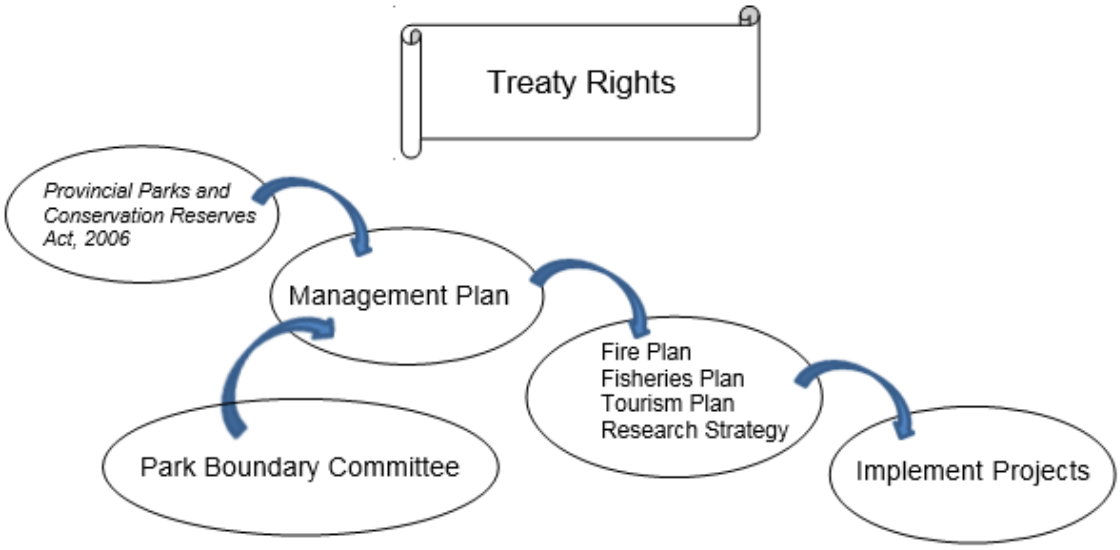

Figure 1: Illustration of the park planning process developed in 2009 with Whitesand First Nation planning committee to demonstrate the recognition of Constitution Act (Section 35 Aboriginal and Treaty rights) and the park planning system.

2 PLANNING AREA

While most of the Wabakimi-Kopka-Whitesand area is within MNRF's Thunder Bay District, the parks also include substantial areas of the Nipigon and Sioux Lookout Districts, as well as a small section of the Dryden District. Wabakimi abuts Albany River Provincial Park in the north, Brightsand River Provincial Park in the southwest, and Obonga - Ottertooth Provincial Park in the southeast. The Caribou, English River, Black Spruce, Lake Nipigon, Wabadowgang Noopming and Ogoki forests surround the parks.

2.1 Regional setting

Whitesand First Nation (population 354 in 2016; registered population 1,238) is located approximately 250 km north of Thunder Bay, Ontario on the north side of Lake Nipigon. Whitesand is one square kilometers of reserve land within the Robinson Superior Treaty and is affiliated with the Independent First Nations Alliance tribal council and the Independent First Nations political treaty organization. Whitesand First Nation was originally located along the northwest shore of Lake Nipigon, near Mount Saint John. The First Nation was without a home from 1942 when high water levels from hydroelectric development flooded the family settlements. The flooding and forced displacement of people living at Whitesand and Mojikit, resulted in the construction of new homes along the Canadian National Railway in places such as Mud River, Ferland,

Wagaming and Armstrong. In the late seventies these people came together and formed what is now known as Whitesand First Nation. In 1986, Whitesand First Nation Reserve #190 was officially formed. Current employment includes forestry operations, roads maintenance and band administration. Other employment opportunities are similar to those found in Armstrong.

Kiashke Zaaging Anishinaabek (Gull Bay First Nation) is an Ojibway Nation located on the western shores of Lake Nipigon and the surrounding territory. It is roughly a 200 km drive north from the closest urban city of Thunder Bay, Ontario and has a registered population of approximately 1,375 citizens residing on and off reserve.

Namaygoosisagagun (Collins) often referred to as Collins is located 21 miles down the CN line west of Armstrong. This isolated community is only accessible by the VIA passenger train and winter rd. It lies adjacent to the southeast corner of Wabakimi Provincial Park. The people of Namaygoosisagagun First Nation have long been land keepers of their traditional lands from time immemorial. To this day the people of Namaygoosisagagun live a traditional orientated life. The community is rooted in living a culturally based lifestyle which includes and is not limited to trapping, hunting, fishing, camping and gathering. It was during the late 1800s and early 1900s that settlers came to Namaygoosisagagun First Nation. The pristine location of the First Nation led to the development of the trading post. This brought in other development and a boost in non-native members to the community. Namaygoosisagagun is and will continue to be a nature orientated community with deep rooted ties to the land.

Whitewater Lake Community Development Corporation represents several First Nation family members from Whitewater Lake. The *Whitewater Lake* settlement is situated adjacent to Best Island in the eastern basin of Whitewater Lake, 55 km northwest of Armstrong This site has several cabins and has been traditionally used for trapline operations and as a summer residence. The First Nation people of Whitewater Lake had significant interaction with Wendell Beckwith and assisted him with the construction of many of his buildings. The settlement consists of 7 camps, and most use is seasonal. Access to the family site is by air, snowmobile, or boat/canoe.

Ojibway Nation of Saugeen is located about 20 km north of the Town of Savant Lake on Highway 599. The Ojibway Nation of Saugeen is west of Wabakimi Provincial Park and south of the St. Raphael Signature Site. About 95 people live on the reserve, although some band members continue to reside in nearby Savant Lake.

Mishkeegogamang First Nation located on two reserves (63A and 63B) on Highway 599 approximately 125 km north of the Town of Savant Lake and 40 km south of Pickle Lake. Mishkeegogamang First Nation is situated west of Wabakimi Provincial Park and northeast of the St. Raphael Signature Site. This community, formerly known as the Osnaburgh First Nation, was established at Osnaburgh House on Lake St. Joseph in 1905 when Treaty 9 was signed. In 1936, the reserve was relocated in anticipation of flooding from the hydroelectric development at Rat Rapids and the diversion of the

Albany River. In 1959, the community moved to its present reserve at New Osnaburgh. Trapping, hunting, forestry, wild rice harvesting, and guiding are primary occupations.

Eabametoong First Nation is located on the north shore of Eabamet Lake on the Albany River. Eabametoong is 362-air km. North of Thunder Bay, or 347-air km. northeast of Sioux Lookout, or 217 km. air km northwest of Geraldton. Fort Hope is the name that originated from the Hudson's Bay Company, which established a fur trading post in 1890 naming it the Fort Hope Post. It was an important trading post and served as the meeting point for several hundred area people who had hunting grounds both north and south of the Albany River, and as far north as the headwaters of the Winisk River. On July 19, 1905 with the signing of Treaty #9, the Fort Hope Band was created along with the Fort Hope Indian Reserve #64. The Reserve is 100 square miles. Today Fort Hope is referred to as "Eabametoong" which has always been the traditional name of this location. Hence, also the Band name has been changed to the Eabametoong First Nation. The present planned community of Eabametoong was started in 1962, before that everyone was scattered in family groups in their traditional hunting grounds i.e.: Miminiska Lake, Makokabatin Lake, Ozhiski Lake and surrounding areas. The Ojibway language (spoken and written) is the working language used by the mature population while English (spoken and written) is predominant as the working language with the younger generation. Employment at present includes tourism, trapping and public administration.

Allanwater Bridge is located on the CNR line approximately 88 km west of Armstrong and 37 km east of Savant Lake. In the 1920s, nearby Allanwater had a population of approximately 200 associated with a large sawmill operation. Few permanent residents remain, although there are some seasonal residents and tourism operations. Allanwater Bridge is situated between Brightsand River Provincial Park and Wabakimi Provincial Park. It is the starting point for the popular Allanwater River canoe route and is accessible by train and air.

Thunder Bay (census metropolitan area [CMA] population 121,621 in 2016) is the largest urban centre in Northwestern Ontario. Thunder Bay is regional centre for industry, shopping, services, recreation, transportation, and education. The Thunder Bay International Airport and the Trans-Canada Highway provide access to the region.

Armstrong (population 193 in 2016) is located southeast of Wabakimi and 25 kilometres west of Lake Nipigon on the Canadian National Railway (CNR) mainline. Armstrong is 240 km north of the TransCanada Highway and is accessed by Highway 527.

Armstrong was founded in the early 1900s, as the western terminus of the eastern division of the CNR. Its early importance was as a railway divisional point, and it has remained an important centre with repair and crew-change facilities. Following the end of World War II, the town saw the development of a radar base, administered by the United States military until 1961, and operated by the Canadian military until 1974. The base was closed after 25 years of operation, when advances in technology eliminated every second radar station along the 'Pine Tree Line'.

Major employers in the community presently include the forest and tourism industries, the CNR, and the Ministry of Natural Resources and Forestry and the Ministry of Transportation. Armstrong is an area base of operations for many of the fly-in remote tourism establishments. Trapping is also an important economic activity for the community.

Armstrong provides a popular starting/ending point for park canoe trips that make use of the VIA Rail passenger train service. Caribou and Little Caribou Lakes, just north of Armstrong are also used for park access.

Savant Lake (population 50 in 2016) is located southwest of Wabakimi Provincial Park at the junction of the CNR line and Highway 599, about 128 km north of Ignace. Savant Lake was established as a refuelling depot for the CNR. Subsequent forestry and mining operations resulted in population growth, but more recently, numbers have declined. The community is surrounded by tourism operations, including air services. Savant Lake is an alternate starting/ending point for Wabakimi canoe trips that make use of the VIA Rail passenger train service.

Pickle Lake (population 388 in 2016) is situated approximately 165 km north of Savant Lake on Highway 599. This community was established in 1929, as a result of a gold discovery along the Crow River. Mining was active in the area until the late 1960s and has seen a recent resurgence with the opening of the Musselwhite Mine, north of Pickle Lake. Currently, the transportation and remote tourism sectors are the town's largest employers.

Sioux Lookout (population 2,941 in 2016) is situated at the north end of Highway 72, about 125 km west of Wabakimi. Settlement began in the early 1900s with railway construction, and the community steadily grew around this CNR terminal point. The major employers in the community are the forest industry, remote tourism, the railway, Indigenous Affairs and Northern Development Canada, and the Ministry of Natural Resources and Forestry. Sioux Lookout is located in prime hunting and fishing country, with numerous remote tourist establishments.

2.2 Land management and development

Land tenure within the parks is held in the form of a Land Use Permit (LUP), Crown Lease or Patent Land. Land tenure within each of the three parks existed prior to their regulation and no new tenure has been approved in any of the parks. A freeze on additional tourism opportunities within the park boundaries has been in place until completion of park management planning.

During the planning process for the expansion of Wabakimi, commitments were made to permit existing land tenure to remain in the expanded area of the park. Existing land tenure in the original park was also permitted to remain. Thus, there continue to be fly-in commercial tourism activities including hunting, fishing, motorboat use, and floatplane

landings. There are numerous facilities and buildings associated with the various outfitting operations located throughout the parks. There are also several commercial establishments on waterways linked to the park (e.g. Allanwater Bridge, Caribou Lake, and Shawanabis Lake). (Appendix I; Figure 2).

2.2.1 Land Use Permits

Commercial Outpost Camps, Private Recreation Camps, Restricted Use Camps are authorized through the issuance of a Land Use Permit (LUP). An LUP authorizes land use, it cannot be pledged or mortgaged. It is a "right to use" for a specified purpose; does not convey any right, title or interest in the land and resources. LUP's contain standard terms and conditions that bind the permittee and the Crown. A fee is paid annually by the permit holder.

Commercial Outpost Camps

Wabakimi Provincial Park

There are 44 commercial outpost camp locations.

Kopka River Provincial Park

There are 6 commercial outpost camps locations.

Whitesand River Provincial Park

There is 1 commercial outpost camp location.

Restricted Land Use Permit

Permits for restricted (Type B) temporary (tent camps) associated with the fall moose hunt have been issued within the Wabakimi expansion area only.

Private Recreation Camps

Land Use Permits for private recreation camps are subject to the permitted uses policy "phase out policy". The policy identifies that existing locations may continue for lifetime of the current permit holder. Improvements will be limited, and estate will have up to one year to remove improvements following the passing of the permit holder.

There are 4 private recreation camps within Wabakimi Provincial Park (Redhead Lake, Onamakawash Lake (2) and Lower Wabakimi Lake).

There are no private recreation camps in Kopka River or Whitesand provincial parks.

2.2.2 Crown Lease / Licence of Occupation

A lease gives the exclusive right to use the land for the time the lease is active but does not give ownership of the land. A lease term is negotiable, but usually 20 years, land can be used for loan security, and rights granted are transferable with ministry consent. A survey is required and is registered on title. An annual fee is calculated and applied.

Wabakimi Provincial Park
There are 2 leases.
There is 1 licence of occupation.

2.2.3 Patent land

Patent land is land that is owned by a private individual or business. Private land within the parks was held prior to park regulation.

Wabakimi Provincial Park
There are 7 patent land properties. Each of the locations has a variety of accommodation structures ranging from cabins to lodges. Some are commercially operated for tourism purposes; some are utilized as private retreats.

There are 5 patent properties that are used as recreation camps.

Kopka River Provincial Park
There is one patent land property used for a tourism lodge.

Whitesand Provincial Park
There are no patent lands within the park.

2.3 Access

Each of the parks can be accessed at a variety of locations outside and inside of park boundaries. The visitor can paddle, use Via Rail, charter a float plane, and use their vehicle. The mode of transportation chosen often depends on which location the person is entering the park. For example, many canoeists choose to enter Wabakimi by paddling across Caribou or Little Caribou lakes or using the services of Via Rail to the Lookout and Allanwater rivers. (Appendix I; Figure 3). To access Kopka River a visitor can drive to Magotte Lake or Sparkling Lake. Bukemiga Lake and Kopka Lake are locations for paddler egress, as well have varying degree of lake side camping. Canoeists and guests at remote tourism facilities utilize float plane access regularly in all the parks.

2.3.1 Road Access

There are no roads or maintained access locations within park boundaries. There are roadside locations on Crown land that provide canoe entry and exit options to access

park lakes and portages. Some locations are more commonly used than others. Road and parking conditions vary from gravel to unmaintained forest industry road.

Road Access from the Armstrong area

Highway 527 (AKA the Armstrong Road) runs some 240 kilometres north to Armstrong from its junction at Highway 11/17 near Thunder Bay.

Highway 811 (AKA the Holinshead Road) connects at Highway 527 near Wabikon Lake, some 115 km north of Hwy 11/17. The road runs approximately 80 kilometres towards the Kopka River from its junction at Highway 527. This road is posted and physically blocked at Kershaw Lake.

Kopka Lake Road connects at Highway 527 approximately 48 km south of Armstrong. This un-maintained 0.5 km trail provides access to Kopka Lake.

Kopka Bridge is located along Hwy 527 approximately 43 km south of Armstrong and is used to access the Kopka River. There are roads north and south of the bridge that provide access to Pishidgi and Wabinosh lakes.

The ***Obonga Lake Road*** adjoins Highway 527 approximately 35 kilometres south of Armstrong, The Obonga Road accesses Kopka River Provincial Park at:

- The Kopka River Bridge 1.2 km west of Hwy 527
- Magotte Lake at km 30
- The Kopka River between Sandison and Kenaganis Lakes, (road is currently overgrown and not passible). The bridge at the above location is scheduled for removal.

Bukemiga Lake Road is located along Hwy 527 approximately 34 km south of Armstrong and access to the Kopka River. This location is used to enter Kopka River and some lake side camping occurs at this location.

Trail Lake Road runs from Armstrong to Trail, Tamarack and Caribou lakes. This road was built by the Armstrong Resources Development Corporation and provides access to the Boiling Sands River and Smoothrock Lake by way of the Tamarack Lake chain. This road is posted with access limitations to Fawn and Doe lakes. The road to Tamarack Lake is deteriorating and its future use needs to be considered. Community members from Namaygoosisagagun use this road through all seasons.

Caribou Lake Road runs in a northwesterly direction from Armstrong to Caribou Lake, approximately 13 kilometres, and provides access to both Little Caribou and Caribou Lakes. The road terminates at Caribou Lake, with access to Little Caribou Lake from a river crossing with a small 2-3 car landing situated about 6 km from Armstrong. This gravel road is generally not ploughed for winter use.

McKinley Road runs in a northerly direction from the Airport Road approximately 37 km east of Armstrong. This road is closed to unauthorized vehicles under the Public Lands Act. The road is signed. Whitesand First Nation uses and maintains the trail access to Ratte Lake.

Airport Road provides access to Whitesand Provincial Park at the Pikitigushi River and at Pikitigushi Lake, via the Pikitigushi/East Gort Rd.

Lee Lake Road is closed to unauthorized vehicles. Access is prohibited under the Public Lands Act. There is a gate in conjunction with an access restriction sign.

Road access from Highway 11

The ***Ogoki Road*** runs north from Nakina, crossing the Ogoki River just east of Ogoki Reservoir. The road then continues northwest crossing the Witchwood River extending north of Whiteclay Lake. The road is signed and gated south of the Ogoki River. At Reckett Lake Road on the Ogoki Road the sign indicates “unauthorized use of this road by motor vehicle traffic is prohibited beyond this point Public Lands Act. R.S.O.”

Road access from the Graham Road

The ***Graham Road*** intersects Hwy 17 a few kilometres past Upsala. At km 93 the road crosses Kashishibog River providing access to Little Sparkling Lake (Kopka River Access) and at 118 km provides access to Harmon Lake (Brightsands River access) via a 200 m portage on the last stretch of rough road. This road continues north and approaches old roads in Wabakimi in the area of NoName and Chapelle Lakes.

Road access from Savant Lake

Highway 599 (Pickle Lake / Savant Lake Road) extends 300 kilometres north from Highway 17 to the Central Patricia Region. The highway passes through Savant Lake on the CNR line and Mishkeegogamang First Nation at New Osnaburgh through to Pickle Lake. Highway 599 provides access to Wabakimi via Pashkokogan Lake, Camp 702 Road to Sassenach Lake and Camp 700 Road to the Flindt River.

2.3.2 Train access

Access to Wabakimi is available by passenger train. The two stations adjacent to Wabakimi are Armstrong Station (east) and Savant Lake Station (west). VIA Rail will drop off/pick up canoeists who have reservations and at least 48 hours’ notice, at “special stops” in the park. Some locations have campsites, and some do not.

Rail stop details by mile post

- Tunnel Lake (post 12.3). Good camp site on north side of tracks.
- Canon Lake (post 17.0) and Mile 17 Canon Lake. There are no camp sites at this location. It is recommended to go to Collins.

- Bath Lake (mile post 19.3). There are no campsites at this location, it is recommended to go to Collins.
- Community of Collins (milepost 20.2). There are camp sites available with advance notice; camping fees may apply.
- Schultz's Trail on Onamakawash Lake (post 24.7). There is a camp site available at this location.
- Tempest Lake (post 29.3). There are no camp sites at this location.
- Beagle Lake (post 32.3). Camp sites are available at this location.
- Lookout River (Aldridge Creek) (post 34.4) is a remote stop with limited camping.
- Redhead Lake (post 44.3) west of bridge, trail to camping area
- Allanwater Bridge (post 54.6). This location has two commercial camps, camping and roofed accommodations are available; camping fees may apply.
- Barrington Lake (mile post 62.5). This location is a commercial camp, camping is available; camping fees may apply.
- Flindt Landing (post 67.1). This location is a commercial camp. There are no camp sites at this location.
- Heathcote Lake (post 67.3) West side of bridge.

2.3.3 Air Access

Area air carriers provide drop off or pick up services for remote tourism facilities and for canoeing parties. Aircrafts landing in Wabakimi require a letter of authorization from the Park Superintendent and a vehicle permit for each aircraft in the park.

2.3.4 Lake Access

Park access can be gained by lakes identified in Table 1.

Table 1. Commonly utilized lakes to enter the respective parks by canoe.

Wabakimi	**Kopka**	**Whitesand**
Little Caribou Lake	Bukemiga Lake	Pikitigushi Lake
Caribou Lake	Kopka Lake	
Tamarack Lake	Maggotte Lake	
Vista Road/Flindt River	Sparkling Lake	
Smye Lake		
Valley Lake		
Hamilton Lake		
Pashkokoan Lake		
Sassenach Lake		
Osnaburgh Lake		

3 PURPOSE OF THE PROVINCIAL PARKS

Provincial parks are regulated under the *Provincial Parks and Conservations Reserves Act 2006 (PPCRA).* The purpose of this Act is to permanently protect a system of provincial parks and conservation reserves that include ecosystems that are representative of all of Ontario's natural regions, protect provincially significant elements of Ontario's natural and cultural heritage, maintain biodiversity, and provide opportunities for compatible, ecologically sustainable recreation. Ontario's provincial parks and conservation reserves are dedicated to the people of Ontario and visitors for their inspiration, education, health, recreational enjoyment, and other benefits with the intention that these areas shall be managed to maintain their ecological integrity (EI) and to leave them unimpaired for future generations.

Wabakimi Provincial Park was originally classified (1983) as a wilderness park and the main objective as outlined in the PPCRA is to protect large areas where the forces of nature can exist freely and visitors travel by non-mechanized means, except as may be permitted by regulation, while engaging in low-impact recreation to experience solitude, challenge, and integration with nature. In 1997 the park boundary was greatly expanded to represent additional earth and life sciences values, and notably, to protect woodland caribou habitat. The expansion area remains unclassified. Wabakimi provides high quality remote tourism and water-based recreational canoeing opportunities.

Kopka River Provincial Park (waterway class) was established to protect provincially significant vegetation and to connect Brightsand Provincial Park in the west with Wabakimi Provincial Park to the north and Lake Nipigon in the east. The addition contains important fish and wildlife habitat, several historic and archaeological sites, scenic landscapes, and watersheds draining into Wabinosh Bay on Lake Nipigon. The waterway provides high quality remote tourism and water-based recreational canoeing opportunities.

Whitesand Provincial Park (waterway class) is an important wildlife travel corridor between Lake Nipigon and Wabakimi Provincial Park. The site also contains several historic sites and representative landscape features, including mixed forest types on weakly broken ground and end moraine. The waterway provides high quality remote tourism and water-based recreational canoeing opportunities.

4 NATURAL HERITAGE VALUES AND PROCESSES

4.1 Ecological integrity

The maintenance of ecological integrity is the priority in the planning and management of Ontario's protected areas. This direction is reflected in the PPCRA (2006), "*To permanently protect representative ecosystems, biodiversity and provincially significant elements of Ontario's natural and cultural heritage and to manage these areas to ensure that ecological integrity is maintained*".

Ecological integrity is a concept that addresses three ecosystem attributes – composition, structure, and function. This concept is based on the idea that the composition and structure of the protected area should be characteristic for the natural region and that ecosystem functions should be in balance.

Since ecological integrity is a concept, it is difficult to measure. There are hundreds of aspects of ecosystems that could be measured at a variety of scales. Since there is not a single approach to assessing ecological integrity, the approach adopted by MECP looks at the purpose of the protected area (why it was created and/or what role it plays in the protected area system), what features and values it contains, processes that occur and the pressures upon the protected area as a whole. The identification of values and pressures, and analysis to determine management priorities and appropriate actions to address those priorities is considered the basis for maintaining and enhancing ecological integrity.

Legislation, policies, and strategies influence how management planning occurs within parks to ensure ecological integrity in maintained. These include but are not limited to: Ontario's Provincial Parks and Conservation Reserves Act (2006); The Wabakimi Interim Management statement (1999), Ontario's Wildland Fire Management Strategy (2014); Fire Management Policy for Provincial Parks and Conservation Reserves (FM: 2:12/PAM7.02); Forest Fires Prevention Act (1990); Caribou Conservation Plan (2009b); the Invasive Species Act (2014) and the Endangered Species Act (2007a).

4.2 Life science values

The flora and fauna of the parks have developed following the recession of the glaciers and the drainage of glacial Lake Agassiz. Ice and water scoured the area, leaving behind a thin layer of nutrient poor sandy till over bedrock, resulting in low diversity of plants and animals. Bare bedrock knolls, plateaux and pockets of silt and clay are evidence of this glacial influence. More recently, natural disturbances such as fire, insects and windstorms have also had an impact on the terrestrial ecology of the parks.

4.2.1 Topography

The landscape of Wabakimi Provincial Park is typified by Precambrian terrain of weakly to moderately broken bedrock knolls, interspersed with numerous waterways and low-lying swamps. Extensive faulting has resulted in two areas of moderately broken uplands in the vicinity of Kenoji Lake as well as a small part of a much larger expanse that extends into the park in the Rove Lake area. In addition, there are isolated diabase cuesta plateaus that stand out in contrast to the primarily weakly broken planar relief that characterises the rest of the park. Augmenting the impression of a subdued relief are the almost flat peat plains situated on the remnant Agassiz and Nakina lake beds.

Bedrock exerts considerable influence on the parks. This is vividly reflected in drainage patterns, lake shapes and certain vegetation patterns. For example, the bedrock structure-drainage pattern relationship has resulted in a system of inter-connected short rivers and elongated lakes referred to as '*canaux et lacs'*. This inter-connecting

waterway system, that is so conducive to canoe travel, was a significant factor in the establishment of Kopka River and Whitesand provincial parks as well as the expansion of Wabakimi.

Generally, low relief, seldom rising more than 20 metres, characterizes much of the Wabakimi/Kopka/Whitesand terrain. However, there are a few relatively high isolated bedrock promontories associated with diabase intrusions. Among the highest points in Wabakimi is the diabase rock knob northeast of Kenoji Lake, which rises more than 60 metres above the surrounding landscape. In the eastern Kopka River, rugged diabase uplands impart a strongly broken terrain pattern particularly visible between Wabinosh Lake and the Lake Nipigon shore. Elsewhere, the Kopka River passes through areas alternating between weakly and moderately broken relief. Canyons associated with the area around the Kopka River Falls represent a transition zone between these two geological landscapes.

4.2.2 Land cover

The parks are situated entirely within the Boreal Forest Region, a broad belt of coniferous forest that stretches between the mostly treeless arctic/subarctic region to the north and the mixed hardwood-coniferous transition forest of the Great-Lakes-St. Lawrence Region of the south. The boreal forest is typically a vast band of coniferous forest dominated landscape that is characterized by a cool climate and a low level of biological productivity (Rowe 1972). Typical boreal tree species occur throughout the parks, predominantly black spruce and jack pine, with some trembling aspen and white birch in upland areas. Black spruce and larch (tamarack) characterise the wet, organic lowlands commonly found in bedrock depressions.

4.2.3 Vegetation

Based on the Ministry of Natural Resources and Forestry's Ecoregion framework, all three provincial parks are located within Ecoregion 3W, with the exception of a small incursion into adjacent 2W at Wabakimi's north end (Appendix I; Figure 4). Ecoregions are delineated primarily based on broad scale climatic parameters, including precipitation, temperature, and humidity (Crins, 2000). Ecoregion 3W encompasses Lake Nipigon and extends west to Thunder Bay, north to Agutua Moraine and east to Geraldton Plain, and south to Lake Superior. It is cold and moist with a mean annual length of growing season of approximately 175 days and approximately 1317 mean annual growing degree days.

Ecoregion 3W is described by Crins et al. (2009) as having a dry-humid, mid-boreal forest climate type that ultimately leads to a regional vegetation spectrum consisting of white spruce, balsam fir, aspen and white birch on well drained sites, and white and red pine on uplands with good soil and air drainage. A regional vegetation mosaic that is predominantly black spruce across a wide spectrum of site conditions characterises the dry-humid, cold-boreal regional climate of adjacent Ecoregion 2W. Other boreal species, such as white spruce, balsam fir and trembling aspen, which characterise 3W,

occur in 2W as admixtures with black spruce on warmer than normal sites (e.g., shores of lakes and large rivers).

Ecoregion 3W is divided into five ecodistricts that reflect broad physiographic patterns. Most of Wabakimi Provincial Park is located in Ecodistrict 3W-1. Relative to most of the other ecodistricts in the province, Ecodistrict 3W-1 is extremely large. Its western half is predominately bare bedrock with scattered patches of shallow, bouldery till drift materials that reflect modification by glacial Lake Agassiz. It was this portion of the ecodistrict that the original Wabakimi Park represented. The eastern half of the ecodistrict has a very different physiography (e.g., deeper soils, more relief) that reflects later ice advances, which originated in the Hudson Bay Lowlands and halted here.

Whitesand Provincial Park provides a good example of mature coniferous and mixedwood forest on weakly broken bedrock and lacustrine and outwash deposits. It is representative of upland areas within site districts 3W-1 and 3W-3. Kopka River Provincial Park crosses ecodistricts 3W-1, 3W-2, and 3W-3 (conifer / mixed wood forests).

Upland Black spruce and Jack pine communities

Black spruce and jack pine forest on shallow soils make up about 63% of Wabakimi. Soils are shallowest in the Elf Lake-Wabakimi Lake area where there are extensive rock barrens, interspersed with open forest. This ecosite, B049 is the most dominant ecosite in the park, covering 42% of the park (Figure 2 and Appendix I; Figure 5A) and is described as greater than 90% tree cover of black spruce and /or jack pine. Understory species consist primarily of black spruce and white birch. The forest floor is comprised of exposed bedrock covered in lichens and/or feather moss with blueberries and bunchberry dominating the sparse shrub and herb layers. Feather moss is found in shaded locations or depressions where there are shallow pockets of soil.

Ten percent of the forest stands within Wabakimi have been classified as Ecosite B050 which has a conifer canopy consisting of black spruce and /or jack pine with greater than 50% cover of conifer species. These stands are often mixed with trembling aspen, white birch, balsam fir and white spruce. The shrub and herb layers are poor, and the ground surface is mostly moss. Soils are deeper than B049 sites.

Five percent of the park was classed as Ecosite B065 consisting of black spruce and/or jack pine greater than 50% tree cover and understory black spruce and balsam fir. The shrub and herb layer is moderately poor and is a moister site than both B049 and B050.

Three percent of the park was classed as a B012 ecosite. These sites consist of very shallow dry soils, open bedrock areas covered in lichen with greater than 50% cover of black spruce and/or jack pine mixed with some white birch. This ecosite has an extremely high value to woodland caribou due to the abundance of caribou lichen, which is a primary winter food source. These shallow, open bedrock areas described as

B012 often exist as small patches within the B049 ecosites. However, many of these patches are too small to be captured either as a primary or secondary ecosite.

Hardwood forest communities

Hardwood-dominated forests make up about 7% of Wabakimi (Figure 2 and Appendix 1; Figure 5A)**.** They occur mostly on eskers and the Agutua and Nipigon moraines and associated landforms. Trembling aspen is the predominant species, usually mixed with some jack pine, black spruce, and white birch. White birch is dominant on some drier sites. Poorer sites on sandy-coarse loamy soils predominate and have an understory of green alder with blueberries, bunchberry, and feather mosses. Richer sites on finer soils have an understory of mountain maple and balsam fir, with moderately diverse herb layers. Beaver activity near shorelines has removed most of the hardwood from riparian stands in much of Wabakimi, Kopka and Whitesand provincial parks. The dominant hardwood ecosite is B055 present in 6% of the park. This ecosite is described as a hardwood canopy greater than 50% cover, consisting of aspen or white birch. Occasionally these sites may be a pure stand of trembling aspen or birch and mixed with balsam fir, black spruce, and white spruce. These sites tend to be shrub rich and herb poor.

Wetland Communities

Forested wetlands such as conifer swamps make up about 20% of the park. Organic intermediate conifer swamp on organic soil (Ecosite 128) makes up about 13.5% of the park (Figure 2 and Appendix 1; Figure 5A)**.** This ecosite occurs where groundwater flow is greater, and nutrients are more available. The conifer canopy consists of black spruce with some tamarack, and abundant speckled alder. The ground surface is dominated by moss but also herb and shrub layers are moderately rich. The organic layer is variable, but sometimes less than 50 cm deep. Poor conifer swamp (Ecosite 127) occurs in 4% of the park and is dominated by black spruce, occupying areas with little groundwater flow and therefore low nutrient availability. Tamarack is usually present as a minor component. A continuous *Sphagnum* carpet is present with shrubs, but herb diversity and cover are low.

Non-forested Wetland Communities

Non-forested wetlands, including bogs, fens, shore fens, thicket swamps and marshes, make up about 10% of the park. Emergent and open-water marshes on lakes and rivers within the park are unmapped but cover thousands of hectares.

Bogs occur where the surface layer of peat is raised above the level of contact with groundwater, and consequently the rooting zone of the vegetation is acidic and nutrient-poor. In Wabakimi, bogs develop in bedrock depressions, as islands in larger peatlands, common on the glaciolacustrine deposits at the north end of Wabakimi where finer soils impair groundwater flow. Bogs occur in 2.8% of the Wabakimi landscape (Ecosite126 and Ecosite137).

Bog communities have few plant species. Treed bogs are characterised by black spruce, Labrador tea, a few species of sedges, and sparse three-leaved false Solomon's seal over a carpet of *Sphagnum.* Open bogs are less common than treed bogs and are found in wetter portions of larger bog complexes and on some lakeshores above the level of seasonal flooding. They are dominated by *Sphagnum* mosses, bog cranberry, leather leaf, and other shrubs. Three leaved Solomon's seal, round-leaved sundew, and cotton grasses are also found at low cover (Harris et al, 2005).

Patterned fens are found at several locations in Wabakimi, particularly on flat, poorly drained glaciolacustrine plains. These communities consist of a matrix of open extremely rich fen, moderately rich fen, poor fen, and treed fen. Open fens are more common than open bog.

Open fens and shore fens occur on shorelines, above the level of contact with the lake and stream water. They are dominated by willow, sweet gale, leather leaf, and other shrubs and sedges such as wire sedge, lake sedge and water sedge. *Sphagnum* cover is high. The most common fen within Wabakimi is a sparse treed fen (Ecosite 136), occurring on 8.5% of the Wabakimi landscape and is described as a conifer canopy consisting mostly of black spruce (>50% tree cover of conifer species). With tamarack (> or = to10% cover) and /or the presence of fen indicators. The shrub, herb and moss are moderately rich. The ground surface is mostly moss with standing water and conifer litter. Other fens occupy 1.7% of the park (ecosites 140,147, 139, 146,). Most types of fens have a high value to caribou in providing abundant tree lichen as an alternate food source. Caribou also use open and treed fens with islands as nursery areas to escape predators and calve during this vulnerable period.

Thicket swamps and meadow marsh are most commonly found on the floodplains of small streams and on pond systems with a history of beaver activity. Thicket swamps are also found around the periphery of open peatlands, often at the edge of uplands where mineral –rich surface water or groundwater is present. In Wabakimi 1.4% of the land was classified as thicket swamp (Ecosite137). Thicket swamps have a dense layer of speckled alder and/or willow species with a layer of blue-joint grass and sedges.

Meadow marshes are dominated by blue joint grass on mineral soils and tall sedges on organic deposits. One percent of Wabakimi was classed as a meadow marsh (Ecosite 142). Rich marsh communities are confined to estuaries and slow-moving streams where sedimentary organics have accumulated. Typical submergents include water milfoils, pondweeds, and common bladderwort. Common emergent species on wave washed sandy lakeshores include hardstem bulrush and marsh spikerush.

Vegetation Communities along the Kopka and Whitesand River

The Kopka River and the Whitesand River Provincial Waterway parks include a 200-meter protected corridor along the shorelines. The Whitesand river shoreline is dominated by 56% black spruce/jack pine ecosites (B049 at 24%, B050 at 18% and

B034 at 14%). Hardwood forests occupy 23% of the forest stands along the river (Figure 4 and Appendix 1; Figure 5E).

The Kopka river is dominated by black spruce and jack pine forests, comprising 42% of the park area. Twenty one percent of these coniferous forest stands are classed as Ecosite B050 and another 21% are classed as ecosite B049, both are spruce dominated with coarse loamy soils, differing only by the decreased species diversity in the B049 tenting towards almost pure black spruce/jack pine and less than 20% birch. Hardwood forests comprise 25% of the shorelines and another 6% are Aspen-Birch stands (Figure 3 and Appendix 1; Figures 5B,5C,5D).

Old Growth

Old growth forests in the park total 10,434 stands and 145204 ha as defined by Old Growth Forest Definitions for Ontario (Uhlig *et al*. 2001). The age of onset for old growth varies from 80 to 160 years depending on the ecosite and the dominant tree species. At 19%, the proportion of old growth forest in Wabakimi is approximately the same as the provincial average of 21% for inventoried land across the province (OMNR 2003a). The most abundant old growth is black spruce (143,613 ha) at 90%, and the remaining 1% jack pine, trembling aspen, and tamarack. Old growth red pines at Brennan Lake were estimated at 195 years old. The oldest forest (>150 years) makes up only about .2% of the Wabakimi. Old growth white pine and eastern white cedar on the Kopka Lake-Obonga portage are estimated to be approximately 200 years old.

Rock Barrens/Talus/Cliffs

Rock barrens are most abundant in the Wabakimi Lake-Brennan Lake area, but are scattered throughout the park, interspersed with open black spruce and jack pine forest. These sites are subject to high temperatures and severe drying during the growing season. The plant communities are therefore species-poor and dominated by drought-resistant plants such as blueberries, rusty woodsia, fringed bindweed, pale corydalis, burnt sedge, and *Cladina* lichens. Scattered black spruce and jack pine are also present. Cliffs and large talus slopes are found at Cliff Lake, the Kopka River in the falls chain area, and the Ogoki River. North facing cliffs support arctic-alpine plants, including several provincially rare species. These habitats share many similar species with rock barrens, particularly on ledges, with fragrant cliff fern, rock tripe, and crustose lichens typical of many vertical faces.

Flora

The flora of Wabakimi, Kopka, and Whitesand parks are boreal and include 378 confirmed species of vascular plants. The species richness is relatively poor compared to other protected areas of the same size. Fourteen species of arctic-alpine affinity inhabit shorelines (bird’s-eye primrose, hair-like sedge, and alpine blueberry), peatlands (Lapland buttercup, low spikemoss, nagoonberry, tufted leafless bulrush) and cliffs (glaucous bluegrass, fragrant cliff wood-fern). Scattered occurrences of plant species

that typify the mixed hardwood-coniferous forests of the Great Lakes-St. Lawrence Forest Region have also been found. Examples of the latter include red pine, black ash, and eastern white cedar. A few species of floristic interest include the small white-water lily, bristly sarsaparilla, interrupted fern, royal fern, native Phragmites, rose pogonia, wild chives and hooded ladies-tresses. Wild rice marshes occur in the northwest reaches of Wabakimi (e.g., Metig Lake and south end of Rockcliff Lake). The parks have few introduced species such as dandelions which are mostly restricted to the rail line, portage trails, and cabin sites. At 4% of the flora, this is comparable to other relatively remote and undisturbed parks in northwestern Ontario.

Federally and Provincially Rare Tree Species

Black ash has recently been listed Federally as a Threatened species (COSEWIC,2018) due to the spread of the invasive Emerald Ash Borer beetle. Black ash are a very important tree to our forests.

Provincially Rare Plant Species

Eight provincially rare plants have been found within these parks including: fir-clubmoss, northern oak fern, inland bluegrass, Vasey rush, slender bulrush, Ross' sedge, slenderleaf sundew and snow lichen.

Regionally Rare Species

Regionally rare plants include swaying clubrush, slender pondweed, Russet cotton-grass, cutleaf anemone, narrow-leaved arnica, and horned dandelion.

Significant Plant Communities

A number of significant plant communities exist within the parks including cliff, marsh, red pine, patterned fen, and hardwood swamp communities.

Cliff Communities

The cliffs at Cliff Lake support arctic-alpine plant species such as fragrant woodfern, fir-clubmoss, glaucous bluegrass, and narrow-leaved arnica. Other specialized cliff species include fragile rockbrake, northern oak fern and fragile fern. Cliffs along the Ogoki Canyon have richer cliff flora than Cliff Lake, and some of the species include horned dandelion, wild chives, Ross' sedge, cutleaf anemone, and American silverberry.

Marsh Communities

Significant marsh communities are at the Ogoki Reservoir and Pucill Lake. Other important marshes described by Noble and Zoladeski (1990) are at Lynam Lake, Berg River, Nemo River, and Metig Lake. These rich wetland communities are highly

productive and support a diversity of flora and fauna. Marsh habitats are important for waterfowl and moose aquatic feeding areas. Rare species inhabiting marshes include black terns at the Ogoki Reservoir marsh and bufflehead at Pucill Lake. A wild rice marsh is located on the Ogoki Reservoir as well as the northwest side of the park (Metig and Rockcliff lakes).

Red Pine, White Pine and Eastern White Cedar Communities

A red pine stand on an island at the south end of Brennan Lake was sampled in 2004 and some scattered red pine occur on the southern shoreline of Brennan Lake. A small red pine stand is also found along the shores of Onamakawash Lake as well. Red pine is at the northern limit of its range at this latitude and therefore is confined to warm, south-facing lake side slopes.
A white pine and eastern white cedar community on the Obonga-Kopka Lake portage represent white pine on the northern edge of their range as well as a rare species assemblage.

Patterned Fens

Patterned peatlands in Wabakimi can be classified as *Boreal Extremely Rich Seepage Fen* (Nature Serve 2004). This is a globally rare community. These fens are east of Whitewater Lake, east of Osprey Lake, south of Windfall Lake, and east of Sorrel Lake. Other significant patterned fens are at Jeep Lake and Ballast Creek headwater

Hardwood Swamps

Black ash swamps are present on floodplains on the Ogoki and Allanwater rivers. Forest Resource Inventory (FRI) data indicate only two stands with black ash stands in the park, but unmapped small stands are also present. Black ash trees grow in rich, telluric peat between boulders. Rich herb and shrub layers are present. Proximity to the river provides a warmer than average microclimate and habitat for plant species at their northern range limit including black ash, royal fern, interrupted fern, sensitive fern, and awl-fruited sedge (Noble and Zoladeski 1990).

Lichen Communities

Twelve provincially rare lichen species have been found near Elf Lake, including *Arthothelium spectabile*, *Calicium parvum*, and *Ochrolechia pseudopallescens*, which are also indicators of forest continuity. Twelve species found, not provincially rare, indicate forest continuity. This list includes *Chaenotheca brunneola, Loxospora elatina,* five species of moose hair lichen (*Bryoria*), and five species of beard lichen (*Usnea*) (Hanna Dorval Personal Comm, 2019).

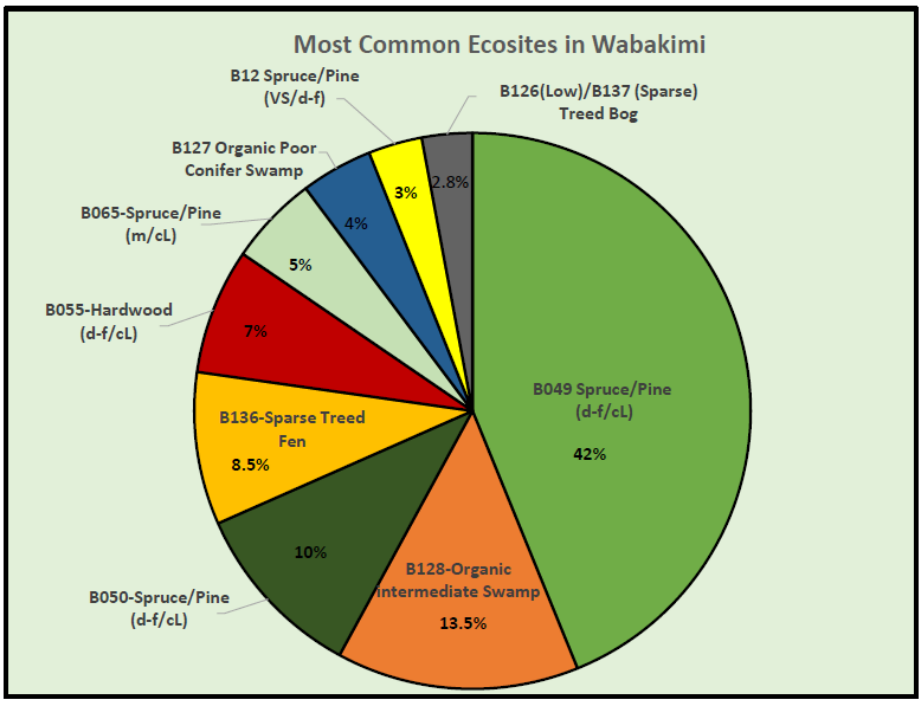

Figure 2: Ecosite composition within Wabakimi (eFRI, 2013) Please refer to Ecosites of Ontario, 2009 for detailed descriptions of the Ecosites including tables for texture and moisture modifier coding.

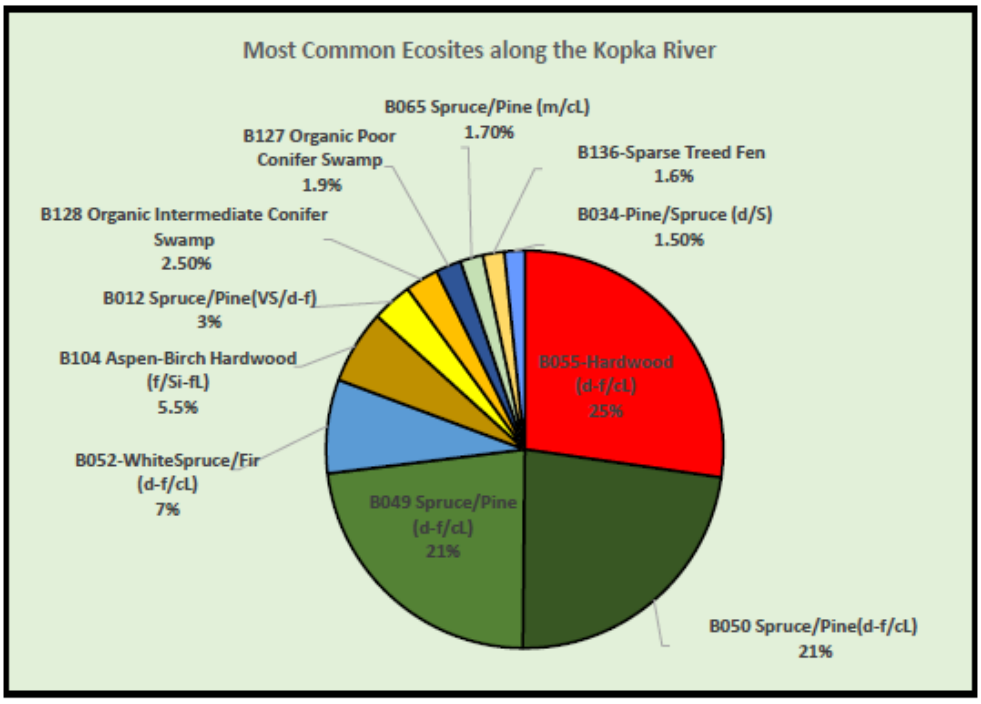

Figure 3: Ecosite composition along the Kopka River. Please refer to Ecosites of Ontario, 2009 for detailed descriptions of the Ecosites including tables for texture and moisture modifier coding.

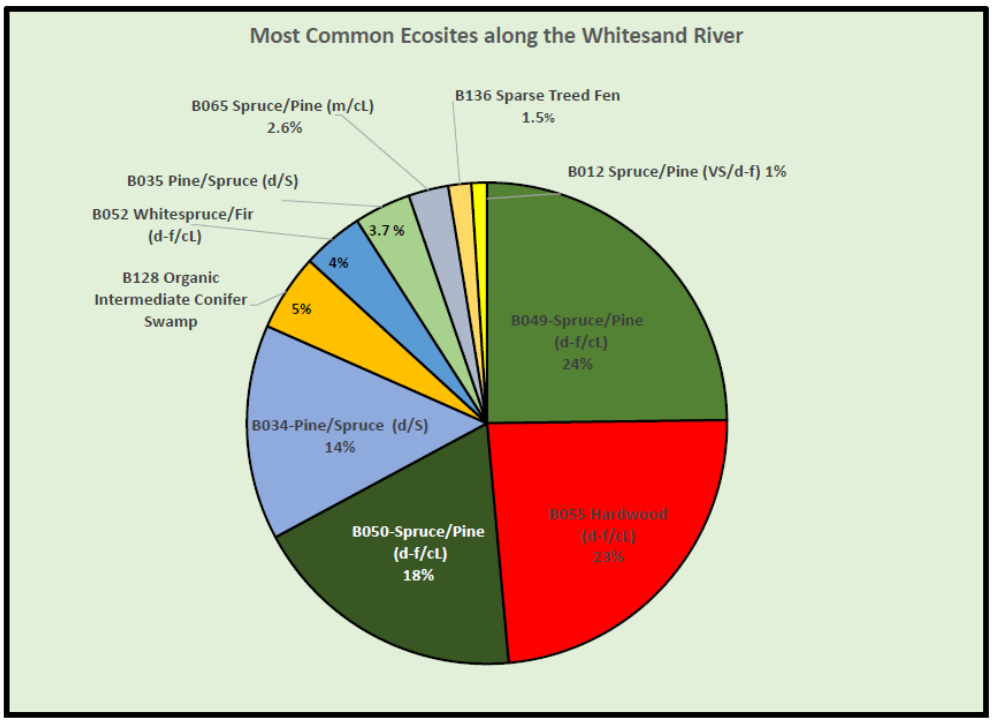

Figure 4: Ecosite composition along the Whitesands River. Please refer to Ecosites of Ontario, 2009 for detailed descriptions of the Ecosites including tables for texture and moisture modifier coding[1]

4.2.3.1 Forest Disturbance

Forest Fire

Forest fire plays an important ecological role in Wabakimi by influencing landscape patterns, soils, tree species composition, and wildlife habitat. Fire intensity, frequency and rates of spread affect the function, composition and structure of an ecosystem by producing a mosaic of plant communities of different ages and species composition on the landscape. Fire creates this diversity by burning at varying intensities and speeds, thereby affecting different areas of the forest structure from the amount of soil/duff burned to the degree of tree mortality. Periodic fires also reduce the amount of accumulated fuel on the forest floor. In addition, fires stabilize insect and disease populations and recycle nutrients bound up in the litter and woody debris (Heinselmann, 1996; Johnson, 1995).

Wabakimi, Kopka and Whitesand provincial parks exist in this fire-adapted boreal landscape which sustains the large, high intensity forest fires that are responsible for its existence. Part of the rationale for the Wabakimi Park expansion was to encompass enough area for fire to continue to have a strong ecological role. The suppression of fires in similar ecosystems have resulted in the succession of forests to less fire tolerant species, making them unsuitable for species that inhabit fire adapted environments

[1] Texture and moisture modifier code tables have been included for reference in Appendix III.

(Johnson and Miyanishi, 1995; Heinselmann, 1981). These suppression activities have in turn affected the wildlife species which use these forests.

At the landscape level, Wabakimi, Kopka and Whitesand's natural fire regime of Ecoregion 3W is characterized by many small fires with a few large stand replacing fires. However, most of the area burned has been in large (>5000 ha), intense fires. The primary ignition type of these fires within the parks is lightning, and the majority of annual areas burnt, contributing to the fire cycle, are these large fires. Lightning caused over 90% of the fires in Wabakimi between 1976 and 2015. Some large fires occurred in the 1930s and 1940s and a few small fires during the 1950s through 1980s, and then again, the 1990s and 2000s received more frequent and larger fires (Figure 5 and Appendix I; Figure 6). Areas adjacent to Wabakimi have a higher proportion of human-caused fires.

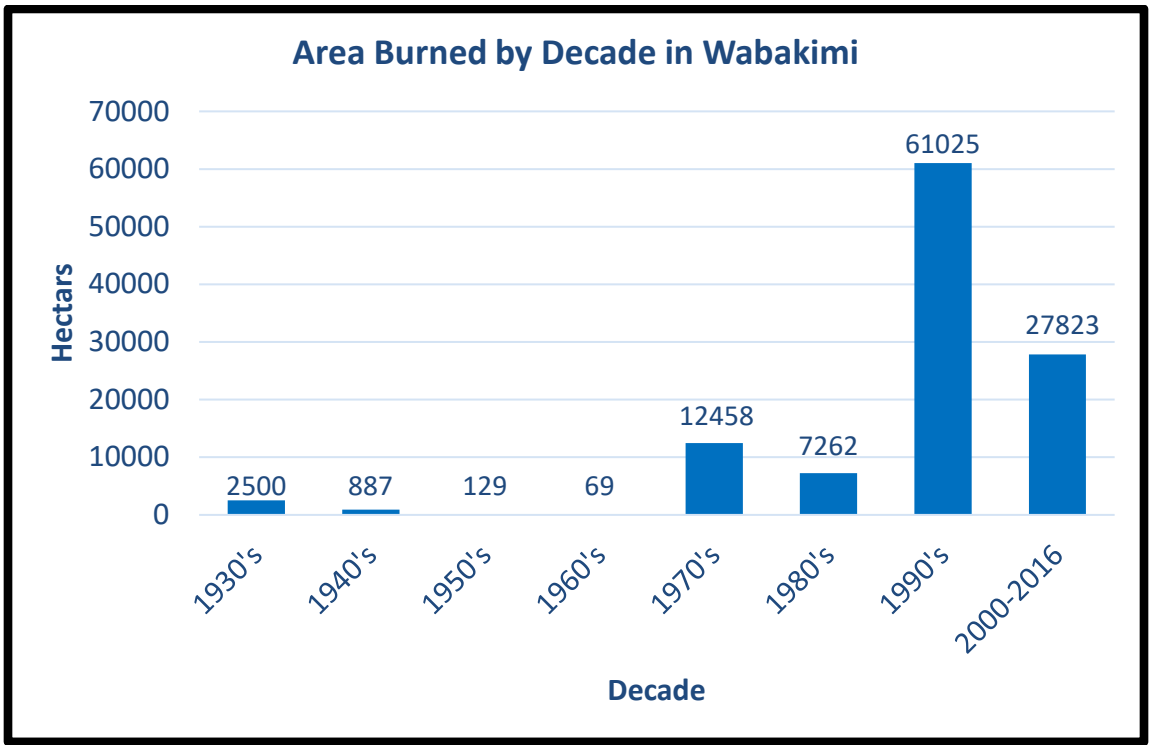

Figure 5: Area burned by decade in Wabakimi Park

Blowdown

A heavy wet snowfall followed by strong winds in October 2001 caused extensive damage throughout northwestern Ontario covering over one million hectares, but the area within Wabakimi is unknown. Another large area of blowdown occurred in the south and east parts of Wabakimi (Biggs et al. 2001, 2002), where spruce, jack pine and balsam fir were most heavily affected. As a result, blowdown areas are common in all parks (Appendix I; Figure 7). A notable example occurs near the mouth of the Allanwater River on Wabakimi Lake and near Uneven Lake in Kopka River. Patches of

forest that have damage from blowdown events exhibit large amounts of downed woody debris and an open canopy. Regeneration in these sites will likely be similar to that occurring in recent burns, although the amount of woody debris may lead to an increased risk of large-scale forest fires. Although a less frequent disturbance than fire, the extent of blowdown may significantly affect wildlife habitat and travel corridors.

Insects

Native insects and diseases play an essential ecological role in the boreal forest ecosystems. Insects and micro-organisms renew forests by consuming trees and other plant material, by removing old or susceptible trees, recycling nutrients, and providing renewed habitat and food for wildlife. The dead/damaged trees provide fuel for wildfire which regenerates the late successional forest stands.

Outbreaks of spruce budworm occur approximately every 35 to 40 years and may last several years. Cumulative defoliation can cause significant levels of mortality and growth loss. Damage is most severe where there are uninterrupted forest stands dominated by mature balsam fir and white spruce (Natural Resources Canada, 2016). Spruce budworm is not a significant disturbance factor in Wabakimi due to the small amount of balsam fir and white spruce present within the park. However, a small area along the Kopka waterway park, just to the east of Pishidgi Lake to the shores of Lake Nipigon was affected in an outbreak of spruce budworm between 1996 and 2000 (LIO, 2019). The tree mortality was low to moderate. The Kopka River and Whitesands river are more susceptible to spruce budworm due to the higher occurrence of balsam fir and white spruce.

Forest Tent caterpillar, a native insect to North America, has historically caused defoliation of trembling aspen and white birch of the boreal forest. Depending on factors such as weather and forest structure, outbreaks occur approximately every 10 to 12 years and last about 3 years at the stand level and 6 years at the landscape level (Natural Resources Canada, 2018; Biggs et al. 2001). Repeated defoliation weakens the trees and makes them more susceptible to other pests or drought but does not necessarily kill the trees. Trees can fully recover from these outbreaks over the long term. The southwest corner of Wabakimi, and a small section of the Kopka River were affected by a tent caterpillar outbreak between 2001 and 2003 (LIO, 2019). In this situation there was moderate to severe defoliation of trembling aspen but long-term damage to the trees was minimal.

The large aspen tortrix attacks the trembling aspen trees in 3 year periods, often in association with the forest tent caterpillar infestations. The defoliation caused by the large aspen tortrix does not affect tree survival since it occurs early enough in the summer to allow trees to produce new foliage (Natural Resources Canada, 2015).

Weather is an important factor affecting outbreaks of all three insect species, however, there is no consensus as to how weather may influence the start and end of cycles.

Further research would be required to determine how climate change could potentially affect native insect outbreaks in the future.

Beavers

Beavers have influenced the forest structure near waterways in the parks through their flooding of adjacent forests and felling of aspen, alder, and other species.

Non-Native and Invasive Species

Non-native species include those that are not native to the parks and the ecoregion in which they occur. Non-native species include invasive species, which can invade and greatly alter ecosystems. Currently, plant species non-native to the Wabakimi ecoregion are found at land tenure sites, as well as shore lunch, portage roads and rail lines. Many private cottages and commercial tourism facilities have groomed lawns and decorative plants. Monitoring the presence and spread of non-native species will be critical in protecting the park ecosystem and developing effective activities to prevent them from becoming fully established.

4.2.4 Wildlife

The wildlife species of the Wabakimi area are typical of the Boreal Forest region. Species include large mammals such as woodland caribou, moose, white-tailed deer, black bear, gray wolves, wolverine, Canadian lynx, fisher, river otter, beaver, and red fox. Small mammals include pine marten, ermine, mink, snowshoe hare, red squirrel, wood chuck, southern red-backed vole, muskrat, deer mouse, heather vole, jumping mice, least chipmunk, little brown bat, hoary bat, and the northern long-eared bat. The little brown bat and the northern long-eared bat are listed as an endangered species both provincially and federally.

Woodland Caribou

The boreal populations of woodland caribou are listed as nationally “threatened” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and under the federal Species at Risk Act (SARA). Woodland caribou are also listed as threatened under Ontario’s Endangered Species Act (ESA). Their range has receded northward in Ontario since the mid-1980s due to loss of habitat and increased predation related to human activities and development such as logging, road networks and other habitat changes (Harris,1999). There is also concern about parasites carried by moose and white-tailed deer (Chown, 2003).

Caribou Population Dynamics

Due to yearly variability and movements of animals in and out of the park boundaries, the exact number of caribou inhabiting Wabakimi Park is not attainable. However, based on a population range assessment that was done on the Brightsand and Nipigon

Caribou ranges in 2010 and 2011(OMNR,2014), the minimal animal count within Wabakimi Park was 175 animals. This is a very rough estimate and includes animals that may use Wabakimi during the winter but move to other areas for the summer. The caribou population is limited by several factors but primarily by winter food supply (related to females' condition during pregnancy), calf survival/mortality, and predation by wolves or other predators (black bear, lynx, and wolverine).

Caribou Winter Habitat

Caribou habitat in the boreal forest consists of large areas of mature forest (60 years of age and older) dominated by coniferous trees such as black spruce and jack pine. This habitat is dynamic and large natural disturbance events such as fires, blowdown, and snow and ice damage can quickly change habitat for caribou. One of the main winter foods for caribou in these forests is ground lichen, which requires intense fires to regenerate. Individual caribou have very large annual home ranges of approximately 200-4000 km^2 and they seek out the large, relatively unfragmented patches of mature open coniferous forest supporting enough amounts of ground lichen. Researchers have also observed associations between caribou and mosaics of pine/spruce-lichen woodland, wetlands, and patches of black spruce (Terry and Wood 1999). Wetlands and black spruce stands support arboreal lichens as well as sedges, which caribou may eat to balance a winter diet otherwise dominated by high-energy, low-protein terrestrial lichens (Storeheier *et al*. 2002a).

Fire and Caribou Habitat Management

Wabakimi, Kopka and Whitesand provincial parks exist in a fire-adapted boreal landscape which sustains the large, high intensity forest fires that are responsible for its existence. Part of the rationale for the park expansion was to encompass enough area for fire to continue to have a strong ecological role. The maintenance of ecological integrity is also the priority in the planning and management of Ontario's protected areas. Since natural wildfire is an essential part of EI, by allowing fire to burn, the landscape should return to a state closer to ecological balance. However, the issue is complicated by the fact that cumulative disturbances (natural and anthropogenic) around the perimeter of the park have limited the availability of winter caribou habitat on a landscape level.

In the Caribou Conservation Plan (CPP), one of the priority actions to achieve protection and recovery of caribou is to enhance caribou habitat. Caribou have evolved with and adapted to fires that both change and renew the habitat in which they live.

Larger fires play an important role in creating future tracts of even-aged, conifer-dominated forest. These stand replacing fires are also critical to renewing winter woodland caribou habitat as they help to regenerate terrestrial lichen, which comprises the bulk of their winter diet. However, caribou are much more vulnerable to disturbance of their main food supply (ground and tree lichen) than other ungulate species whose food supply recovers rapidly from disturbance (Chown, 2003). Winter habitat is

particularly critical for maintaining energy reserves when forage quality is at its lowest, movements are impeded by snow, and cows are in their latter stages of pregnancy (Chown, 2003).

Numerous studies show that caribou range widely to accommodate their life requirements; depend heavily on lichens in whatever form they are most abundant (terrestrial or arboreal), and that spruce-pine-lichen wintering habitat is one of the main limiting factors for caribou. More recent studies have also documented the importance of terrestrial lichens all year long, not just during the winter months (State of the Caribou Report, 2014). Therefore, management decisions need to reflect a balanced approach, allowing natural fire to occur with some level of protection for current sensitive caribou wintering areas. Development of a vegetation management plan for Wabakimi must consider the quality, supply, and location of caribou habitat within Wabakimi, as well as the relationship to, and integration with, caribou habitat supply and the associated caribou habitat tracts on the adjacent managed landscape. Managing forest fire response would ensure a balance is made between protecting current sensitive winter caribou habitat and renewing future habitat by creating a dynamic mosaic of sufficient amounts of caribou habitat at varying stages of maturity.

The core of the winter range is the exposed bedrock encompassing Smoothrock, Wabakimi, Brennan and Elf lakes, and extending to Seseganaga Lake on the park's southwestern boundary (Appendix I; Figure 8). Other important wintering areas are north of Whitewater Lake and the Heafur to Flindt Lake area. Large late winter concentrations have been sporadically observed in several locations including Elf Lake, Wabakimi Lake and south of the CNR line. A study during the 1970s of the area around Lake Nipigon revealed a large winter concentration of approximately 100 woodland caribou in the vicinity of Wabakimi Lake. These caribou were living in almost undisturbed conditions in an area containing relatively low densities of moose and wolves.

Caribou Calving Habitat

Continued research has documented that during the summer months, the caribou of the Wabakimi area become widely dispersed, within and outside of the parks. Many of the larger and more obvious lake /island summer habitat complexes (e.g. Wabakimi, Brennan, Smoothrock lakes) have been recognised in Wabakimi Park since the early 1980s, while a number of more recent discoveries have been made as a result of calving inventories since 1990 (Appendix 1; Figure 8). Caribou cows tend to calve on islands and spend much of the summer months around these island complexes to potentially avoid calf predation during this vulnerable time.

In Appendix I, the map in Figure 8 shows the seasonal distribution of woodland caribou within Wabakimi based on sightings, collared caribou data locations, caribou surveys (winter aerial surveys and summer ground calving transect surveys) between 1981 and 2016.

Moose

Moose population densities reflect habitat quality and, the Wabakimi/Kopka area generally represents marginal habitat supporting only isolated pockets of moose habitat. Moose depend on early successional stages of vegetation to provide enough browse and require disturbance such as forest fires or logging to create new food sources. According to past MNRF surveys, population density is considered low compared to populations outside the park. Moose are limited in Wabakimi by the low browse productivity of the predominant bedrock landforms. Aerial observations have indicated that while moose occupy much of the park area, they generally are not found in areas occupied by caribou. Wolf track densities suggest that wolf concentrations are considerably higher in areas occupied by moose.

White-tailed Deer

Two records of white-tailed deer were documented in the southern part of the park in 2004, with a previous individual recorded at Whitewater Lake in the mid-nineties. This represents a northward range expansion and individuals would be unlikely to survive a series of winters of average or above average snow depths.

Wolves

Wolves are found throughout the park and generally inhabit areas occupied by moose. The population status of wolves with Wabakimi is currently unknown, however the population is closely associated with the status of moose, deer, and caribou populations. Trapping of wolves occurs in the park, but the level of human-caused mortality is unknown.

Black Bear

Deciduous-dominated or mixed wood areas in the parks support higher bear densities. Given the dominance of conifer stands in Wabakimi, Whitesand and Kopka, bear populations are likely lower than elsewhere in Thunder Bay District.

Wolverine

Wolverine has been given a designation of “special concern” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and have been given a “threatened” designation by the Committee on the Status of Species at Risk in Ontario (COSSARO). The Wabakimi/Kopka/Whitesand area is within the current wolverine range and during the past 10 years wolverine tracks have been observed throughout the park. A young male wolverine, likely dispersing from its natal range, was incidentally trapped on the Obonga Lake Road (southeastern boundary) in the winter of 2015. Also, a wolverine was viewed on two trail cameras set up in the Elf Lake area during the 2016 winter. Eabametoong First Nation mentioned that the Shabuskwia Lake area is known for the presence of wolverine. The parks provide suitable habitat and a prey base (e.g.

snowshoe hare, deer, moose, woodland caribou, and beaver) for this wide-ranging, sparsely distributed carnivore with an apparent aversion to human disturbance.

Beavers

The Elders in some of the communities have noted that beaver populations are indicators of healthy ecosystems and therefore the higher the population, the healthier the ecosystem. For the past 8 years, active and inactive beaver lodges have been recorded on trips through the park to attempt to get an idea of beaver populations. This comes with its own challenges as the data is inconsistent from year to year and logistically difficult to cover the entire park to compare data over time due to the dynamic nature of beaver activity. However, given that there is little to no trapping activity in the park, beaver populations appear to be very healthy. The predators of beavers include wolves, wolverine, and black bear. Data from trail cameras and winter aerial surveys shows that predator populations are relatively low.

Birds

Wabakimi Provincial Park has a relatively high number of nesting bird species (104 species) compared to other parks in northwestern Ontario. This may be partly due to a relatively high survey effort and the diversity of landform-vegetation including wetland and shoreline habitats (Northern Bioscience, 2005).

The most common songbirds include conifer forest specialists such as the Nashville warbler, winter wren, and ruby-crowned kinglet along with habitat generalists like the white-throated sparrow. Northern species such as the rusty blackbird, olive-sided flycatcher, and Bonaparte's gull are common and widespread, while birds common further south in northwestern Ontario, such as the oven bird and red-eyed vireo are relatively rare and confined to hardwood forests. Songbird populations occur at low densities compared with other parks further south in northwestern Ontario, likely due to the low productivity and diversity of the forests.

Northern waterthrush is common on rocky shorelines throughout the park, while yellow warbler and common yellowthroat frequent sandbars on the Ogoki River. Greater yellowlegs and solitary sandpiper colonies (a rare nesting bird in the Thunder Bay District) were discovered on isolated rocky islands and in low diversity forests.

In 2004, Northern Bioscience life science inventory field work found black tern (provincially rare), bufflehead (northeastern edge of range), and American white pelican (provincially rare). In 2016, a territorial pair of peregrine falcons was observed on the cliffs on Lake Nipigon within Windigo Bay Provincial Park (Foster pers. comm, 2016). Windigo Bay Provincial Park lies just outside the eastern edge of Wabakimi.

Reptiles and Amphibians

The relatively short summers and the long, cold winters of the Wabakimi area limit the number of species of reptiles and amphibians. Only five species of frogs, and one species of both toad and snake have been recorded within the park. No turtles have been discovered, to date. Two blue-spotted salamanders were discovered in Wabakimi during the 2016 summer field season and one spotted salamander was found on an island on Lake Nipigon (Foster Personal Comm, 2016). These occurrences mark a northern extension of the traditional range of both the blue-spotted and the spotted salamanders.

Invertebrates

Little is known about the terrestrial and aquatic insects of Wabakimi and associated waterway parks. Detailed inventories have not been conducted to date; however, limited studies of butterflies, dragonflies and damselflies have been conducted by Northern Bioscience in a life science inventory of Wabakimi Provincial Park in 2004. In this life science report, thirteen species of butterflies, 25 species of dragonfly and 11 species of damselflies were documented. While little is recorded about the insects of Wabakimi, visitors will quickly realize that this does not reflect the absence of insects. Early spring and summer bring black flies and mosquitos. There are also an abundance of ants, flies, and wasps. Crickets, cicadas, and grasshoppers can be heard chirping and buzzing on a hot summer's day, and fireflies may be seen glowing in the air at night. Mayflies, stoneflies, caddisflies, dragonflies, and damselflies can all be seen dipping and diving in the air near lakes, rivers, and wetlands. In their nymph and larval stages, these same insects occupy aquatic habitats and can be observed swimming in the water, alongside water striders, water boatmen, and other water beetles. Wood ticks are now moving northward and are becoming more common in Wabakimi and area.

Table 2. Significant Wildlife Species found in the Wabakimi area

Provincially rare wildlife and/SAR	**Dragonflies**	**Mammals**	**Birds**	**Fish**
		Woodland caribou Wolverine Little brown bat Northern-long eared bat	Black tern, white pelican, Bald eagle Peregrine falcon Common nighthawk Canada warbler Olive-sided flycatcher Barn swallow Bank Swallow Horned grebe Short-eared owl Rusty Blackbird	Lake sturgeon

			Evening grosbeak Eastern Palm Warbler	
Regionally rare wildlife	Ocellated darner, Boreal snaketail, Lake emerald, Kennedy's emerald Forcipate emerald		Sandhill crane, Common tern	
Other regionally Significant Bird Species - With the exception of the barred owl, these are northern species near their southern range limit			Greater yellowlegs, Barred owl, Three-toed woodpecker, Connecticut warbler,	

Fish communities

Information on species distribution within Wabakimi is available from the Broadscale Monitoring program (2012-2014) in which 9 lakes were surveyed within Wabakimi Provincial Park. In addition, 5 Fall Walleye Index Netting surveys (FWIN 1998-2001), 33 Aquatic Habitat Inventories (AHI; 1970s and 80s), and reports from tourist operators all contributed to the data collection of species distribution.

A total of 27 fish species have been reported in Wabakimi. The most common sportfish within Wabakimi include northern pike (*Esox lucius*), walleye (*Sander vitreus*) and lake trout (*Salvelinus namaycush*). These species are found in 22 % or more of the AHI surveyed lakes (Table 3). Brook trout (*Salvelinus fontanalis*) are also found within a few lakes in the northern portion of Wabakimi).

Table 3. Sport fish species information from 76 lakes within Wabakimi Park, 44 Lake Surveys (BSM, FWIN, AHI) and 36 tourist operator websites

Species	Number of Lakes with Species Present	Percentage of Lakes with Species Present
Walleye	58	78%
Lake Trout	17	22%
Northern Pike	56	46%
Lake Whitefish	29	38%

Coolwater and Coldwater Fish Communities

Fish communities in Wabakimi are classified broadly as "coolwater" and "coldwater" with emphasis on dominant sport fish species for each community type. Coldwater and

coolwater fish communities exist independently of each other in separate waterbodies but can also be found within the same water body depending on the shape, depth, and productivity of the lake. Definitions of coldwater and coolwater communities are based mainly on the presence or absence of trout species, primarily lake trout in Wabakimi, which are dependent on coldwater habitat for their survival. Although defined by the fish species, coolwater and coldwater lakes differ in their physical and chemical characteristics with coolwater lakes being generally smaller, shallower, and more productive and with lower water clarity than coldwater lakes.

Coolwater communities are the most abundant fish community within Wabakimi Provincial Park and are widely distributed throughout the park. Of the 76 lakes in the park that have species information, 83% are classified as coolwater fish communities. The most common sport fish grouping within these lakes are walleye and walleye/northern pike communities that are found in at least 39% and 15% of coolwater lakes, respectively. The second most common grouping is walleye/northern pike/yellow perch which is found in at least 9% of the coolwater lakes. In addition to the presence of walleye, northern pike, and yellow perch, coolwater communities commonly include white sucker and a wide variety of minnows (Brown 2007). In lakes with deeper waters (>8m) lake whitefish, cisco and burbot are also common species (Brown 2007). Coolwater sportfish groupings that include lake whitefish, northern pike and walleye are found in at least 12% of lakes in Wabakimi. The nine broadscale lakes surveyed were predominantly walleye, northern pike, white sucker, lake whitefish, yellow perch, and cisco communities with a few deeper lakes reporting sturgeon and burbot present. Smallmouth bass are present in three lakes within the park as an introduced species, and rock bass (also introduced) are found in two lakes immediately adjacent to the park boundary as well as Heathcote Lake in the south-western part of Wabakimi.

Productive Capacity of Fish Populations

The productive capacity (the amount of fish that can be produced kg/yr.) of waterbodies is an important concept in the management of fish populations. Shallower lakes with larger areas of plant growth are more productive than deep lakes with steep shorelines. Lakes in Wabakimi, for which there is data, have greater average depth than other zones in northwestern Ontario and therefore tend to be less productive. A number of factors affect productivity:

- temperature measured in Growing Degree Days (GDD>5°C) 1317 GGD for Wabakimi
- Nutrients measured by total dissolved solids (TDS)
- Lake shape and depth
- Water clarity measured by Secchi depth readings

These factors are used in models to calculate lake productivity referred to as the maximum sustainable yield (MSY kg/ha/yr) for each lake. One of the simplest and most common estimates of productive capacity is the Morphoedaphic Index (MEI) which uses the average depth and the amount of nutrients measured by Total Dissolved Solids (TDS) in a simple ratio to predict the productive capacity for the entire fish community. The productive capacity for Wabakimi is 7.4 which is low for the northwest region (range of 6.2-24.6, regional average 15.6). This may be a reflection of the abundance of deep, cold lakes in Wabakimi but is likely a result of the low number of lakes that have data within the park.

The Status of Walleye Populations in Fisheries Management Zone 2 and 6

The data presented below is for the entire Fisheries Management Zone (FMZ) 2 and 6 which is representational of Wabakimi Park as a subzone[2]. However, it is important to keep in mind that there are likely differences in the fisheries specific to Wabakimi. Discrete physical characteristics of waterbodies and differences in fish community types have significant effects, especially on catch per unit effort (CUE) data. The unique nature of waterbodies, both within and among FMZs, must be noted since physical characteristics including climate, water chemistry, lake morphology, and fish community as well as angling pressure, all exert effects on walleye populations.

Data collected from fall walleye index netting (FWIN) projects conducted across the entire Zone 2; show that the entire zone has walleye populations with traits that indicate a higher density than other populations in northwestern Ontario with increased survival to older age classes. The higher number of larger, older mature fish may be due to the relatively lower exploitation levels compared to other parts of the region. For comparison, a rapid growth rate to maturity and low age of female maturity in FMZ 5 may be a response to both heavy fishing pressure and a more favorable growing environment. Walleye in FMZ 2 mature latest, compared to other zones, possibly resulting from a combination of a cooler climate in FMZ 2 and relatively low exploitation of fish populations

The catch per unit effort (CUE), or average number of walleye caught per net for the 9 BSM lakes in Wabakimi were mostly around the FMZ 6 average of 3.84/net (Figure 6). Three lakes that experience less fishing pressure and are likely more productive stand out on the graph (Sassenach, Kilbarry and Webster). Northern pike CUE in the Wabakimi BSM lakes is obviously lower than for Walleye but the same trend continues with three or four of the lakes looking much more productive than the rest, as compared to the FMZ 6 average CUE of 0.17 northern pike/net (Figure 7).

While the average catch of walleye from Wabakmi Park lakes was similar to other lakes in FMZ 6, walleye populations from Wabakimi tended to have larger sized and older fish than outside the park suggesting lower angling harvest. Status assessment of nine of the populations suggest that Wabakimi Park walleye tended to have higher biomass

[2] See link for map and details on management zones within the province https://www.ontario.ca/page/fisheries-management-zones-fmzs-1-2-and-3.

and lower mortality relative to other FMZ 6 lakes (Figure 9) and all assessed populations were considered healthy (i.e. points fell within the green quadrat in Figure 8). A few of the points fell into the negative simply due to the fact that the observed mortality was actually lower than predicted mortality. This can happen in lakes with lower angling harvest.

According to the data collected from the Aquatic Habitat Inventory, lake trout were present in 36% of the 33 lakes surveyed. No lake trout were captured in the Broadscale Monitoring lake surveys. Further research is required to determine the population, distribution, and status of lake trout in Wabakimi Provincial Park.

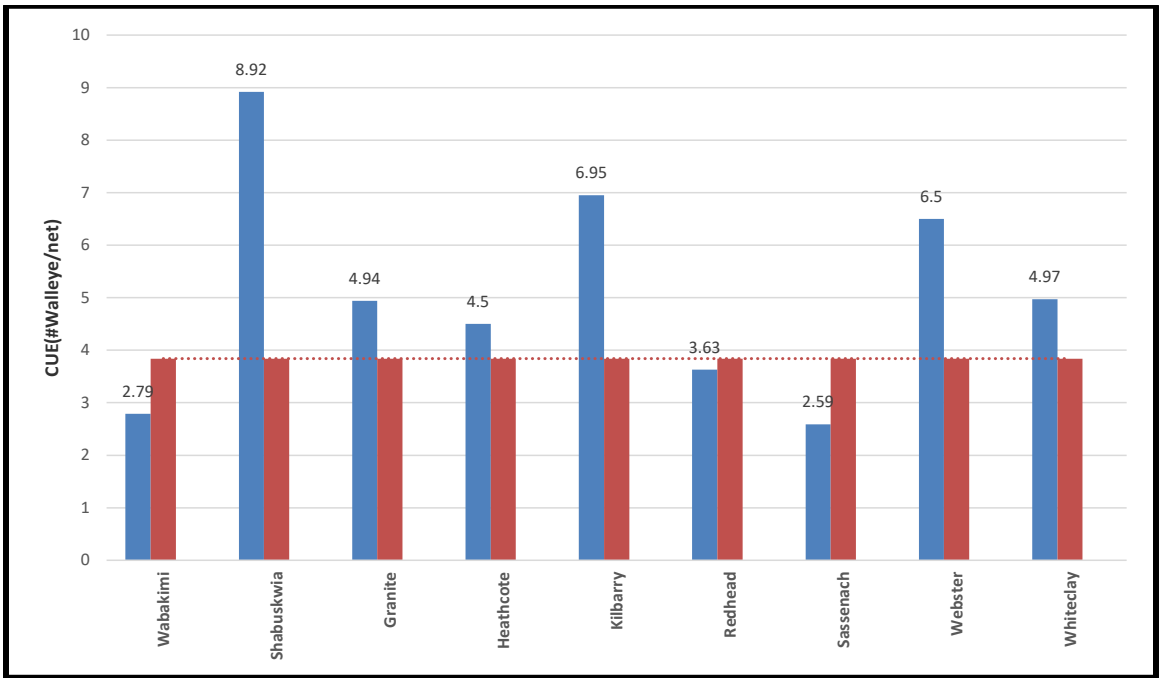

Figure 6: Broadscale monitoring lake catch rates for 9 Wabakimi lakes (Blue) compared to the Fisheries Management Zone 6 average (Red) of 3.84 walleye/ net.

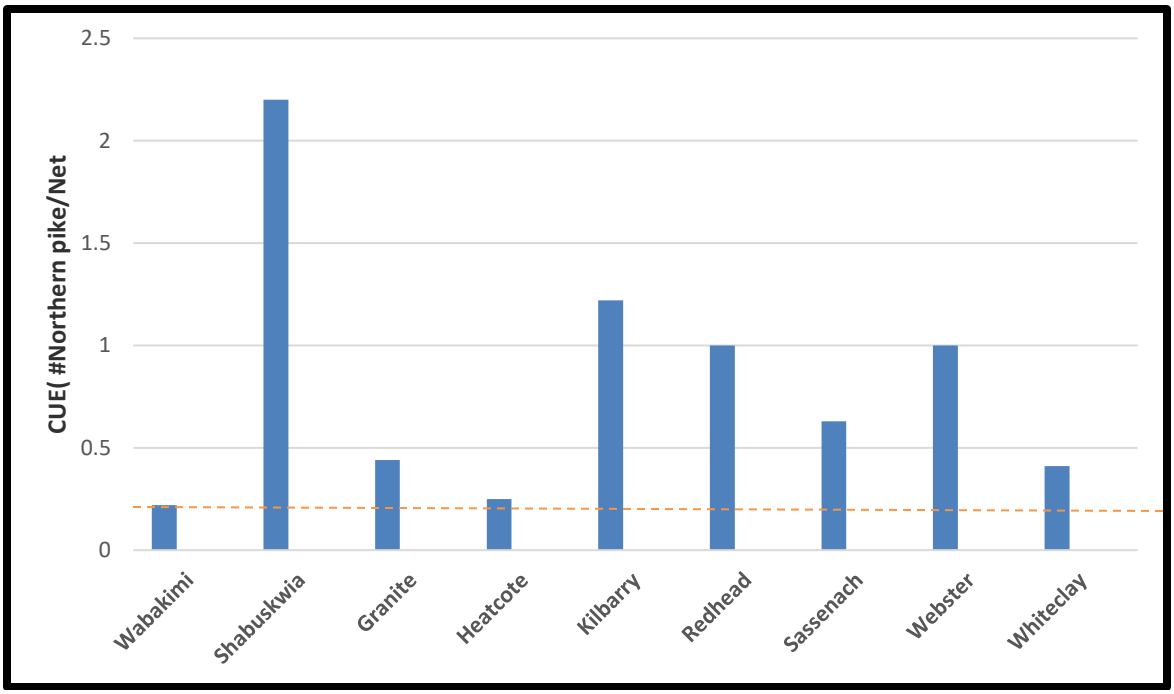

Figure 7: Broadscale monitoring lake catch rates for 9 Wabakimi lakes (Blue) compared to the Fisheries Management Zone 6 average of 0.17 northern pike/net (dotted line).

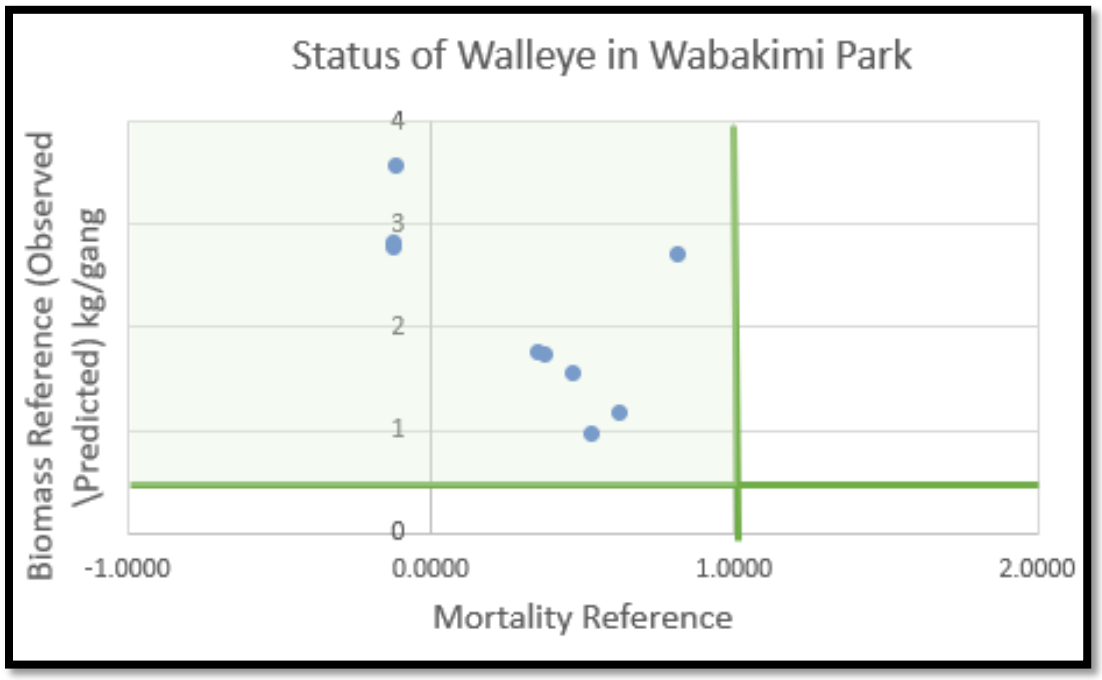

Figure 8: Status of walleye populations assessed by Broadscale Monitoring from Wabakimi Park (2012-2014 data)

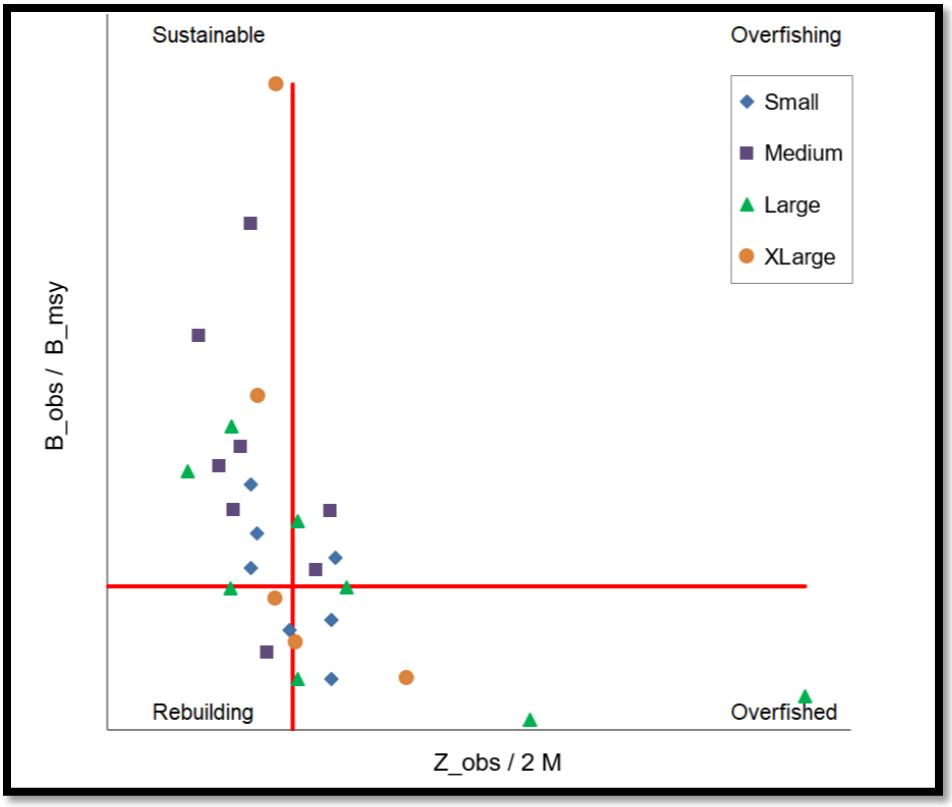

Figure 9: Status of walleye populations assessed by Broadscale Monitoring from Fisheries Management Zone 6 (2010-2012 data).

Species at Risk

Lake sturgeon are the only known aquatic species at risk found in Wabakimi Provincial Park. Two populations are found within the park, the Southern Hudson's Bay / James Bay population and the Great Lakes Upper St. Laurence River population (Table 4).

Table 4. Species at Risk (SAR) fish species found within Wabakimi Provincial Park

SPECIES	**PROVINCIAL STATUS (SARO list)**	**FEDERAL STATUS (SARA list)**	**COSEWIC Designation (Federal)**
Lake Sturgeon – Southern Hudson's Bay James Bay Population	Special Concern	No Status	Special Concern
Lake Sturgeon – Great Lakes Upper St. Laurence River Population	Endangered (2017)	No Status	Threatened

As shown in Table 4 COSEWIC has proposed two Designated Units (DU's) within Wabakimi Provincial Park to be identified federally. While not currently afforded legal protection under SARA 2002, lake sturgeon populations located within DU 8 (Great Lakes Upper St. Laurence) are considered "threatened" by COSEWIC while populations within DU 7 (Southern Hudson Bay – James Bay) are considered "special concern". The proposed DU's for Canada are displayed in table 4 and are in contrast to legislated populations under the Provincial ESA, 2007.

In 2009 the Committee on the Status of Species at Risk in Ontario (COSSARO) evaluated the status for lake sturgeon in Ontario and identified three regions for classification. The northwestern Ontario populations, including identified populations within Wabakimi Provincial Park were classified as "threatened" (an up listing from "special concern") and therefore afforded species and habitat protection under the ESA, 2007. In 2017 this population was reassessed and classified as "Endangered".

Lake sturgeon is a prominent component of the Wabakimi Provincial Park fish community and is well represented in the larger waterbodies. Lake sturgeon is found primarily in the south-central portion of the park in eight lakes of the Upper Ogoki Watershed (LS Atlas, 2001, 2011). These lakes are generally deep coldwater lakes with connecting waterways. However, very little is known about the status and health of these populations as no assessments have been conducted to date.

Within Wabakimi Provincial Park, sturgeon exploitation was significantly reduced well in advance of the designation. Non-Indigenous commercial quotas were purchased, and extinguished, and recreational harvest was virtually non-existent due to a highly restrictive minimum size limit that exceeded the length of all but the most exceptional fish in the area. A minimum total length equivalent of 190 cm (75 inch) essentially resulted in a catch and release fishery throughout the zone. Lake sturgeon continue to be harvested through indigenous subsistence fisheries. These fisheries are generally believed to contribute to a modest harvest although harvest levels are largely unknown. Lake sturgeon is highly valued by many First Nations and can have immense cultural significance.

Introduced and Invasive Aquatic Species

Introduced species are alien species that have become established in ecosystems outside of their natural historic range as a result of human assistance. Once established, introduced species are often referred to as being *naturalized* (Williamson and Fitter 1996). Introduced species are often released to provide economic, social, and occasionally, ecological benefits.

Some species of economic and social value have been introduced to Wabakimi Provincial Park through stocking programs by the OMNRF. The most notable introductions within the parks have been smallmouth bass and rock bass. Historical stocking in Ontario was based on direction from District Fisheries Management Plans as a management strategy to increase angling opportunities. While stocking is a valid

fisheries management tool, current stocking guidelines aim to protect genetic integrity of indigenous communities and favor the management of naturally reproducing populations through regulations (OMNR 1992a). Preference for the management of naturally reproducing populations of native species through regulatory action is also supported through the PPCRA (2006) to maintain ecological integrity of native fish populations and communities.

A small number of lakes within Wabakimi and just outside the park boundary have reported populations of introduced smallmouth bass and rock bass (OMNR Funnel, 2012). Smallmouth bass have been identified in Rove Lake, Caribou Lake, and the Ogoki Reservoir (AHI database). Rock bass have been observed in Whitewater, Heathcote, Wabakimi, Caribou and Smoothrock lakes as well as the Ogoki Reservoir (John Conner Pers. Comm.). Rock bass have also been documented in Kawaweogama and Antler lakes (AHI database) which are part of the Allanwater River system within Brightsand Provincial Park. These introduced species as well as invasive species and threats within Wabakimi (listed in Table 5) have the potential to compromise the Ecological Integrity of Wabakimi Provincial Park (OMNR, 2005). Some of these listed species are not yet discovered in the park but if proper measures are not taken, there is the potential that they could be unintentionally introduced to the parks.

Table 5. Aquatic introduced species, invasive species and threats within Wabakimi

Aquatic Introduced Species		**Pathways of Invasion**	**Occurs in Wabakimi**
	Rock bass (*Ambloplites rupestris*)	FMZ 4, FMZ 6	Yes
Aquatic Introduced Threats		**Pathways of Invasion**	
	Smallmouth bass (*Micropterus dolomieu*)	FMZ 4, FMZ 6	Yes
Aquatic Invasive Threats		**Pathways of Invasion**	
	Rusty crayfish (*Orconectes rusticus*)	FMZ 4, FMZ 6	No
	Spiny water flea (*Bythotrephes longimanus*)	FMZ 4, FMZ 5, FMZ 6	No
	Freshwater jellyfish (*Craspedacusta sowerbyi*)	FMZ 4	No
	Rainbow smelt (Osmerus mordax)	FMZ 6, Lake Nipigon	No
	Viral Hemorrhagic Septicemia (VHS)	Southern Ontario	No
	Invasive common reed grass (*Phragmites australis subsp. Australis*)	FMZ 4, FMZ 5, FMZ 6	No

4.3 Earth science values

4.3.1 Bedrock Geology

Wabakimi, Whitesand and Kopka River provincial parks lie within the ***Canadian Shield***, an expansive rock terrain of Precambrian age, which underlies half of Canada and is comprised of some of the oldest rocks on earth (Appendix I; Figure 9 B).

The Canadian Shield is divided into several provinces and subprovinces based on broad differences in age, internal structural trends, and rock type. The Wabakimi/Kopka

area is situated in the largest of these, the ***Superior Structural Province***, which extends from Lake Winnipeg in Manitoba to Ungava Bay in northern Quebec. The rocks of the Superior Province are of Archean age, having been formed between 2.5 and 3 billion years ago, and are characterised by a number of alternating volcanic-and-sedimentary rock-rich orogenic (mountain-building) belts, and granitic masses. The volcanic rock belts, in this case referred to as *greenstone belts*, typically have high mineral potential.

Wabakimi and Whitesand provincial parks contain elements of two subprovinces of the Superior Province. These are the *Wabigoon Subprovince* in the southern portion of the parks and the *English River Subprovince* in the parks' northern sectors (Card et. al. 1993; Ontario Geological Survey 1991a). Metamorphosed volcanic rocks that represent an 'island arc' environment dominate the Wabigoon Subprovince. The English River Subprovince consists of metamorphosed sedimentary rocks, which are thought to have originated in the basins between the volcanic island arcs. These sedimentary and volcanic rocks were subjected to igneous intrusion approximately 2.7 billion years ago. These intrusions occur as small dikes or as larger bodies called plutons. Within Whitesand, the area between Highway 527 and the north end of Gort Lake is found within the Wabigoon Subprovince, while the area to the north is found within the English River Subprovince. A provincially significant major fault line separates these two subprovinces and is evident along a line running from the south end of Rattle Lake to Linklater Lake to the west. Within Wabakimi, numerous individual plutons have been identified, including the Smoothrock Lake Pluton, two smaller plutons on Wabakimi Lake, and the Outlet Bay Pluton adjacent to the eastern boundary. The English River subprovince consists of a variety of granitic rocks and migmatites. The granitic rocks consist of plutons of variable size, including those at Redman Lake, Grayson Lake and in the Webster-Dawn Lakes areas. The shattered and broken (cataclastic) rocks of the Pashkokogan Lake - Kenoji Lake fault zone form the boundary between the English River and Wabigoon Subprovinces. The portion of Whitesand Provincial Park occurring in the English River Subprovince is found in the Abamasagi batholith, which is comprised of a peraluminous granite suite (Breaks 1992).

The western two-thirds of Kopka River Provincial Park are located in the Superior Structural Province's Wabigoon Subprovince. The park's eastern end, however, occurs within the Nipigon Embayment of the Southern Structural Province. The Nipigon Embayment, previously known as the Nipigon Plate, consists primarily of younger sedimentary rock (pre-Keweenawan Sibley Group) and intrusive sheets of volcanic rock (Keweenawan Nipigon diabase sills) that lie unconformably on the older rocks of the Superior Province. The subsequent erosion of these rock types produced the distinctive terrain that is characterised by high remnant mesas (e.g., Inner Barn Island in Wabinosh Bay).

To date, mineralization's of economic interest have not been developed in the Wabakimi area. Sporadic mineral exploration occurred in the vicinity of Caribou, Smoothrock, and Brennan lakes, which focused on gold-bearing quartz veins. In 1943, the first authentic discovery of tin in Ontario was made in the Linklater Lake area, located southeast of

Whitewater Lake. The greenstone belts occurring in the vicinity of Caribou Lake and the Misehkow-Albany River continue to be of economic interest to mining exploration.

4.3.2 Surficial Geology

Although the research literature shows a wide variation of dates for when the Wabakimi area was last free of ice, the consensus centres around 9000 years B.P. (before present). The original Wabakimi park boundary configuration depicted, in both space and time, a somewhat narrow range of events and associated processes (i.e. erosion and deposition) related to the advance and subsequent retreat of the ice-front and the later, lowering stages of a waning glacial Lake Agassiz in this area.

The Wabakimi expansion to the north, south and east, however, includes much wider range of glacial history and, in doing so, incorporates numerous elements not previously represented in the park (Appendix I; Figure 9A). Based on the research literature's scenario, the Wabakimi expansion southwards incorporated higher and older levels of Lake Agassiz and their respective spillway outlets to what is now the Lake Nipigon basin. The expansion northwards and eastwards records the final demise of Lake Agassiz in this area and includes provincially significant elements of the contemporaneous Whitewater Moraine, which marks a brief halt in the ice's retreat northward. It also incorporates a number of additional, but somewhat later, glacial events and associated features related to ice advances and retreats such as the Crescent Moraine and the large Agutua/Nakina morainic complex. The elements of the Agutua and Nakina moraines captured here are also considered to be provincially significant. The entire Agutua Moraine extends over 400 km in length across northwestern Ontario and exceeds 150 m in height creating the most massive, elevated moraine topography in the province. The immensity of this moraine is staggering and demonstrates the degree of glacial melting and sediment deposition in late glacial time.

The Nipigon Moraine consists of a discontinuous but extensive series of ice-contact moraine ridges and kames along the west side of Lake Nipigon. For most of its length this moraine is a single ridge feature but within Wabakimi Provincial Park the moraine consists of broad accumulations of ice-contact sediments. Multiple ridges and linear troughs suggest this was an interlobate moraine feature formed between different lobes of the melting glaciers in the area. The moraine in the area of Whiteclay Lake is notable and features significant topographic relief typical of interlobate moraine formation. As a result, this section of the moraine is considered provincially significant (Kor 1994).

In addition, associated with this moraine is an ice-contact fan deposit north of Musgrove and Killbarry lakes which was deposited in Lake Agassiz and, like the moraine itself, is considered provincially significant.

Current research indicates that glacial ice over-rode features that mark older ice-halt positions (e.g., near the confluence of the Shabuskwia and Albany rivers). Associated with these post-Agassiz events were the various phases of glacial Lake Nakina, which expanded and contracted in tandem with the oscillating ice-front. The highest Nakina

level, which backed up the Ogoki drainage system beyond Whitewater Lake, may have briefly been contiguous with a high-level lake in the Lake Nipigon basin. When the level of this latter lake fell, it stranded Lake Nakina behind the height of land. During this period, when the ice-front was stretched across the Ogoki River valley, Lake Nakina managed to spill over the drainage divide into the Nipigon basin through the upper reaches of what is now the Pikitigushi River system. The Pikitigushi Spillway was the last spillway to operate in the northeastern portion of the glacial Lake Agassiz basin and consisted of a system of channels through the Nipigon Moraine. This spillway drained the Gimli phase of glacial Lake Agassiz as well as the final stages of glacial Lake Nakina. It is an integral part of the complex deglacial history of this area, which is noted for being the confluence of three major moraine systems (Nakina, Agutua, Nipigon), and as such the Pikitigushi Spillway is considered to be a provincially significant feature (Kor 1994).

The Kopka River system is believed to have been one of the spillway channels that facilitated the lowering of Lake Agassiz. Thus, the Kopka River corridor records a chronology that marks the advance to the Nipigon Moraine position at Pishidgi Lake roughly 9600 years ago, the drawdown of Lake Agassiz, as well as subsequent events down to the present level of Lake Nipigon. Shoreline scarps and step-down delta surfaces within the Kopka, and other river valleys on the west side of the Nipigon basin reflect receding levels of a waterbody, which, at its highest levels, straddled the divide separating the Hudson Bay (Arctic) and Great Lakes watersheds. Opportunities to represent such features within the river corridor include the north shore of Kopka Lake and the diabase uplands east of Wabinosh Lake.

Both Barnett (1992) and Prest (1968) suggest that the Whitesand Provincial Park area was overlain with Labrador Sector Laurentide ice until ~ 9.5 ka[3] before present (BP) (early Holocene). However, Zoltai (1965) suggests that the Whitesand area was overlain with ice from the Hudson Bay ice mass rather than the Labrador Sector ices. Prest (1968) provides a more detailed glacial history of the area with the ice front being stationed over the northern Lake Nipigon area between 10.3 – 10 ka BP. During this period of time, a number of advances (Marquette Phase) and retreats (Gribben Phase) occurred (Webster 2017). Around 9.5 ka BP, glacial Lake Kelvin developed along the ice front to the north, however, it appears that the Whitesand area was still under thick ice sheets. Circa 9 ka BP, the ice front retreated to the northeast to the Ogaki Reservoir area. Glacial lakes Nakina and Agassiz appear to merge around 8.7 ka BP, covering the entire Whitesand area. It is believed that the Whitesand valley was most likely a glacial spillway for glacial Lake Agassiz (Barnett 1992).

Similar evidence of glacial activity occurs in a number of distinct landscapes within Wabakimi. These include: broad expanses of bedrock that were cleared of surficial materials by ice and/or Lake Agassiz waves; areas of ice-deposited silty sand till drift materials (both lodgement and ablation-related) shallowly overlying bedrock; large lacustrine/eolian sand plains with areas of poorly drained patterned peatlands, which together, denote former lake beds of glacial lakes Agassiz and Nakina (e.g., Lonebreast

[3] the abbreviated form of ‘kilo annum’, depicting time in ‘thousand year’ units.

Bay, Whitewater Lake, Whiteclay Lake, headwaters of the Nemo River and Ballast Creek); large, discontinuous agglomerations of sand and gravel that mark major ice-halt positions (e.g., Whitewater Moraine, Crescent Moraine, Agutua/Nakina morainic complex); and complex areas of glacio-fluvial sand and gravel deposits that were laid down as broad planar aprons of outwash extending some distance outward from the ice or high relief ice-contact landforms such as eskers and kames (e.g., from Whiteclay Lake north to the Albany River).

Important, but smaller scale landscape features include northwest-southeast trending sequences of short narrow De Geer or washboard moraine ridges that formed at ice-edge in Lake Agassiz and are now an integral part of the remnant lake floors (e.g., Muskiga Lake, Burntrock Lake, Elf Lake-Berry Lake area, Wabinosh Lake, Pishidgi Lake); ice-molded drumlinoid ridges that denote the direction of ice-movement (e.g., west of Wabakimi Lake); and glacio-fluvial ice-contact landforms such as eskers (e.g., Kenoji Lake, Davies Lake, Goldsborough Lake, Wabinosh Lake) and ‘perched’ or ‘hanging’ deltas (e.g., Kilbarry Lake, Ballast Creek).

Much of the old lakebed of Lake Agassiz in the park provided material for the development of aeolian dunes in a post-glacial environment prior to vegetation. The dunes range from subdued irregular mounds, single parabolic, longitudinal ridges, and complexes of well-developed, compact, inter-related parabolic and longitudinal dunes with intervening peatland and wetland pockets. A total of eight dune areas were identified within the park with three sites considered to be provincially significant as they form a relatively contiguous arcurate band. These three sites are situated along the i) south side of Ogoki River/Whiteclay Lake, ii) the east side of Whitewater Lake, and iii) the north side of Whiteclay Lake. The dunes on the south side of the Ogoki River are noted to be topographically the highest dunes on the Agassiz lake-plain. The largest individual dune is located in the Smoothrock Lake-Lonebreast Bay area but is somewhat isolated from other dune areas.

4.3.3 Soils

Bare bedrock is a ubiquitous feature of Wabakimi and Kopka River provincial parks. The prevalence of bedrock relates to the effects of glacial ice scouring and Lake Agassiz wave washing. The genesis or origin of the unconsolidated soil materials, however, reflects depositional activity and can be classed as glacial or ice-related, glacio-lacustrine/lacustrine (i.e., lake-deposited), eolian (i.e., wind-deposited), glacio-fluvial (i.e., water-deposited material in close association with glacial ice), alluvial (river-related) and colluvial (gravity-related). In addition, there are organic deposits that have developed ‘in place’. With minor exceptions, the mineral soils typically fall into the sand-dominated texture classes (e.g., sand, silty sand, loamy sand, sandy loam). These sands are typically low base (i.e., acidic), reflecting their local bedrock provenance (i.e., granites), and are, consequently, low in nutrient availability. Although not proven, the soils along Wabakimi’s eastern side may be somewhat more basic (i.e., less acidic) given a possible increase in carbonates related to ice incursions in this area from the Hudson Bay Lowlands. For similar reasons, the soils in this area of the park are deeper.

Depending on their origin and local conditions (e.g., drainage), the coarsely textured, well-drained, sand-dominated mineral soils in the parks typically develop into Humo-Ferric Podzols. In certain localised circumstances (e.g., finer-textured loamy materials) the soils might be mistaken for podzols but appear to be Dystric Brunisols with weakly or strongly expressed eluviated horizons (i.e., eluviated Dystric Brunisols). The Dystric Brunisols are sometimes referred to as Mini Humo-Ferric Podzols. Although there is no systematic proof, the Brunisolic category may have increased, on a relative basis, with the expansion of Wabakimi to the east. Gleyed versions of the Podzolic and Brunisolic types occur on poorly drained sites (e.g., lower slopes) and Peaty Phase Orthic Gleysols develop on wet sites where peat depths are less than 40 cm. Deeper organic soils are usually Terric Fibrisols and Fibric Humisols depending on the degree of decomposition and peat depth. Peat depths of two metres typically characterise the larger peatlands, however, depths of four metres have been encountered. Orthic Regosols, which have a sporadic occurrence in the parks, are associated with boulder pavements in former spillway channels or pockets of boulder lag that are residual from the reworking of till drift and De Geer moraine ridges by Lake Agassiz. Although it requires verification, it is expected that Wabakimi's soil diversity has been enhanced by the northerly expansion of the park where there appears to have been over-riding of older morainic landforms by later ice advances.

4.4 Watersheds

The Arctic-Atlantic Continental Divide passes through the southeastern extremities of Wabakimi Park, and in some areas, such as south of Aldridge Lake, approximates a physical boundary between Wabakimi and Kopka River Parks (Appendix I; Figure 10). Most of Wabakimi Provincial Park is located within the Ogoki River drainage basin of the Arctic (Hudson Bay) watershed. Downstream from Wabakimi, water in the Ogoki system is controlled to flow either through its natural course to the Albany River, or into Lake Nipigon via the Ogoki Diversion. The 1943 Ogoki Diversion was created to provide water for additional electricity generation at Niagara Falls, in support of the war effort. This project involved the creation of the Ogoki Reservoir, part of which extends into eastern Wabakimi, downstream from Whiteclay Lake. The dams associated with the diversion do not affect the Ogoki River system water levels above the reservoir. Most of the Ogoki River headwaters and a significant area of Albany River headwaters are included in Wabakimi, creating a desirable situation where water flow originates from within a protected area and travels out.

The majority of Kopka River Provincial Park drains into Lake Nipigon. Sparkling Lake, at the extreme west end of the Kopka system drains into the Brightsand River in the Arctic watershed. Whitesand River in Whitesand Provincial Park also drains into Lake Nipigon.

4.5 Climate

Northern Ontario is characterised by a *modified continental* climate, with long, relatively dry winters and warm to hot, and at times humid, summers. Modified continental refers to a climate moderated by the influence of large water bodies (e.g. Lake Superior, Lake

Nipigon, Hudson and James Bay), although, Wabakimi is sufficiently distant from any large water body to be only minimally affected by its modifying influence. However, that portion of Kopka River Provincial Park in close proximity to Lake Nipigon will experience some temperature moderation as well as higher humidity levels. Wabakimi is located within the northern portion of the *Height of Land* climatic region, and the southern portion of the *Albany* climatic region, while Kopka River is located in the middle of the Height of Land climatic region. Wabakimi and Kopka River are both situated in Ecoregion 3W, a 'dry-humid' zone.

Primarily due to its northern latitude (between 50°N and 51°N), summers in the Wabakimi area are characterised by long, sunny days, with a maximum of 16½ hours of sunlight on the summer solstice. High summer is from about June 7-10 until September 1-5 (82-87 days). Winter sets in around October 27-31 and lasts until April 22-26 (177-183 days). The average length of the growing season (when the mean daily temperature exceeds 5.5°C) in the area is 140-155 days. The average frost-free period is 75-100 days; however, frost can occur any month of the year.

The mean temperature during July is 16°C (62°F), and for January is -17° to -20°C (1°F). The temperature distribution pattern in the park area is *bi-modal*. About 30% of the time, the temperature is above average, with winds out of the southwest to west; 25% of the time, the temperatures is below average, with north through east winds. Summer winds (in descending order of frequency) are from the west, southwest, north, and east. Summer wind speeds average 15 km per hour.

The weather in the Wabakimi area tends to be changeable, although this is less evident in winter than in summer. In winter, cold polar air masses produce dry, clear weather. In summer, cyclonic air masses pass through, warm humid air masses from the south alternate with cooler and drier air from the north. During the summer, there is a frequent occurrence of afternoon cloud due to daytime heating, and late afternoon thunderstorms are quite common.

Total annual precipitation (approximately 750 mm) is considered moderate and occurs throughout the year. This includes snow depths of 30 to 60 cm on average. During the high summer season, there is a 25 % to 30 % frequency of days with precipitation totalling 0.25 mm or more. Summer visitors often find that "it will be a nice day, if it doesn't rain."

The trees do not leaf out before late May or early June and leaves begin to fall in early to mid-September. Although the summer season is short, it is generally quite warm. Water temperatures often exceed 20°C (70°F) by mid-summer, which is warm enough for comfortable swimming. After mid-August, the water temperatures tend to drop off quickly due to cool night temperatures.

Fall arrives comparatively early, beginning in late August. Freeze-up usually occurs in mid to late November, with break-up occurring in early to mid-May (the mean date is

May 10). The lakes tend to be equally divided between six months frozen and six months ice-free.

The short, spring shoulder season usually lasts about twenty days. In May, daytime highs average 20°C. Despite the warm days, overnight lows are -5°C or colder. The spring shoulder season ends with the sudden arrival of summer, due, in part, to the lack of nearby moderating water bodies.

Warmer-than-normal microclimates occur on high, bare, exposed bedrock knolls and ridges, as well as on the coarse sands and gravels of the higher glacio-fluvial landforms, and on broad sand plains. Dry and very dry moisture regimes characterise these sites. Colder-than-normal microclimates are associated with swamps, low-lying basins, and the steep north-facing slopes of the diabase uplands.

5 CULTURAL HERITAGE VALUES

The precontact (time before Europeans arrived), postcontact, and traditional use of Wabakimi, Whitesand, and Kopka River provincial parks by First Nation, other Indigenous people, and Euro-Canadians is significant. Evidence of longstanding use of this cultural landscape by Indigenous people includes artifacts finds, habitation sites, pictographs, burial sites, quarry spots, and flintknapping locations (chipping certain stones to make tools) (Adams, 1988; Arthurs, 1986; Hinshelwood, 2018). Anishinaabemowen names for culturally and spiritually significant sites throughout these parks further indicate the deep-rooted knowledge and long relationship between Indigenous peoples and the land. There is often considerable overlap between sites occupied in the distant past and those in contemporary use. Often, the best sites have been subject to use throughout the centuries, since they offer scenic and practical geographic attributes.

Like many other areas in Northern Ontario, very limited archaeological research or cultural resource management assessments have been completed in the Wabakimi and Kopka River provincial parks since research is expensive and archaeology is often development driven. However, all three parks' areas are deemed to have high potential for archaeological sites, particularly due to their travel connections with the Albany River and Lake Nipigon, where much research and many sites have been documented (e.g., Adams, 1988; Dawson, 1976a, 1976b). To date, a total of 44 known archaeological sites have been registered with the Ontario Ministry of Heritage, Sport, Tourism, and Culture Industries within Wabakimi Provincial Park and 14 within the bounds of Kopka River Provincial Park. There have been no sites recorded within Whitesand Provincial Park at the time this document was written but undoubtedly, they exist given the thousands of years that the area has been occupied.

Pictographs, or paintings made using red ochre pigments on bedrock, are direct evidence of ancient cultural heritage in the parks area. Several pictograph sites are found along the Kopka, Allanwater and Palisade rivers, and near Wabakimi, Smoothrock and Cliff lakes. Pictographs are considered sacred sites by Indigenous people and are usually found on vertical cliff faces near the water's edge, creating a

spectacular location for viewing from the water. Pictographs often contain human or animal figures and were painted with a mixture of ground hematite or red ochre (iron oxide minerals), mixed with animal grease or fish oil. While it is likely that most of the paintings were completed during the late Precontact period and perhaps into the post-contact, these pictographs remain of high cultural and spiritual significance to today's Indigenous people. Most Elders recommend that people leave tobacco or other offerings at these locations, to signify respect at these places and that people should not touch or alter the paintings.

Located in Wabakimi Park on the Pikitigushi River system, Cliff Lake is one of the most significant pictograph sites in Northern Ontario (Dewdney and Kidd, 1967). The lake is a narrow channel about 5 km in length, flanked on both sides by massive cliffs. The cliff faces contain at least 60 panels of pictographs in images that seem to indicate thunderbirds, canoes, caribou, and others whose identity is unclear to the modern viewer. Although we may draw inferences, only the painter would have known exactly what was being conveyed. Dewdney and Kidd (1967:140) describe this site as an "…age-hallowed place, where paintings were made at different intervals over long periods of time". The Cliff Lake pictographs are of national, perhaps even international, significance due to the highly unusual location, number, and variety of paintings that are preserved there. Recently, a significant and rare source of red ochre was found on Smoothrock Lake (Hinshelwood, 2018) indicating that the paint for nearby pictographs may have been sourced there.

Evidence of a complex cultural history in these three parks also includes landscape modifications such as fish traps, tree clearing, and distribution of wild rice. In the Northwest side of Wabakimi Park around Savant Lake, just to the west of the park boundary and Metig Lake, are some examples of significant wild rice beds (Zizania sp. and manomin in Anishinaabemowen). Wild rice has traditionally been sown in shallow water along the paths of Indigenous peoples' travel routes. It was spread not only as a main subsistence item and source for trading but also to provide food for ducks and muskrats. The purpose was to increase the population of these animals to improve hunting and trapping of them (Vennum, 1988). After many millennia, wild rice, and other plants (medicinal and subsistence) continue to play an important role in the food supply and culture of Indigenous people in this area of the boreal forest.

5.1 The Precontact Period

5.1.1 Early or Palaeo Period

The first human inhabitants to occupy Northern Ontario were Indigenous people who hunted big game on the tundra-like environment near the retreating Laurentide ice sheet and glacial Lake Agassiz (see Section 4.3). This timeframe is known as the Early or Palaeo Period, dating between about 9,000 - 7,000 years before present (BP or before AD 1950). It is characterized by people making large, lanceolate shaped spear points, bifaces, and large scrapers with beautifully made chipping patterns that are usually made from local materials such as quartz, jasper taconite, or chert (Ross, 1995). No evidence of artifacts or sites representing the Plano Tradition of the Interlakes

Composite cultures have been found within the three parks yet; however, minimal archaeological surveys have taken place. It is likely that extensive trade networks had been set up already into Northern Ontario at this time since some ‘exotic’ lithic materials have been found such as Hixton Silicified sandstone (Wisconsin) and Knife River flint (North Dakota) (Ross, 1995). The closest evidence of artifacts or sites in this period are found to the south at Dog Lake and the Thunder Bay region (e.g., Ross, 1995) as well as near Sioux Lookout (Pilon and Dalla Bonna 2004).

5.1.2 Middle or Shield Archaic Period

Beginning approximately 7,000 years BP, there is evidence across Northern Ontario to indicate there was a significantly different transition from the technologies and economies of earlier Indigenous cultures. This change is labelled as the Middle Period (or previously as the Shield Archaic), which lasted until about 2,200 years ago. Despite being the longest archaeological period, it is the most poorly understood by archaeologists due to a lack of research and data. As a result of the changing climate and distribution of plants and animals, a shift was necessitated from subsistence hunting to gathering a wider range of plant and animal food sources. People started making dart stone projectile points as part of atlatl (throwing spear) technologies, rather than earlier spear points. Perhaps the most unusual invention of the Middle Period cultures in Northern Ontario was mining and altering native copper from the shores of Lake Superior to make hammered and annealed tools or ornaments. The people of Middle Period likely descended from earlier Indigenous people in the boreal forest north of Lake Superior.

Hinshelwood (2018) and colleagues completed a brief survey of one part of Wabakimi Provincial Park and found at one site a corner-notched projectile point, which is indicative of the late Middle Period. Limited evidence of Middle Period occupations has been found within the parks, thus far, but sites of this age are present throughout the immediate Thunder Bay area (e.g., Hinshelwood, 2004). It is likely that further archaeological research will provide more evidence of these occupations within the Wabakimi, Whitesand, and Kopka River parks area.

5.1.3 Middle Woodland (Late Period)

The hallmark of Indigenous cultural changes characteristic of the Late Period (~2,200 – 1,000 BP) is the invention of earthenware pottery and a switch to bow and arrow hunting technologies. Within Northern Ontario, the archaeological cultures of the Middle Woodland period are best known as the Laurel “Configuration”, who made conoidal shaped, hand-built pottery wares that were smoothed on the exterior and usually highly decorated with various forms of stamping (Reid and Rajnovich, 1991). Lithics and projectile points were made much smaller than earlier times in the form of side-notched types of typically local stone materials (e.g., Hinshelwood [2018] reports one example made of Hudson Bay Lowland chert at a site in Wabakimi Provincial Park). More evidence of seasonal gatherings of people for subsistence and social purposes has been found during this period, resulting in larger encampments represented at prime

fishing locations. Laurel Configuration sites indicate developed and expanded trade routes used in earlier times.

5.1.4 Late Woodland (Late Period)

The Late Woodland Period (ca. 1,000 until after European contact) is distinguished due to evidence of widespread changes in pottery technologies and a switch to manufacturing some triangular arrow projectile points (along with continuing side-notched forms). During this period, Indigenous people started making globular shaped pots in textile bags with minimal decorations, which was a new technological innovation. More specific archaeological cultures are evident in Northern Ontario, through the finding of distinctive Blackduck, Selkirk, and Sandy Lake pottery wares (e.g., Dawson 1976a), indicating different groups of Indigenous people were present. The parks are located geographically where many cultures would likely have interfaced as suggested by postcontact and more recent usage.

There was a similarity of resource use between the Middle Woodland Laurel and those later cultures that made Blackduck/Selkirk/Sandy Lake wares relating to hunting, fishing, and gathering wild rice and other plants. In addition, the Late Woodland Period also saw changes within societies that likely increased migrations, population, and communication since there are many more sites represented with this timeframe.

5.2 The Postcontact Period

5.2.1 Early European Contact and the Fur Trade

In precontact times, North American Indigenous peoples had well-established trade routes, which were used for thousands of years to transport trade materials for thousands of miles (e.g., lithic raw materials for stone tools such as Knife River flint transported from North Dakota into Northern Ontario). These routes and the intimate knowledge the Indigenous peoples have of the landscape, were the foundations upon which the fur trade was built.

By the 1660s, trade links had been established from Lake Nipigon through to the Albany River and Hudson Bay. Some of these routes passed through both Wabakimi and Kopka River provincial parks, and sites bearing traces of these activities are found within the parks (e.g., Arthurs, 1986). With the establishment of English trading posts on Hudson Bay during the 1670s, the stage was set for centuries of many Indigenous people being involved in the fur trade.

By 1784, a trading post had been established by French traders at Rocky Island Lake, just east of Collins, Ontario. Slightly later, in 1799, the XY Company was established with the intention of breaking the NWC monopoly in the west. Competition between the English and French meant typically better fur prices and for the purchase of food, tools, and trapping supplies. However, this intensified competition for finite furs also led to the rapid depletion of many of the fur bearing species. By 1805, the XY Company was

absorbed by the NWC and again the main rivals were it and the Hudson's Bay Company (HBC), leading to a period of fierce competition, intimidation, and violence. After almost half a century of intensive trapping, the game returns from the region were minimal and the beaver had largely disappeared, where it had once been abundant.

This period was devastating for many people in Northern Ontario. Although many Indigenous people continued a lifestyle that was similar to that of their ancestors, after decades of involvement in the fur trade many had also come to rely on the various trading companies. As fur returns diminished, it became more difficult for people to acquire the supplies they needed to survive from the forest or from the trading companies. European diseases made a huge impact on Indigenous populations that had no immunity.

In 1821, the HBC had amalgamated with the NWC, thus forming a monopoly of trade throughout Northern Ontario. Wabinosh House, located on Wabinosh Bay, operated from 1821 until around 1850. This was at, or nearby, the earlier NWC site of Fort Duncan which operated from approximately 1795-1821 (Dawson, 1969). The post was later moved 10 miles south and renamed Nipigon Post, only to once again be renamed in 1900 to Nipigon House, and again in 1954 to what is now known as Gull Bay (Jones, 2015).

After 1840, beaver hats were no longer as fashionable in Europe and hunting pressure on the beaver was reduced. The HBC continued to operate its trading posts throughout the remainder of the century. However, with the decline of the fur trade in Northern Ontario in the mid to late 1800s, entrepreneurs gradually became interested in other commercial activities such as fishing, prospecting, mining, and forestry, marking the beginning of a new era.

Part of the more contemporary culture history of the three parks also includes trap cabin ruins. Perhaps one of the more notable recent examples are the Wendell Beckwith residences in eastern Whitewater Lake. In his early years, Beckwith was a scientist and inventor at the Milwaukee Tool Company and Parker Pen, where he helped refine the workings of the ballpoint pen. Beckwith settled at Best Island in 1964 and, with the help of local First Nation people, built three cabins. He also assisted with the design and construction of a church in Collins, Ontario, and the main building at Ogoki Lodge. He spent much of his time carrying out scientific research, which included studies of astronomy, gravity, and higher mathematics, especially the number pi, as well as research into log architectural design.

Although he was typically a recluse, Beckwith hosted some visitors, becoming somewhat of a local folk hero. Since his death in 1980, his cabins have remained accessible to the public who continue to visit the site. Many of his research papers and artifacts were collected for one of his buildings, known as 'the Museum', and are stored in Collins and in the Thunder Bay Historical Museum. Discussions with interested parties needs to occur to determine next steps for this site.

In the early 1900s, the CNR arrived in the Armstrong - Sioux Lookout area bringing important changes including employment for some local Indigenous peoples and many newcomers. The rail line continued to attract people and Armstrong emerged as a small town, particularly with the establishment of the radar base after World War II. Small towns like Savant Lake, Allanwater Bridge and Collins also had railroad stations and prospered. Savant Lake had become established with the opening, in 1905, of the Saint Anthony Goldmine located south of the town. Allan Water had a booming sawmill business and Collins was a loading point for chromium mined from south of the community. Tourists soon became aware of the attractions in the area, arriving first by train and later by road, marking the establishment of a strong local commercial tourism industry. Until the 1950s, the main form of transportation used in the area were dog teams and boats until provincial highways were built.

Although the traditional lifestyles of the area's Indigenous peoples have changed a great deal over thousands of years, communities that have traditional use areas within the three parks retain a particularly close relationship with this boreal forest landscape: Indigenous Elders have described traditional routes used in their family's and their own lifetimes between communities, such as the use of current recreational routes combined with the Witchwood/Atwood Rivers to travel from Namaygoosisagan to Eabametoong First Nation. Today, some Indigenous peoples from surrounding areas reside seasonally in the parks pursuing traditional practices and food by fishing, hunting, trapping, and harvesting plants. They will continue to exercise their Treaty and Aboriginal rights within the boundaries of these parks.

6 RECREATION VALUES

The landscape of the Wabakimi, Kopka River and Whitesand provincial parks is made up of numerous large lakes, rivers, rapids, and waterfalls, along with rolling hills, rock outcrops, black spruce bog and muskeg, and occasional steep cliffs and beaches, provide a rich diversity of interconnected waterways with rugged and scenic landscapes. These landscapes provide opportunities for high quality wilderness recreation and backcountry travel, including fishing, canoeing, camping, swimming, and hunting, as well as potential opportunities for hiking, backpacking and cross-country skiing. Many park visitors use the services of the fly-in outpost camps and lodges located throughout the parks, with high quality sport fishing as the traditional business for many of these establishments. Moose hunting also occurs within the expanded area of Wabakimi, and Kopka River and Whitesand.

7 RESOURCE USE

7.1 Customary Practices

Indigenous people maintain a close relationship with the land. Customary activities such as vegetation management, hunting, gathering, fishing, and trapping form an integral part of the cultural landscape. Lewis (1977, 1982) has shown that Indigenous people

regularly burned certain habitats to improve game and plant resources at least as far back as the mid-1800s.

Wild rice planting and harvesting is another customary practice. Wild rice has traditionally been sowed in shallow water along the paths of First Nation travel routes. It has also been determined that rice was transplanted not only as a main food and economic source but also to provide food for ducks and muskrats. The purpose was to increase the population of these animals to improve hunting and trapping (Vennum, 1988). Wild rice will continue to play an important role in the food supply and culture of First Nation people.

Indigenous peoples within Ontario have rights agreed upon through Treaties that are protected under the Canadian Constitution, and include the right to hunt, trap, and fish for subsistence on traditional lands. First Nation trappers still work the lakes, rivers, streams, and landscape within Wabakimi, Kopka and Whitesand Provincial Parks. Park management planning cannot restrict or impede these rights.

7.2 Recreational use

7.2.1 Remote Tourism Industry

Commercial outpost camps and lodges are an important component of the recreational landscape of Wabakimi, Kopka River and Whitesand provincial parks. The remote tourism industry dates back many decades to the advent of the float plane and pilots from World War II who recognised the appeal of the wilderness. The remote tourism industry has traditionally provided fly-in fishing vacations with basic roofed accommodations for mostly anglers who travelled primarily from the United States. In recent years the industry has begun to evolve to serve a broader market that includes more Canadian residents and Europeans, extended families, couples, and older adults, including paddlers who are beginning or ending their canoe trip at a lodge or an outpost camp.

These facilities operate from late May to early October and provide accessible wilderness experiences at a raised level of comfort to a range of multigenerational clientele who may not be able to access the parks otherwise.

Some canoeists may take exception to encounters with motorboats, floatplanes, and buildings, while some facility-based visitors may resent the presence of canoeing parties passing by or camping on lakes where they are staying. The challenge is to manage the parks to accommodate both the remote tourism clientele and canoeists, so that conflicts between user groups can be minimized. The uniqueness of the wilderness experience the parks provides for both guests of the remote tourism experience and the backcountry canoeist needs to be recognized, celebrated, and protected as the demand for remoteness and wilderness will position the parks as a world class destination in decades to come.

7.2.2 Angling

The Wabakimi/Kopka area provides very high-quality walleye and northern pike fishing in Ontario. Most anglers in the parks originate from the United States. While canoe trippers provide some angling pressure, the lodges and outpost camps host most of the anglers in the parks. Most tourism lakes contain walleye, suggesting it to be the “bread and butter” fish species that sustains the facility-based tourist industry within the parks. Angler effort is not always restricted to lakes where there are tourism facilities. Many operators encourage day trips to surrounding lakes in an attempt to spread out the harvest pressure and enhance the visitor experience. Most operators encourage catch and release and other conservation initiatives aimed at maintaining a sustainable fishery. The sport fish harvest attributed to guests at private camps is thought to be considerably less than at commercial tourism operations.

7.2.3 Sport hunting

The moose and bear hunt are recognised as important to area tourism. The remote tourism operations contribute significantly to the local economy related to the moose hunt. Most of this is associated with non-residents purchasing fly-in hunting packages. At the time of the Wabakimi Park expansion, a commitment was made to continue the moose hunt in the Wabakimi expansion area, where it was not seen to conflict with special values or features being protected.

Hunting has not been permitted within the original 155,000 ha Wabakimi Park since 1989. Hunting for moose, and to a lesser extent, bear, and grouse, occur in the expanded area of Wabakimi Park, Kopka and Whitesand area (Appendix I; Figure 11).

Wabakimi park is contained within Wildlife Management Units (WMUs) 15A, 15B, 16C, 16B and 17. Kopka River and Whitesand provincial parks contained within one unit each, 15B and 16C, respectively. Wildlife Management Unit 15B was opened to deer hunting in 2003.

Road accessible hunting occurs near park boundaries through the use of Trail Lake, Obonga Lake, Graham and Camp 702 roads.

7.2.4 Boat Caches

Numerous boat caches exist throughout the parks and have been in place prior to regulation. Most boat caches are used by commercial outpost camp and lodge operations to enable access to adjacent waterbodies, and some sites store multiple boats. Others are related to resource harvester activities, such as trapline or baitfish operations. No new boat caches have been permitted since park regulation.

7.2.5 Canoeing

The Wabakimi area is recognised as exceptional canoe country. The three parks provide a myriad of interconnected waterways offering over 2000 km of river, lake, and whitewater canoeing opportunities. The complex drainage patterns, combined with canoe, floatplane and rail access/egress offer an almost infinite variety of canoe routes. Visitors to Wabakimi/Kopka/Whitesand provincial park can choose from a range of trip possibilities depending on skill level, desired trip length, and the degree of exertion and challenge sought.

Table 6. Wabakimi backcountry permit statistics

2018: **Total Camper Nights – 4437** Total Campers – 487 Total Youth – 170 Canadian Campers – 282 USA Campers - 205	2017: **Total Camper Nights – 2887** Total Campers – 333 Total Youth - 86 Canadian Campers – 128 USA Campers – 205	2016: **Total Camper Nights – 2811** Total Campers – 329 Total Youth - 131 Canadian Campers – 79 USA Campers – 240

At close to 900,000 hectares, Wabakimi is considerably larger than other backcountry canoeing parks in Ontario. Quetico and Woodland Caribou provincial parks are approximately 460,000 hectares, while Algonquin Park encompasses approximately 750,000 hectares. Primary canoe routes include the Kopka River, Flindt, Allanwater, Lookout, Nemo, Pikitigushi and Ogoki rivers, with waterway linkages to Albany River and Brightsand River provincial parks.

Ojibway have travelled the waterways of Wabakimi for centuries, and most portages in this region evolved from this traditional use. Ease of travel tends to be excellent, with relatively short portages around river obstacles, averaging 100-300 metres in length. The canoe routes of the Wabakimi area were first documented and maintained by the Ministry of Natural Resources in 1970. Due to fiscal restraint, the backcountry maintenance program ceased in 1982, but was re-instated in 1999 under the direction of Ontario Parks. The implementation of park fees for interior camping also began in 1999.

The parks receive support for canoeing and recreational opportunities through the Friends of Wabakimi. The organization has close to 200 members which advocate for the natural, cultural, and historical resources of the park and recognizes Wabakimi as a world class canoeing destination.

Throughout the Wabakimi area, campsites are found on rock outcrops on points and islands, and thus tend to possess relatively high biophysical carrying capacity. Cold water temperatures limit swimming to the high summer period when water temperatures can exceed 20 degrees C (70 degrees F).

There is potential for trail development within the parks, although interest in activities such as backpacking and cross-country skiing has been very limited to date. Similarly,

the lack of significant viewpoints throughout most of Wabakimi Park may not generate sufficient interest from backcountry users to warrant major trail development.

Some snowmobiling occurs within the parks, primarily associated with ice fishing, trapping and landholder access. A snowmobile route between Savant Lake and Allanwater Bridge has been identified as a traditional activity for residents of these communities. Policy direction will be addressed through the planning process.

7.3 Commercial Use

7.3.1 Commercial Trapping

Commercial trapping by First Nations has occurred within the parks for generations and contributes to the economy of the surrounding area. Wabakimi encompasses all or part of 34 traplines, with 11 others in Kopka River and 4 in Whitesand (Appendix I; Figure 12). First Nation members hold all of the Wabakimi, Kopka, and Whitesand traplines, although not all traplines are active.
Twenty-one trap cabins are located within the parks to facilitate effective trapline management. Although most travel is by snowmobile, some trappers maintain cached boats for fall trapping. There are regulations concerning size, location, distance from water; and use restrictions.

Beaver and pine marten account for the largest proportion of the annual yield of fur. Red fox, mink, muskrat, otter, and weasel account for much smaller harvest numbers. Economic return from trapping fluctuates between years due to market prices, trapper effort and population densities. Income from individual traplines varies considerably and represents only a supplemental income for most trappers. There is also a significant cultural value to trapping as for many it represents a traditional land use activity.

Information regarding other fur bearing animal populations is not well known. Species such as lynx follow regular density cycles and are closely tied to the natural prey population of snowshoe hare. Others, like the timber wolf, are associated with the status of moose and caribou populations. Species such as pine marten and fisher are dependent on prey populations that require old growth forest habitat. Trapping also has the potential to influence other wildlife populations. For example, woodland caribou populations can be affected by wolf densities, which are related to wolf trapping activity. Other management activities, such as fire suppression, will influence forest habitat with implications for species that prefer or are dependent on specific forest conditions. Comparisons of fur production to changes in forest cover may provide opportunities to learn about other furbearer response to habitat conditions.

7.3.2 Commercial bait fish harvest

Wabakimi Park incorporates all or part of 44 bait fish blocks amounting to 241 square kilometres (100 square miles) (Appendix I; Figure 13). Kopka River crosses through 10, with approximately 20 additional blocks within the parks unallocated. Whitesand has

portions of four baitfish blocks. The majority of baitfish harvest is from small lakes using float planes during the open water season. The bait collected from these licenses is then generally sold wholesale to area tourist operations.

8 SOCIAL AND ECONOMIC BENEFITS

Provincial parks provide a wide range of social, economic, and environmental benefits to communities, the region and the province. Some of the benefits can be measured in economic terms; other benefits cannot.

There are other benefits which provincial parks and protected areas provide to local communities, to the province and to society as a whole. The following are important benefits and help demonstrate how the park supports our quality of life:

- Protection and contribution to ecological functions (e.g. water quality and quantity),
- Protection and preservation of cultural features (including traditional knowledge)
- Sustainability of natural resources,
- Health benefits from use of parks (mental, physical, spiritual benefits),
- Provides employment opportunities
- Worker productivity (healthy and happy workers tend to be more productive - a visit to a provincial park can contribute),
- Educational benefits (young and old learning about our environment),
- Scientific benefits (research in provincial parks),
- International responsibilities to protect intact landscapes and biodiversity
- Business location decisions (quality of life/business) and community cohesion,
- Ecosystem services, and
- Adaptation of ecosystems and society to a changing climate.

Provincial parks help to make communities attractive for residents, business as well as for tourists. Area residents value the surrounding lands for subsistence, employment, and business opportunities, as well as for enjoyment and recreation.

A tangible measure of the social and economic contribution of a protected area is the number of jobs it supports. In the Wabakimi area the combined expenditures from the remote tourism industry, canoe outfitting, and Ontario Parks helps to support opportunities for employment in the local and regional economy. This activity contributes to a stable local economy and community.

9 PROTECTED AREA PRESSURES

The protection of Wabakimi/Kopka/Whitesand natural and cultural resources is a primary concern of the park planning process. An analysis of constraints and capabilities, and the identification of existing and future pressures on park values, are critical to the identification of zones and the achievement of the provincial parks' system objectives of protection, heritage appreciation, recreation, and science. Identifying constraints and capabilities includes consideration of significant features and values, sensitive areas, and terrain impediments. Some areas can be readily identified as

having constraints due to their requirement for protection (e.g. rare plant habitat, certain cultural heritage sites and caribou calving and nursery areas). On a broad scale, the evaluation of Wabakimi/Kopka/Whitesand for capabilities and constraints includes the following:

Capabilities

- Terrain conducive to recreation
- Water accessibility for recreation
- Interconnecting waterways
- Remote tourism facilities
- Sense of remoteness
- Access limitations
- Cultural and historical values
- Nearby communities
- Links to other parks and Crown land
- High quality sport fishing and hunting
- Landscape connectivity
- Viewing opportunities

Constraints

- Terrain limitations
- Sensitive wildlife habitat
- Culturally sensitive sites
- Visitor conflicts
- Social limitations (crowding)
- Recently burned areas (campsites and portages)
- Access limitations
- Adjacent Crown land industrial activities

9.1 Recreational Carrying Capacity

Recreational carrying capacity defines the level of use an area or a site can sustain while providing good quality recreational experiences and protecting the environment, incorporating both ecological and social considerations. In remote wilderness areas, recreational carrying capacity consists of the capability of the land base to sustain use consistent with long-term resource protection with consideration for the social factors, such as solitude, relating to the quality of the visitor experience. The determination of carrying capacity is integral to the establishment of use targets (and limits) as well as recreation management prescriptions. The number of visitors to an area, their length of stay, and the types of activities will determine the magnitude of human impacts. Current and future park use and user expectations, for both lodge and outpost camp guests as well as wilderness canoeists need to be considered.

The parks have a high capability for dispersing large numbers of canoeists due to the variety of interconnecting waterways. In addition, most linear waterways can be

travelled in either direction, since in general river current seldom impedes upstream travel. The geography of the Wabakimi area provides opportunity for various access locations and travel routes. A diversity of side trips on the smaller waterways, back bays, and channels of the parks enables exploration. Air and rail access offer loop routes and variable trip lengths, as well as remote trips.

Biophysical factors related to recreational carrying capacity includes items such as soil depth and type, slope, ground cover, presence of bedrock, vegetation types and wildlife habitat. In general, the presence of bedrock outcrops at the shoreline increases the durability of most popular recreational sites, although soils and vegetation are compacted adjacent to the bare rock areas. The boreal setting of the Wabakimi area imposes a general degree of fragility. Although most campsites and portages are still in excellent condition, this is primarily because of low use levels. Site deterioration can occur quickly, due to compaction, loss of vegetation, litter, etc. as use increases.

Generally, the lakes and waterways exhibiting the most numerous rock outcrops such as Smoothrock, Wabakimi, Brennan and Burntrock lakes, have the highest physical carrying capacity. Some of these same areas have also been identified as significant for caribou calving and nursery areas, highlighting the significance of ecological considerations in the determination of recreational carrying capacities. Lonebreast Bay and Kenoji and Muskiga lakes are examples of areas having low bushy shorelines with few rock outcrops/activity sites, resulting in a lower physical carrying capacity.

Other constraints to recreational carrying capacity include items such as fisheries productivity, sensitive wildlife habitat and the protection of species at risk and cultural resources. The sensitivity of cultural heritage and First Nations' values such as pictograph, burial and medicinal plant harvesting sites requires special consideration to ensure that their protection is addressed. Fishing pressures within Wabakimi vary significantly, with most lakes experiencing very little pressure, to some larger lakes with multiple fly–in fishing lodges and outposts experiencing much higher pressure. Although broadscale fisheries surveys have been conducted throughout the park, the level of fishing pressure on individual lakes that were not surveyed remains uncertain. Caribou calving, which occurs in the summer months each year from May 1 to June 31st, is of critical importance to maintaining a healthy and viable population. Caribou tend to use islands in lakes and fens to calve, as well for their nursery areas in order to avoid predation. Research shows that caribou cows and calves are sensitive to disturbance from recreational activities such as fishing with motorboats and camping on islands (Carr, 2010).

The capability of an area to sustain wilderness use, not only involves biophysical parameters and ecological considerations, but social factors as well. The perceptions of wilderness users are an integral component of a park's carrying capacity and relate to what determines perceptions of crowding and congestion along canoe routes as well as at tourist camps and campsites. This includes expectations as to the type of experience sought, and the types of things that can impinge on a person's subjective experience of

wilderness, such as garbage, aircraft landings, motorboats, and the presence of other groups.

Wilderness canoeists generally place a high value on solitude and prefer to have none or few contacts with other people, visually/acoustically isolated campsites, and increasing isolation as distance from the periphery increases. The presence of lodges, outpost camps and associated motorboat use in the Wabakimi area may be viewed by some canoeists as detracting from their wilderness experience. Tourist camp guests may be more inclined to accept the presence of canoeists, creating an asymmetrical conflict. Satisfaction is linked to expectations, suggesting the need for the provision of accurate information to all park visitors ensuring that canoeists are aware of the tourist camps and lodges and that remote tourism guests are aware of canoeists.

As visitation increases, there may be perceived crowding in some areas of the parks, especially at entry points on popular canoe routes. This may warrant the need for entry/travel quotas in certain sectors of the park. Visitor dissatisfaction may occur in response to increased encounters between canoeists and tourist camp operations. This may serve as a social constraint, which could warrant some temporal and/or spatial separation of canoeists and lodge/outpost visitors. Camping and visitation restrictions on calving islands and other locations of important habitat may be needed to mitigate impacts of disturbance by park users. There may also be a need for restrictions to areas/sites with First Nations' cultural significance.

Visitors may be managed through direct and indirect management techniques. Direct management emphasises regulation of behaviour and restricts individual choice and freedom. Direct management may include enforcement, zoning, user quotas and restrictions on activities. Indirect management emphasises influencing behaviour, thus allowing the visitor more freedom and variation in use. Indirect management techniques include varying maintenance standards, visitor education, differential fees, etc. While most wilderness visitors prefer indirect management, a combination of both techniques is usually necessary.

10 MANAGEMENT CONSIDERATIONS AND PRIORITIES

10.1 Park Classifications

Park classification defines an individual park's role in providing opportunities for environmental protection, recreation, heritage appreciation and tourism. Classification establishes a management framework for individual parks within the parks system.

Kopka River and Whitesand provincial parks are classified as Waterway Parks. The original Wabakimi Park area is classified as a Wilderness Park and as such, contributes to the achievement of the system target for wilderness parks in Ecoregion 3W. The park management plan will evaluate the wilderness classification of the original Wabakimi area and determine the classification of the expansion area.

Park classification will consider:

- the spirit and intent of the recommendations of the Wabakimi Park Boundary Committee;

- commitments made by Ontario at the time of park expansion (i.e. to permit moose hunting);
- the continued achievement of parks and protected areas system representation targets;
- ecological units;
- the ability to meet specific park class standards; and
- provincial park policy.

The Wabakimi vision was the establishment of a large, protected wilderness area in which many existing recreational uses and traditional activities would continue. Wabakimi could potentially be a Wilderness (W) park with park policy exceptions regarding hunting, a Natural Environment (NE) park, or some combination of the two classifications.

Classification and zoning will be a key determinant in the management of hunting in Wabakimi Park.

10.2 Park Zoning

The park planning process will analyse the constraints and capabilities of the three parks based on carrying capacity, use patterns and access and dispersal patterns. The determination of carrying capacities will be used in the designation of zones. Zoning will provide a variety of opportunities for recreation, heritage appreciation and education, while maintaining the integrity of the resources upon which the opportunities are based. There are six different types of zones that may apply to the management planning process for Wabakimi/Kopka/Whitesand:

Nature Reserve zones protect the provincially significant earth and/or life science features within a park and may include a protected buffer area in where minimal development is permitted. Development is generally restricted to trails, necessary signs, interpretive facilities (where warranted) and temporary facilities for research and management.

Wilderness zones include wilderness landscapes of appropriate size and integrity to protect natural and cultural values, and to support extensive types of backcountry recreation, such as canoeing or hiking. Development is limited to wilderness (backcountry) campsites, portages, trails, and signs necessary for route identification. Wilderness campsites are either canoe-in or hike-in; established at a very low density; and offer primitive levels of facility development (designated fireplaces and pit privies), in keeping with the character of the landscape which the zone protects.

Historical zones encompass the provincially significant cultural resources of a park. They generally focus on a specific site (e.g. occupation site, building) and that site's relationship to the surrounding landscape, so they may include a protective buffer around the main feature in the zone. Development is limited to trails, necessary signs, interpretive, educational, research and management facilities and historical restorations or reconstructions where appropriate.

Natural Environment zones include natural landscapes which permit the minimum level of development required to support low-intensity recreational activities. Development is limited to backcountry campsites, portages, necessary signs, and minimal interpretive facilities.

Access zones serve as staging areas, a means of both providing and regulating use in areas of the park geared towards extensive recreation. Generally, development is limited to roads, visitor control structures and group campgrounds. Provision may be made for limited orientation, interpretive or educational facilities, though generally more for self-use rather than through structured personal service. Limited facilities for research and park management may be present.

Development zones contain the area(s) of the park geared towards the support of intensive day-use and car camping activities. They constitute a relatively small portion of most parks. Development may include roads, visitor control structures, beaches, picnic areas, car campgrounds, commercial service facilities, and orientation, interpretive, educational, research and management facilities.

10. 3 Planning Considerations (From the Terms of Reference)

10.3.1 First Nations and Local Communities

- The Wabakimi/Kopka First Nation communities have expressed interest in park-related economic development and resource use opportunities, as well as a continuing role in park management and operations.
- Aboriginal and treaty rights are protected by the Constitution of Canada.
- Local communities have derived very limited economic benefit from Wabakimi/Kopka parks to date, although expectations were advanced at the time of the Wabakimi Park expansion. Land disposition in some areas adjacent to Armstrong was deferred pending completion of the park management plan. Several communities have expressed interest in hosting park developments.
- The Agutua Moraine has been suggested as a logical road and transmission line corridor to serve more northern communities.
- Several cabins built by the Whitewater Lake Community Development Corporation are unauthorized. A level of development appropriate to Indigenous rights needs to be determined for this site on Whitewater Lake.

- The cooperation of First Nations to address issues such as restrictions on winter access into caribou areas will be critical to the ability of the parks to protect caribou.

10.3.2 Access

- The Obonga Lake Road provides access into southern Wabakimi Park via a bridge crossing on the Kopka River (km45). This area was incorporated into the Wabakimi expansion primarily for its value as future caribou habitat. There will be costs and/or liability concerns associated with maintaining this bridge.
- The future of in-park roads must be determined. Additionally, the plan should recommend management direction for roads adjacent to the parks.
- Floatplane access is a requirement for most tourist camp operations and enhances canoeist dispersal throughout the parks. Aircraft corridors have been suggested, but these may present safety concerns. The continued use of the parks by private floatplanes must be determined.
- There is a need to address access point use and management at areas such as Tamarack, Kopka, Bukemiga, Pishidgi, Ratte, Little Caribou and Caribou lakes, and the Flindt River. Items requiring direction include unauthorized camping, semi-permanent structures, public access, waste disposal, parking, road maintenance, environmental protection, and fees.
- Most visitor access at Allanwater Bridge and Flindt Landing currently requires the crossing of tenured lands. Management options need to be explored.
- Mechanised (snowmobile) access by adjacent landholders, anglers and trappers may require restrictions to protect caribou.
- Whitewater Lake Community Development Corporation has expressed interest in road access to Whitewater Lake.
- Namaygoosisagagun uses the Trail Lake Road and the waterways between Collins and Tamarack Lake for summer and winter access. A water crossing on this route at Wabinosh Creek is scheduled for removal.
- An abandoned forest road system north of Alphonse Bay of Caribou Lake has not been physically closed due to concerns raised by Whitesand First Nation. Potential access from this road to Caribou Lake has been an issue with outfitters on the lake.
- As use increases, parking may become congested at some access points. There are also security and economic issues associated with parking and shuttle service availabilities.
- Water taxi services may provide an opportunity to enhance visitor distribution and safety, particularly on large lakes adjacent to the parks (e.g., Caribou Lake).
- Continued and future park access using VIA Rail is an unknown. The current service restricts the number of canoes transported. A comprehensive approach to park access must consider rail, road, air, and water access.

10.3.3 Hunting

- Hunting may be permitted. Nature reserve and wilderness class parks and zones restrict hunting activities. Safety and conservation with respect to hunting have been identified as concerns.
- Commitments were made at the time of the Wabakimi expansion to continue the moose hunt in the expansion area where the hunt did not conflict with the protection of other values. The management of hunting for other species needs to be determined.
- It has been suggested that the creation of a Wabakimi WMU (Wildlife Management Unit) would enhance wildlife management for both hunted and areas without hunting.
- A number of Bear Management Areas (BMAs) are located within the parks. Direction is needed on existing and future locations and uses.
- The closure or removal of bridges and roads may restrict hunting opportunities.

10.3.4 Wildlife

- Detailed inventory work or long-term monitoring has been conducted for birds, amphibians, and caribou but not for reptiles or small mammals. The lack of information makes management difficult.
- Caribou are subject to human disturbance, particularly during calving periods. Campsites and shore lunch sites are often located at or near sites used by caribou. There may be a need to separate (increasing) human and caribou activities. The occasional presence of dogs accompanying park visitors further compounds this concern. Aircraft and motorboat restrictions may be required. Visitor education enabling the identification of caribou signs are vital to their protection.
- Commercial trapping may continue indefinitely except in wilderness and nature reserve class parks and zones. In nature reserve and wilderness class parks and zones, existing commercial fur harvesting may continue for the lifetime of the current head trapper, If a licence is revoked, surrendered or an application for transfer is received prior to that time, all portions of the registered trapline within the park will be rescinded from the trapline’s legal description. Status Indians exercising treaty rights may continue commercial fur harvesting.
- Snowmobile trails create wolf access and caribou predation. Some areas of Wabakimi/Kopka have been identified as important winter habitat. Recreational, trapping, and adjacent landowner snowmobile use may present concerns for habitat impairment.
- Deer sometimes carry a parasitic brainworm, which affects caribou and moose. Deer population management should be considered in classification and zoning discussions.

10.3.5 Fish and Fisheries

- Lack of population and lake structure information hampers effective management. The continued co-operation of the tourism industry with fisheries assessment is integral to strategy development.
- Tourist camp operating levels and boat cache locations are often not based on any fisheries inventory research. Some operators pursue this information while others avoid it for fear of mandated operating reductions. There is a need to ensure that this data becomes available, and that regular monitoring occurs.
- Many tourist operations promote conservation limits, catch and release and similar initiatives. Consistency via regulation may be appropriate.
- The planning process will consider fisheries management through the implementation of strategies such as size limits, creel limits, bait fish restrictions, fish sanctuaries and development and access controls. Related items such as barbless hooks, lead-free tackle should also be considered.
- Lack of angler education results in improper fish handling techniques and increased mortality.
- Baitfish harvest is an existing use permitted to continue indefinitely except in nature reserve and wilderness class parks and zones. In nature reserve and wilderness class parks and zones, existing licensed operations in park-encompassed waters may be extended annually, for the lifetime of the current licencee or until the licence is surrendered—whichever occurs first, (except for except for Indigenous use, subject to applicable legislation and regulation). Annual extensions are conditional on the outcome of a policy review[4] of bait use and bait harvesting in protected areas. Owners of tourist operations in wilderness class parks are permitted by licence to bait fish in designated water bodies within the park, but only for use in the park.
- A provincial baitfish policy review on the collection, use and transportation of baitfish is ongoing[5]
- There are elevated mercury levels from unknown natural source(s) in the fish and waters of some park lakes. Options to minimise the exposure of park users to mercury should be considered.
- Snowmobile access for ice fishing may create trails for wolves to easily reach winter caribou areas.
- Aircraft access associated with angling and baitfish harvest may require restrictions.

[4] Ontario's Sustainable Bait Management Strategy was approved July 21, 2020

[5] The provincial baitfish policy review is complete and Ontario's Sustainable Bait Management Strategy was approved July 21, 2020. The approved strategy will be used to establish direction on the collection and use of bait within the parks in future planning stages.

10.3.6 Land Management

- The phasing out of non-indigenous trapping in some areas may present the need for removal of existing trap cabins. These may have value for other purposes such as park management or commercial tourism.
- Direction is needed for the establishment of trap cabins and incidental cabins associated with Indigenous and treaty rights.
- At the time of this document existing private recreation camps may continue for lifetime of the current permit holder. Improvements will be limited, and an estate will have up to one year to remove improvements following the passing of the permit holder.
- Interest exists for the development of new commercial tourism operations. Existing facilities impacting park values may need to be relocated.
- Land disposition on the Caribou Lake Road was halted pending completion of the park management plan. The plan should identify a process for strategic land disposition in this area.
- The management of in-park private lands may warrant the use of a Restricted Area Order or a similar planning tool.
- Several Type B (Restricted) Commercial Outpost Camp locations have been used in the parks. Direction is needed on existing and future locations and uses.
- Many commercial, resource harvester and private boat caches exist throughout the parks. There is a need for management of this activity.
- A prioritized land acquisition strategy should be established.

10.3.7 Vegetation Management

- Fuelwood cutting associated with the commercial tourism operations and private camps should be addressed, as should the harvesting of logs for the construction of docks and buildings.
- Fire is the primary agent of forest succession and maintaining the successional mosaic to provide for the continuance of woodland caribou habitat is very important. The planning process will include the identification of options for a fire management strategy for the park, as well as direction regarding vegetation management.
- Indigenous peoples wish to continue harvesting medicinal plants and wild rice from within the parks. These areas may need protection from recreational uses.

10.3.8 Recreation Management

The range of permitted uses found in the three parks provides park managers with the overall challenge of managing these uses as well as the challenge of

preventing/resolving conflicts between user groups. The greatest potential for conflict exists between canoeists and commercial tourism activities such as motorboats, aircraft, facilities, and other development in the park. Options to alleviate potential conflict will be explored through the planning process. These may include spatial and/or temporal (seasonal) area allocations and restrictions.

As canoeist visitation to the parks increases, visitor management strategies used in other backcountry parks (e.g. Quetico, Killarney, and Algonquin) may be necessary to protect park resources and to provide a quality visitor experience. Examples of strategies include:

- Entry quotas, dispersal, and reservation systems. The many means and points to access these parks provide a challenge for management. Currently, reservations are unavailable, and quotas do not apply.
- Restrictions on the use of glass or metal containers by backcountry campers. This has been shown to reduce litter in other parks.
- Implement campsite designations. The use of designated campsite signage may be seen to intrude on the visitor experience.
- Party size restrictions can reduce environmental impacts and potential negative impacts on the experiences of other visitors.

Recreation management will also need to consider items such as:

- Motorboat use and motor size restrictions
- Aircraft landing locations
- Recreation travel corridors (e.g. snowmobile trails),
- Shore lunch sites
- Campsite and shore lunch site furniture
- Boat and canoe caches
- Development of hiking trails and/or cross-country ski trails
- Hut to hut types of opportunities
- Water taxi services
- Use of personal watercraft
- Waterskiing
- Use of chainsaws, power ice augers and similar mechanized equipment

10.3.9 Visitor Services

- The management plan needs to provide direction on how and to what extent park information will be made available to the public. Some outfitters sell trip planning and information services and envision fewer visitors who spend more while having

less environmental impact. The area communities generally envision more economic benefit associated with more visitors. Many park visitors believe that a provincial park should provide detailed park information.

- Backcountry visitors will expect a signage standard to be in place throughout the park. Direction is needed regarding the signage of campsites, portages, and hazards.
- The mandatory use of guides in specific park areas warrants consideration from a safety, environmental, cultural, and economic perspective. For example, the use of Indigenous guides to access Cliff Lake could provide an economic opportunity that ensures the long-term protection of the pictographs.
- Options to enhance marketing of the parks need to be identified, including opportunities to co-operate with other public and private sector groups, in order to optimise mutual benefits to the local and regional tourism industries, as well as to the park.
- Many guests of the remote tourism industry have no idea that they are within a provincial park. There is a need to increase awareness of this and the associated park regulations.
- Some area community residents have expressed concern that many park visitors never visit or provide economic benefit to their towns, as their trip starts and ends at a remote outfitter location.

10.3.10 Park Facility Development

- The strategic location of park infrastructure is important for the efficient management and operations of the parks. Additionally, communities surrounding the park see the location of park facilities as a potential economic generator.
- Camping permits are currently sold by outfitters[6] who benefit by attracting clientele. Their locations are dispersed; they have long, convenient operating hours and provide this service in a cost-efficient manner. On the other hand, there may be a need for a central (park office) location where visitors can locate park staff and from which customer service could be provided, permits and park merchandise sold, visitor use can be managed, emergency information accessed, etc.
- Partnership opportunities warrant investigation.
- The level of development must be determined. Items to be considered include an interpretive centre, park office(s), staff housing, equipment storage, signage, campground, showers.
- Interior operating facilities may be required for staff safety, accommodation, and equipment storage. The phase out of some private recreation camps and trapline operations may provide opportunities to acquire suitable facilities.

[6] Camping permits have been available online since 2018 and can be obtained by visiting the Ontario Parks reservation webpage.

- Park-related development that occurs outside of parks can maintain the integrity of a park land base and provide economic benefit to a community.
- The Armstrong Fire Attack Base re-development plan incorporates some parks-related office and storage.
- The communities adjacent to the parks provide significant opportunities for park-related development to occur outside of the parks. This has the potential to provide an economic boost to the area communities, while maintaining the integrity of the park. Examples might include park office developments and/or campgrounds.

10.3.11 Research

- The parks receive research proposals annually. Direction is required as to what proposals should be considered or given priority.
- A research facility associated with the parks has been suggested as being a potential community economic generator. The community of Ely, MN has been used as an example.
- Partnership opportunities need to be identified and developed.
- Sustainability criteria need to be addressed for all park activities.

10.3.12 Cultural Resource Management

First Nations and Indigenous people have a significant role in the development of the park management plan. The plan will identify measures to ensure the long-term protection of sacred Indigenous sites and other cultural values.

- Options for the management of the Beckwith site must be addressed.
- The Cliff Lake pictographs may warrant specific management to ensure their protection. Direction on other pictograph sites is required.

10.3.13 Economic Development

In keeping with the commitments made at the time of the Wabakimi Park expansion, consideration will be given to sustainable economic development opportunities associated with the parks, particularly for local communities and First Nations. Many related factors have been previously listed. The parks will provide both direct and indirect economic benefits and employment opportunities. Park planners must strive to balance the protection mandate of Ontario Parks with socio-economic concerns.

- Interest has been expressed regarding new ecotourism and development opportunities, park facility partnerships, access point management, maintenance, and compliance services, etc.

- First Nations have expressed interest in a process that enhances their ability to acquire existing tourism opportunities.
- Extending the park season is a challenge that would provide economic rewards. Opportunities that recognize the protection mandate of the parks need to be explored.
- There is interest in the development of “gateway” communities.
- There is a need to establish sustainability criteria for existing and proposed developments.
- Direction on items such as access point management may influence the feasibility of associated business, such as a private campground.
- Direction on rail access quotas or road access availability may enhance the business of air carriers.
- North American and international demographic and economic changes, trends and forecasts must be considered in economic development planning. Activity changes, such as black-powder hunts, may need to be considered.
- Crown and park land economic development proposals may need to consider First Nation and area community benefits.
- The use of permit allocations for park resources can be used to enhance business planning and marketing.
- Areas of significant interest such as Cliff Lake or the Beckwith site may provide an economic opportunity for a First Nation priority allocation to use of an area.
- Public access restrictions on roads adjacent to the parks may enable economic opportunities.

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12 APPENDIX I MAPS

Figure 1 Regional Setting

Wabakimi
Kopka River
Whitesand

Legend

- Community
- First Nation Community
- Whitewater Lake Community Development Corporation
- Namaygoosisagagun
- Railway

Road

- Highway
- Primary
- Secondary
- Unmaintained

Treaty Boundary

- Treaty No. 3, 1873
- Robinson-Superior Treaty 1850
- Treaty No. 9, 1905-1906, 1929
- Lake
- Conservation Reserve
- First Nation Reserve
- Other Provincial Park
- Wabakimi Provincial Park -- Original Boundary
- Wabakimi, Kopka River, and Whitesand Provincial Parks

1:900,000
0 5 10 20
km

Ontario

Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

Figure 2 Remote Tourism, Recreation, and Canoe Routes

Ontario Parks
Wabakimi
Kopka River
Whitesand

Legend

- Main Base Lodge
- Outpost Camp
- Private Recreation Camp
- Canoe Route Maintained
- Canoe Route Not Maintained

Road

- Highway
- Primary
- Secondary
- Unmaintained

- Railway
- Lake
- Conservation Reserve
- First Nation Reserve
- Other Provincial Park
- Wabakimi Provincial Park -- Original Boundary
- Wabakimi, Kopka River, and Whitesand Provincial Parks

1:600,000
0 3.75 7.5 15
km

Ontario

Base data derived from the Land Information Ontario (LIO) compiled at a scale of 1:20000.

This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations or features, nor as a guide to navigation.

Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September, 2020

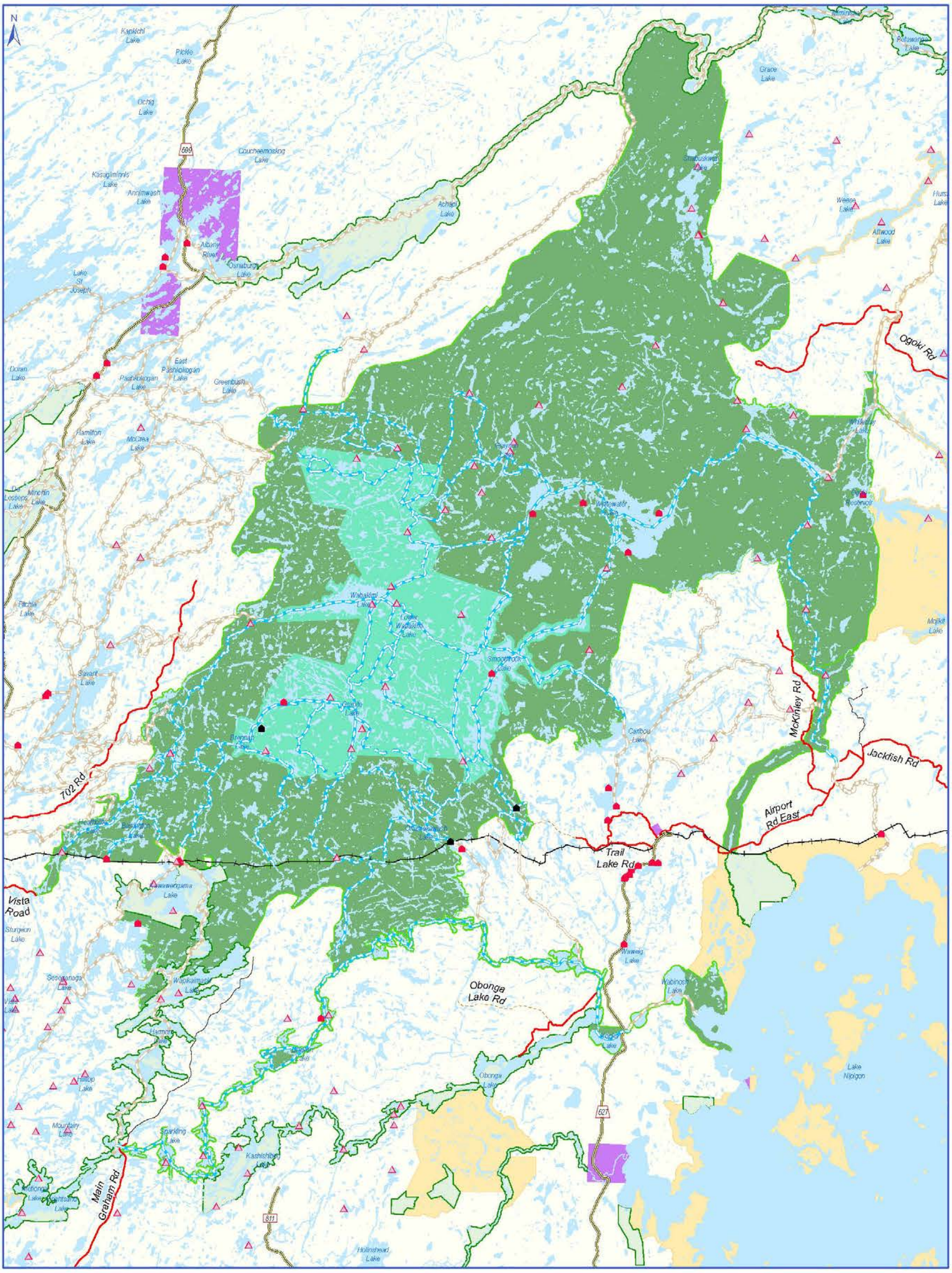

Figure 3 — Park Access

Wabakimi
Kopka River
Whitesand
PARKS

Legend

- Community
- First Nation Community
- Rail Stop
- Access Point

Road

- Highway
- Primary
- Secondary
- Unmaintained

- Railway
- Lake
- Conservation Reserve
- First Nation Reserve
- Other Provincial Park
- Wabakimi Provincial Park -- Original Boundary
- Wabakimi, Kopka River, and Whitesand Provincial Parks

1:600,000
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km

Ontario

Base data derived from the Land Information Ontario (LIO) compiled at a scale of 1:20000.

This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations or features, nor as a guide to navigation.

Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

Figure 4 Ecodistricts

Wabakimi
Kopka River
Whitesand

Legend

- Lake
- Ecodistrict
- Conservation Reserve
- First Nation Reserve
- Other Provincial Park
- Wabakimi Provincial Park -- Original Boundary
- Wabakimi, Kopka River, and Whitesand Provincial Parks

1:900,000
0 5 10 20
km

Ontario

Land Information Ontario (LIO) compiled at a scale of 1:20000.

This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations or features, nor as a guide to navigation.

Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

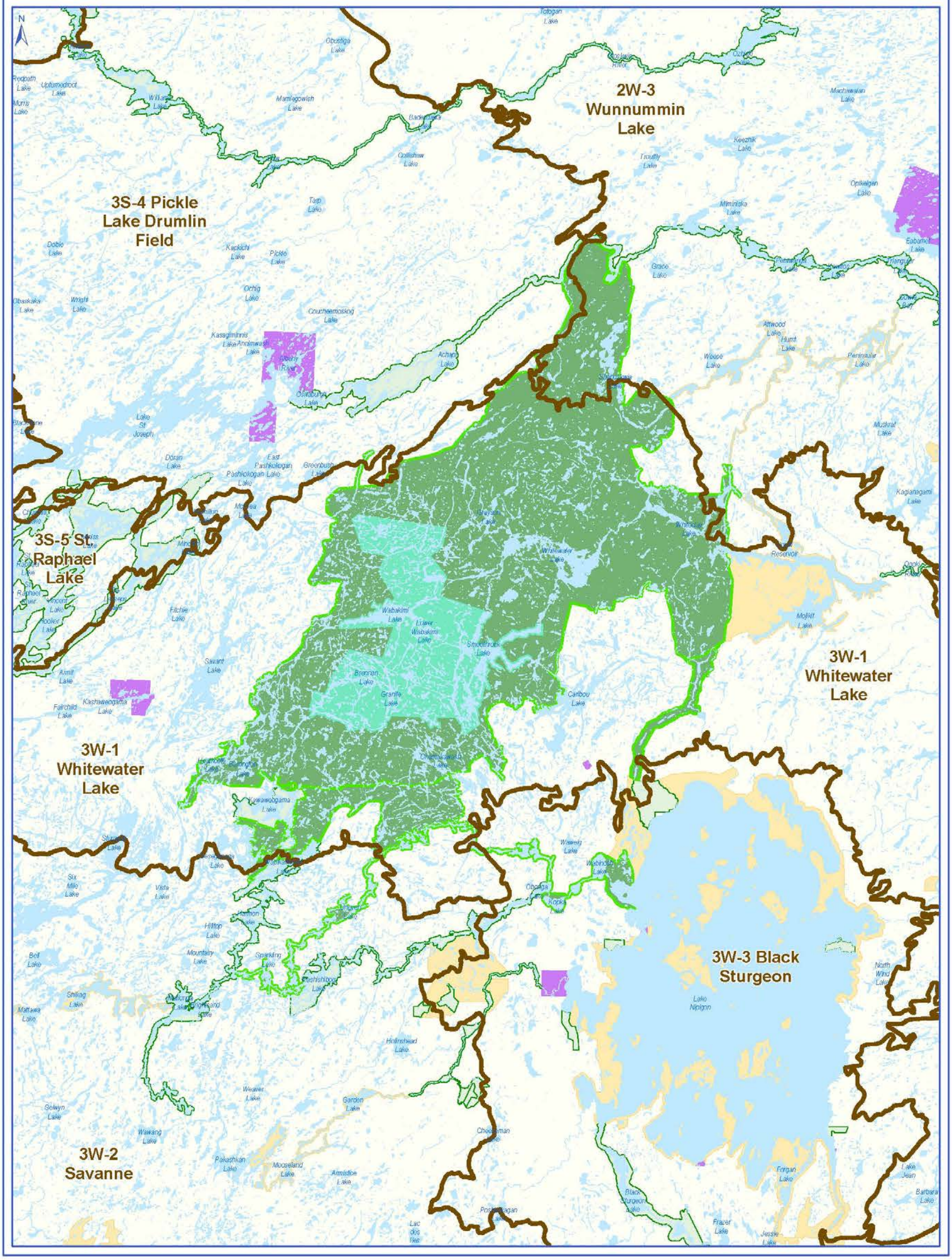

Figure 5A

Ecosites

Wabakimi
Kopka River
Whitesand

Legend

Ecosites within Wabakimi Provincial Parks

- B49 - Black Spruce/Jackpine (d-f /cL)
- B128 - Organice Intermediate Conifer Swamp
- B50 - Spruce / Pine (d-f /cL)
- B12 - Spruce / Pine (VS /d-f)
- B55 - Hardwood (d-f /cL)
- B65 - Spruce / Pine (m /cL)
- B127 - Organic Poor Conifer Swamp
- B136 - Sparse Treed Fern
- B126/ B137 - Treed Bog

- Lake
- Conservation Reserve
- Other Provincial Park
- Wabakimi Provincial Park -- Original Boundary
- Wabakimi, Kopka River, and Whitesand Provincial Parks

1:600,000
0 3.75 7.5 15
km

Ontario

Base data derived from the Land Information Ontario (LIO) compiled at a scale of 1:20000.

This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations or features, nor as a guide to navigation.

Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

Figure 5B

Kopka Ecosites

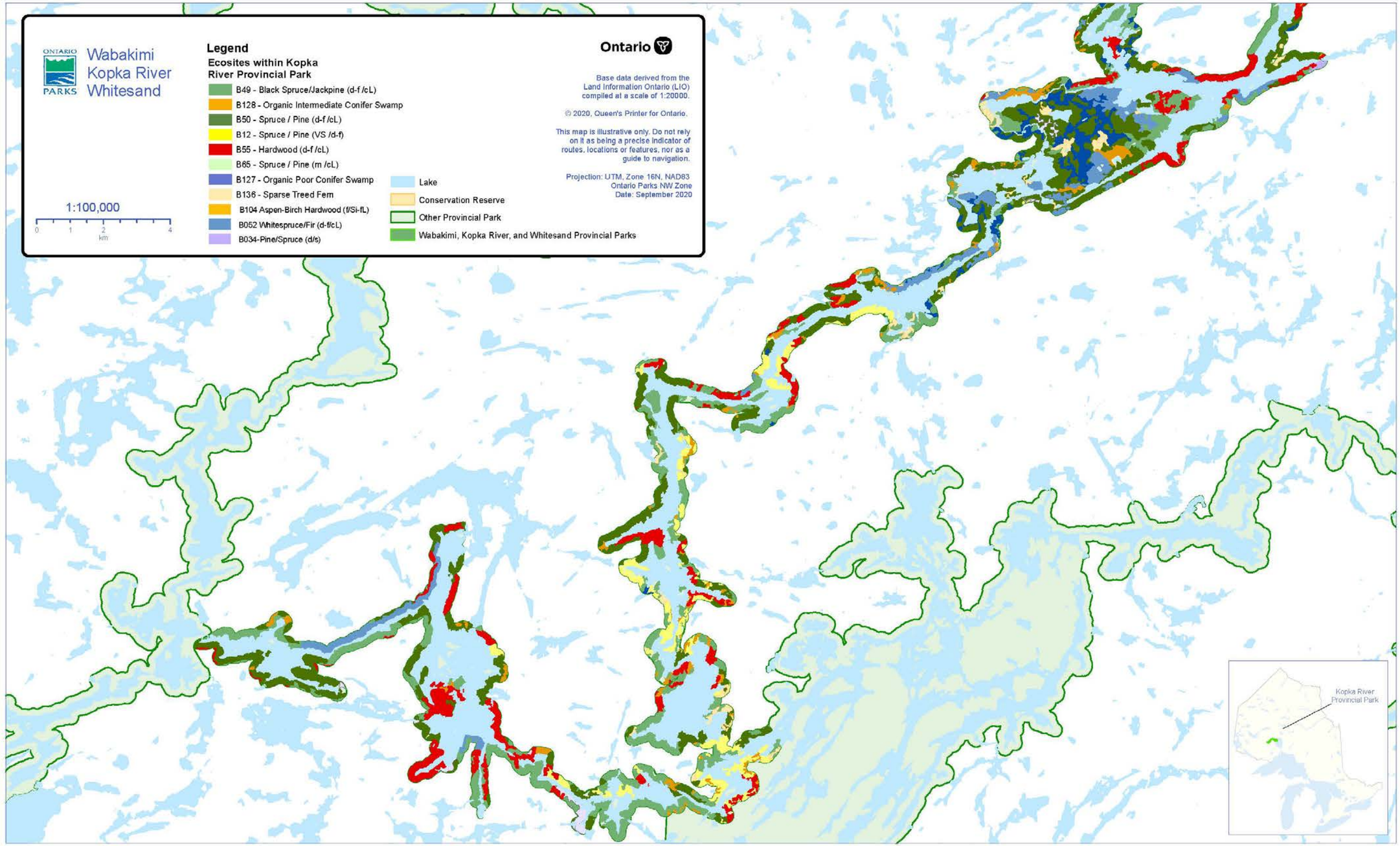

Figure 5C

Kopka Ecosites

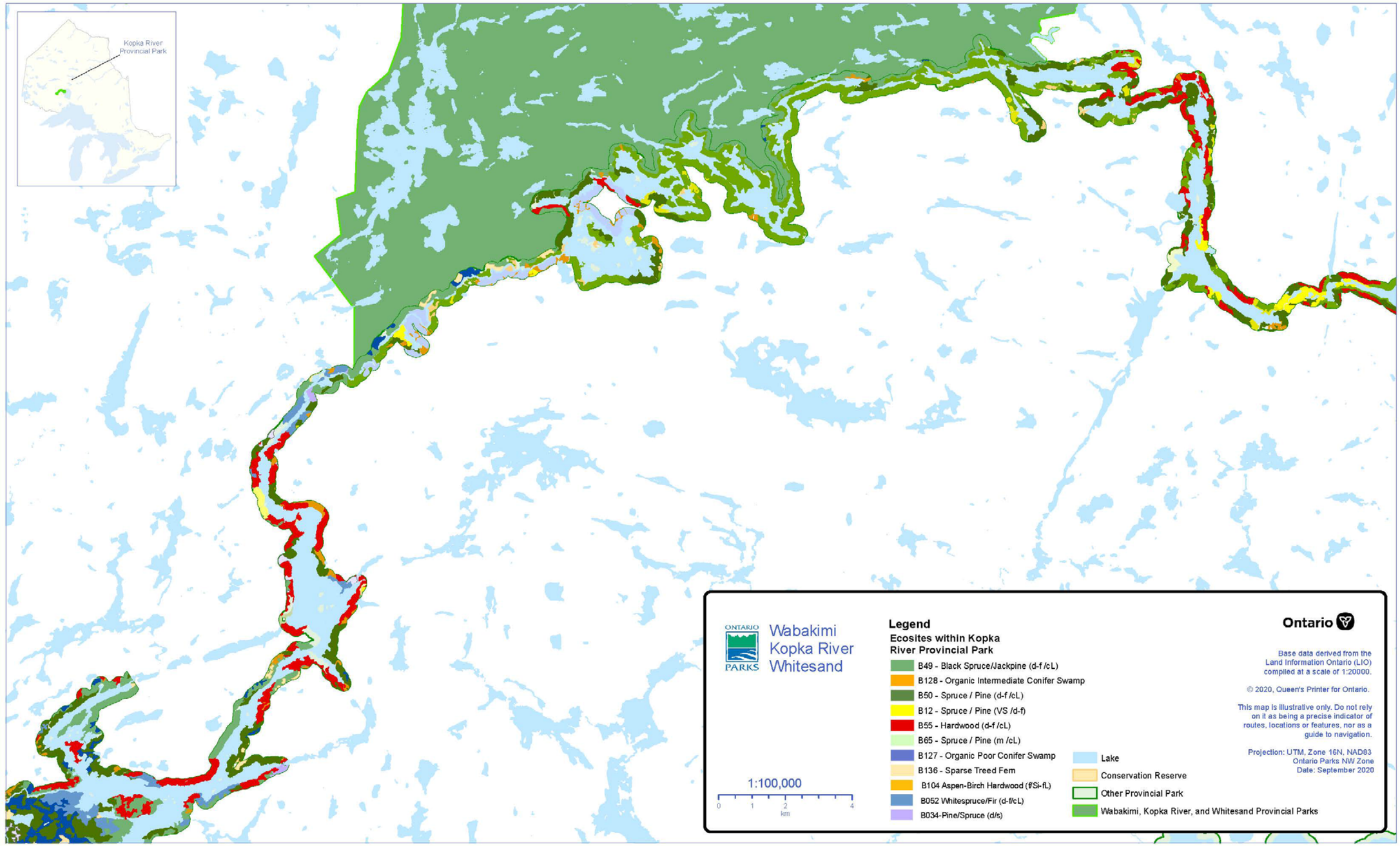

Figure 5D

Kopka Ecosites

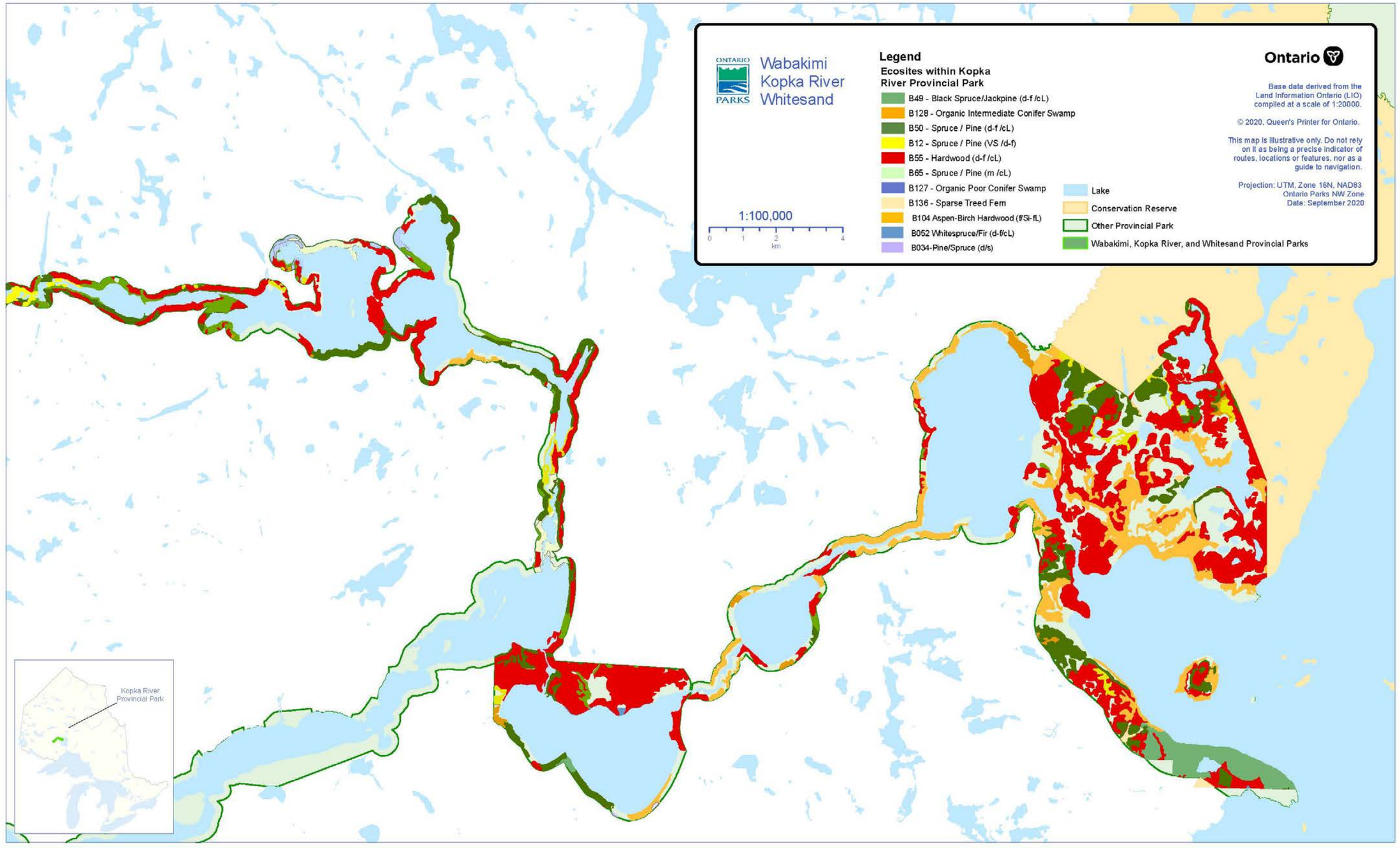

Figure 5E

Whitesand Ecosites

Wabakimi
Kopka River
Whitesand

Legend

Ecosites within Whitesand Provincial Park

- B49 - Black Spruce/Jackpine (d-f /cL)
- B128 - Organice Intermediate Conifer Swamp
- B50 - Spruce / Pine (d-f /cL)
- B12 - Spruce / Pine (VS /d-f)
- B55 - Hardwood (d-f /cL)
- B65 - Spruce / Pine (m /cL)
- B127 - Organic Poor Conifer Swamp
- B136 - Sparse Treed Fern
- B126/ B137 - Treed Bog
- B034 Pine/Spruce (d/s)
- B035 Pine /Spruce (d/s)
- B052 Whitespruce/Fir (d-f/cL)
- Lake
- Conservation Reserve
- Other Provincial Park
- Wabakimi, Kopka River, and Whitesand Provincial Parks

1:100,000
0 0.5 1 2
km

Ontario

Base data derived from the Land Information Ontario (LIO) compiled at a scale of 1:20000.

This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations or features, nor as a guide to navigation.

Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

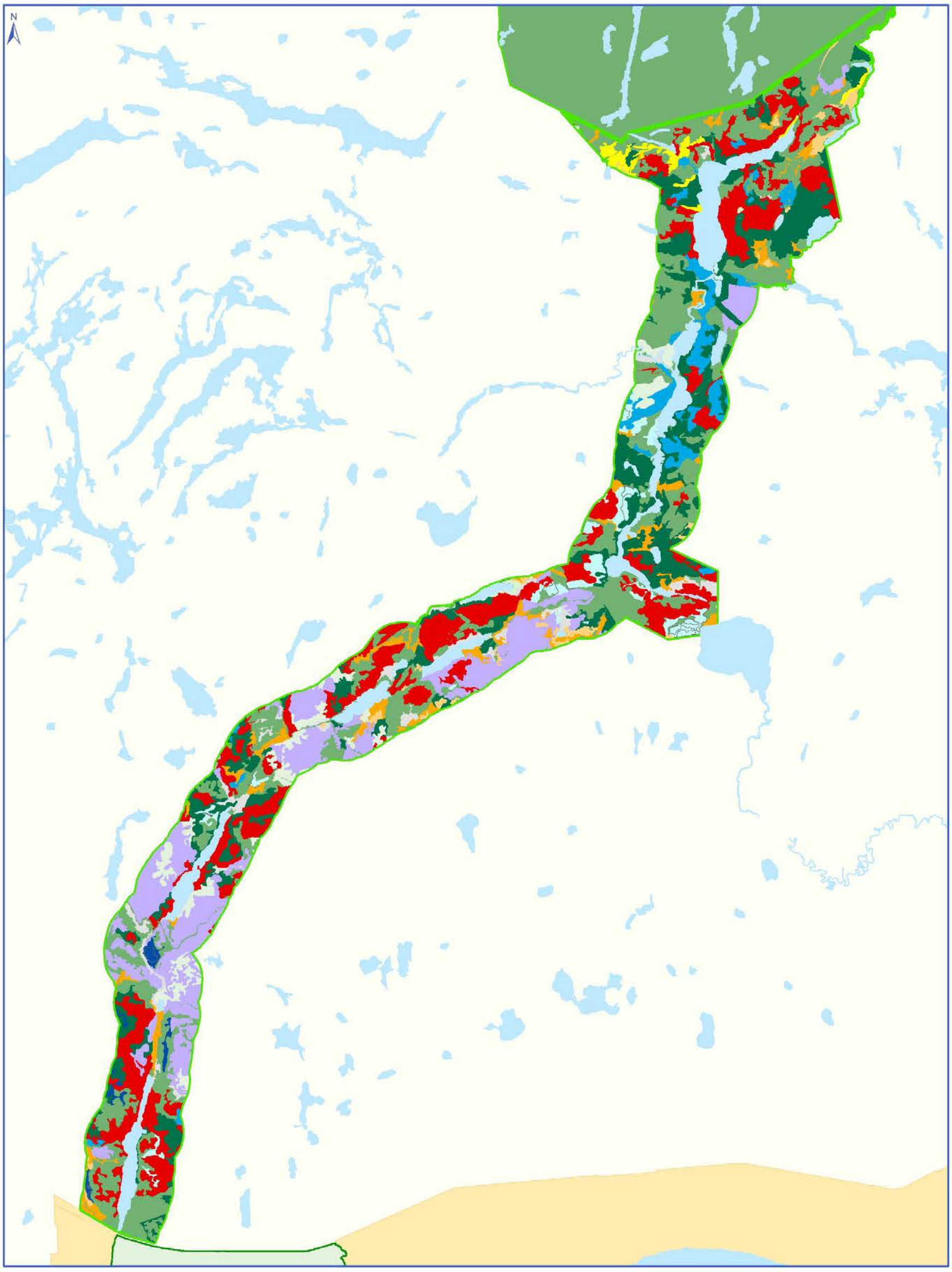

Figure 6 Fire History

ONTARIO PARKS Wabakimi Kopka River Whitesand

Legend

Fire Distrubance as Point -- Area Under 40 Hectares

Year 2003 - 2016

Fire Disturbance Area

Year 1960 - 1979

Year 1980 - 1999

Year 2000 - 2016

Lake

Conservation Reserve

Other Provincial Park

Wabakimi Provincial Park – Original Boundary

Wabakimi, Kopka River, and Whitesand Provincial Parks

1:900,000

0 5 10 20

km

Ontario

Base data derived from the Land Information Ontario (LIO) compiled at a scale of 1:20000.

This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations or features, nor as a guide to navigation.

Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

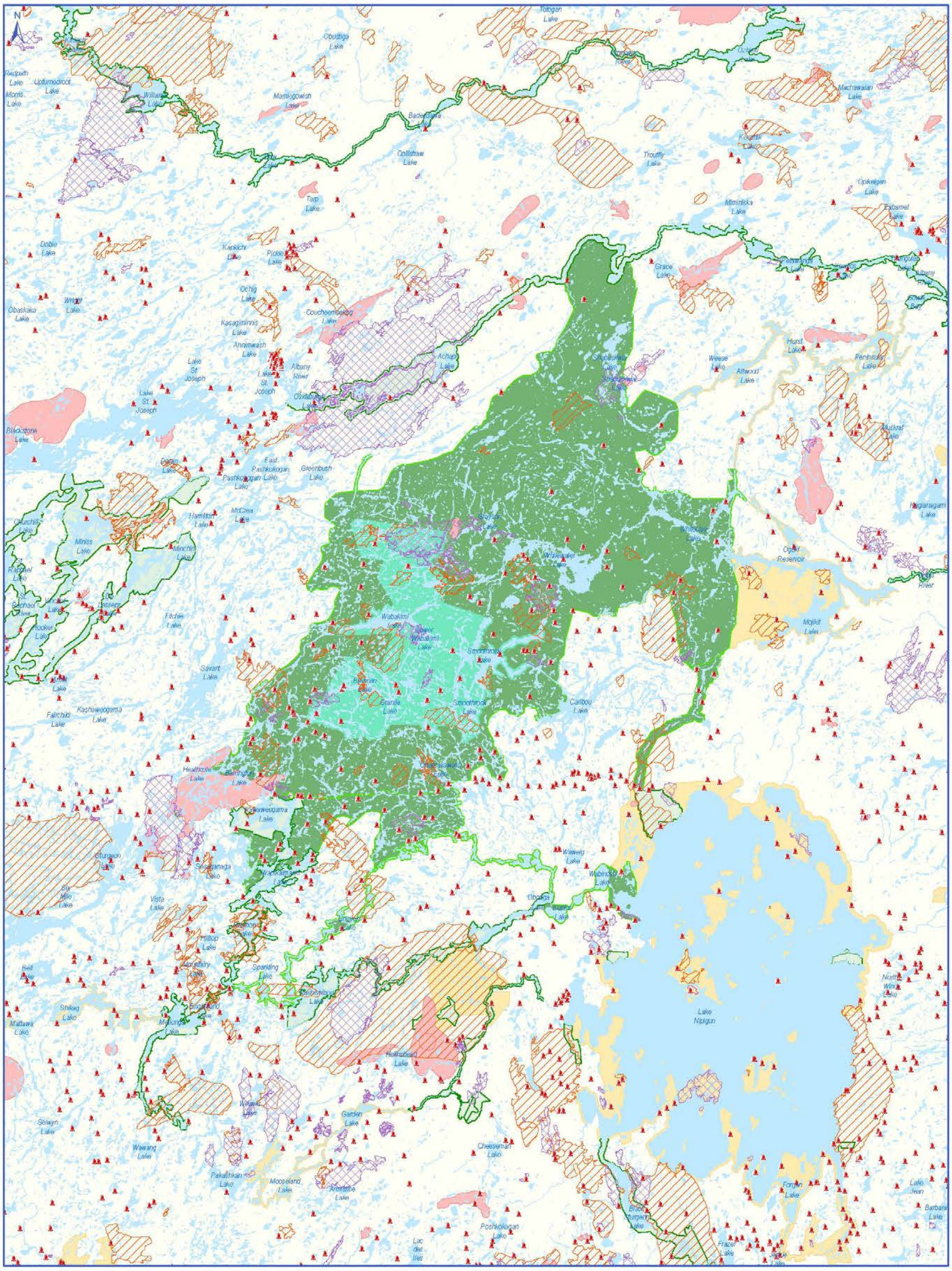

Figure 7 Forest Disturbance

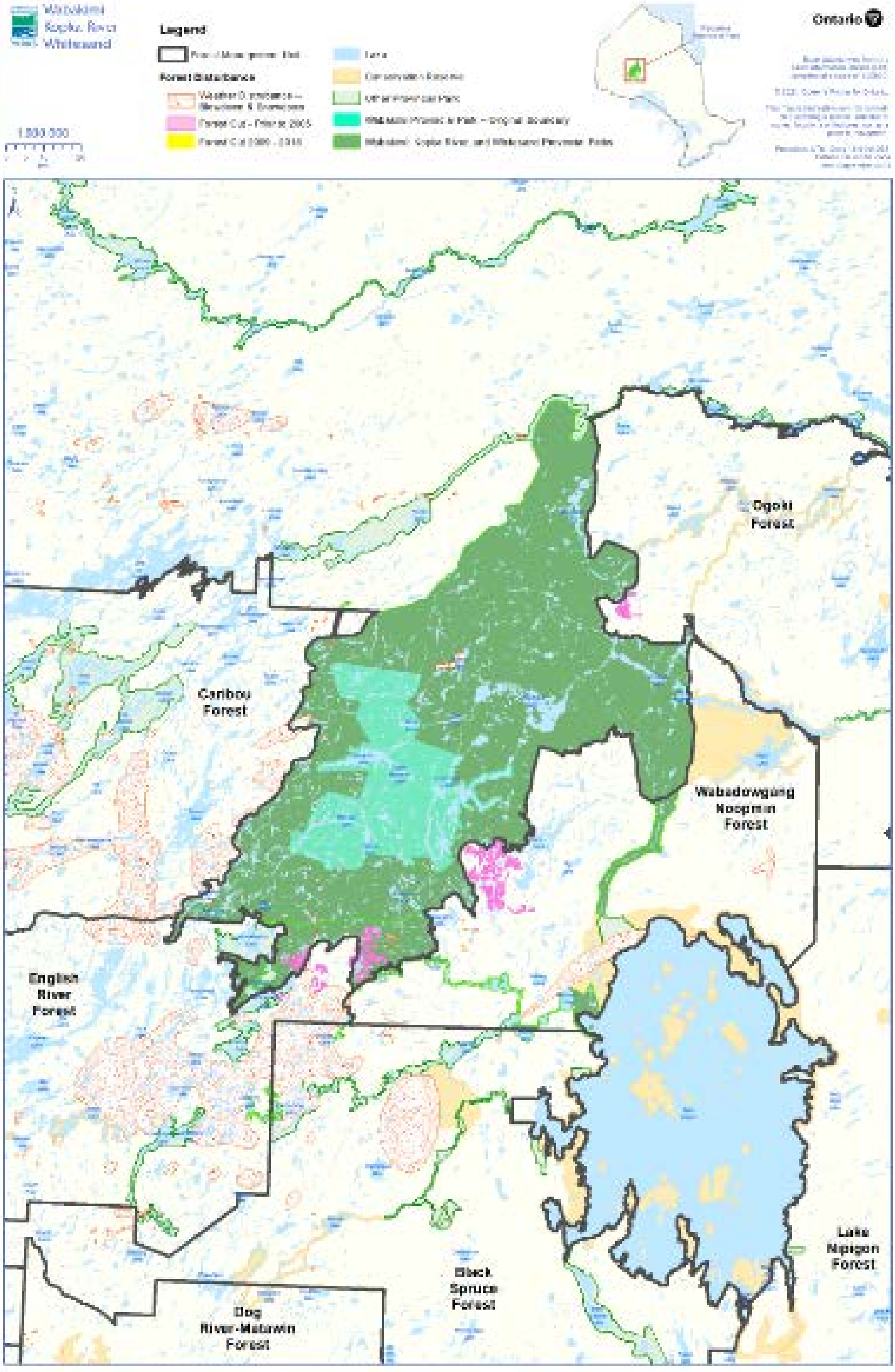

Figure 8 Caribou Use Areas

ONTARIO PARKS Wabakimi Kopka River Whitesand

Legend

Railway

Road

Highway
Primary
Secondary
Unmaintained

Lake

Caribou Use Area

Summer Use Area
Winter Use Area
Nursery Area

Conservation Reserve
Other Provincial Park
Wabakimi Provincial Park -- Original Boundary
Wabakimi, Kopka River, and Whitesand Provincial Parks

1:900,000
0 5 10 20
km

Ontario

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Figure 9A — Surficial Geology

ONTARIO PARKS Wabakimi Kopka River Whitesand

Legend

Landform Features
- Drumlin
- Esker
- Moraine
- Steep-Walled Valleys
- Other Linear Ice-Flow

Surficial Geology
- Bedrock
- Fluvial deposits
- Glaciofluvial ice-contact deposits
- Glaciofluvial outwash deposits
- Glaciolacustrine deposits
- Organic deposits
- Till

- Lake
- Other Provincial Park
- Wabakimi Provincial Park Original Boundary
- Wabakimi, Kopka River, and Whitesand Provincial Parks

1:900,000
0 5 10 20
km

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Figure 9B

Bedrock Geology

ONTARIO PARKS
Wabakimi
Kopka River
Whitesand

Legend

Dikes
- Biscotasing mafic dike
- Empey Lake mafic dike
- Mackenzie mafic dike
- Mafic dikes of uncertain age
- Mafic sills and dikes
- Marathon mafic dike
- Marathon, Kapuskasing or Biscotasing mafic dike
- Matachewan mafic dike
- Pickle Crow mafic dike (Molson swarm) normal
- Pickle Crow mafic dike (Molson swarm) reverse

- Iron Formation
- Lake
- Wabakimi Provincial Park -- Original Boundary
- Other Provincial Park
- Wabakimi, Kopka River, and Whitesand Provincial Park

1:900,000
0 5 10 20
km

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Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

Legend for Figure 9B

Bedrock Geology

Rock Type

- Anorthosite
- Basaltic and andesitic flows, tuffs and breccias, chert, iron formation, minor metasedimentary and intrusive rocks, related migmatites
- Biotite tonalite to granodiorite
- Conglomerate and arenite
- Conglomerate, sandstone, shale
- Dacitic and andesitic flows, tuffs and breccias
- Gabbro
- Gabbro, anorthosite, ultramafic rocks
- Granite, alkali granite, granodiorite, quartz feldspar porphyry; minor related volcanic rocks (1.5 to 1.6 Ga)
- Hornblende tonalite to granodiorite
- Logan and Nipigon mafic sills (circa 1100-1115 Ma)
- Mafic metavolcanic and basaltic rocks with minor komatiitic flows, metasedimentary and pyroclastic rocks
- Mafic metavolcanic rocks, minor iron formation
- Mainly coarse clastic metasedimentary rocks, with minor, mainly alkalic, mafic to felsic metavolcanic flows, tuffs and breccias
- Massive to foliated granodiorite to granite
- Metavolcanic rocks, minor metasedimentary rocks, mafic gneisses of uncertain protolith, granitic gneisses
- Muscovite-biotite and cordierite-biotite granite, granodiorite-tonalite
- Paragneiss and migmatites
- Potassium feldspar megacrystic units
- Pyroxenite, diorite, monzonite, syenite, nepheline syenite
- Rhyolitic, rhyodacitic flows, tuffs and breccias
- Rhyolitic, rhyodacitic, dacitic and andesitic flows, tuffs and breccias
- Rhyolitic, rhyodacitic, dacitic and andesitic flows, tuffs and breccias, chert, iron formation, minor metasedimentary and intrusive rocks; related migmatites
- Syenite, nepheline and/or foid-bearing syenite
- Tonalite to granodiorite-foliated to gneissic-with minor supracrustal inclusions
- Tonalite to granodiorite-foliated to massive
- Ultramafic rocks
- Ultramafic, gabbroic and granophyric intrusions (probably related to 35)
- Wacke, siltstone, arkose, argillite, slate, mudstone, marble, chert, iron formation, minor metavolcanic rocks, conglomerate, arenite, paragneiss, migmatites
- diorite, quartz diorite, minor tonalite, monzonite, granodiorite, syenite and hypabyssal equivalents
- wacke, siltstone, arkose or argillite (from lowlands)

Figure 10 Watersheds

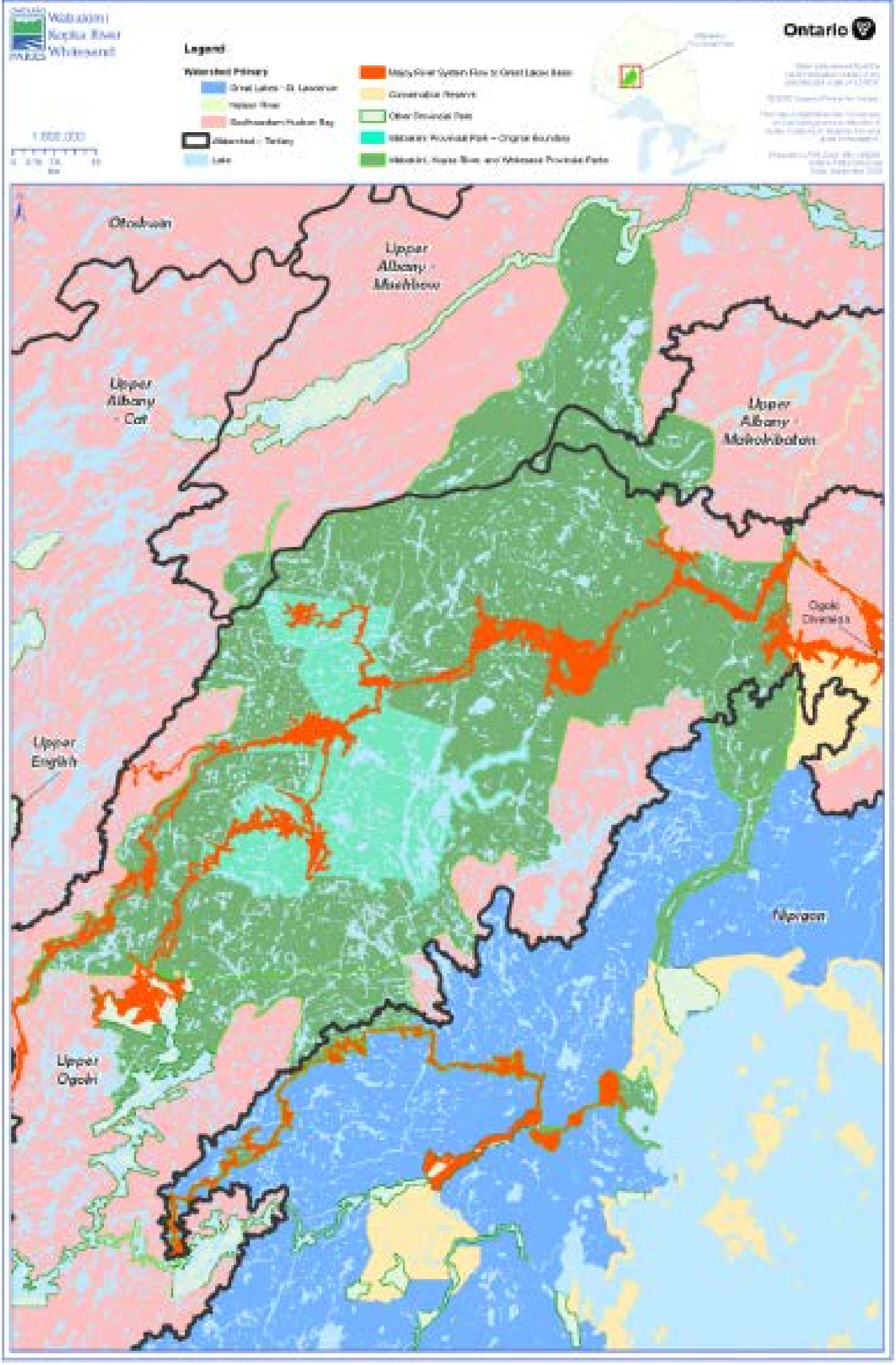

Figure 11 Bear Management Areas

Wabakimi
Kopka River
Whitesand
ONTARIO PARKS

Legend

Railway

Road

Highway
Primary
Secondary
Unmaintained

Lake
Wildlife Management Unit
Bear Management Area
Conservation Reserve
Other Provincial Park
Wabakimi Provincial Park -- Original Boundary
Wabakimi, Kopka River, and Whitesand Provincial Parks

1:600,000
0 3.75 7.5 15
km

Ontario

Base data derived from the Land Information Ontario (LIO) compiled at a scale of 1:20000.

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Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

Figure 12

Traplines

ONTARIO PARKS Wabakimi Kopka River Whitesand

Legend

Trapline Status
- Other
- Vacant
- In Use

Road
- Highway
- Primary
- Secondary
- Unmaintained

- Trapper Cabin
- Railway
- Lake
- Conservation Reserve
- First Nation Reserve
- Other Provincial Park
- Wabakimi Provincial Park -- Original Boundary
- Wabakimi, Kopka River, and Whitesand Provincial Parks

Ontario

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Ontario Parks NW Zone
Date: September 2020

1:900,000
0 5 10 20
km

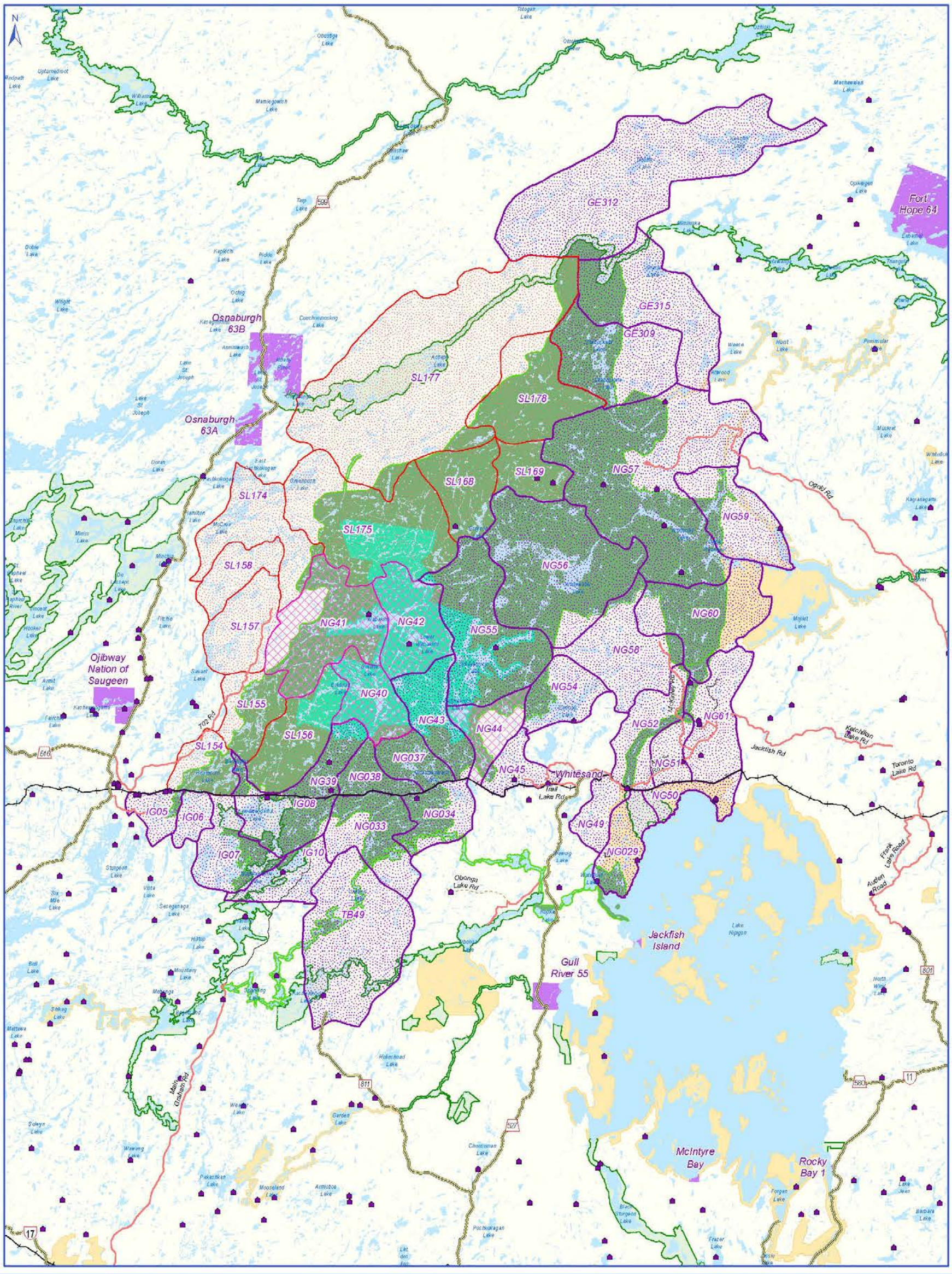

Figure 13 Baitfish Harvest Areas

Ontario Parks
Wabakimi
Kopka River
Whitesand

Legend

Railway

Road

Highway
Primary
Secondary
Unmaintained

Lake
Fisheries Management Zone
Baitfish Harvest Area
Conservation Reserve
Other Provincial Park
Wabakimi Provincial Park -- Original Boundary
Wabakimi, Kopka River, and Whitesand Provincial Parks

1:600,000
0 3.75 7.5 15
km

Ontario

Base data derived from the Land Information Ontario (LIO) compiled at a scale of 1:20000.

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Projection: UTM, Zone 16N, NAD83
Ontario Parks NW Zone
Date: September 2020

13 APPENDIX II TERMS OF REFERENCE COMMENT SUMMARY

Sixty written comments were received from park users, outfitters, remote tourism operators, environmental nongovernment organizations (ENGOs), and patent land holders, canoeing website forum bloggers, local residents and government agencies. Residents of northwestern and southern Ontario, Quebec, the Midwestern USA, the UK, and Europe submitted comments.

A summary of topics raised by respondents is organized my topic:

Access

General access comments addressed not creating new access points or creating new access outside of park boundary on Crown land. Some respondents expressed the desire to restrict all motorized access including aircraft. The creation of new access points on the west side of Wabakimi was suggested.

Train related access comments addressed provision of improved launch sites and campsites associated with drop-off locations to avoid conflict with patent landowners along the rail corridor as well as providing night reflective mileage signage.

Comments related to roads and trails were strongly in favour of not creating new roads or trails and discouraging ATV use in the parks. Suggestions included reviewing gated roads to facilitate canoe route access, removing remaining bridges and culverts, and providing better information about authorized access from adjacent roads.

Aircraft related comments included the suggestion to limit air access to a few locations in the interior of Wabakimi and restricting access by air to lodges and outpost camps only. Other commenters acknowledged the need for air access throughout Wabakimi due to the distances involved and supported having no restrictions on aircraft landing. It was suggested that Ontario Parks be the only distributor of aircraft landing permits.

Boat Caches

Comments relating to boat caches included suggestions to require that boats be cached off trail/landing, that fuel storage at caches be prohibited, that a quota be implemented, that unauthorized boats be removed, that an annual permitting system be implemented, that boat caches be limited to lakes with fisheries assessment to ensure sustainable fishery, that private boat caches be permitted for access to patents. Some commenters suggested that boat caches be prohibited and that the use of logs to roll boats between water bodies be prohibited.

Canoe Route Maintenance

General comments relating to canoe route maintenance suggested that improved/increased maintenance is required, that access points require garbage clean-up, that maintenance

program be expanded to adjacent Crown land routes and that a volunteer program for canoe route maintenance be implemented.

Portage specific comments included the improvement/expansion of maintenance and the use of a rotation schedule in order to cover the large area of Wabakimi.

Signage related suggestion included the provision of reflective signage at drop-off points on the railway corridor, not providing signage to mark portages and campsites, and improving directional signage adjacent to the parks.

Caribou

Comments relating to caribou stressed their importance as a management priority with regard to the protection of habitat and calving/nursery areas. Suggestions included active management/stewardship and minimizing the recreational footprint.

Classification

The majority of respondents who commented on classification indicated a strong desire for the entirety of Wabakimi to be classified as wilderness or at least the largest amount possible of the expansion area to be so classified. Some respondents felt that all three parks should be classified as wilderness. A number of respondents indicated that the original park classification should not be changed from wilderness. Some suggested that classification as wilderness include the provision of policy direction for non-conforming activities. Suggestions for natural environment classification of the expansion area acknowledged MNR commitment to retaining remote tourism industry and moose hunting in the expansion area. One respondent suggested natural environment classification in the sense of Algonquin Park's classification.

Commercial Tourism

A number of respondents called for the removal of tourism infrastructure from Wabakimi with the suggestion that this be phased out gradually as properties come up for sale. Most respondents called for the continuation of the remote tourism industry within Wabakimi as it presently exists, with no additional expansion or new opportunities. Outposts and lodges were identified as potential rescue resources for backcountry travellers and acknowledged as infrastructure that makes Wabakimi more accessible to people of all ages as a multigenerational tourism resource.

Comments relating to shore lunch sites indicated that there should be no structures or equipment stored at these locations and that shore lunch sites should not be set aside for the exclusive use of outpost clients.

General comments relating to remote tourism included the need for operators to maintain high environmental standards, including the education/orientation of guests. It was suggested that fishing business transition to ecotourism. As well the need for fisheries assessment to determine bed capacity and boat cache capacity was identified.

Cultural Resources and First Nations

The presence of indigenous historic sites in Wabakimi and Kopka was noted. A correction to the reference to Saugeen Nation #258 was identified. It was suggested that existing remote tourism opportunities be made available to First Nations and that other economic opportunities related to the parks be identified for First Nations. The value of TEK, and indigenous information about travel routes and important cultural sites was identified. As well the importance of the role of indigenous consultation in planning was identified.

Park Facilities

Several respondents suggested that park administrative facilities be developed in Armstrong and Savant Lake to issue permits etc. It was suggested that parking be developed at remote access points. A number of respondents suggested that no new facilities be developed or that any development occur outside of park boundaries. One commenter suggested that a campground be developed at each of the three parks.

Fire

The need for a park fire management plan was identified to ensure that natural fire regimes are maintained.

Fisheries

Respondents identified the need for fisheries assessment and a park fisheries plan and suggested that Wabakimi be a stand alone FMZ. Specific suggestions including prohibiting earthworms as bait, banning live bait and treble and barbed hooks and lead tackle, prohibiting fish finders, prohibiting the export of fish, and having conservation licences only. Disposal of fish entails away from camp/lunch sites was also suggested.

Garbage/waste disposal

The eventual need for privies at high use sites was identified. Some respondents indicated their support for a glass bottle ban and some also supported a metal can ban for canoeists. The need to clean up garbage at seasonal use and other sites was identified. The need for tourism outfitters to remove all of the waste from the park was also identified.

Greater Park Ecosystem

It was suggested that FMP timing restrictions on harvest activities be implemented so as not to conflict with tourism season. The importance of maintaining connectivity to the larger landscape was identified as was the importance of ensuring that development outside of the park does not compromise ecological integrity.

Hunting

Some respondents called for the prohibition of hunting. Some respondents indicated that moose hunting only should be permitted. Some indicated that moose population surveys are required to inform hunting quotas. The importance of moose hunting to the remote tourism industry was identified.

Kopka and Whitesand specific comments

Respondents suggested that Kopka River needs interior maintenance and access point maintenance. It was suggested that both Kopka and Whitesand become operating parks.

Motorized Travel

Several respondents called for the prohibition of all motorized travel, and some called for the same with the exception of float planes. Most respondents acknowledged the need for motorized access to outposts and lodges and other patents and supported this. Suggestions included horsepower limits for motorboats, restricting the use of motorboats to lakes with tourism infrastructure and or those accessible without portaging. As well the prohibition of PWCs was suggested as was the prohibition of houseboats. It was suggested that all motorboats require a summer vehicle permit and that snow machines /tractor be permitted to resupply outposts in winter.

Park Map and Website

Many respondents indicated the need for a detailed park map that can be used to plan canoe trips and that shows connection to adjacent Crown land routes. It was suggested that the park map indicate areas that are sensitive for caribou and restrict camping at such locations. It was also suggested that Ontario Parks sell park maps exclusively.

Many respondents indicated the need for Wabakimi to have its own website with safety bulletins and information and a posting forum for comments and trip reports.

Patent lands

One patent land holder indicated that they have an interest in maintaining the status quo regarding their activities including motorized access to the property and that they do not feel that they should pay any fees to use the park. Other respondents indicated that they did not support the expansion of private recreation camps.

Permitted Activities

Several respondents called for low impact recreational activities only and the prohibition of any new consumptive recreational activities. It was suggested that dog sledding be permitted and that it be prohibited. It was suggested that Ontario parks consider permitting non mechanized self –propelled winter camping.

Terms of Reference Criticisms

Many respondents were critical of the changes in the 2013 terms of reference from the version approved in 2003. Specific criticisms included the lack of representation on the planning team of park stakeholders including tourism interests, and the lack of pre-consultation with non-indigenous stakeholders. It was suggested that each stage of public comment should be at least 60 days in length.

Scope of Planning

It was suggested that regulation for other wilderness class parks be applied to Wabakimi i.e. can and bottle ban. It was also suggested that three separate plans be prepared in the planning exercise. Some respondents suggested that the adjacent conservation reserves should be included in the planning exercise. It was also noted that ecological integrity is the primary guiding principle for the planning exercise.

Revenue generation

Suggestions for revenue generation included fees for camping, day use, boat caches, aircraft landing, and motorboats.

Zoning

The need to zone sensitive areas as nature reserve was identified. It was suggested that zoning be used to limit motorized access to certain areas.

14 APPENDIX III ECOLOGICAL LAND CLASSIFICATION (ELC) CODING TABLES

Table 1. ELC Substrate textural classes
*includes all textures with “gravelly” and “very gravelly” modifiers – can have up to 35% and 50% coarse fragments by volume. Greater than 90% coarse fragments constitute a “rock” substrate.

	Code	mineral soil textural families used by ELC	general characteristics	textural classes*
rock	R	bedrock, coarse fragments, skeletal	consolidated bedrock and coarse fragments (> 90% by vol)	-
coarse mineral	S	sandy	Coarse Sandy - all very coarse, coarse, and medium sands	- vcS, LvcS, SivcS, cS, LcS, SicS, mS, LmS, SimS
			Fine Sandy - all fine sands	- fS, LfS, SifS
	cL	coarse loamy	very fine sands and loams	- vfS, LvfS, SivfS, vcSL, cSL, mSL, fSL, vfSL, L
fine mineral	Si	silty	all silts and silt loams	- Si, SiL
	fL	fine loamy	all clay loams	- SCL, SiCL, CL, fSC, vfSC
	C	clayey	soils with > 40% clay particles	- SiC, C
organic	O	organic	> 40 cm organic materials	- folic terrestrial orgaincs, Of, Om, Oh

Table 2. Moisture Modifier Codes

OIP code	terms		description
Θ	dry	dry	extended periods of severe moisture deficit
0	moderately dry		
1	moderately fresh	fresh	adequate moisture for plant growth; neither significant excess or deficits of moisture
2	fresh		
3	very fresh		
4	moderately moist	moist	long periods or continuous saturation levels of moisture; begins causing anaerobic conditions
5	moist		
6	very moist		
7	moderately wet	wet	excess levels of flooding or saturation; significant oxygen reduction to inhibit decay
Other codes			
N/A	xeric	xeric	reserved for special conditions where OIP sampling does not apply: i.e. where persistent features like mottling and gleying are not available for measurement all Active, Subterranean, Rock, and some Very Shallow and Shallow to Moderate, and vertical substrates, that are not humid or flooded when prolonged periods of drought are primary ecological drivers
N'A	humid	humid	reserved for special conditions where OIP sampling does not apply: i.e. where persistent features like mottling and gleying are not available for measurement all Active, Subterranean, Rock, and some Very Shallow and Shallow to Moderate, and vertical substrates, that are not dry, saturated, or flooded
N/A	saturated	saturated	reserved for special conditions where OIP sampling does not apply: i.e. where persistent features like mottling and gleying are not available for measurement all Active, Subterranean, Frozen, and vertical rock and mineral substrates, that are not dry or humid