

# **LAKE NIPIGON CONSERVATION RESERVE RESOURCE MANAGEMENT PLAN**

## **CHAPTER 2**

July 2003

**APPROVAL STATEMENT:**

I am pleased to approve the Management Plan for the Lake Nipigon Conservation Reserve.

This Management Plan provides guidance for the management of the Conservation Reserve and the basis for ongoing monitoring activities.

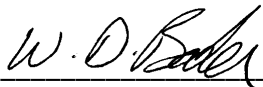
The Lake Nipigon Conservation Reserve is located within the Lake Nipigon Basin Signature Site, one of 9 such areas featured in the *Ontario's Living Legacy Land Use Strategy* (1999). Signature Sites are identified for their range of natural and recreational values and their potential to contribute to future recreation and tourism.

This Management Plan has been developed under the general direction of the Lake Nipigon Basin Signature Site Ecological Land Use and Resource Management Strategy, which provides the overall context for land use and resource management activities in the basin.



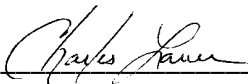
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## STATEMENT OF ENVIRONMENTAL VALUES AND THE ENVIRONMENTAL BILL OF RIGHTS

In accordance with the provisions of the *Environmental Bill of Rights*, the Ministry of Natural Resources prepared a *Statement of Environmental Values*. It describes how the purposes of the *Environmental Bill of Rights* are to be considered whenever decisions are to be made which might significantly affect the environment.

The primary purpose of the *Environmental Bill of Rights* is “to protect, conserve and wherever possible, restore the integrity of the environment.” From the Ministry’s perspective, that broad statement of purpose translates into four objectives in its *Statement of Environmental Values*:

- To ensure the long-term health of the ecosystems by protecting and conserving our valuable soil, aquatic resources, forest and wildlife resources as well as their biological foundations;
- To ensure the continuing availability of natural resources for the long-term benefit of the people of Ontario;
- To protect natural heritage and biological features of provincial significance; and,
- To protect human life, the resource base and the physical property from the threats of forest fires, floods and erosion.

The Ministry’s *Statement of Environmental Values* has been considered in the development of this resource management plan for the Lake Nipigon Conservation Reserve.

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## 1 INTRODUCTION

The Lake Nipigon Conservation Reserve was established as a result of the *Lands for Life* and Ontario's Living Legacy land use planning processes. It is recognized in the *Ontario's Living Legacy Land Use Strategy* (1999) as part of the Lake Nipigon Basin Featured Area (also known as a Signature Site), one of nine identified featured areas.

The Lake Nipigon Conservation Reserve is comprised of four Lake Nipigon bays (Humboldt, West, McIntyre and South), its islands and shore lands and is one of seventeen designated and existing protected areas and enhanced management areas that make up the Lake Nipigon Basin Signature Site. The designation of Conservation Reserve permits many traditional land uses to continue, including non-consumptive recreational activities as well as hunting, trapping and angling while at the same time excluding timber harvesting, mining, hydroelectric power development and sale of Crown land.

The planning process and public consultation required for the development of this resource management plan were integral parts of the overall planning process for the *Ecological Land Use and Resource Management Strategy* for the Lake Nipigon Basin. Detailed information relating to the process followed and the public input obtained can be found in Appendix A of the strategy document.

## 2 PLANNING AREA

### 2.1 BOUNDARY

As indicated in Figure 4, the boundary of the Lake Nipigon Conservation Reserve includes some of the bed of Lake Nipigon, the islands, 500 metres of the shoreline along the southern half of the lake and 1000 metres of the shoreline along the northern half of the lake (except for areas designated as enhanced management area). The Lake Nipigon Conservation Reserve boundary has been revised from that originally identified in the

*Ontario's Living Legacy Land Use Strategy* (1999) to include four of the five bays originally identified as the Lake Nipigon Waters Conservation Reserve. This amalgamation makes sense since the shoreline and aquatic ecosystems are closely connected ecologically. With the amalgamation, the total area of the Lake Nipigon Conservation Reserve is approximately 177,228.6 hectares.

Although all of the bed of Lake Nipigon is not included within the boundaries of the Lake Nipigon Conservation Reserve, this plan provides direction for fisheries and water resource management for all of Lake Nipigon. Given that the aquatic and shore land ecosystems are so inextricably linked, management direction is needed for both in order to ensure sustainability and protection of the conservation reserve.

The boundaries of the Lake Nipigon Conservation Reserve exclude patented land, mining claims and mining leases. Active mining claims, staked before the designation of the conservation reserve, are designated as forest reserves. Should these claims be retired, then these lands will be incorporated into the protected area. Currently, six forest reserves exist in English Bay, Chief Bay and Black Sturgeon Bay and adjacent to Lynx Harbour.

### 2.2 REGIONAL SETTING

The Lake Nipigon Conservation Reserve is located approximately 170 kilometres northeast of Thunder Bay and 50 kilometres north of the Town of Nipigon. It falls within the Thunder Bay and Nipigon Administrative Districts of the Ministry of Natural Resources and is situated between 88 and 89 degrees longitude and between 49 degrees 15 minutes and 50 degrees 15 minutes latitude (Figure 5).

The City of Thunder Bay has an international airport and is the largest service centre in the region. There are nine communities in close proximity to the Lake Nipigon Conservation Reserve: Beardmore, Macdiarmid (part of the newly created Municipality of Greenstone),

Armstrong, Nipigon, Red Rock, Gull Bay, Biinjitiwaabik Zaaging Anishinaabek (Rocky Bay), Whitesand Reserve and Red Rock Reserve (Lake Helen). The hamlet of Orient Bay, is located at the south end of Pijitawabik Bay, approximately 10 kilometres south of MacDiarmid. The tiny settlements of Mud River and Ferland are located on the rail line, north of Lake Nipigon. These communities provide essential services such as gas, shopping, groceries, banking, restaurants, hotels and medical care. Other population centres in this region of Northwestern Ontario include Terrace Bay, Schreiber, Manitouwadge, Geraldton, Nakina, Longlac, Jellicoe and Caramat.

At present the Indian Reserves of Gull Bay and Rocky Bay are the only occupied reserves on the shores of Lake Nipigon. The Jackfish Island Indian Reserve is currently unoccupied, while McIntyre Bay Indian Reserve has a small number of summer residents. The Whitesand Reserve is located next to the community of Armstrong. A portion of Lake Nipigon Provincial Park has been deregulated to provide reserve lands for Sand Point First Nation. Official reserve status for these lands has not yet been obtained and no community currently exists at this location. Other Aboriginal communities with traditional ties to Lake Nipigon but without established communities or reserve lands include Lake Nipigon Ojibway First Nation, and two Aboriginal groups seeking band status, Poplar Point Ojibway, and Poplar Point. The Red Rock First Nation community is located on the Nipigon River just south of the conservation reserve.

### 2.3 DESCRIPTION OF STUDY AREA

Lake Nipigon, the 38th largest lake in the world and the largest lake wholly within Ontario, and its surrounding shore lands, constitute a natural resource of global significance. Its clear, deep, unpolluted waters reach to a maximum depth of 166 metres (540 ft) and support a fish community that has remained basically unchanged since it was first studied almost a century ago. Although the Trans-Canada Highway runs just

south of its shoreline, Lake Nipigon has remained relatively undeveloped and remote, offering pristine landscapes and solitude to the outdoor enthusiast and refuge for a number of species at risk.

The Lake Nipigon Conservation Reserve is home to the woodland caribou, a threatened species in Canada. The islands of Lake Nipigon provide critical calving and summer habitat for the caribou. Migration corridors pass through the Mungo Park Point and Castle Lake areas. Other wildlife of note include the endangered American White Pelican, which has established a number of breeding colonies on the islands; the bald eagle, great gray owl and osprey (Figure 6).

Lake Nipigon supports a fish community of 46 species, two of which have been listed nationally as threatened, the shortjaw cisco and deepwater sculpin. The sport fishery is considered world class with the cold, clear waters of Lake Nipigon producing memorable sized lake trout and brook trout. The warmer bays produce walleye and exceptional sized northern pike. A quality commercial fishery also exists on Lake Nipigon. The primary commercial species is lake whitefish.

The Lake Nipigon Conservation Reserve has a rich heritage related to prehistoric Aboriginal cultures, the fur trade, early logging and railway construction. Numerous archaeological sites have been documented and many more are likely undiscovered.

One of the most striking characteristics of the area is the rugged topography. Along portions of the Lake Nipigon shoreline and islands, diabase cuervas form vertical cliff faces of up to 150 metres above the water's surface. These dramatic topographic features provide microclimates for arctic-alpine disjunct plant species. Areas in the conservation reserve with particularly scenic cliff landscapes include Outer Barn Island, Undercliff, Castle Bay and the Tchiatang Bluffs in Black Sturgeon Bay.

There are a fair number of access points to the conservation reserve, some located within the study area boundaries and some located



outside in the adjacent enhanced management areas and private land. Some sites are developed such as High Hill Harbour and South Bay access, whereas others are simply rough trails to a clearing by the water, such as North Chief Bay.

The Lake Nipigon Conservation Reserve provides an exceptional recreational landscape for outdoor enthusiasts, offering excellent backcountry recreation opportunities such as angling, wildlife viewing, sea kayaking, hunting and birding, to name a few. There are no tourism facilities within the boundaries of the conservation reserve other than a number of access points and Crown land campsites. Charter boat and cruiser boat operators provide single-day and multi-day trips on Lake Nipigon, catering to anglers, hunters and outdoor enthusiasts. Tourism, campground and marina facilities exist outside the conservation reserve in enhanced management areas and on private land located on Lake Nipigon's shores.

### 3 PLAN GOAL AND OBJECTIVES

*Goal Statement: To protect, enhance and where necessary, restore the natural ecosystems, populations and wilderness qualities of the Lake Nipigon Conservation Reserve, while allowing for recreational development that will not compromise the integrity and environmental values of the conservation reserve ecosystem.*

Objectives specific to the Lake Nipigon Conservation Reserve have been developed in light of the overall objectives for the Lake Nipigon Basin Signature Site. The intent is to implement strategies to achieve these objectives which in turn will further the objectives for the Basin.

#### 3.1 ACCESS

- To manage access on Lake Nipigon so as to ensure the continued remote character of the north half of Lake Nipigon
- To work towards developing/maintaining (through potential partnerships) good

quality access points in a balanced fashion around the southern half of Lake Nipigon

- To ensure that existing and future access point activity/development on Lake Nipigon does not damage the lake environment

#### 3.2 CROWN LAND USE

- To allow for Crown land use activities (camping, hiking, boating, hunting) within the Lake Nipigon Conservation Reserve, while ensuring the protection of sensitive features (nesting sites, calving grounds, significant plants, etc.)
- To ensure that existing structures on Crown land within the conservation reserve (trap cabins, commercial fish camps) are being used for their designated purpose; and to require their removal if they are not
- To encourage low impact camping and respect for the conservation reserve environment, its plants, fish and wildlife
- To seek partners for the mapping and improvement (fire pits, picnic tables, box privies) of remote campsites within the Lake Nipigon Conservation Reserve
- To enforce the 21-day Crown land camping rule within the conservation reserve to ensure fair and equal access to Crown land camping opportunities
- To allow no disposition of Crown land for recreation camps, tourist lodge or outpost camps in order to protect the pristine and undeveloped character of the conservation reserve

#### 3.3 TOURISM AND RECREATION

- To promote the Lake Nipigon Conservation Reserve as a landscape offering exceptional backcountry recreational opportunities in the form of camping, sea kayaking, boating and nature appreciation
- To support and promote existing tourism developments/businesses in the enhanced management areas as facilities through

which the Lake Nipigon Conservation Reserve can be accessed and enjoyed

- To investigate the opportunity for canoe route/trail/look-out development in the Castle Lake area and the potential linking this opportunity to tourism operations
- To investigate and pursue, through partnership with local First Nations, the development of a small number of authentic historic Aboriginal encampments within the conservation reserve to be promoted as tourist attractions

### 3.4 FISHERIES

- To protect, rehabilitate and sustain aquatic ecosystems and populations within the Lake Nipigon Conservation Reserve while allowing for the benefits of Aboriginal subsistence, sport, commercial and bait fishing
- To use brook trout and lake trout population status as indicators of a healthy aquatic ecosystem
- To maintain fish populations at current levels in Lake Nipigon or restore to historical levels of abundance and stock structure with specific targets as follows:
  - Restore brook trout populations to 1930s level of abundance and stock structure
  - Restore walleye and sauger to early 1980s levels of abundance and stock structure
  - Restore sturgeon to 1919 –1924 levels of abundance and stock structure
  - Maintain lake trout populations at current levels as a minimum with a target of achieving 1993 levels of abundance and stock structure
  - Maintain northern pike populations at current levels of abundance and stock structure
  - Maintain lake whitefish at current levels of abundance and stock structure as a minimum
- Maintain stable self-sustaining status of other non-depleted stocks
- Restore depleted stocks of other native species with emphasis on rare, threatened and endangered species (deepwater sculpin, shortjaw cisco)
- To implement new management techniques in order to manage for a sustainable, world class commercial and sport fishery on Lake Nipigon
- To provide high quality recreational angling experiences on Lake Nipigon with a reasonable expectation of catching a memorable sized fish as follows:
  - Brook trout will be managed to provide a catch rate of 1 brook trout for every 2 hours fishing and 1 brook trout greater than 55 cm for every 8 hours fishing
  - Lake trout will be managed to provide a catch rate of 1 lake trout for every 3 hours fishing and 1 lake trout greater than 85 cm for every 8 hours fishing
  - Northern pike will be managed to provide a catch rate of 1 pike for every 1 hour of fishing and 1 pike greater than 85 cm for every 8 hours of fishing
- To manage walleye and sauger in the short term to allow recovery of degraded stocks and in the long term as a sustainable high quality sport and commercial fishery with catch rates equivalent to those in the early 1980s
- To manage lake whitefish primarily as a commercial species and to maintain, as a minimum, current catch rates
- To manage sturgeon in the short term to allow recovery of degraded stocks and in the long term as a sport fishery with a reasonable expectation of catching a memorable sized fish
- To use this plan as a catalyst for the development of a fisheries management plan for Lake Nipigon by 2005

- To ensure that the necessary information for improved management of the Lake Nipigon ecosystem is collected and analyzed (e.g., fish stock status/movement, estimate of subsistence harvest, location and mapping of critical fish habitat)
- To encourage First Nations to be involved in Lake Nipigon fisheries management activities such as information gathering, public education and enforcement

### 3.5 WILDLIFE

- To protect and sustain wildlife habitat and populations within the Lake Nipigon Conservation Reserve while allowing for the benefits of wildlife viewing, Aboriginal subsistence hunting, sport hunting and trapping
- To promote opportunities for non-consumptive uses of wildlife in the conservation reserve such as nature appreciation, interpretation, education, photography and scientific study
- To manage and protect caribou habitat, manage users and work collaboratively with forest industry, MNR districts/Regions and the Provincial Caribou Recovery Team to ensure the continued persistence and potential expansion of the Lake Nipigon woodland caribou population
- To protect, rehabilitate and create, through vegetation management, wildlife habitat so as to ensure sustainable and diverse wildlife populations and to maintain environmental quality and ecosystem integrity
- To work to maintain and where possible expand the populations of wildlife species at risk in the Lake Nipigon Conservation Reserve (e.g., bald eagle, white pelican, peregrine falcon, cougar, wolverine, woodland caribou)
- To encourage First Nations to be partners in the protection and management of wildlife in the conservation reserve

### 3.6 VEGETATION

- To manage vegetation in the conservation reserve in order to ensure a natural diversity of vegetation cover and structure
- To investigate opportunities to use fire and fire management strategies in order to enhance or protect important vegetative communities and wildlife habitat
- To identify, document and protect regionally and provincially significant plant species/communities as well as arctic-alpine disjuncts within the conservation reserve

### 3.7 CULTURAL HERITAGE

- To identify, document and protect the cultural and historical values of the Lake Nipigon Conservation Reserve
- To encourage partnerships with local communities and tourist facilities in order to promote public awareness, understanding and appreciation of cultural values in the conservation reserve

### 3.8 WATER RESOURCES

- To ensure the continued maintenance, and where necessary, improvement of water quality and to ensure that no degradation of water quality occurs as a result of tourism, recreational or industrial activities/development in and around the Lake Nipigon Conservation Reserve
- To identify the major sources/locations/loadings of siltation and erosion in the Little Jackfish River
- To develop plans to address the structure and erosion rates of degraded channels of the Little Jackfish River

- To ensure that the current Water Management Plan for Lake Nipigon and the Nipigon River is adhered to
- To identify, document and address any sources of pollution on Lake Nipigon (e.g., sewage, phosphorus, organic material from access points, communities, houseboats, etc.)
- To reduce the probability of the introduction of exotics (e.g. zebra mussels) into Lake Nipigon
- To develop quantitative, measurable water quality targets for Lake Nipigon

## 4 MANAGEMENT DIRECTION

The management direction that follows in this section must be considered along with the direction contained in MNR's conservation reserve policy. Where this resource management plan does not address a specific activity, the provisions of the conservation reserve policy will apply.

### 4.1 ACCESS

Access to the Lake Nipigon Conservation Reserve is a combination of well-developed access points (public, private and municipal), river-access and forest access roads.

Access to the southern half of the conservation reserve is achieved via a number of locations, the municipal access facilities at Poplar Lodge Campground and High Hill Harbour being the primary ones. Although not located within the boundaries of the conservation reserve, these two access facilities provide the best services and sustain the heaviest use of any of the access points to Lake Nipigon. Private access facilities exist in the Orient Bay area.

South Bay has an old as well as a new access point located within the boundaries of the conservation reserve. Habitat degradation of a nearby spawning bed resulting from use of the old access point prompted the construction of the new site. The old site is still being used for access as well as Crown

land camping. Negative impacts to the spawning bed are still occurring and physical closure has been proposed for some time as the preferred solution by MNR biologists. The South Bay Anglers and other interest groups support the closure of the old site while some members of the public feel this restriction is unnecessary and unfair. The new access point provides some amenities (dock, launch pad, parking) and could sustain facility expansion and improvement.

Pine Portage access is located in the South Lake Nipigon Enhanced Management Area at the south end of Forgan Lake. This site is on a Crown lease held by Ontario Power Generation. Some concern exists about potential liability and safety issues associated with having a public access point on a waterpower lease and in such close proximity to the Pine Portage Dam. It is a favoured site for those who have smaller watercraft as it provides fairly sheltered access to the lake and is easy to get to via Highway 585.

The Poshkokagan River enters the southwest side of the conservation reserve and can be reached via the Black Sturgeon Road. The access point itself is onto the Poshkokagan River, 5 km upstream from the conservation reserve, however the Poshkokagan River mouth is within the conservation reserve. It is used most frequently by Americans and non-local Ontario residents and provides a sheltered means of accessing Lake Nipigon waters. Facilities are few and include an earthen launch pad, fire pit, parking and a cleared area for camping. A significant amount of wetland habitat exists along the river and is used by waterfowl and marsh birds for nesting. Local MNR biologists have noted concerns regarding the possible negative effect of wave action on marsh bird nesting success. This site is a favourite of physically handicapped individuals and seniors as the river waters are calm compared to the open waters of Lake Nipigon. Local tourist outfitters have complained that this site is used heavily by non-residents for Crown land camping purposes for extended periods.

Other access points on the west side of Lake Nipigon include Chief Bay, Kings Landing and Pishidgi Lake. Chief Bay access is very primitive and infrequently used. Kings Landing, located in the Gull Bay Enhanced Management Area, is run by the King family. It was originally the site of a logging camp. When the camp was no longer needed for forestry purposes the company left but the Kings, who worked for the logging company, continued to live seasonally at the site. Facilities include earthen ramps, docks, campsites, picnic tables and two pit privies, all in fair to poor condition. Creel surveys indicate that almost all users of this site are non-residents. Pishidgi Lake access provides water/portage access to Lake Nipigon via the Kopka River, Wabinosh Lake and Wabinosh River.

The northern half of the conservation reserve is less accessible. Access can be obtained via a number of water routes off the CNR line including, Whitesand River, Pikitigushi River and Little Jackfish River. Access into the Castle Lake area is possible via the Wabinosh Road to Bosnell Lake and from Bosnell Lake to Castle Lake. Lake Nipigon can be accessed from Castle Lake via a portage trail. There is also an old tramway, still in good shape, leading from Ferland to the shore of Lake Nipigon. There is a concern that forest access in proximity to Ferland could ultimately lead to road access to the north shore of Lake Nipigon, jeopardizing the overall objective for remoteness in the north.

The remaining access exists in the north east portion of the conservation reserve; Ombabika Bay access, Humboldt Bay north and south and Onaman River access via the Onaman River Resort. Access at Humboldt and Ombabika is via old logging roads in very rough condition. These sites are used by commercial fishermen, tourist outfitters, anglers and hunters. There are no facilities, however a number of structures and dilapidated cabins exist at Humboldt south. Although not easily accessed and undeveloped, those who use these sites do not want to see their access restricted.

#### 4.1.1 DIRECTION

Access point management within the boundaries of the conservation reserve will take into account access provided to the conservation reserve via facilities located outside its boundaries in the enhanced management areas. No new access will be created in the Lake Nipigon Conservation Reserve. The intent is to provide access to the conservation reserve shorelands, waters and islands via well located, good quality access points, while at the same time ensuring protection of the environment and maintenance of northern remoteness. Facility improvement through partnerships will be investigated. Crown land camping at public access points will be governed by the 21-day Crown land camping rule. Measures will be taken to address any negative environmental impacts resulting from access development/activity (Figure 6).

#### 4.1.2 MANAGEMENT STRATEGIES

- a) Allow no new access in the Lake Nipigon Conservation Reserve
  - Forest access roads coming close to the boundary of the conservation reserve and old forest access roads within the conservation reserve will be monitored to ensure no new access is created to Lake Nipigon. Any new access discovered will be physically removed and signed immediately
- b) Promote good quality access at South Bay (new)
  - Work with partners (South Bay Anglers, Township of Nipigon) to improve and maintain this access point. Facility improvement will include pit privies, garbage cans, picnic tables, signage, parking area expansion, increased docking and boat launching
  - Post signage indicating Crown land camping permitted for a maximum of 21 days

- Post signage relating to fishing regulations on Lake Nipigon, preventing exotic species introductions and restricted use zones (Sec. 4.2.2)
  - Erect interpretive panels (Sec. 4.3.2)
  - Initiate an access point clean-up blitz (as part of a Basin-wide initiative) with partners and volunteers
- c) Close the old access point in South Bay to protect the South Bay brook trout population
- Physically remove the old access point by ditching the access road, cleaning up any garbage and returning the site to a natural condition
  - Post signage restricting access
  - Post signage at the access clearing prohibiting Crown land camping
- d) No Ferland to Lake Nipigon access
- Improvements to the old tramway from Ferland to Lake Nipigon will not be permitted
  - Mechanized travel from Ferland to Lake Nipigon via the old tramway will be permitted by Aboriginals carrying out traditional activities only
- e) Determine the impact of access activities on marsh bird/waterfowl nesting along the Poshkokagan River
- During the first field season after approval of this plan, an assessment of the impacts of motorboat activity on the riverine environment will be conducted
  - If study results indicate that wetland features are being negatively impacted by motorboat wake, management action will be implemented. If management actions such as no wake zone, electric motors only, speed limit, or horsepower limit are deemed to be a sufficient means of protecting the wetland features, the access point will remain open and facilities may be put in place through partnerships to address environmental concerns (i.e. garbage facilities, vault privies)
- f) Allow the Ombabika Bay, Humboldt North and Humboldt South access points and roads to deteriorate naturally
- Should study results indicate that access point closure is necessary to ensure protection of the wetland features, then consideration will be given to improving the access at the north end of Chief Bay (e.g. improve road, parking, launching ramp)
  - The Ombabika and Humboldt access points will not be promoted as public access through signage or brochures
  - No road improvements will be conducted or permitted on the roads into Ombabika and Humboldt Bays
  - Onaman River access via the Onaman River Camp will be permitted

## 4.2 CROWN LAND USE

Crown land use in the Lake Nipigon Conservation Reserve currently involves recreational and commercial activities such as camping, hiking, angling, boating, hunting, trapping, and bait fishing as well as the construction of facilities on Crown land such as recreation camps, trap cabins, commercial fish cabins and outpost camps. Issues relating to Crown land use include environmental degradation (erosion, soil compaction, destruction of vegetation, garbage), impacts to animal populations related to user activity and unauthorized buildings/structures.

Some popular campsites on Crown land within the conservation reserve are degraded. Vegetation has been cut to build structures, garbage is evident, human waste is not properly disposed of and multiple fire pits exist. There are also unauthorized structures within the conservation reserve, many in disrepair, which are unsightly and take away from the natural landscape. Unauthorized structures have no tenure or letter of authority authorizing their existence.

In addition, further investigation is required to determine if some authorized structures are being used for unauthorized purposes.

Concern exists about the impact of Crown land activities (boating, camping, swimming, etc.) on fish and wildlife species in the conservation reserve, especially species at risk. Scientific research has demonstrated the vulnerability of new born pelican chicks to heat and cold. Boating activity that causes nesting pelicans to move off their nests and leave young chicks exposed, could seriously jeopardize breeding success. Similarly, caribou are known to be sensitive to human disturbance. Camping and hiking on critical caribou calving islands during calving season could negatively affect the caribou population. Camping and swimming activity occurring where critical fish spawning and rearing habitat exists can be detrimental to the habitat. Wave action from motorboat activity in wetland environments can negatively affect wetland nesters and ecosystems.

Light pollution is one of the least known but most widespread forms of pollution on the planet. The virtually light-free skies of Lake Nipigon are becoming an increasingly rare resource around the world and are an important feature contributing to the wilderness quality of this lake. Lights from developments and communication towers on Lake Nipigon have a negative impact on the night skies. Concern exists about the increased light pollution that could result from future developments on Lake Nipigon.

#### 4.2.1 DIRECTION

The intent is to encourage a diversity of Crown land uses within the conservation reserve while ensuring environmental protection. Crown land activities occurring or proposed that may have a negative impact on the environment will be managed by restricting activities or excluding them entirely. Crown land camping will be governed by the 21-day Crown land camping rule. Existing structures on Crown land within the conservation reserve that are authorized and being used for their intended purpose will be permitted to remain.

Crown land dispositions in the form of leases, land use permits or licences of occupation for lodges, outpost camps or remote recreation camps will not be permitted. Use of off-road vehicles (ATVs, snowmobiles) is permitted on existing trails in the conservation reserve (except in restricted use zones). New ATV or snowmobile trails will not be developed. Off trail use is allowed only to remove game. Trapping will continue to be a permitted use.

First Nations whose members carry out traditional activities such as fishing, hunting, trapping and gathering within the conservation reserve, may construct a cabin for their members. Current ministry policy (interim) permits the building of structures that are incidental to the exercise of a treaty right, in consultation with the local Ministry of Natural Resources. Activities in the Lake Nipigon Conservation Reserve will be consistent with this interim policy and any final policy. In the case of non-Aboriginal traplines, existing trap cabins are permitted to continue; new cabins are not permitted.

The skies and viewscape of Lake Nipigon will be managed as a dark-sky area.

#### 4.2.2 MANAGEMENT STRATEGIES

- a) Restrict Crown land use in all areas of critical fish and wildlife habitat (Figure 6)
  - No Crown land activity will be permitted between April 15 and July 1 on identified Lake Nipigon Islands to protect calving caribou
  - No Crown land activity will be permitted within 500 metres of a pelican colony between April 15 and August 15
  - No Crown land activity will be permitted within 200 metres of a bald eagle nest between March 15 and August 15
  - No Crown land activity will be permitted within 200 metres of an osprey nest between March 15 and August 15
  - No Crown land activity will be permitted within 300 metres of a great blue heron colony between April 15 and August 15

- Only electric motors and non-motorized travel will be permitted from April 15 to August 1 in Williger Creek, McCann Creek, Tweed Creek and Owl Creek in McIntyre Bay to protect wetland habitat and species
  - As new information becomes available regarding sensitive sites (e.g. potential nesting peregrine, new eagle nests, new wetland sites, cultural sites), Crown land use restrictions will be implemented as necessary. For example, establish no wake zones in tributaries to Lake Nipigon
  - Establish a fish sanctuary in South Bay
- b) Educate the public regarding restricted use zones and times through brochures, maps and signage
- Place educational signage outlining the restrictions on Crown land use and the reasons for them at South Bay, Poplar Lodge Campground, High Hill Harbour, Pine Portage and Kings Landing access points
  - Distribute educational brochures and maps through the local MNR office and through partners such as tourist outfitters, municipalities, Thunder Bay Field Naturalists, Ontario Federation of Anglers and Hunters and tourist information centres
- c) Eliminate the unauthorized use of Crown land in the conservation reserve
- Inventory and document all structures in the conservation reserve and determine their status
  - Notify owners of unauthorized structures that they must remove them from Crown land within a reasonable time period
  - Advise owners, who are not using authorized structures for their intended purpose (i.e. using a commercial fish cabin as a commercial recreation camp), that they must use structures for their authorized purpose or they must remove them from Crown land
- d) Improve selected Crown land campsites within the conservation reserve
- Inventory and map Crown land campsites within the conservation reserve and determine those that are most heavily used
  - Through partnerships with tourist operators, municipalities and outdoor clubs, provide a picnic table, fire pit and box privy at selected campsites to reduce the likelihood of environmental degradation
  - Develop educational material on low impact camping and distribute through partners (Municipalities, tourist establishments, outdoor clubs)
  - Initiate a Crown land campsite clean-up blitz (as part of a Basin-wide initiative) with the involvement of partners and volunteers
- e) Manage the skies and viewscape of Lake Nipigon as a light-free zone
- Ensure all infrastructure and developments minimize light straying by developing a lighting control plan
  - Provide input to all tower proposals for the surrounding lands affecting the viewscape

### 4.3 TOURISM AND RECREATION

The Lake Nipigon Conservation Reserve provides excellent tourism and outdoor recreation opportunities such as world class angling, a chance to view species at risk, quality boating experiences and backcountry camping all within an exceptional natural landscape. Local communities such as Gull Bay, Nipigon and Beardmore benefit from tourism activity generated by the proximity of the Lake Nipigon Conservation Reserve.

Almost all existing tourism facilities associated with the conservation reserve are located outside its boundary in Gull Bay, Orient Bay and at Poplar Point and High Hill Harbour, however, it is the natural attractions of the



conservation reserve that fuel these businesses. Seven cruiser-boat operators charter multi-day trips around Lake Nipigon, providing accommodation and services. In addition there are approximately 25 to 30 day charter operators who take clients on half day or full day fishing excursions. Recreationists using Poplar Lodge Campground, High Hill Harbour and the various other access facilities as a starting point, radiate out into the conservation reserve, camping on islands/shoreline, sea kayaking, fishing and exploring.

The only tourism or recreation facility that exists within the boundaries of the conservation reserve is the South Bay access point. Many members of the public have commented that it is the wild and undeveloped nature of the Lake Nipigon Conservation Reserve that makes it such a special place to visit and would like to see it remain this way. Conversely, development in the conservation reserve has been suggested in the form of lodges and tourist outpost camps. Development of authentic Aboriginal campsites to be visited by tourists with a local First Nation host has also been proposed.

#### 4.3.1 DIRECTION

Tourism development within the Lake Nipigon Conservation Reserve will be low impact and will include canoe routes, trail and lookout development, campsite improvement, signage and educational/interpretive material and displays. This lower level of development in the conservation reserve will complement the direction for facility-oriented development in some of the enhanced management areas around the lake. No large scale development in the form of lodges, outpost camps, recreation camps or eco-camps, etc. will be permitted. The feasibility and potential impact of developing a small number of traditional Aboriginal encampments will be considered as tourist attractions (Figure 6).

#### 4.3.2 MANAGEMENT STRATEGIES

a) Investigate the development of traditional Aboriginal encampments to be used as tourist facilities

- Conduct a literature search to determine if and where similar developments have occurred and their level of success
  - Consult with local First Nations to determine level of interest and the range of ideas
  - Allow the development of a small number of traditional prehistoric/historic Aboriginal encampments within the conservation reserve held under land use permit. Each development must be accompanied by a viable business plan and must demonstrate that no negative environmental impacts will result
  - Consider the need to rotate the sites to prevent environmental degradation
- b) Develop a canoe route, hiking trail(s) and lookout(s) in the Castle Lake Area
- Investigate the chain of lakes in the Castle Lake area for potential canoe routes, trails and lookouts using aerial photography, field visits and local knowledge
  - Work to partner with local First Nations and/or tourist operators who could use this development to enhance their businesses (e.g., Armstrong lodge owners, cruiser boat operators on Lake Nipigon)
  - Plan development to ensure environmentally sensitive features will not be negatively impacted
  - Through partnerships, clear or improve existing portage trails between selected lakes, develop trails to lookouts where possible, establish campsites and erect signage marking the route
  - Develop a canoe route brochure, highlighting the dramatic topography of the area and distribute through tourist operators and other partners
- c) Develop quality tourist information products
- In partnership with the local municipalities, tourist outfitters, etc., develop a good quality colour map

handout of the Lake Nipigon Conservation Reserve and surrounding protected areas. Identify access points, trails, campsites, tourist facilities and restricted use zones, and include information on species at risk, low impact camping, local prehistory/history and significant plant species

- With partners, contract the development of display panels to be located at South Bay access point promoting the many attractions and features of the conservation reserve

#### 4.4 FISH COMMUNITY AND FISHERIES

Lake Nipigon, the largest lake wholly within Ontario, supports a diversity of warm and cold water fish species. Although rainbow smelt has been recently (1976) introduced into the lake, the fish community remains basically unchanged from that which existed almost 100 years ago. The fishery has been used by Aboriginals for subsistence purposes for thousands of years and more recently for commercial fishing (1917) and sport fishing (1920s).

Two fish species at risk make their home in Lake Nipigon; the shortjaw cisco and deepwater sculpin. Both are ranked as threatened by the Committee on the Status of Endangered Wildlife in Canada. Little information is available for these species and no rehabilitation efforts, studies or recovery plans have been initiated/completed.

Whitefish is the mainstay of the commercial fishery, with other species such as walleye, lake trout, sauger and northern pike varying in their contribution to the fishery. The lake sturgeon fishery collapsed in the 1920s and it remains at a very low level. Reported harvests for lake trout and whitefish have been stable from 1990 to 1998. The commercial smelt fishery has exploded from 1000 kg annually in the early 1990s to 239,000 kg by 2000.

Currently commercial fishermen favour gillnetting over other methods of commercial fishing. This method results in incidental catches of non-targeted species such as lake

trout. Commercial fishermen are reluctant to try trapnetting or poundnets as a means of reducing incidental catches. There have also been requests for trawling licences for smelt but concern exists regarding the impact of trawling on non-target species and harmful disruption of bottom substrate. An experimental licence to trawl for smelt has been issued for three seasons with restrictive conditions.

Some conflict exists between the commercial fishermen and sport fishermen with regard to lake trout. Commercial fishermen would like an increase in the lake trout quota. Now that the sport fishing harvest of lake trout has increased, lake trout harvest levels may not be sustainable without direct harvest controls on the sport fishery or a reduced commercial quota or some combination of the two.

Walleye populations are degraded from overexploitation. Walleye and sauger harvests have remained low since the early 1990s. The commercial walleye and sauger fishery was recently closed lake-wide in April 2002 due to the degraded status of the populations. Wabinoosh and Ombabika Bays have been closed to all commercial fishing since 1996. Some commercial fishermen would like to see these bays closed to sport fishermen as well.

More information is needed for the management of the Lake Nipigon fishery. Levels of subsistence harvest are unknown. Stock status indicators are unavailable for all commercial and sport species except lake whitefish. It is not known whether Lake Nipigon fish populations are made up of many separate, genetically distinct populations or whether there is only one population. Lack of this knowledge makes management difficult.

There is a need for more information regarding the degree to which the tributaries to Lake Nipigon and surrounding lakes are used by Lake Nipigon fish, thus hampering effective management. There are barriers to migration in these tributaries, however, their location is not well documented. The level of angling use in these waters is unknown.

#### 4.4.1 DIRECTION

The Lake Nipigon fishery and fish communities will be managed to maintain a world class sports and commercial fishery. The annual allowable harvest levels for each game and commercial species will be determined, taking into account the status of the stocks and the management objective for each species. In consultation with stakeholders, this annual allowable harvest will be divided up among the subsistence, commercial and sports fisheries. A cost-benefit analysis will be conducted to support allocation decisions between the sports fishery and commercial fishery. Once the allowable harvest has been determined, a direct harvest control mechanism for the sports fishery will be investigated. Types of direct harvest control systems include establishing check stations at access points to tally sport harvest of each species with a live release requirement after allowable harvest has been reached; or establishment of a tag system.

Collection and analysis of information and education of users will be a priority. Partners will be encouraged to become involved in both these endeavors. Sensitive fish habitat will be identified and appropriate measures taken to ensure its protection. Opportunities for fish habitat restoration will be investigated and could include restoring fish passage, repairing damage from log drives or stabilizing degraded shorelines near spawning areas.

A Lake Nipigon Fisheries Management Plan will be prepared by 2005.

#### 4.4.2 MANAGEMENT STRATEGIES

- a) Improve management of the commercial fishery in order to reduce incidental catches, reduce the waste of non-marketable species, allow no over-harvest and ensure a world class commercial fishery is maintained
    - Encourage commercial fishermen to convert to live entrapment gear by providing training and funding to assist with gear purchase
  - b) Improve management of the sport fishery to ensure sport fish are not over-harvested and a world class fishery is maintained
    - Establish zone quotas based on stock discreteness and movement studies and consult commercial fisherman to develop a system for allocating zones
    - Ban gill nets in certain areas or depths and at times when non-target species are plentiful
    - Encourage harvest of smelts
    - Adjust the harvest for degraded species such as walleye and sturgeon until the fish populations recover
    - Buy out commercial licences on a willing seller basis as funds permit
    - Over the long term, reduce commercial fish quotas for all traditional sport fish species and reallocate to the sport fishery, leaving lake whitefish as the primary commercial species
    - Continue to monitor smelt trawling for level of incidental catch and degree of impact on substrate, habitat and species at risk through periodic on board inspections, and by examining substrate before and after trawling with the intent of prohibiting trawling if negative impacts are evident. Trawling will be reviewed during the development of the Fisheries Management Plan for Lake Nipigon
- Discourage fish derbies/trout hunts on Lake Nipigon or provide options for their modification to allow for live release of fish
  - Increase the chance of survival of released fish by allowing only artificial lures on a year round basis in addition to the existing single barbless hook regulation
  - Close South Bay spawning area to angling year round to protect fish habitat (Figure 6)

- Investigate reduced limits for some or all sport fish in Lake Nipigon
  - Increase enforcement efforts to improve compliance with fishing regulations
  - Investigate a direct harvest control system using a tag or check station system for some or all species to achieve stated species specific objectives (Sec. 3.4)
  - Review seasons, size and possession limits in relation to a direct harvest control system
  - Produce brochures, wallet cards, and provide rulers, videos, fact sheets as well as host seminars promoting proper angling and handling techniques and preventing introduction of exotics
- c) Improve the management and restoration of species at risk populations
- Conduct or partner in studies to determine the local status and habitat use of species at risk in Lake Nipigon
  - Develop recovery plans for rare, threatened and endangered species
  - Develop an identification system so commercial fishermen can report cisco by species rather than as a lumped group
  - Reduce all lake sturgeon harvest to zero
  - Promote awareness of province wide and national recovery plans for each species
- d) Increase the collection and analysis of information related to the management of the Lake Nipigon fishery
- Work with Anishinaabek Ontario Fisheries Resource Centre to incorporate traditional knowledge and increase First Nation participation in science information gathering
  - Develop stock status indicators for each individual sport and commercial species and develop a protocol for annually reviewing the commercial and sport quota for each species
- Conduct tagging and telemetry studies and or genetic studies to determine discreteness of stocks, where they occur, whether tributaries are being used and to locate spawning areas and timing of spawn
  - Continue to monitor smelt populations through Lake Nipigon Fisheries assessment Unit (LNFAU) program and conduct research or partner in research to determine the impact of smelt on native Lake Nipigon fish populations
  - Encourage/work with the Aboriginal community to develop a system for determining total subsistence harvest and to develop a means of recording this on an annual basis
  - Work with bait fishermen to develop a reporting system to better establish which water body bait fish are harvested from within a harvest block and encourage or seek funding to conduct studies on Lake Nipigon bait fish
- e) Address the lack of information and improve the management of Lake Nipigon tributaries and surrounding lakes within the conservation reserve
- Inventory fish and fish habitat in surrounding lakes and tributaries to lake Nipigon
  - Inventory all stream crossings (rail and road) of tributaries in the conservation reserve to identify barriers to migration and work with DFO to ensure any problematic crossings are corrected

## 4.5 WILDLIFE

The Lake Nipigon Conservation Reserve is home to common boreal wildlife species as well as a number of important species at risk. Woodland caribou use the Lake Nipigon Islands for calving and summer habitat. The bald eagle population, previously devastated by the effects of DDT is now thriving. White pelican colonies have increased in size and number since their arrival on Lake Nipigon in the 1970s.

Caribou, pelicans and bald eagles require isolation to breed successfully. Potential increases in human activity in the area may negatively impact these species. Management of users will be required to ensure protection of these populations.

Caribou are known to winter near the Armstrong Airport, Jojo Lake area and in the area between Livingstone Point and Mungo Park Point. Migration to the Armstrong wintering area is generally from Wabinosh Lake northward to Castle Bay area and north along the Whitesand River. These routes and wintering areas may change as habitat changes.

Some information has been gathered on species at risk as well as moose and bear populations in the conservation reserve, however very little is known about insect, amphibian, reptile, bird or small mammal diversity and abundance. Increases and decreases in population numbers and the presence or absence of species is useful information for determining the health of the ecosystem and in making management decisions. Initial efforts were made in the 2001 field season to establish small mammal and bird monitoring stations at select locations within the conservation reserve.

Moose were protected from hunting in 1957 through the establishment of the Nipigon Islands Crown Game Preserve. However, the Islands were again opened to moose hunting from 1965 to 1970 during which time the population was decimated. Hunting large game on the islands has been a non-permitted use since 1970 and moose populations are

recovering slowly. The majority of the public who have provided input on this topic have indicated that they do not want to see the islands opened to moose hunting. Tourist operators have said that the chance for their clients to see a moose is worth more to them than a chance to hunt them.

Subsistence hunting by Aboriginals has occurred in the Lake Nipigon area for thousands of years. There is no information available estimating the current level of harvest for species such as moose, caribou, deer, bear, hare, grouse or waterfowl for subsistence purposes. This lack of information makes it very difficult to manage the non-Aboriginal hunt and ensure sustainability of these wildlife populations.

Fire is an important mechanism for forest renewal in the boreal ecosystem. Many years of fire suppression have altered the landscape in the boreal forest. Current and future availability of critical habitat for caribou in the Lake Nipigon Conservation Reserve needs to be examined and habitat management options investigated. Fire may play a useful role in managing for caribou habitat.

Additional bird species at risk have been sighted in the conservation reserve but are not confirmed breeders in the area (peregrine falcon, black tern). It has been determined that suitable habitat exists in the conservation reserve for these species, thus providing an excellent opportunity to work toward expanding their populations.

White pelican, bald eagle and double crested cormorant populations are increasing in the conservation reserve. Some fishermen are concerned that these fish-eating birds are negatively impacting fish populations, although the scientific literature does not support this.

White tailed deer exist along the south half of Lake Nipigon. Deer benefit from forest disturbance and the resulting early successional habitat, but are limited by the harsh winters of the boreal forest. It is unknown how the presence of deer impacts on the local moose and caribou populations.

Some concern exists about the possible negative effects of a brainworm parasite carried by white tailed deer which is fatal to moose and caribou. No white tailed deer hunting season currently exists in Wildlife Management Unit 15B (south and west of Lake Nipigon).

#### 4.5.1 DIRECTION

Protection of wildlife and their associated habitat will take precedence over human use and development activities, especially in the case of species at risk. The collection of information needed to make management decisions will be given priority such as caribou tracking and establishing wildlife trend-through-time monitoring stations. The use of fire and silviculture for habitat management within the conservation reserve will be investigated. Hunting of big game on the islands will continue to be a non-permitted use. All known sensitive habitat (breeding colonies, nest sites, calving islands, etc.) will be protected through restricted use zoning as outlined in Section 4.2.2.(Figure 6).

#### 4.5.2 MANAGEMENT STRATEGIES

- a) Work to ensure the continued existence of and optimally to expand the range and population size of the woodland caribou within the Lake Nipigon Conservation Reserve
  - Prepare a paper consolidating and summarizing all caribou studies and local knowledge concerning the Lake Nipigon and vicinity caribou population
  - Conduct tracking studies on Lake Nipigon caribou to further explore movement patterns and habitat use
  - Keep any structures/development (e.g., trail, campsite, trap cabin) away from known migration routes and islands of less than 30 hectares in size
  - Using computer modeling and field investigation, determine the availability of caribou habitat over time within the Lake Nipigon Conservation Reserve. Use this information to determine if/what

vegetation management is required to maintain caribou habitat over time

- Ensure a link is maintained between the Nipigon and Thunder Bay Districts and the Provincial Caribou Recovery Team regarding woodland caribou management
  - To encourage the understanding and appreciation of caribou by the public, investigate the opportunity to develop a viewing station at a mineral lick on Logan Island, to be promoted in partnership with tourist operators (cruiser boats)
- b) Develop estimates of current and future subsistence demand for wildlife in the conservation reserve
    - In consultation with Aboriginal communities around the lake, develop estimates of subsistence harvest for moose, caribou, deer, bear, hare, grouse and waterfowl from the islands and shore lands
    - Determine whether non-Aboriginal and Aboriginal harvests combined are sustainable
    - Encourage and assist in the development of a harvest reporting program to be administered by the Aboriginal communities
  - c) Improve information relating to small mammal, forest bird, amphibian and reptile populations as well as for species at risk
    - Establish long term trend-through-time monitoring stations at various locations in the conservation reserve including rare habitats, following standard protocols (e.g., Forest Bird Monitoring, Marsh Monitoring, Small Mammal Trapping Surveys)
    - Continue wildlife monitoring stations at Caribou Island and Geikie Island for forest birds, small mammals and salamanders and marsh monitoring programs at McCann Creek

- Establish scheduled regular monitoring for species at risk populations e.g., pelicans, peregrines and bald eagles to determine long term population trends and habitat use
- d) Address perceived issues relating to impacts of fish-eating birds on Lake Nipigon fish populations
- Develop and distribute educational material providing facts about feeding behavior of these species, their role in the ecosystem and the protected status of bald eagles and pelicans
  - Encourage and provide input into development of provincial policy regarding cormorant control
  - Encourage academic/naturalist organizations to conduct feeding and behavior studies for pelican, bald eagle and cormorant in the Lake Nipigon Conservation Reserve

## 4.6 VEGETATION

The Lake Nipigon Conservation Reserve is located in the boreal forest, and includes a variety of community types such as forests, wetlands, rock barrens, cliffs and open dunes. Vegetation communities change over time, as does their corresponding value to wildlife. The boreal forest is quite dependent on fire as a critical driver in its life history. Drastic shifts in vegetation structure (composition and age structure) are occurring in the conservation reserve as a result of fire suppression activities. Present fire suppression strategies have increased the length of time between fires by as much as 350 to 500 percent to 526 years. Some form of vegetation management will be required to maintain a healthy balance of vegetation communities and wildlife habitat in the conservation reserve as well as to ensure the protection/continuation of infrequent and underrepresented vegetation types.

Twelve arctic alpine disjunct plant species have been documented in the conservation reserve as well as four provincially significant

plant species. It is likely that other regionally and provincially significant and disjunct species would be identified if further field investigation were conducted. These species are associated with specialized habitat types.

### 4.6.1 DIRECTION

Vegetation in the Lake Nipigon Conservation Reserve will be managed to ensure the existence of a diversity of vegetative communities based on what the “*natural*” scenario should be and to meet habitat needs of the wildlife, with particular attention focused on caribou. Fire and silviculture (i.e. planting or seeding) within and adjacent to the conservation reserve will be used to achieve this direction.

Fire will be used and managed to achieve positive ecological benefits in disturbance dependent eco-systems. Fire will be allowed to fulfill its natural role on the islands of Lake Nipigon. Fire and Resource Managers will identify those areas in the conservation reserve where fire will be used to maintain, restore or enhance ecological diversity.

Unique habitats, vegetative communities and rare or significant flora will be protected. Efforts will be made to improve the level of knowledge of the vegetative communities and flora in the conservation reserve.

### 4.6.2 MANAGEMENT STRATEGIES

- a) Investigate and implement vegetation management techniques using fire to ensure the continued availability of habitat for caribou through space and time and to ensure a healthy ecosystem
- Work with forest industry and Fire Management Section to identify candidate areas for fire renewal for select peninsulas - North Peninsula, South Peninsula, Bonner Island and peninsulas surrounding McIntyre Bay
  - Conduct studies in existing burned areas on the islands and shorelands to determine whether there is an adequate seed source to achieve desired results if prescribed burning were implemented to

manage vegetation and habitat or whether additional seeding or planting may be required to achieve desired future forest condition (i.e. spruce dominated)

- Based on computer modeling and studies, write a fire management plan designating areas on the islands and shorelands, that are suitable for prescribed burning as well as areas that will require seeding or planting
- b) Protect infrequent and under represented vegetation types such as old growth white pine, old growth red pine and old growth white spruce
- Conduct site specific field studies of these sites to develop site specific vegetation management strategies to protect or rehabilitate these stands through time
- c) Improve information and knowledge of the floral and vegetative communities in the Lake Nipigon Conservation Reserve
- Work with the Natural Heritage Information Centre, Thunder Bay Field Naturalists, the academic community and other interested partners to consolidate, collect and document information on the vegetative communities, flora and unique habitats present in the Lake Nipigon Conservation Reserve
  - Implement management strategies such as zoning sensitive vegetative communities as restricted from Crown land use, in order to protect and/or rehabilitate rare and unique species/communities
  - Prepare a pocket guide to the arctic alpine and 4 provincially significant plant species for distribution to staff and interested publics to increase awareness and to encourage protection and identification of the location of additional occurrences

## 4.7 CULTURAL HERITAGE

The Lake Nipigon Conservation Reserve and surrounding area has a rich and varied past. A number of efforts have been made by various organizations and individuals to document the prehistory and history of the area, although much is left to do. Prehistoric campsites have been documented on the lakeshore dating back thousands of years. Lake Nipigon was also the centre of some fierce rivalries during the fur trade, resulting in many trading posts being built in the conservation reserve area.

There are most certainly many more prehistoric and historic sites located in the conservation reserve that have yet to be discovered, resulting in the concern that these sites may be inadvertently destroyed through recreational or tourism activity.

### 4.7.1 DIRECTION

The intent with regard to cultural heritage is to improve the current level of knowledge, to increase public appreciation and understanding and to ensure the protection of cultural heritage values in the conservation reserve. This direction will be achieved through partnering and by managing Crown land use activities. In all cultural heritage management initiatives, MNR will endeavor to work with local Aboriginal communities to encourage their involvement in collecting and recording cultural information and in educating the public.

### 4.7.2 MANAGEMENT STRATEGIES

- a) Improve the knowledge base of prehistoric and historic sites and associated activities in the conservation reserve
- Encourage the collection, consolidation and interpretation of cultural heritage information through partnerships with local historical societies, museums, Aboriginal communities, universities, municipalities and other ministries
  - Keep an up-to-date record of known cultural values in the MNR office to assist in managing Crown land use to prevent



negative impacts to cultural resources

- Ensure that the exact location of archaeological/cultural sites is not divulged to the public in order to limit the impacts of site disturbance
- b) Incorporate cultural heritage information in displays and public handouts to improve public awareness and understanding
- Proposed displays at South Bay Access, Poplar Lodge Campground and at tourist information booths will incorporate cultural heritage information pertaining to the Lake Nipigon Conservation Reserve and surrounding area
  - Develop a cultural heritage educational brochure for the Lake Nipigon area to be made available to the public through partners (tourist operators, municipalities, museums, tourist information booths, etc.); outline the laws around removing artifacts from Crown land

#### 4.8 WATER RESOURCES

The waters of Lake Nipigon are undeniably a significant resource. Unlike the Great Lakes, Lake Nipigon's fish communities and limnological characteristics have remained almost unchanged since they were first sampled nearly 100 years ago. This is likely attributable to the undeveloped nature of the lake, a surprising fact given its close proximity to railways and Highways 11 and 17. However, there are threats to Lake Nipigon's relatively pristine condition, associated with its use and management.

The construction of the Waboose Dam in 1942 and the creation of the Ogoki Reservoir, increased flows in the Little Jackfish River from 4m<sup>3</sup>/s to 120 m<sup>3</sup>/s and turned this minor stream into a soft, excavated, wide channel. It is estimated that 30 million cubic metres of sediment were released from the Little Jackfish River Between 1943 and 1972. This resulted in 9 metres of sediment being deposited near the river mouth in Ombabika Bay. This sediment loading has caused and continues to cause significant habitat

degradation (lower light penetration and silt deposition) in Ombabika Bay.

The dams on the Nipigon River continue to impact fish and invertebrates on the river due to drawdown, despite the implementation of the Lake Nipigon and Nipigon River Water Management Plan. It is not clear whether the drawdown is also impacting fish spawning success on Lake Nipigon. The Namewaminikan River dam was breached in 1993 and tonnes of sediment were washed downstream. The dam powerhouse is currently in disrepair.

Up-to-date and complete information relating to water quality, zooplankton, phytoplankton and benthos in Lake Nipigon is not available, although recent data (2001) was collected for West Bay, Wabinosh Bay, McIntyre Bay, South Bay and Humboldt Bay. There are no standardized sampling protocols for the lake nor are there any long-term monitoring stations. Transfer of limnological and contaminant-monitoring data between agencies such as universities and the Ministry of the Environment is poor. Similarly, as the headwaters to the Great Lakes system, Lake Nipigon should be linked into the Lake Superior Management Committee to ensure that Lake Nipigon water quality objectives and other lake objectives are compatible with the Lake Superior basin plan. This is not currently the case.

The level of pollution occurring from areas of human development, houseboats/cruiser boats and heavily used campsites and access points is not known. Elevated levels of copper, zinc and toxaphene have been noted in the lake.

Elevated mercury levels have been detected in fish from Lake Nipigon and consumption restrictions apply to some species, although this is not well known by members of the public. In more recent studies, elevated levels of toxaphene were found in some Lake Nipigon fishes.

Introduction of exotic species is a concern shared by MNR and members of the public. The spiny water flea was recently introduced

into the lake and many people fear that the zebra mussel will also make its way into Lake Nipigon if direct action is not taken.

Although mandatory boat washing has been suggested as a means of reducing the likelihood of accidental introductions of exotic species, this has proven ineffective and cost prohibitive to administer and implement when attempted elsewhere in North America.

#### 4.8.1 DIRECTION

Maintenance of a healthy watershed will be the priority in all water management decisions pertaining to the Lake Nipigon Conservation Reserve. Effort will be spent increasing the information base relating to water quality and limnology for Lake Nipigon and its tributaries, using partnerships whenever possible. Zero-discharge will be the goal with regard to pollution input into Lake Nipigon. Fish culture will not be permitted in Lake Nipigon. Potential introduction of exotics into Lake Nipigon will be addressed through public education and further research.

#### 4.8.2 MANAGEMENT STRATEGIES

a) Improve collection and interagency transfer of information

- Establish conditions on all scientific collector's permits requiring that all data be transferred to the Nipigon District MNR within a specified time
- Establish standard protocols with other agencies and universities to ensure any water related data collected is transferred
- Establish water quality objectives for Lake Nipigon
- Initiate water quality, plankton and benthos studies throughout Lake Nipigon and Lake Nipigon tributaries with the goal of establishing long term trend-through-time monitoring stations at key locations
- Develop partnerships with charter boat operators, anglers, commercial fishermen and cottagers to collect key water quality data on a regular basis following standard protocols

b) Implement a zero-discharge or “*pollution free*” policy for Lake Nipigon

- In cooperation with other regulatory agencies, use aerial thermography and site inspections to identify and document pollution inputs into Lake Nipigon
- Through remedial action, address any sources of pollution (e.g. repairing malfunctioning septic systems, proper disposal of garbage/waste)
- Require sealed holding tanks for all houseboats and cruiser boats on Lake Nipigon and with cooperation from partners (municipalities, Ministry of Tourism, Department of Fisheries and Oceans), ensure that boats are equipped and facilities are used to properly manage waste water

c) Address habitat degradation relating to hydroelectric development

- Identify concern regarding erosion in Ombabika Bay due to the Ogoki Diversion in writing to Federal Department of Fisheries and Oceans and Ontario Power Generation with intent of jointly developing a plan to correct the problem
- In developing new direction, make reference to the erosion control plan developed for the Little Jackfish River by Ontario, as part of the Environmental Assessment of the proposed hydroelectric development
- Ensure that required repairs are completed on Namewaminikan River Dam so that there is no reoccurrence of sediment washing into the river and Lake Nipigon as previously occurred in 1993
- Initiate studies or partner with Ontario Power Generation to determine where fish habitat impacts are continuing to occur on Lake Nipigon and institute corrective measures

d) Take action to help prevent the introduction of exotics into Lake Nipigon

- Work with partners to establish signage at all access points, educating the public about the importance of keeping exotics out of Lake Nipigon and how best to achieve this (e.g., no dumping of bait buckets, live wells, washing equipment)
  - Educate local tourist operators, commercial fishermen and campground operators and enlist their support in the education of the public
  - Research management strategies implemented elsewhere to deal with exotics in an effort to determine what might prove a successful strategy for Lake Nipigon
- e) Work with MOE to improve public awareness of fish contaminant levels and fish consumption restrictions for Lake Nipigon
- Collect and provide fish samples to the Ministry of the Environment (MOE) for contaminant sampling on a routine basis and encourage timely processing and reporting to MNR
  - Ensure that local residents are made aware of consumption restrictions; providing public notice when changes occur
  - Assist the Ministry of the Environment in working with local communities to develop a communication system to ensure that contaminant levels are well known and any changes in levels are quickly communicated to local residents

## 5 PLAN IMPLEMENTATION

MNR has the lead role in implementation of this strategy and is committed to keeping it current and relevant through appropriate monitoring and amendments.

Plan implementation will ensure that the *Environmental Assessment Act*, *Environmental Bill of Rights* and other pertinent legislation are adhered to at all times.

Completion of the projects and activities described in this strategy and any ancillary strategies is dependent on the availability and allocation of funding in accordance with priorities established by the Ministry of Natural Resources and the Government of Ontario. The MNR will pursue opportunities for partnerships with other agencies and interest groups in the funding and implementation of activities and programs identified.

Operational and work plans developed to implement the direction of this resource management strategy must be consistent with the objectives and strategies identified herein. Some flexibility in applying plan direction in site-specific operational situations to address biophysical circumstances and include technical expertise is recognized.

### 5.1 INVENTORY, MONITORING, ASSESSMENT AND REVIEW

Inventory, monitoring, assessment and review are essential to the effective implementation of this plan and are an integral part of the management strategies identified. This includes, for example, inventory and monitoring of fish and wildlife populations, vegetative communities, habitat availability and recreational use and impact. Other sources of important information include creel surveys, data gathered by the Lake Nipigon Fisheries Assessment Unit, regular consultation with the Nipigon Watershed Advisory Committee and statistics collected by the Ministry of Tourism. All of this information is necessary to ensure that plan objectives are being met and policies remain current and relevant.

## 5.2 PLAN REVIEW AND AMENDMENT

There is no intent to carry out a comprehensive review of the Lake Nipigon Conservation Reserve Resource Management Strategy at any prescribed interval. Using adaptive management, the resource management policies in this document will be kept current through periodic amendments resulting from changes in government policy, new resource information or in response to public need.

Proposed amendments must not alter the overall intent of the Lake Nipigon Conservation Reserve Resource Management Strategy. An amendment to the plan may be requested at any time and the District Manager will decide whether or not to consider it. Requests for amendments must have a basis in fact, demonstrably relate to the scope of the plan, and respond to changing resource conditions, new information,

changing government policies or public need. The MNR also has the authority to initiate amendments in response to new information or changed conditions.

Amendments will be classified as either minor or major. Minor amendments are those changes that do not have a negative effect on the public, adjacent landowners or the environment and are generally administrative in nature. Minor amendments will be approved by the District Manager and will not normally be subject to public consultation.

Major amendments have a significant social, economic and/or environmental impact. Major amendments will be reviewed by the MNR District Manager and submitted to the Regional Director for approval. Public consultation will occur for all major amendments and notice of all major amendments will be posted on the EBR electronic registry.

**TABLE 3: CROWN LAND INFRASTRUCTURE AND ASSOCIATED TENURE**

FORM OF TENURE	ISSUED TO	LOCATION	PURPOSE
Land Use Permit	Individual	North west shore of Albert Island	Personal Recreational Camp
Land Use Permit	Boy Scouts of Canada	SW side of Forgan Lake	Club House / Camp
Land Use Permit	Nighthawk Charters	McIntyre Bay, N. of Cannister Cr.	Docking
Letter of Authority	For Trapline NG11	Little Bonner Lake	Trap Cabin
Letter of Authority	For Trapline NG21	Shoreline of Lynx Bay	Trap Cabin
Letter of Authority	For Trapline NG21	Shoreline of West Bay	Trap Cabin
Letter of Authority	Individual	Prince of Wales Island, East side	Commercial Fish Cabin
Letter of Authority	Individual	Alexander Island, Patch Point	Commercial Fish Cabin
Letter of Authority	Individual	West Shore of Grand Bay	Commercial Fish Cabin
Letter of Authority	Individual	Colter's Harbour	Commercial Fish Cabin
Letter of Authority	Individual	NW of Champlain Point	Commercial Fish Cabin
Letter of Authority	Individual	Gravel Point	Commercial Fish Cabin
Letter of Authority	Individual	Bell's Island	Commercial Fish Cabin
Letter of Authority	Individual	Undercliff Island	Sweat Lodge
Letter of Authority	Individual	Ellis Island	Commercial Fish Cabin
Letter of Authority	Individual	Ellis Channel	Commercial Fish Cabin
Letter of Authority	Individual	Ellis Island	Commercial Fish Cabin
License of Occupation	Individual	Davis Island	Recreation Camp

## 6 BACKGROUND INFORMATION

### 6.1 INFRASTRUCTURE AND LAND TENURE

Highway 17 runs across the south end of the Lake Nipigon Conservation Reserve. To the west of Lake Nipigon, Highway 527 provides access to the communities of Whitesand, Armstrong and Gull Bay. Highway 580 links the community of Beardmore to the east shore of Lake Nipigon. Highway 585 runs north along the west side of the Nipigon River from Highway 17, north to Pine Portage, an access point to Lake Nipigon. A number of secondary and tertiary roads exist in the conservation reserve. South Bay Road provides access to the South Bay Access Point. Chief Bay Road provides access to the water in north Chief Bay and the Wabinosh Road extends south from the Pikitigushi Road along the western boundary of the conservation reserve, providing access into the Castle Lake area. The Humboldt Bay Road and Ombabika Bay Road branch off of the Auden Road and extend into the conservation reserve.

The main transcontinental Canadian National Railway (CNR) line runs north of Lake Nipigon. A second CNR Line travels south of the Lake Nipigon Conservation Reserve, crosses at Pijitawabik Bay, and heads northeast toward Beardmore. Although the Trans-Canada Highway is located directly south of the Lake Nipigon Conservation Reserve, very little development has occurred in this area. The islands, Lake Nipigon shoreline and surrounding lands are almost exclusively Crown owned.

Alienated lands within the Lake Nipigon Conservation Reserve include the Indian Reserves of McIntyre Bay and Jackfish Island, and a number of patent parcels located just south of McIntyre Bay.

Infrastructure exists on Crown land within the conservation reserve in the form of trappers cabins, commercial fish cabins and recreation camps. Some of these structures are authorized through various forms of tenure such as land use permits, letters of authority and licences of occupation (Table 3).

Other structures are not authorized and have no form of tenure.

First Nations whose members carry out traditional activities such as fishing, hunting, trapping and gathering within the conservation reserve are allowed to construct a cabin for use by their members. Current ministry policy (interim) permits the building of structures that are incidental to the exercise of a treaty right, in consultation with the local Ministry of Natural Resources.

There are other untenured structures within the conservation reserve that are considered unauthorized occupations of Crown land. This list of untenured occupations on Crown land includes approximately 15 trap cabins, and 10 - 15 other buildings used for a variety of purposes (e.g., recreation, hunting, commercial fishing).

### 6.2 ACCESS POINTS AND FACILITIES

There are 6 access points to Lake Nipigon that are located on Crown land and within the boundaries of the Lake Nipigon Conservation Reserve; South Bay (2), Chief Bay, Humboldt Bay (2) and Ombabika Bay access points. Three waterways provide access to northern Lake Nipigon from the CN rail line; Whitesand River, Pikitigushi River and Little Jackfish River and the Onaman River provides access into Humboldt Bay. South Bay is an approved public access point while the access points in Chief, Humboldt and Ombabika Bays are unofficial/unmaintained access points.

There are two access points in South Bay, an old access and a new one. The old access point is located at the bottom of the Bay and consists of a large clearing and boat ramp. This area of the bay was developed some 30 years ago and has been used for access and Crown land camping. Important brook trout spawning habitat exists at the old location which is in jeopardy from the access activity. In response to this concern, the Ministry of Natural Resources constructed a new access point on the southeast side of South Bay. Facilities include a concrete launch ramp, a

dock, a small sandy beach, signage and a parking area. The South Bay Anglers Association and MNR jointly maintain this access point.

The access point at Chief Bay is not heavily used, does not include any facilities and is not maintained. There is a rough road leading from a forest access road to a river flowing into the north end of Chief Bay. A small boat can be launched into the river.

The access points at Humboldt and Ombabika Bay are not maintained and can often only be accessed by snowmachine or all terrain vehicles due to rough roads and fallen trees. There are a number of commercial fish cabins/campers at Humboldt Bay South but otherwise there are no facilities at these access points. The Onaman River which flows into Humboldt Bay, can be accessed via the road accessible Onaman River Resort.

There are a number of good quality access points to Lake Nipigon, located outside the conservation reserve boundaries on Crown land and private land. On the southeast shore of Lake Nipigon the municipally operated by Poplar Lodge Campground and High Hill Harbour Marina, held under licence of occupation and land use permit, provide excellent access facilities including docking, boat ramps, washrooms, campsites and parking. Pine Portage Access Point is located on a Crown lease held by Ontario Power Generation and provides access into Forgan Lake and southern Lake Nipigon. Facilities include a dock, boat ramp and parking. The communities of Macdiarmid and Biinjitiwaabik Zaaging Anishinaabek (Rocky Bay) and the Sandpoint Reserve provide access to the east shore of the lake, while on the west shore access is available at Kings landing, in the Gull Bay Enhanced Management Area, and the Gull Bay Indian Reserve. Poshkokagan River access, an access point located outside the Basin Signature Site, provides access to Chief Bay in southern Lake Nipigon. Pishidgi Lake access point provides access to the west shore via the Kopka and Wabinosh Rivers. Finally, private access facilities are available at tourist establishments located in Orient Bay.

### 6.3 PREHISTORY AND HISTORY

Lake Nipigon and its surrounding shorelines have played an important part in Ontario's prehistory and history. Although the extent of archaeological research in the Lake Nipigon area is far from complete, archaeologists have discovered prehistoric sites that are representative of three distinct periods, Archaic, Initial Woodland and Terminal Woodland as well as historic sites from the fur trade and early settlement era. Further research may reveal the presence of earlier cultures.

About 7,000 years ago a changing climate and distribution of plants and animals resulted in a transition from the Paleo-Indian culture to the Plains Archaic and Shield Archaic Traditions. The Shield Archaic people were indigenous to the boreal forest north of Lake Superior. The most important development of the Shield Archaic culture was the use of native copper found on the shores of Lake Superior to make tools and personal ornaments. There is evidence that copper tools were being traded heavily across North America during this time. One Shield Archaic site has been documented in the Lake Nipigon Conservation Reserve on Mystery Island at the north end of Pijitawabik Bay.

Around 2,500 years ago, the Laurel Culture of the Initial Woodland Period succeeded the Shield Archaic people and lasted until approximately 1000 years B.P. The Initial Woodland people gathered seasonally to socialize, fish and gather food, resulting in the establishment of larger settlements at prime fishing grounds. The appearance of pottery marked the Initial Woodland Period. The Laurel Culture made small conical jars with distinctive impressed decorations. Nine archaeological sites associated with the Initial Woodland Period have been documented on the islands and shoreline of the conservation reserve. Some of these sites also show evidence of other cultural periods.

The Terminal Woodland cultural period followed the Initial Woodland around 1,000 years ago and lasted until the time of European contact. The Blackduck and Selkirk

Cultures marked the beginning of the Terminal Woodland Period with distinct pottery styles, differing from that of the Laurel culture. Pictographs of humans and animals found on Lake Nipigon are thought to be associated with the Terminal Woodland Period. Two such pictograph sites are located in the Lake Nipigon Conservation Reserve at Gull Bay and Undercliff. Fifteen Terminal Woodland archaeological sites have been documented in the conservation reserve. Many of these sites show signs of earlier prehistoric and historic use.

Lake Nipigon and its surrounding shore lands were important to prehistoric peoples for their subsistence and survival and continued to be important with the onset of European contact. Lake Nipigon was at the center of the conflict between the Northwest Company and Hudson Bay Company as they struggled for control of the fur trade. In order to facilitate trade with the Aboriginals, both companies, first the Northwest Company and then the Hudson Bay Company, began to build trading posts in the interior of the boreal forest. Due to its ideal location as an aquatic link between Lake Superior and Hudson Bay, Lake Nipigon became home to 19 trading posts, built between 1684 and 1937. Archaeological investigations have occurred at some of these sites.

Construction of the Canadian Pacific Railway through the Town of Nipigon was completed in 1885. In 1903, construction of the National Transcontinental rail line running north of Lake Nipigon was initiated. Finally, construction of a third transcontinental rail line running along the shore of Pijitawabik Bay and east toward Longlac was completed in 1914. The easy access provided to Lake Nipigon by this railroad and the onset of World War I with its associated food shortage, resulted in a new stage in Lake Nipigon's history. In 1917, Lake Nipigon was opened up to large scale commercial fishing.

The previously untouched stocks were quickly over-fished with a peak harvest of 2.3 million pounds in 1919. Fish were unloaded at Macdiarmid and transported by horse-drawn wooden sled over cleared ground to the

Canadian National Railway line for shipment. Lake sturgeon populations were decimated by 1926 and have never recovered. The commercial fishery continues to be an important source of income for local Aboriginal residents.

Logging first occurred within the conservation reserve in the late 1800s and early 1900s to provide lumber for trestle timbers and ties used in railway construction. As paper mills were established in Port Arthur, Sault Ste. Marie, Nipigon and Red Rock, pulpwood logging became more prevalent. Early forestry was much more labour intensive than it is today, requiring log drives along most of the major tributaries flowing into Lake Nipigon. Log booms were made in Chief Bay, Humboldt Bay, Gull Bay, McIntyre Bay and Poplar Point, then hauled to Red Rock or Thunder Bay within the year for processing. Evidence of these early booms is apparent in these Lake Nipigon bays today, where a layer of bark and wood debris can be seen on the lake bottom. Remnants of old logging camps can still be found on the shores of Lake Nipigon.

The early 1900s saw the development of another resource industry in the Lake Nipigon Basin, hydroelectric power generation. A series of four dams (Cameron Falls, Virgin Falls, Alexander, Pine Portage) were built on the Nipigon River from 1918 to 1950. The second dam, Virgin Falls, was built in 1925 to control water levels on Lake Nipigon. This dam created the largest reservoir in existence and raised Lake Nipigon by 15 cm (0.48 ft). Pine Portage, built in 1950, was the fourth dam constructed on the Nipigon River and it too raised the water level of Lake Nipigon by 12 cm, flooding over the Virgin Falls Dam. In addition to the damming of the Nipigon River, the Waboose Dam was built on the Ogoki River in 1942 to divert water flowing north, southward to the Great Lakes. The Waboose Dam flooded the waters back to the height of land where a channel was constructed to allow the water to flow south. The Summit Control Dam was built across this channel. From this dam, the water flows through a series of lakes into the Little Jackfish River and

then Lake Nipigon. The Ogoki diversion increased the Lake Nipigon level by 35 cm, and increased the flows in the Little Jackfish River from approximately 4 m<sup>3</sup>/s to approximately 120 m<sup>3</sup>/s resulting in excessive erosion and siltation in the river and Ombabika Bay.

## 6.4 NATURAL RESOURCES AND ENVIRONMENT

### 6.4.1 CLIMATE

Lake Nipigon occurs within Ecoregion 3W. Because of the moderating effect of the lake, the regional climate is characterized as “*modified continental*”; with long, cold winters and short, warm summers. Typical of the lake are high humidity conditions and depressed spring and summer temperatures, particularly along the shoreline. The coldest month is January with a mean temperature of -16.6°C and the warmest month is July with a mean temperature of 17.0°C. The lake generally freezes by late December. Most precipitation occurs in August and September, with an average of 89.9 mm and 90.8 mm of rainfall respectively. The heaviest snowfall occurs in December and January, with 49.5 cm and 50.9 cm respectively (North-South Environmental, 2001).

### 6.4.2 EARTH SCIENCES

#### Bedrock Geology

The entire basin of Lake Nipigon lies within the Canadian Shield, an extensive rolling bedrock dominated plain consisting predominantly of Precambrian crystalline igneous and metamorphic rocks with minor occurrences of sedimentary rocks (North-South Environmental, 2001). The Canadian Shield is divided up into a number of provinces and sub-provinces on the basis of overall differences in internal structure and style of folding (Stockwell in MNR, 1987). Lake Nipigon and most of its shoreline and islands lie within the Nipigon Plate, a sub-province of the Southern Province of the Canadian Shield. The northern shore of the lake and portions of the eastern shore lie

within the larger Superior Province of the Canadian Shield.

The oldest Precambrian rocks are represented by east-west trending belts of Archean (early Precambrian) metavolcanic and metasedimentary rocks. These east-west trending formations, commonly referred to as ‘Greenstone Belts’, were later intruded by granite bodies during periods of mountain building. Granitic rocks occurring either as massive to weakly foliated plutons, formed from the cooling of magma at depth, or as layered migmatitic rocks derived from the partial assimilation of preexisting volcanic and sedimentary rock.

The Southern Province bedrock is dominated by extensive, flat-lying, Logan and Nipigon diabase sills. These make up the famous Nipigon Plate assemblage of Proterozoic (late Precambrian) mafic to ultramafic intrusive rocks that cover a large portion of the Lake Nipigon Conservation Reserve. The Nipigon Plate rocks form one of the more interesting and scenic features in the area. Over time, the softer sedimentary strata have been eroded away, leaving spectacular displays of cliffs and outcrops, particularly on the northwest shore of Lake Nipigon in Castle Bay, at Undercliff, Pijitawabik Bay and on Inner and Outer Barn Islands (North-South Environmental, 2001).

#### Surficial Geology

The surficial geology of the Lake Nipigon Conservation Reserve is dominated by events that occurred during the late Wisconsin glacial period and during the early Holocene, or post-glacial period. The landscape is dominated by an eroded, glacially molded bedrock surface with pockets and localized deposits of glacial till, peat, and glaciolacustrine sands and silty clays.

During the late Wisconsin glacial period, small, localized, shallow pockets of ground moraine (a non-stratified, not obviously sorted sediment) were deposited between numerous rock outcrops. The major glacial events of the study area are marked by four moraines – the Kaiashk, Onaman, Nipigon,



and Crescent moraines. Essentially, the study area was ice covered until the very latest stages of the retreat of the Wisconsin glacier. As the ice retreated, Glacial Lake Kelvin formed along the ice margin, eventually occupying all of the current Lake Nipigon Basin. Lake Kelvin subsequently drained into Lake Superior forming the present-day Lake Nipigon.

Within the conservation reserve, shallow water sand deposits (plains and beaches) of Glacial Lake Kelvin are best represented along the north and northeast shores of Lake Nipigon, particularly north of Windigo Bay. Occasional deeper water silty clay glaciolacustrine deposits of Lake Kelvin are found along the southwest shore and to the east in the vicinity of Humboldt and Ombabika Bays (North – South Environmental, 2001).

In the Lake Nipigon watershed, the overburden of Lake Nipigon is primarily characterized by morainic material comprised of silt and sand. This was a result of erosive action by the retreating glacier that was accompanied by the deposition of outwash sand and gravel. These deposits characteristically are sorted and stratified and usually comprise important aggregate resource areas. Notable deposits occur in Innes Township and north of Windigo Bay (MNR, 1987).

Fine sand, silt and clay were deposited over much of the Lake Nipigon area adjacent to Gull Bay, English Bay, Windigo Bay, Ombabika Bay and Humboldt Bay. These sediments represent disposition in relatively deep water and indicate inundation by a glacial lake (MNR, 1987).

Deltas were formed wherever glacial meltwater systems emptied into Lake Kelvin. For example, the deltaic sand and gravel which occurs in the Southeast Lake Nipigon area represents the discharge of the Jellicoe spillway. It is considered that this spillway functioned during the lower, relatively short-lived level of glacial Lake Kelvin.

There are numerous areas exhibiting lacustrine (lake bottom) deposits from glacial Lake Kelvin which are susceptible to erosion and are generally associated with the major rivers that drain into the lake. These are most evident in the north end of the lake from the Whitesand River eastward, notably in Windigo and Ombabika Bay areas. These layered sands, clays and silts from the bottom of glacial Lake Kelvin are well exhibited in the banks of the Little Jackfish and Pikitigushi Rivers. These rivers carry considerable silt loads, resulting in sedimentation and deposition at the river mouths (MNR, 1987).

Numerous escarpment features also exist throughout the Lake Nipigon Conservation Reserve, particularly along the North Peninsula, the northwest shore, and south of Pijitawabik Bay and Forgan Lake. The formation of these escarpments was controlled by the thick horizontal diabase sills in these areas that were eroded in part by catastrophic drainage of glacial Lakes Agassiz and Kelvin.

### 6.4.3 VEGETATION COMMUNITIES

#### Forests

The Lake Nipigon Conservation Reserve is located within the Boreal Forest Region, Nipigon Forest Section (Rowe, 1972) and Hills (1959) ecodistrict 3W-3. Typically, better drained sites have a mixed forest cover composed of trembling aspen (*Populus tremuloides*), white birch (*Betula papyrifera*), white spruce (*Picea glauca*) and balsam fir (*Abies balsamea*), sometimes with admixtures of red (*Pinus resinosa*) and white pine (*Pinus strobus*) (OMNR 1982, 1986). In areas protected from fire, white spruce and balsam fir attain dominance. Jack pine (*Pinus banksiana*) is characteristic of dry uplands, while black spruce (*Picea mariana*) is common in lowland situations. Table 4 outlines the occurrence of vegetation types in the Lake Nipigon Conservation Reserve.

Most of the larger islands in Lake Nipigon are forested, while smaller islands are typically bare rock with limited vegetation occurring in sheltered crevices. The present forest cover

originated after fires swept the area almost 150 years ago (Nolan 1970, Gollat 1976). Dominant species on the northern islands are black spruce, white spruce and balsam fir. Gollat (1976) also observed scattered mature and over-mature stands of trembling aspen and some isolated jack pine. A few small, old jack pine stands occur on Shakespeare Island and Geikie Island. The more humid climate and decreased frequency of fires on the islands results in conditions that are conducive to the development of older forest stands, in which the recruitment of young trees is much reduced and a broken canopy characteristic of old growth forests develops.

### Wetlands

Extensive open wetland communities are located throughout Lake Nipigon on the protected bays, including open water, graminoid (sedge and grass) and meadow marshes. These wetland communities tend to exhibit strong patterns of zonation from deep to shallow areas. In the deeper water, open water marshes include plants such as submerged pondweeds (*Potamogeton spp.*) and water milfoil (*Myriophyllum*). Graminoid marshes form in the shallower water with emergent plants including wool-grass (*Scirpus cyperinus*) and softstem bulrush (*Scirpus validus*) (North-South Environmental, 2001).

Riparian wetlands along the rivers that drain into Lake Nipigon generally show a zonation pattern from deep, fast moving water to slow water areas to floodplains that are only seasonally flooded. The faster moving open water areas along rivers are dominated by submerged pondweeds (*Potamogeton spp.*), while slow moving waters can also have bullhead lily (*Nuphar variegata*) and common coontail (*Ceratophyllum demersum*). Meadow marshes are located at the edge of riverbanks and at river mouths on Lake Nipigon where flooding is common. Along riverbanks in areas that are only seasonally flooded, and on raised beach ridges that run parallel to the Lake Nipigon shoreline, thicket swamps occur (North-South Environmental, 2001).

Within the Lake Nipigon Conservation Reserve, fens are not a common vegetation community, only occurring inland along creeks, small rivers and at the edge of smaller lakes. Typically, open floating mat fens are present along the water's edge, followed by low shrub fen further inland where the peat mat is anchored, and finally a treed fen consisting of black spruce and shrubs at the outer edges. Pools and small channels within the fen support small populations of submergent marsh species such as bladderwort (*Utricularia spp.*), pondweed and bullhead lily (North-South Environmental, 2001).

True bogs are extremely rare in the conservation reserve. Sphagnum moss forms hummocks which support shrubs such as labrador tea (*Ledum groenlandicum*), leatherleaf (*Chamaedaphne calyculata*) and small cranberry (*Vaccinium oxycoccus*). Bogs are typically very species poor, supporting only a limited flora due to a lack of nutrient rich water (North-South Environmental, 2001).

### Rock Barrens, Cliffs, Talus Slopes

Rock barrens, cliffs and talus slopes are found throughout the conservation reserve. These sites often have features resembling arctic tundra ecosystems including northern or eastern exposures, low annual temperatures, extreme temperature amplitudes, high humidity, a lack of tree cover (and competition from trees and shrubs), and long hours of sunlight. As a result, these areas also tend to have a high concentration of arctic-alpine disjunct species (Table 5). Typical flora of rock barrens includes a layer of lichens, sedges, low sweet blueberry (*Vaccinium angustifolium*), velvet-leaf blueberry (*Vaccinium myrtilloides*), and rock cranberry (*Vaccinium vitis-idaea ssp. minus*). Vegetation of exposed bedrock beaches along the Lake Nipigon shoreline typically includes lichens, rushes (*Juncus spp.*), goldenrod (*Solidago spp.*), cinquefoil (*Potentilla spp.*) and balsam poplar seedlings.

Cliffs have scattered pockets of vegetation concentrated on ledges and in crevices.

Typical species can include lichens and mosses as well as fragrant wood fern (*Dryopteris fragrans*), rock polypody (*Polypodium virginianum*), and northern beech fern (*Phegopteris connectilis*). In sheltered areas stunted black spruce and white birch can be found. The unstable boulder talus at the toe of the slope can vary from bare rock, covered only by crustose lichens and mosses with sparse herbs growing in crevices and soil pockets, to deciduous white birch stands. More stable talus slopes can support white cedar mixed wood communities.

### Sand Dunes and Bluffs

Sand dunes and bluffs are found scattered along the shores of Lake Nipigon. Open dunes and bluffs are fairly common throughout the Lake Nipigon Basin. These communities typically have only scattered areas of vegetation interspersed with large areas of bare sand. Where vegetation is present, lichens (*Cladina rangiferina*, *Cladina stellaris*, *Cladina mitis*, and *Stereocaulon spp.*) dominate. Other common species include bearberry (*Arctostaphylos uva-ursi*), spreading dogbane (*Apocynum androsaemifolium*), rocky mountain fescue (*Festuca saximontana*), slender mountain-rice (*Oryzopsis pungens*) and white-grained mountain-rice (*Oryzopsis asperifolia*).

### 6.4.4 FLORA

The Lake Nipigon Conservation Reserve's flora is predominantly boreal, with some added complexity resulting from the occurrence of species more commonly found in the Great Lakes – St. Lawrence Forest and species of arctic-alpine affinity (OMNR 1982, 1986). In general, the flora of the islands tends to be less diverse than the flora of the mainland (MNR 1982, 1986).

A very low percentage of Lake Nipigon Conservation Reserve's plants are non-native. A large proportion of these species have been documented from highly disturbed areas such as roadsides, open fields, railway ballasts and burnt areas.

There are 4 provincially significant vascular plant species and 12 plant species with arctic-alpine affinities documented for the Lake Nipigon Conservation Reserve (Tables 5 & 6). Although wetlands, dunes, beaches and rock barrens make up a very small fraction of the conservation reserve landscape, they harbour a disproportionately large percentage of the floral diversity (North-South Environmental, 2001). Arctic-alpine species are often associated with specialized habitats in which they survived from the post-glacial times on northerly exposed rock faces, cool crevices, cliff ledges and talus slopes, where there is little or no competition from forest vegetation and the microclimatic conditions support a more northern flora.

### 6.4.5 DESCRIPTION OF STUDY AREA VEGETATION

Between Mungo Park Point and Livingstone Point, the shallow soils over bedrock support spruce and cedar coniferous forests as well as occasional stands composed of Jack pine (Bird and Hale, 1994).

Around Humboldt Bay, black spruce-cedar swamps occur in low-lying areas. In upland areas between Humboldt Bay and South Peninsula, coniferous mixedwoods form the dominant vegetation cover. Ombabika flats is a distinctive expanse of lacustrine plain located between the broken palisades of South Peninsula and the cliffs of the mainland. These flats have a uniform vegetation cover consisting of black spruce (*Picea mariana*) bogs and swamps, with balsam fir (*Abies balsamea*) and occasional tamarack (*Larix laricina*) (Bird and Hale, 1994). The understory species include mountain maple (*Acer spicatum*), Labrador tea (*Ledum groenlandicum*), small cranberry (*Vaccinium oxycoccos*), low sweet blueberry (*Vaccinium angustifolium*), wood horsetail (*Equisetum sylvaticum*), blue-bead lily (*Clintonia borealis*) and several species of sphagnum moss (*Sphagnum sp.*).

Spruce forests dominate the shores of Ombabika Bay with deciduous stands composed of trembling aspen (*Populus tremuloides Michx.*) occurring infrequently. A few wetlands occur along the shoreline in

sheltered bays in the form of graminoid fens and willow thickets. At the northern end of Ombabika Bay the Little Jackfish River marshes form a continuous wetland feature (North-South Environmental, 2001).

North Peninsula has a diverse forest cover. The western shores have stands dominated by black spruce, white spruce (*Picea glauca*) and balsam fir on upland, sandy soils, with white birch (*Betula papyrifera*) as a common secondary species. Most of the balsam fir is dead due to spruce budworm infestation. The understory of these forests has extensive carpets of feathermosses and abundant arboreal lichens. Jack pine (*Pinus banksiana*) occur in dry, rocky outcrop areas and as occasional patches on the North and South Peninsulas (Bird and Hale, 1994).

The large marshes at Windigo Bay exhibit distinctive vegetation zonation from the open waters of Lake Nipigon to areas inland. Softstem bulrush (*Scirpus validus*) and hard-stemmed bulrush (*Scirpus acutus*) form emergent vegetation communities in deep water. Canada blue-joint (*Calamagrostis canadensis*) is the dominant species in beach strand communities. Behind the beach are extensive graminoid fens with floating mats of slender sedge, and on more stable substrates, low shrub fens with sweet gale (*Myrica gale*). The final transition between open wetland and swamp is characterized by speckled alder (*Alnus incana* ssp. *rugosa*) thickets, which form at the edge of lowland black spruce swamp. Graminoid marshes on shallow sandy substrate exist along the shore of the bay, with species such as wool grass (*Scirpus cyperinus*), softstem bulrush, Baltic rush (*Juncus balticus*), northern manna grass (*Glyceria borealis*) and tall manna grass (*Glyceria grandis*) (North-South Environmental, 2001).

In the southwest corner of Lake Nipigon, large continuous wetlands are located around the Poshkokagan River mouth in Chief Bay. Bird and Hale (1994) report the following species in Chief Bay wetlands: speckled alder, common reed (*Phragmites australis*), wool grass, softstem bulrush, Baltic rush, northern manna grass and tall manna grass. The open

wetlands are fringed by alder thickets and willows that grade into the surrounding mixed forests composed of white spruce, black spruce, balsam fir, trembling aspen and white birch. There are also some swamps dominated by tamarack.

Forests that have been disturbed by logging characterize some of the upland areas around Chief Bay. Typically the dominant species are white spruce, white birch, balsam poplar, mountain maple, red-osier dogwood (*Cornus stolonifera*), mountain ash (*Sorbus decora*) and jewelweed (*Impatiens capensis*). The understory includes typical boreal species such as bunchberry (*Cornus canadensis*), blue-bead lily (*Clintonia borealis*), one-flowered wintergreen (*Moneses uniflora*) and club moss (*Lycopodium* spp.) (Bird and Hale, 1994).

Between Gull Bay and Chief Bay, mixed forests on lakeshore slopes are composed of white spruce, balsam fir, trembling aspen and white birch. Locally, white pine (*Pinus strobus*) mixedwoods are also found (North-South Environmental, 2001). The dominant species on the north islands are black spruce, white spruce and balsam fir, however, massive spruce budworm outbreaks between 1943 and 1949 eliminated most of the mature balsam fir (Gollat, 1976). Most of the forest present on the Lake Nipigon Islands originated from large forest fires that occurred over most of the area about 150 years ago (Gollat, 1976). The high density of these now old stands tends to inhibit new growth. A few small over-mature jack pine stands occur on Shakespeare Island and Geikie Island (North-South Environmental, 2001).

Mixed stands of red (*Pinus resinosa*) and white pine have been reported on the western side of St. Paul Island. Red pine has also been reported in an area north of the Blackwater River and in an area on Two Mountain Island in Grand Bay (Bird and Hale, 1994, North-South Environmental,

#### 6.4.6 FISH

Lake Nipigon is a deep, cold water lake that has largely retained its original fish species

composition. The dams on the Nipigon River have prevented fish migration from Lake Superior where many non-native species now exist. A comparison of Lake Nipigon fish species found by Dymond in 1926 with those found today shows only a few notable differences (Table 7). Brown trout (*Salmo trutta*), rainbow smelt (*Osmerus mordax*) and black bullheads (*Ameiurus melas*) were introduced into Lake Nipigon. Many of the “extra” species listed in 2001, such as shortjaw cisco (*Coregonus zenithicus*), bloater (*Coregonus hoyi*) and finescale dace (*Phoxinus neogaeus*) were likely present in 1926 but not encountered due to survey techniques (Swainson, 2001).

The cold, clean, well oxygenated water of Lake Nipigon is essential for species such as lake trout (*Salvelinus namayacush*), brook trout (*Salvelinus fontinalis*), whitefish (*Coregonus clupeaformis*) and cisco (*Coregonus artedii* sp.) and has allowed two threatened species, the shortjaw cisco and deepwater sculpin (*Myoxocephalus thompsoni*) to persist (Swainson, 2001). Recently, it was determined that a new species of “Nipigon blackfin” cisco exists in Lake Nipigon. Exactly what species this new cisco is has not yet been determined by taxonomists (Swainson, 2001).

Important upwelling areas with sand and gravel, critical for brook trout spawning are thought to exist in Pijitawabik Bay, McIntyre Bay, West Bay, South Bay, English Bay and Humboldt Bay. Ombabika Bay produces 90% of Lake Nipigon walleye. Wabinosh Bay also produces walleye. Wetlands along the shoreline are important for northern pike spawning, particularly in Humboldt Bay (Salmon, pers. Comm., 2000 in North-South Environmental, 2001).

Lake whitefish is the most important commercial species and the most abundant in terms of biomass (Salmon and Livingston, 1998 in North South Environmental, 2001). They spawn in mid-October through November and require cool water temperatures. Specific spawning areas are not well known but have been reported in McIntyre Bay, Black Sturgeon Bay, South Bay,

English Bay and Wabinosh Bay (Gollat, 1976).

Rainbow smelt (*Osmerus mordax*) were accidentally introduced into Lake Nipigon in recent years (first observed in the 1970s) and have increased exponentially since then. They are important as a commercial fish species and as a food source for other life forms (van Ogtrop and Salmon, 1998).

Lake trout are a valuable sport and commercial fish species on Lake Nipigon. Spawning areas for this species are not well known but have been reported near Murchison Island, Dawson Island, Gros Cap, Shakespeare Island and South Bay (Gollat, 1976 in North South Environmental, 2001). Lake trout are now being caught at sizes unreported in the past (30 – 40 pounds). This increase in size of large lake trout is thought to be a result of the availability of rainbow smelt as a food source.

Brook trout is one of the most prized sport fish in Lake Nipigon. They require high quality, cold water environments for survival and reproduction. They can be found in the non-breeding season near Shakespeare Island, Mungo Park Point, the Virgin Islands, South Bay, Gros Cap, West Bay, Jackfish Island and the north central islands area (Gollat, 1976 in North-South Environmental, 2001).

The largest concentration of lakes in the conservation reserve occurs on the northwest side of Lake Nipigon. This is an area of rugged terrain, high cliffs and deep lakes with coldwater fisheries. A number of these lakes have been surveyed for game species present. Snowshoe Lake, Castle Lake and Walkover Lake all contain lake trout and northern pike. Clamp Lake contains brook trout (Swainson, 2001). Other lakes in the conservation reserve, Bonner Lake, Rhea Lake and Frith Lake are all warm water lakes with warm water species occurring in them.

#### 6.4.7 REPTILES AND AMPHIBIANS

Seventeen species of reptile and amphibian have been reported in the general vicinity of the Lake Nipigon Conservation Reserve. Inventory information specific to the

conservation reserve is not available. None of the species reported is considered at risk, however, many are at the northern limit of their range in the Nipigon area (North-South Environmental, 2001). Only 13 of these species have actually been observed, the remainder are based on range maps. The most common herpetofauna in the conservation reserve include the eastern garter snake (*Thamnophis sirtalis*), American toad (*Bufo americanus*), northern spring peeper (*Pseudacris crucifer*) and wood frog (*Rana sylvatica*). Boreal chorus frog (*Pseudacris maculata*) is also common in the area. The mink frog (*Rana septentrionalis*), northern leopard frog (*Rana pipiens*) and green frog (*Rana clamitans*) are at the northern edge of their range and mainly limited to the southern part of the conservation reserve.

There are historical reports of sightings of the yellow-spotted (*Ambystoma maculatum*), blue spotted (*Ambystoma laterale*) and Jefferson complex (*Ambystoma Laterale/A. jeffersonianum*) salamanders in the study area (North-South Environmental, 2001). The Thunder Bay Field Naturalists have recently (1991-1993) reported the Jefferson and Jefferson complex salamanders on Ellis Island in Lake Nipigon (Table 8).

A red eft, the land stage of the eastern newt (*Notophthalmus viridescens*) was collected in September 2001 from the Oskawe Lake – South Bay area (J. Haskell pers. Comm., 2001 in Swainson and McNaughton, 2001).

#### 6.4.8 BIRDS

The number of breeding birds in the Lake Nipigon Conservation Reserve (and surrounding area) ranges from 60-79 breeding bird species (Thompson, 2000) to 150 species (North-South Environmental, 2001). More inventory work is required to further refine the actual number of breeding birds in the conservation reserve. Most of the breeding bird observations are derived from surveys conducted within and in proximity to the study area by Thunder Bay Field Naturalists from 1991 –1993 and surveys within Windigo Bay Provincial Park by Northern Bioscience in

1997. Other sources used to derive the breeding bird list (outlined in North-South Environmental, 2001) are more general such as the Atlas of Breeding Birds of Ontario.

Two bird species at risk are confirmed breeders in the Lake Nipigon Conservation Reserve, the American white pelican (*Pelicanus erythrorhynchos*) and the bald eagle (*Haliaeetus leucocephalus*). The black tern (*Chlidonias niger*) and peregrine falcon (*Falco peregrinus*) are species at risk that have been sighted in the conservation reserve but are not confirmed breeders. Other species of note include the great gray owl (*Strix nebulosa*), osprey (*Pandion haliaetus*), great blue heron (*Ardea herodias*) and double-crested cormorant (*Phalacrocorax auritus*).

The American white pelican is protected under Ontario's *Endangered Species Act*. Pelicans were first observed nesting on Pretty Island in McIntyre Bay in 1991, although pelicans had been seen on Lake Nipigon as far back as the late 1970s (Bryan, 1991). New nesting sites were found in 1992 and 1993 on islands to the west of Ombabika Narrows and on an island near Windigo Bay. In 2000, approximately 300 nests were observed on a small island north of Boles Island near West Bay. The Lake Nipigon pelican population is currently estimated to be greater than 1,000 birds and expanding (Swainson and McNaughton, 2001).

The Lake Nipigon Conservation Reserve provides the remote and isolated habitat preferred by the white pelican. Pelicans nest in late May or early June on small (0.4 to 1.2 ha), remote, bedrock islands (Peck and James, 1983; Peck, 1987). Chicks are very vulnerable during their first two weeks, having no feathers to protect them from the cold or sun. Under the right conditions, as little as twenty minutes of human disturbance of the nesting grounds can be fatal for almost all chicks under two weeks of age (Koonz, 1987).

Key feeding areas for the pelicans of Lake Nipigon are West Bay, Wabinosh Bay, Windigo Bay, Ombabika Bay and the mouth of most tributaries (Swainson and McNaughton, 2001). Pelicans feed mainly on non-

commercial fish species such as stickleback and suckers. An adult pelican consumes, on average, 1.8 kg of food daily (Swainson and McNaughton, 2001).

The bald eagle is a species at risk in Ontario and is listed under the Endangered Species Act (Swainson and McNaughton, 2001). Bald eagles breed on large freshwater lakes with shallow bays and clear water, allowing fish to be visible. In the Lake Nipigon Conservation Reserve, eagles are known to nest almost exclusively in large poplar trees that protrude above the forest canopy (R. Swainson pers. Comm., 2001 ci Swainson and McNaughton, 2001). There are currently one hundred and forty known eagle nests in the Lake Nipigon Conservation Reserve.

Bald eagles rely on open water for food in winter and generally migrate to large rivers to find a food source (Root et. al., 1988 ci North South Environmental, 2001).

The great gray owl is not listed as a species at risk, but is tracked by the Ministry of Natural Resources as an indicator species of extensive mature coniferous forest. Its habitat requirements include large tracts of coniferous forest (100 to 400 hectares or larger) interspersed with peatlands. Great gray owls tend to nest in clearings with grasses and forbs that support prey species (Ontario Hydro, 1989 ci North South Environmental, 2001). This species has been sighted in the Lake Nipigon Conservation Reserve in the high hills near Wabinoosh Bay (Carroll, 2000, pers. Comm. ci North South Environmental). There are no confirmed reports of nesting, though suitable habitat exists in the Lake Nipigon Conservation Reserve.

Peregrine falcons are a species at risk in Ontario and are listed under the *Endangered Species Act* (Swainson and McNaughton, 2001). There was a dramatic decline in their population numbers through the 1950s, 60s and 70s due to the widespread use of DDT. Many reintroduction programs have since been initiated and there are now 50 pairs of peregrines nesting in Ontario, many along the north shore of Lake Superior (Ratcliff, 2000,

pers. Comm.). Peregrine falcons usually nest on high cliffs near vast open areas such as large lakes or grasslands, feeding mainly on small birds (North South Environmental, 2001). Habitat and food are abundantly available in the Lake Nipigon Conservation Reserve. The Thunder Bay Field Naturalists observed a peregrine during breeding season at Tichnor Island in Humboldt Bay, however, nesting has not been confirmed (Ratcliff, pers. Comm., 2001 in North South Environmental, 2001).

Black terns are a species at risk in Ontario and are ranked as Vulnerable (Natural Heritage Information Centre, 2001 ci Swainson and McNaughton, 2001). They usually nest in extensive freshwater wetlands, particularly in cattail marshes associated with large lakes and ponds (North–South Environmental, 2001). This species is noted as a possible breeder in the Lake Nipigon Conservation Reserve as it has been observed by Thunder Bay Field Naturalists near suitable breeding habitat in Windigo Bay and Ombabika Bay. Black terns require large wetlands of a minimum of 5 hectares in size to sustain a population. Their nests are susceptible to swamping by boats because they build them very close to the water line.

Thunder Bay Field Naturalists report that the osprey is a common raptor on Lake Nipigon. They require areas of shallow, clear water for feeding and tall trees or high ledges for nesting. Due to the effects of DDT, osprey nests on Lake Nipigon declined to just two in 1969 (Postupalsky, 1971 ci Swainson and McNaughton, 2001). In 1993, osprey nests on Lake Nipigon increased to forty but only seventeen were observed in 2001 (Swainson, 2001, pers. Comm.). This decline is likely due to the increase in bald eagle numbers, as bald eagles are usually dominant over osprey.

Bryan (1992, ci Swainson and McNaughton, 2001) recorded five great blue heron colonies on Lake Nipigon (Tichnor Island, The Rabbit Islands, island south of Logan and east of Vennor, island east of Murray, Red Willow Islands). At least three other heronries are known, two nesting in conjunction with white pelicans and one on the mainland in McIntyre

Bay (Swainson, pers. Comm., 2001). The total number of active heronries in the Lake Nipigon Conservation Reserve is unknown.

Lake Nipigon was home to the first recorded (1920) double crested cormorant colony in Ontario. The population increased through the 1940s and 50s and then declined dramatically in the 1960s and 70s due to the widespread use of DDT (Swainson and McNaughton, 2001). With the banning of DDT, the cormorants have made a comeback. During surveys by the Thunder Bay Field Naturalists in 1991 and 1992, over 5,000 cormorants and fifteen nesting colonies containing a total of 2,500 nests were counted. Large colonies of cormorants still exist in the Lake Nipigon Conservation Reserve, but current population size and number of colonies is unknown (Swainson and McNaughton, 2001).

#### 6.4.9 MAMMALS

No mammal survey work, specific to the Lake Nipigon Conservation Reserve has been completed. The number of mammal species estimated to be present in the Lake Nipigon Conservation Reserve and surrounding area varies depending on the information source. North-South Environmental (2001) lists 52 species of mammals, whereas Thompson (2000) lists somewhere between 30 and 39 species.

Several mammal species are at the northern limit of their range such as white-tailed deer (*Odocoileus virginianus*), long-tailed weasel (*Mustela frenata*), bobcat (*Lynx rufus*), several shrews, hairy-tailed mole (*Parascalops breweri*) and the eastern chipmunk (*Tamias striatus*). Likewise, there are a number of species that are at the southern limit of their range including the woodland caribou (*Rangifer tarandus*), wolverine (*Gulos gulos*), cougar (*Felis concolor*) and arctic shrew (*Sorex arcticus*) (Burt and Grossenheider, 1976 in Swainson and McNaughton, 2001).

Three mammal species at risk occur in the Lake Nipigon Conservation Reserve, the woodland caribou, cougar and wolverine.

All three of these species require large home ranges in isolated areas with minimal human disturbance (Swainson and McNaughton, 2001).

Woodland caribou are the only indigenous cervid north of Lake Superior; white-tailed deer and moose arrived from farther south at the beginning of the century (Cumming and Beange, 1993 in North-South Environmental, 2001). The woodland caribou population has been steadily receding northward and declining in numbers since the 1850s as a result of human disturbance and habitat destruction. They are now categorized as threatened in Canada.

The Lake Nipigon caribou population is one of the most southerly populations in the province and is estimated at 150 to 250 individuals (Gollat, 1997 in North-South Environmental, 2001). Although it was recently thought that caribou used only the northern half of Lake Nipigon islands and shorelands, 2001 field studies revealed that the southern islands are also being used.

Caribou summer on the islands of Lake Nipigon, swimming there after spring break-up to have their calves where they are relatively free from wolf predation. They use small to mid-sized islands ranging from 0.5 to 1550 hectares but prefer islands 25 to 75 hectares in size. Most caribou return to the mainland for the winter, although some spend the winter on the islands.

The eastern population of cougar (*Felis concolor*) is classed as endangered in Ontario (COSSARO) and is protected under Ontario's *Endangered Species Act* (Swainson and McNaughton, 2001). Cougar sightings occur every year in Ontario, with many sightings occurring in and around the Lake Nipigon Conservation Reserve. Although scat, track casts and hair samples have been collected locally and elsewhere in Ontario, the results have been inconclusive except for one instance in the Kenora area.

Cougars inhabit extensive tracts of forests, with minimal human presence or disturbance. They are known to have large territories and



exist at very low densities even where populations are well established (Swainson and McNaughton, 2001). White-tailed deer is the primary prey species, however, cougar will prey on a variety of animals including porcupine, beaver, domestic animals and moose. They prefer habitats that are vegetatively and topographically complex (Dawson pers. comm., 2001 in Swainson and McNaughton, 2001), which is characteristic of the terrain in the Lake Nipigon Conservation Reserve.

Wolverine (*Gulo gulo*) is ranked as Vulnerable in Ontario (COSSARO) but has recently been recommended for reclassification as Threatened (Dawson, 2000 in Swainson and McNaughton, 2001). Historically wolverines ranged over most of Ontario, however, populations have steadily receded northward. It is believed that this recession is directly related to increased human disturbance and activity.

The wolverine feeds primarily on dead caribou and moose and requires large home ranges (100 to 700 km<sup>2</sup>) (Hash, 1987 in North-South Environmental, 2001). There are scattered records of wolverine in the Lake Nipigon Conservation Reserve. In the mid 1980s, a wolverine was observed using a den near Gros Cap on Lake Nipigon (Odorizzi pers. comm., 2000 in North-South Environmental, 2001).

Other mammal species of note in the Lake Nipigon Conservation Reserve include the moose (*Alces alces*) and wolf (*Canis lupus*). Evidence indicates that moose moved into the Lake Nipigon area in the late 1800s or early 1900s due to the availability of early successional habitat created by human activity (exploration). Moose currently inhabit the shore lands and islands of Lake Nipigon. Although the islands are closed to hunting of big game today and have been since 1970 (except for subsistence purposes by Aborigines), moose were hunted in the past resulting in a dramatic population decline. The current island population is estimated at 110 animals (Swainson and McNaughton, 2001).

Wolves are the primary predators of moose and caribou in the Lake Nipigon Conservation Reserve (in addition to humans). Although persecuted through the 1950s, 60s and 70s, wolves still remain a common sight on Lake Nipigon. At least one wolf pack was observed on Shakespeare Island during 1998 and 2001 surveys (Swainson pers. comm. 2001 in Swainson and McNaughton, 2001). Wolves are often seen on the Lake Nipigon ice, feeding on fish discarded by the commercial fisherman.

#### 6.4.10 WATER

Although only a portion of Lake Nipigon is designated as conservation reserve, it is undeniably the most significant feature in the study area. Lake Nipigon is the largest headwaters to the Great Lakes, has a water renewal time of 25.6 years and drains an area of 24,650 km<sup>2</sup>. With a surface area of 484,800 ha and a maximum depth of 166 metres, Lake Nipigon is a massive body of fresh, clean water that is worthy of protection.

The limnology of Lake Nipigon has been studied a number of times, the first studies being conducted by a team from the University of Toronto from 1921 to 1924. The most recent collection and analysis of limnological information for Lake Nipigon was conducted in 2001 by Geowest Environmental Consultants Ltd. for the MNR (2002). This study involved the collection of water chemistry, phytoplankton, zooplankton and benthos information in Wabinoosh Bay, West Bay, McIntyre Bay, South Bay and Humboldt Bay. Results of the study indicate that in general, it appears that Lake Nipigon remains in an ecological condition very similar to historical values reported. Basic limnological information for Lake Nipigon is listed in Table 9.

The water quality parameters of Lake Nipigon are generally typical of a large, deep, oligotrophic lake. It is characterized as relatively nutrient poor with low levels of nitrates and total phosphorus. Levels of total dissolved solids are low, and alkalinity is low to moderate as a result of being situated on bedrock and shallow soils with low to

**TABLE 4: OCCURRENCE OF VEGETATION TYPES IN THE LAKE NIPIGON CONSERVATION RESERVE.**

Community types and names follow Harris et al. (1996) for wetland (W) types and Sims et al. (1989) for forest types (V). Note: the following community types are the best approximation based on existing information.

<b>VEGETATIVE COMMUNITY</b>	
<b>TYPE</b>	<b>NAME</b>
V5	Aspen Hardwood
V8	Trembling aspen (white birch)/mountain maple
V9	Trembling aspen mixed wood
V13	Red pine mixed wood
V16	Balsam fir - white spruce mixed wood/feathermoss
V19	Black spruce mixed wood herb rich
V22	Cedar (inc, mixed wood) / speckled alder / sphagnum
V23	Tamarack (black spruce) / speckled alder / Labrador tea
V27	Red pine conifer
V30	Jack pine - black spruce / blueberry / lichen
V36	Black spruce / bunchberry / sphagnum (feathermoss)
V37	Black spruce / ericaceous shrub / sphagnum
W1	Open water marsh: mixed: mineral substrates
W4	Open water marsh: floating leaved plants
W7	Marsh; bulrush: mineral substrate
W8	Marsh: common reed: mineral substrate
W11	Marsh: cattail
W13	Meadow marsh: bluejoint grass
W14	Open graminoid shore fen: wire sedge
W15	Low shrub shore fen: leatherleaf - sweet gale / graminoid
W22	Poor fen: black spruce - tamarack / ericaceous shrub
W35	Thicket swamp: speckled alder / bluejoint grass
W36	Thicket swamp: tall willow

Source: North-South Environmental, 2001

moderate capacity to reduce acidity (Cowell, 1986 in Swainson, 2001). Lake pH conditions are neutral to slightly alkaline. Oxygen levels are high in all areas of the Lake.

Ombabika Bay is naturally more turbid than the rest of Lake Nipigon because of its soils, shallow waters and susceptibility to wind and wave action. Its transparency dropped from 2.3 m in 1924 to 1.1 m in 1976 and 1.5 m in 1984 as a consequence of massive erosion and inputs of suspended sediment caused by diverting the Ogoki River down the Little Jackfish River in 1943 (Swainson, 2001).

Elevated mercury levels were detected in fish from Lake Nipigon in the 1970s and continue to persist today. Consumption restrictions apply to some species over a certain size (Ministry of the Environment, 2001). Mercury is released into the food chain during the breakdown of organic material. It is thought that decomposition of bark left on the lake bottom from the log drives and organic material flooded by the creation of the Ogoki Reservoir is causing the increase in mercury levels (Ontario Hydro, 1988, Ontario Ministry of Natural Resources, 1987, Ministry of the Environment, 2001).

Concentrations of PCBs in Lake Nipigon have been found to be similar to other smaller lakes in the area and in remote Canadian lakes. Elevated levels of the pesticide toxaphene have been found in Lake Nipigon fish (Whittle et al. In Swainson, 2001). Toxaphene was banned from use in Canada in 1974 and restricted in the United States in 1982. It is still used in Mexico and South America and is transferred through the atmosphere to our lakes. Concentrations of total copper in Humboldt Bay and total zinc in South Bay were found to exceed Ontario Provincial Water Quality Objectives in a recent limnological study (Geowest Environmental Consultants, 2002).

The species composition and abundance of benthic and planktonic organisms in the most recent study (Geowest Environmental Consultants, 2002) were indicative of clear, cold, oligotrophic lakes in northwestern Ontario. The shallow-water sampling

produced greater numbers and diversity of benthic and planktonic organisms than the deep-water sampling.

The spiny water flea (*Bythotrephes cederstroemi*), a crustacean native to Europe, was the only exotic species found during the sampling. It is a small creature, about 1/2 an inch long, with a barbed tail spine that often catches on fishing line and down riggers. Its preferred food is the same as that eaten by native plankton and fishes, leading to concerns that the invader may be competing for food with native species (Geowest Environmental Consultants, 2002). Evidence of zebra mussels was not found during this most recent study nor has evidence been found in previous studies.

## 6.5 SOCIAL AND ECONOMIC ASPECT

### 6.5.1 FISHERIES RESOURCE USE

#### Commercial Fishery

The Lake Nipigon fishery resource has been used for subsistence purposes for thousands of years, first by indigenous peoples and then by European fur traders and settlers. The lake was opened to unrestricted commercial fishing in 1917 in response to a food shortage brought on by World War I. The fish stocks were quickly over-fished as a “*fishing bonanza*” took place. Peak harvest was reached in 1919 at 2.3 million pounds.

The commercial fish harvest from 1917 to 2000 (Figure 3) has been characterized by widely fluctuating annual differences which are likely the combined result of fluctuating stock abundance (strong year classes) and variable fishing effort (driven by market prices, weather and number of fishermen) (Swainson, 2001).

As it was in 1917, the lake whitefish has continued to be the mainstay of the Lake Nipigon commercial fishery. Other fish species harvested include walleye, lake trout, sauger and to a lesser degree, northern pike. A recent addition to the commercial fishery is the rainbow smelt. An introduced species, the rainbow smelt population has exploded in

**TABLE 5:** Arctic-alpine disjunct native, vascular plant species of the Lake Nipigon Conservation Reserve. Nomenclature follows Newmaster et al. (1998). Sources for arctic status: Ontario Plant List (Newmaster et al. 1998); Checklist of Vascular Plants of Thunder Bay District (Thunder Bay Field Naturalists). Source: North-South Environmental, 2001

SCIENTIFIC NAME	HABITAT	LOCATION	COMMON NAME	SOURCE	
				NEWMASTER ET AL(1998)	THUNDER BAY FIELD NATURALISTS
<b>DRYOPTERIDACEAE</b>					
<i>Dryopteris fragrans</i> (L.) Schott	Moist crevices in talus boulder	Wilson Island	Fragrant wood fern		✓
<b>ERICACEAE</b>					
<i>Vaccinium uliginosum</i> L. ssp <i>Pubescens</i> (Wormsk. ex Hornem) S. Young	Moist shoreline rock crevices	Humboldt Bay	Bog blueberry	✓	✓
<b>PRIMULACEAE</b>					
<i>Primula mistassinica</i> Michx.	Moist shoreline rock crevices	South Bay; Macoun Island; Murchison Island; Shakespeare Island	Bird's-eye primrose		✓
<b>ROSACEAE</b>					
<i>Potentilla tridentata</i> Sol. Ex aiton	Moist shoreline rock crevices and cliffs	Black Sturgeon Bay; Ursel Island; Caribou Island; South Bay	Three-toothed cinquefoil	✓	
<b>FABACEAE</b>					
<i>Oxytropis splendens</i> Douglas ex Hook	Exposed cliff faces	Prince of Wales Island	Showy oxytrope		✓
<b>ASTERACEAE</b>					
<i>Senecio congestus</i> (R.Br.) DC	Moist shoreline rock crevices	Black Sturgeon Bay	Marsh groundsel	✓	
<b>CYPERACEAE</b>					
<i>Carex capillaris</i> L. ssp. <i>capillaris</i>	Moist shoreline rock crevices moist streams	South Bay; Shakespeare Island	hair-like sedge		✓
<i>Carex scirpoida</i> Michx.	Moist shoreline rock crevices	South Bay	scirpus-like sedge	✓	✓
<i>Scirpus cespitosus</i>	Moist shoreline rock crevices	South Bay; Chief Bay	cespitose bulrush	✓	✓
<b>POACEAE</b>					
<i>Calamagrostis stricta</i> (Timm) Koeler ssp. <i>stricta</i>	Moist shoreline rock crevices	Humolt Bay; South Bay	Northern reed grass		✓
<i>Poa glauca</i> M. Vahl ssp. <i>glauca</i>	Rock crevices and rocky shoes	St.Paul I; Brown I; Black Sturgeon Bay; Cooke Pt.	Glaucous bluegrass		✓
<i>Trisetum spicatum</i> (L.) Richter	Rock crevices and shore	Russel I; South Bay	Narrow false oats		✓

**TABLE 6:** Provincially significant, native vascular plant species documented for the Lake Nipigon Conservation Reserve listed in taxonomic order. Nomenclature follows Newmaster et al. (1998). Provincial status is based on Natural heritage Information Centre (2000). Source: North-South Environmental, 2001

SCIENTIFIC NAME	HABITAT	LOCATION	COMMON NAME	G RANK	S RANK
<b>DRYOPTERIDACEAE</b>					
<i>Dryopteris x triploidea</i> Wherry	Moist, rich woods	South Bay	Wood fern	HYB	S3S4
<i>Gymnocarpium x intermedium</i> Sarvela	Moist shoreline rock crevices and moist cliffs	Macoun I.; Brown I.; Shakespeare I.	Hybrid oak fern	HYB	S2?
<b>FABACEAE</b>					
<i>Oxytropis splendens</i> Douglas ex Hook	Exposed cliff crevices	Prince of Wales Island	Showy oxytrope	G5	S3
<b>JUNCACEAE</b>					
<i>Juncus vaseyi</i> Engelm.	Ephemeral boggy pool	South Bay	Vasey's rush	G3G5	S3

Lake Nipigon and the commercial smelt fishery has grown along with it. Smelt harvest has increased from 1000 kg per year in the early 1990s to 239,000 kg in 2000.

Reported commercial harvests from 1990 to 1998 for lake whitefish and lake trout have been stable, whereas walleye and sauger harvests have remained at low levels following a decline in harvest and subsequent closure of Ombabika Bay to commercial fishing in 1996 (Swainson, 2001). The commercial walleye and sauger fishery was recently closed lake-wide (April 2002).

There are currently ten commercial fish licences on Lake Nipigon, all issued to First Nation or Metis people. Lake wide quotas are assigned to each licence for each fish species and fishermen are restricted to size and type of gear they can use (Swainson, 2001).

There is no history of commercial fishing in the smaller lakes within the Lake Nipigon Conservation Reserve (e.g., Castle Lake, Boswell Lake, Snowshoe Lake, Bonner Lake). Since the early 1990s there has been an expanding commercial fishery for smelts in the tributaries to Lake Nipigon (Swainson, 2001).

### Sport Fishery

Sport fishing on Lake Nipigon did not really get under way until after the Second World

War. Tourist outfitters running charter boats out of Orient Bay, took anglers on multi-day, live on boat trips around the lake. The species targeted at this time were walleye, northern pike and brook trout. Charter boat operations continued through the 1950s to present day. Currently there are seven charter boat operators that offer over night trips and full on board services and accommodation. There are also approximately 25 to 30 day trip operators.

In recent years the equipment used by the average angler has become more sophisticated. An increasing number of sports fishermen have fish finders, larger boats and down riggers. This has enabled them to travel out on Lake Nipigon on their own and to travel further afield. This widespread use of new technology in the early 1990s resulted in the "discovery" of the recovering lake trout stocks, resulting in an explosion in the lake trout sport fishery (Swainson, 2001). The sport fish harvest of lake trout, historically less than 4% of the total sport fish harvest (Savioja, 1985 in Swainson, 2001), is now as high as 75% (van Ogtrop, 2001 in Swainson, 2001). The quality of the lake trout sport fishery has declined as a result.

Some sport fishing occurs on the inland lakes within the Lake Nipigon Conservation Reserve. From 1950 to 1970, Castle Lake was a popular destination for guided trips from

TABLE 7: FISH SPECIES OF LAKE NIPIGON

Source: Swainson, 2001

COMMON NAME	SCIENTIFIC NAME	DYMOND (1926)	MNR (2001)
Lake sturgeon	<i>Acipenser fluvescens</i>	X	X
Brown trout	<i>Salmo trutta</i>		X
Brook trout	<i>Salvelinus fontinalis</i>		X
Lake trout	<i>Salvelinus namayacush</i>	X	X
Lake whitefish	<i>Coregonus clupeaformis</i>	X	X
Cisco (lake herring)	<i>Coregonus artedii sp.</i>	X	X
Bloater	<i>Coregonus hoyi</i>		X
Blackfin cisco	<i>Coregonus nigripinnis sp.*</i>	X	X
Nipigon cisco	<i>Coregonus nipigon sp. *</i>	X	X
Shortjaw cisco	<i>Coregonus zenithicus</i>		X
Round whitefish	<i>Prosopium cylindraceum</i>	X	X
Rainbow smelt	<i>Osmerus mordax</i>		X
Northern pike	<i>Esox lucius</i>	X	X
Longnose sucker	<i>Catostomus catostomus</i>	X	X
White sucker	<i>Catostomus commersoni</i>	X	X
Silver redhorse	<i>Maxostoma anisurum</i>	X	X
Shorthead redhorse	<i>Maxostoma macrolepidotum</i>	X	X
Northern redbelly dace	<i>Phoxinus eos</i>		X
Finescale dace	<i>Phoxinus neogaeus</i>		X
Lake chub	<i>Couesius plumbeus</i>	X	X
Golden shiner	<i>Notemigonus crysoleucas</i>		X
Emerald shiner	<i>Notropis atherinoides</i>	X	X
River shiner	<i>Notropis blennioides</i>	X	
Blacknose shiner	<i>Notropis heterolepis</i>	X	X
Spottail shiner	<i>Notropis hudsonius</i>	X	X
Mimic shiner	<i>Notropis volucellus</i>	X	X
Fathead minnow	<i>Pimephales promelas</i>		X
Longnose dace	<i>Rhinichthys cataractae</i>	X	X
Pearl dace	<i>Margariscus margarita</i>		X
Black bullhead	<i>Ameiurus melas</i>		X
Burbot (ling)	<i>Lota lota</i>	X	X
Brook stickleback	<i>Culaea inconstans</i>	X	X
Ninespine stickleback	<i>Pungitius pungitius</i>	X	X
Trout-perch	<i>Percopsis omiscomaycus</i>	X	X
Smallmouth bass	<i>Micropterus dolomieu</i>	X	X
Yellow perch	<i>Perca flavescens</i>	X	X
Sauger	<i>Stizostedion canadense</i>	X	X
Walleye	<i>Stizostedion vitreum vitreum</i>	X	X
Iowa darter	<i>Etheostoma exile</i>	X	X
Johnny darter	<i>Etheostoma nigrum</i>	X	X
Logperch	<i>Percina caprodes</i>	X	X
Mottled sculpin	<i>Cottus bairdi</i>	X	X
Slimy sculpin	<i>Cottus cognatus</i>	X	X
Spoonhead sculpin	<i>Cottus ricei</i>	X	X
Deepwater sculpin	<i>Myoxocephalus thompsoni</i>		X

**TABLE 8: REPTILES AND AMPHIBIANS IN THE VICINITY OF THE LAKE NIPIGON CONSERVATION RESERVE**

COMMON NAME	SCIENTIFIC NAME	OBSERVED IN BASIN
Common Snapping Turtle*	<i>Chelydra serpentina</i>	No
Western Painted Turtle	<i>Chrysemys picta belli</i>	Yes
Eastern Garter Snake	<i>Thamnophis sirtalis</i>	Yes
Northern Redbelly Snake*	<i>Storeria occipitomaculata</i>	No
Eastern Newt	<i>Notophthalmus viridescens</i>	Yes
Blue Spotted/Jefferson Salamander complex	<i>Ambystoma laterale/A jeffersonianum</i>	Yes
Blue Spotted Salamander	<i>Ambystoma laterale</i>	Yes
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Yes
Yellow Spotted Salamander	<i>Ambystoma maculatum</i>	Yes
Redback Salamander*	<i>Plethodon cinereus</i>	No
American Toad	<i>Bufo americanus</i>	Yes
Northern Spring Peeper	<i>Pseudacris crucifer</i>	Yes
Boreal Chorus Frog	<i>Pseudacris maculata</i>	Yes
Mink Frog	<i>Rana septentrionalis</i>	Yes
Green Frog	<i>Rana clamitans</i>	Yes
Wood Frog	<i>Rana sylvatica</i>	Yes
Northern Leopard Frog	<i>Rana pipiens</i>	Yes

\* Occurrence of these species within the Lake Nipigon Conservation Reserve is questionable.

Mud River Outfitters, who portaged in from Lake Nipigon (Doug Townsend, pers. Comm., 2001 in Swainson, 2001). Angling for walleye and northern pike occurs in Bonner Lake. Some of the lakes on the Lake Nipigon islands also receive angling pressure.

#### Bait Fishery

Although there are at least five popular bait fish species occurring in Lake Nipigon, very little is known about these species or their habits in the lake (Swainson, 2001). There are 16 bait fish blocks that fall entirely or partially within the Lake Nipigon Conservation Reserve (#'s 501881, 494881, 498881, 501882, 494884, 494882, 494883, 501883, 502883, 502882, 498883, 497882, 502881, 493882, 496883, 498882). Harvest is

reported by block not by water body, so the amount of harvest from conservation reserve waters specifically is unknown.

#### Subsistence Fishery

The early Aboriginal inhabitants of the Lake Nipigon Basin relied on the Lake Nipigon fishery as a source of food. This tradition of subsistence fishing continues today by the First Nation people whose traditional lands include Lake Nipigon. Subsistence fishing includes a limited amount of angling and some gillnetting on a year round basis.

The level of subsistence harvest has not been quantified (Swainson, 2001).

### 6.5.2 FOREST AND MINERAL RESOURCE USE

With the designation of the Lake Nipigon Conservation Reserve as a protected area through the *Lands for Life* and *Ontario's Living Legacy* planning processes, forestry and mineral exploration are no longer permitted activities within the conservation reserve boundaries. Forest Reserves exist in English Bay, Chief Bay and Black Sturgeon Bay where active mining claims were staked prior to the designation of the conservation reserve. Mineral exploration is a permitted use in forest reserves. If these claims lapse, the land will be incorporated into the Lake Nipigon Conservation Reserve.

Logging has occurred in the past in the Lake Nipigon Conservation Reserve. Early operations concentrated on white pine and spruce saw logs and later on spruce pulpwood. The many river systems allowed early loggers to use river drives and booms on Lake Nipigon to transport the wood. A small number of logging operations took place on Shakespeare and Kelvin Islands in the 1940s and 50s.

### 6.5.3 WATER RESOURCE USE

#### Hydroelectric Power Generation

Between 1918 and 1950 four waterpower dams were constructed on the Nipigon River; the Virgin Falls Dam, Cameron Falls Dam, Alexander Dam and the Pine Portage Dam. The dams have resulted in a 17 cm increase in the level of Lake Nipigon. In addition, in 1943 the construction of the Ogoki Diversion on the Ogoki River raised the lake level by 35 cm and increased the flows by 50% in the Nipigon River. The total resulting increase in lake level is 62 cm. Varying water levels resulting from dam operations have had a significant negative impact on aquatic organisms, fish habitat and spawning activity in Lake Nipigon and especially in the Nipigon River.

In 1994, a long-term Nipigon River Water Management Strategy was developed after extensive planning and fieldwork. This strategy identified guidelines for addressing

water level needs for Lake Nipigon and Nipigon River fish and all users. From this strategy, an operating plan to guide the day to day dam operations has recently been developed. The plan provides tables with weekly recommended flows for any given Lake Nipigon level and inflow (Swainson, 2001c). The new operating plan will significantly improve water level conditions for fish in and for users of Lake Nipigon and the Nipigon River.

All three of the generating stations are operated by Ontario Power Generation (formerly Ontario Hydro). In 2000, the total value of the Nipigon River power production was \$86 million. The dams on the Nipigon River generate power for the Thunder Bay area and surrounding communities of the north shore. The Ogoki Diversion provides increased water flow through the Great Lakes system, thereby increasing the power resources of Southern Ontario and Quebec and improving levels of the Great Lakes for the benefit of Canada and the United States (HEPC, 1942 in Swainson, 2001c).

Another hydroelectric power dam is located on the Namewaminikan (Sturgeon) River. Although not situated within the Lake Nipigon Conservation Reserve, this facility has impacted the lake environment. It was constructed in 1992, creating a 7 km long reservoir. In 1993, the earthen dam was breached and tons of sediment was washed downstream and into Lake Nipigon (Swainson, 2001c). It has never operated due to financial and technical difficulties. The dam is currently in disrepair and will require substantial investment to make it operational. Communications between Nipigon District MNR and the Dam owner are underway to ensure the situation is rectified.

#### Drinking Water

Gull Bay, Rocky Bay, Macdiarmid, Sandpoint, Orient Bay and Poplar Point cottagers use Lake Nipigon as a source of drinking water. Gull Bay and Rocky Bay have water treatment facilities, although water quality has been degraded at times and boil water advisories have been issued. Residents of Macdiarmid,



Orient Bay and Poplar Point area take water directly from the lake and may use individual filtering systems or they use wells for their drinking water. There are no known direct sources of toxic chemicals entering into Lake Nipigon today. Nutrient loading and water contamination may be occurring from areas of human development.

#### 6.5.4 WILDLIFE RESOURCE USE

##### Wildlife Viewing

Wildlife resource use in the Lake Nipigon Conservation Reserve includes wildlife viewing, trapping and hunting. Wildlife viewing is increasing in popularity and is now often considered an integral and important part of any outdoor experience, be it an angling expedition or a sea kayaking trip. The opportunity to view wildlife in their natural surroundings is a thrill for any outdoor enthusiast. Due to its pristine and undeveloped nature, the Lake Nipigon Conservation Reserve provides abundant opportunity to view wildlife including species at risk such as woodland caribou, bald eagles and pelicans. Cruiser boat operators are seeing the value of maintaining abundant wildlife populations in the conservation reserve, as their clients are increasingly more interested in wildlife viewing as opposed to just angling and hunting.

##### Hunting

The Lake Nipigon Conservation Reserve falls within Wildlife Management Units (WMU) 15B, 19, 20 and 21A. The islands make up WMU 20, the south and west side of the conservation reserve fall into unit 15B and the east side of the conservation reserve falls into WMU 19 and 21A. There is no big game hunting season in WMU 20 (islands), however, small game hunting (grouse and snowshoe hare) is permitted.

Moose are the principal big game animal in the conservation reserve. Since the migration of moose to the Lake Nipigon area in the late 1800s, Aboriginals and European settlers have hunted them for subsistence purposes. In 1957, the Lake Nipigon Islands Crown Game

Reserve was established (Gollat, 1975). This status was retained until 1965 at which time the islands were opened for hunting. In 1970 hunting again became a non-permitted use. Geikie Island retained its game preserve status and is now called the Geikie Island Caribou Crown Game Preserve. Moose are heavily targeted during hunting season around the shores of Lake Nipigon and Aboriginals continue to hunt them for subsistence purposes throughout the conservation reserve.

White-tailed deer have become more abundant in the area south of Lake Nipigon due in part to the disturbances caused by forestry activities and the resulting availability of early successional habitat. Although there is currently no season for white-tailed deer in WMU 15B, potential exists for a deer hunt in this area.

Black bear has steadily increased in importance as a big game animal. Bear hunting is done primarily by non-residents using local bear outfitter services. There are currently four Bear Management Areas (BMA) that fall partially or wholly within the Lake Nipigon Conservation Reserve as identified in Table 10. Bear hunting is not permitted on the Lake Nipigon islands but does occur on the shore lands.

##### Trapping

Trapping is the oldest commercial industry in the Lake Nipigon Conservation Reserve. Trapping was not controlled until 1947 when the Department of Lands and Forests implemented a licensed trapping system with registered traplines. From 1957 to 1965 trapping was not permitted on the Lake Nipigon islands due to the establishment of the Lake Nipigon Islands Crown Game Preserve. As of the 1998 trapping season, the predominant species trapped were marten, beaver and weasel (Swainson and McNaughton, 2001). Other species include muskrat, otter, mink, lynx, fisher, wolf, red fox and red squirrel.

There are nineteen registered traplines that fall partially or wholly within the Lake

TABLE 9: LIMNOLOGICAL CHARACTERISTICS FOR LAKE NIPIGON

Source: Swainson, 2001

PARAMETER	LAKE NIGPIGON MEASUREMENTS
Surface Area (ha)	484,800
Catchment Area (ha)	2,465,000 or 2,934,8000
Maximum Depth (m)	166
Mean Depth (m)	Estimated 46
Water Renewal Time (yrs)	25.6
Lake perimeter (km)	1,044
Island Perimeter (km)	1,000
Oxygen (mg/l)	8.6 – 13.2
pH	6.4 – 8.2
Alkalinity (mg/l)	30.8 – 68.4
Transparency Open Lake (m) secchi disk	4.0 – 5.5
Transparency Ombabika Bay (m) secchi disk	1.5
Chlorophyll a (ug.L)	2.4
Nitrate mg/l	.016 (range .007 - .075)
Total phosphorus	.056 (range .01 - .10)
Total Dissolved Solids (mg/l)	79 – 83
Mean monthly epilimnetic temperature June - Aug. 1989-1992 (celcius)	13

TABLE 10: BEAR MANAGEMENT AREAS IN LAKE NIPIGON CONSERVATION RESERVE

OUTFITTER NAME	BMA LICENCE NUMBER	APPROXIMATE LOCATION
Royal Windsor Lodge	NG 21A-06	Pijitawabik Bay
Royal Windsor Lodge	NG 15B-32	Bonner Island
W.F.O. Bear Hunt Inc.	NG 15B-43	South Shore Lake Nipigon
Wolf River Bear Baits	NG-15B-31	South Shore Lake Nipigon

Nipigon Conservation Reserve (NG10, NG11, NG14, NG19, NG 20, NG21, NG23, NG27, NG28, NG29, NG35, NG50, NG62, NG71, NG73, NG74, NG82, NG86, NG93).

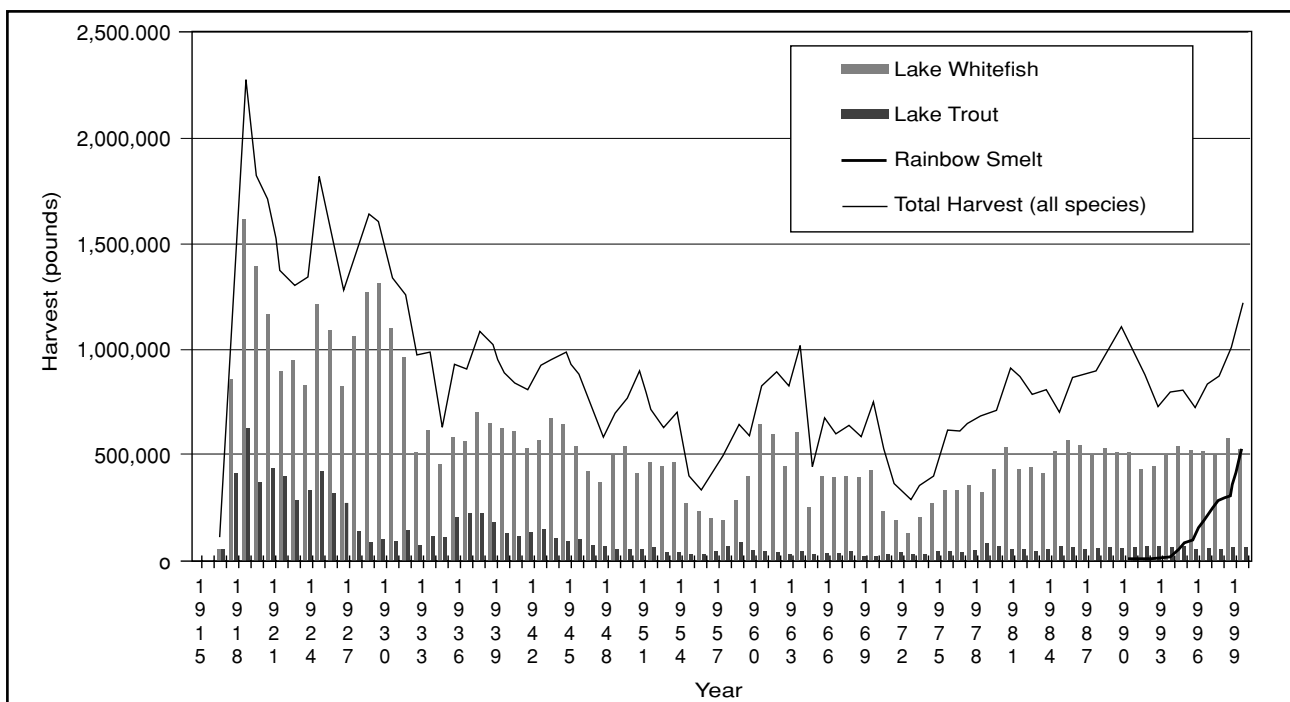
### 6.5.5 TOURISM AND OUTDOOR RECREATION

The Lake Nipigon Conservation Reserve abounds with opportunities for outdoor recreation including camping, boating, canoeing, sea kayaking, wildlife viewing, hiking, angling and hunting. The fact that the conservation reserve is basically undeveloped and the natural environment is in a near pristine condition means optimal experiences for tourists and recreationists.

There are seven cruiser boat operators who offer extended trips on Lake Nipigon, providing accommodation and services. Although the majority of their clientele are anglers, these operators also cater to hunters in the fall and family groups looking for a quality outdoor recreation experience. Some of the cruiser operators also own tourist establishments in Orient Bay outside the boundaries of the conservation reserve. Others simply operate their cruiser service from a docking facility (High Hill Harbour, Sandy's Dock). There are about 25 to 30 charter boat operators who mainly cater to anglers, providing half-day and day-long

**FIGURE 3: REPORTED COMMERCIAL HARVEST, Lake Nipigon (1917 – 2000)**

Source: Swainson, 2001



fishing excursions. These charter boat operators work out of High Hill Harbour or Poplar Lodge Campground.

Lake Nipigon provides many opportunities for backcountry camping, boating and sea kayaking. There are approximately 40 Crown land campsites that exist in the conservation reserve on the islands and shoreline of Lake Nipigon. There is no organized campground within the conservation reserve, but the Poplar Lodge Campground in the Lake Nipigon-Beardmore Enhanced Management Area serves as a staging area for boaters, sea kayakers and canoeists who are heading into the Lake Nipigon Conservation Reserve to recreate.

Canoeing on the open waters of Lake Nipigon is a challenge, however, there is opportunity for canoeing in the Castle Lake area. Also many of the rivers flowing into Lake Nipigon are popular amongst canoeists (Gull River, Kopka River, Pikitigushi River, Onaman River, Whitesand River, Namewaminikan River).

There are no cottage subdivisions within the boundaries of the conservation reserve, however, cottage lot owners in the Lake Nipigon-Beardmore Enhanced Management Area recreate in the conservation reserve. Two private recreation camps exist, one held under land use permit on Albert Island and one held under Licence of Occupation on Davis Island.

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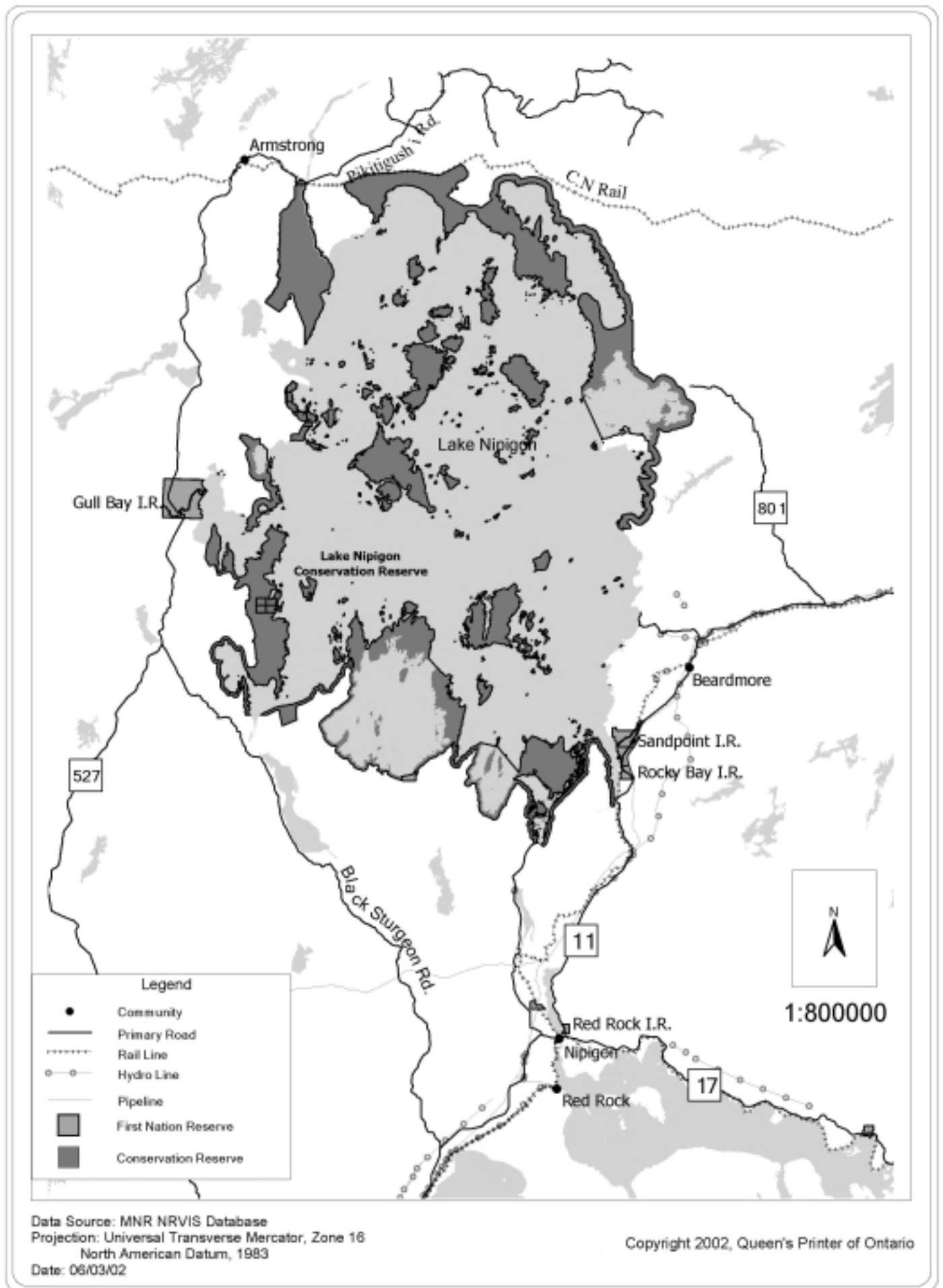
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**INSERT FIGURE 4**  
BOUNDARY MAP FOR LAKE NIPIGON CONSERVATION RESERVE

**FIGURE 5: REGIONAL SETTING MAP FOR LAKE NIPIGON CONSERVATION RESERVE**



Data Source: MNR NRVIS Database  
 Projection: Universal Transverse Mercator, Zone 16  
 North American Datum, 1983  
 Date: 06/03/02

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**INSERT FIGURE 6**  
RESOURCE MANAGEMENT MAP FOR LAKE NIPIGON CONSERVATION RESERVE

