Ontario

St. Raphael Signature Site

Background Document

January 2004

Printed in Ontario, Canada

On trouvera le résumé du présent document au site Web du ministère des Richesses naturelles, à http://www.mnr.gov.on.ca/MRN/index.html

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Printed on recycled paper.

51825
(800 P.R. 12 01 04)
ISBN 0-7794-5515-0

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Summary of Background Information

The St. Raphael Signature Site is a 153,000 hectare area of remote boreal forest and lakes in northwestern Ontario's Sunset Country. This special area encompasses one of Ontario's newest provincial parks and a surrounding enhanced management area; a new land use designation under *Ontario's Living Legacy Land Use Strategy* (1999). The components of the signature site are: St. Raphael Provincial Park (P2287) and the Miniss Enhanced Management Area (EMA) (E2283a) (Figure 1).

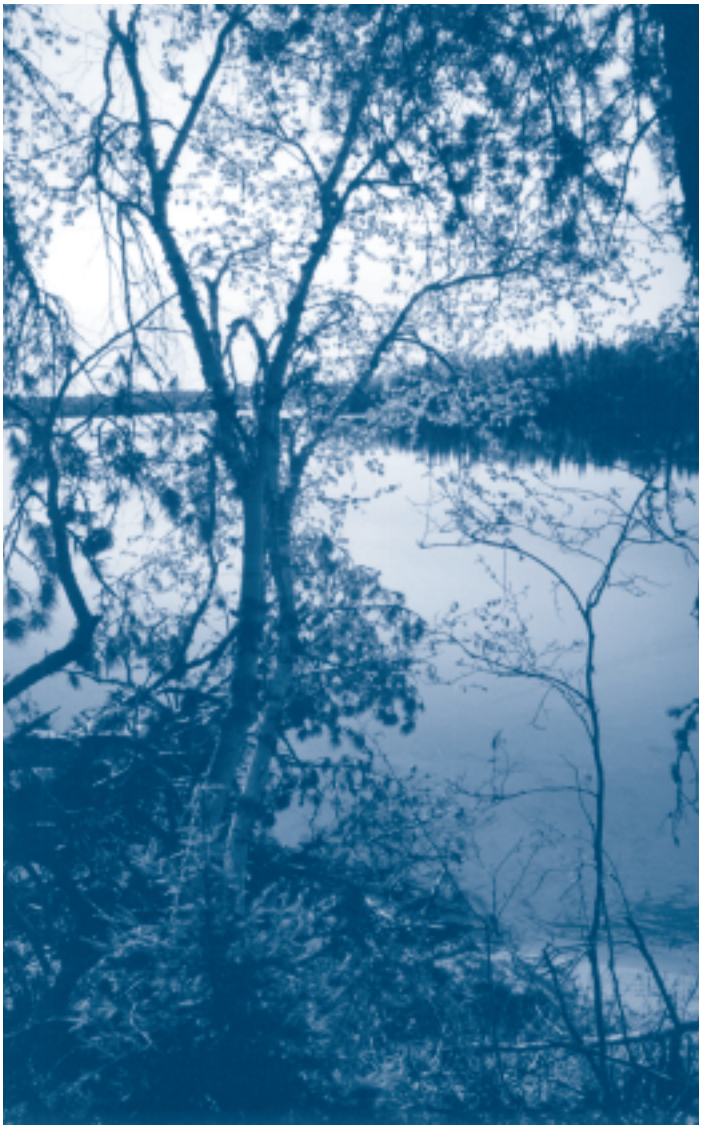
Visitors to St. Raphael come to enjoy the world class fisheries, pristine waters and wilderness experience. There is potential to expand backcountry recreation and eco-tourism opportunities in the signature site, drawing on the areas circular canoe routes and waterway connections to the major river systems of Lake St. Joseph and the Albany River. A thriving remote tourism industry exists in the signature site based on fishing, and to a lesser extent, hunting, mushroom gathering, wildlife viewing and other water and land based pursuits. The development and enhancement of this industry will continue to be encouraged. The Miniss EMA is a significant component of the Caribou Forest Sustainable Forest License (SFL) held by Bowater Canadian Forest Products Incorporated and contributes to the wood supply of several regional forest product facilities. The Miniss EMA may also contain areas for potential mineral exploration and development.

St. Raphael supports several significant wildlife, vegetation and landscape features that are rare and representative of the region. St. Raphael Provincial Park and portions of the Miniss EMA contain important winter habitat and calving sites for woodland caribou (*Rangifer tarandus*). Woodland caribou are a threatened species in Ontario and provisions, such as habitat guidelines, have been prepared to protect this species. The signature site also provides nesting grounds for species such as sandhill cranes (*Grus Canadensis*), bald eagles (*Haliaeetus leucocephalus*), herons (*Ardea herodias*) and osprey (*Pandion haliaetus*). Sandhill cranes are a regionally rare nesting bird species and nesting sites are difficult to find. The site also contains four provincially rare and ten regionally rare plant species. The river darter (*Percina shumardi*), found in Churchill Lake is considered a provincially rare fish species. Four significant dragonfly and damselfly species have also been observed in St. Raphael. St. Raphael protects valuable ecological communities, such as old-growth red pine (*Pinus resinosa*) stands and an extensive bog complex. Red pine is found at the northern extent of its range in the signature site.

The signature site displays post-glacial features that are characteristic of northwestern Ontario. The bedrock geology contributes significantly to the geological conservation targets of Ontario Parks in that St. Raphael represents the regional structural-tectonic boundaries of three geological sub-provinces of the Superior Province of the Canadian Shield. The Miniss River Fault and Churchill Batholith are provincially significant geological features in the signature site in both their display and extent. The geomorphology displayed in the area is common across the province, with beaded eskers, esker-kames, and drumlin fields being widespread across the site. The display of fluted till moraine in parts of St. Raphael is regionally significant (Frey and Duba, 2002).

A signature site strategy is being prepared for the signature site that will guide the protection and management of resources, visitor use and economic opportunities within this area. This strategy will encompass the vision and objectives for the site, developed with public consultation at each stage. This strategy will guide management decisions and operations in both land-use designations and will ensure sustainable and equitable management of featured resources at the site well into the future. The vision statement for the St. Raphael Signature Site is as follows:

"To preserve and protect the remote character and unique values of the St. Raphael Signature Site while sustaining and balancing traditional, economic and recreational activities and opportunities."



1.0 Introduction

1.1 A Strategy for St. Raphael Signature Site

The St. Raphael Signature Site is one of nine "featured areas" identified within *Ontario's Living Legacy – Land Use Strategy* (1999) (OLL LUS). Signature sites were identified to demonstrate the range of natural and recreational values, and related management issues and approaches that are dealt with in the Land Use Strategy.

The Land Use Strategy assigned lands within the St. Raphael Signature Site to two land use categories; St. Raphael Provincial Park and the Miniss Enhanced Management Area. For each of these designated areas, the strategy provided a description highlighting the values that resulted in the identification of the area and the land use intent and key management direction for these values. Additional operational and development guidelines are normally provided through subsequent resource management or operational planning.

With respect to the St. Raphael Signature Site, there is a need to ensure a sustainable balance between the use and protection of the values identified in the two designated areas. A St. Raphael Signature Site Strategy will be developed to further define permitted uses and coordinate land use intent and policy direction for the two land-use designations. This signature site strategy will include sufficient information to support sound management decisions, and set the overall management direction for the signature site.

Specific actions required for implementing the signature site strategy will be provided by resource management plans prepared for each area. A park management plan and an enhanced management area plan will be prepared as stand alone documents during this same planning process. The St. Raphael Signature Site Strategy will build on direction established in *Ontario's Living Legacy Land Use Strategy* (1999) and the *Ontario Forest Accord* (1999).

The Ministry of Natural Resources (MNR) began the preparation of the signature site strategy in January of 2003, with the establishment of a planning team and development of the *Terms of Reference* for the project. In February 2003, an *Invitation to Participate* was issued to the public, stakeholders and interest groups. Since that time the project team, assisted by an advisory committee of local interest groups, has been researching and compiling information on the St. Raphael Signature Site. This background document provides a summary of the information that has been gathered to date.

Next steps include the development of issues and management options, a preliminary signature site strategy, and a final strategy with comprehensive public consultation at each stage. As policies and direction for the strategy are developed, they will be directly incorporated into the development of options and the preliminary and final plans for St. Raphael Provincial Park and the Miniss EMA. The result will be a comprehensive strategy for the entire signature site, a detailed park plan for St. Raphael Provincial Park, and a detailed resource management plan for the Miniss EMA.

Essential to this process is the establishment of a clear and concise vision for the signature site. The vision statement developed by the St. Raphael Advisory Committee is:

"To preserve and protect the remote character and unique values of the St. Raphael Signature Site while sustaining and balancing traditional, economic and recreational activities and opportunities."

Table 1: Steps in the Planning Process

Steps	Products
1. Terms of Reference	Approved Terms of Reference
2. Invitation to Participate	None
3. Background Information	Background Information Document
4. Issues and Management Options	Issues and Management Options Document
5. Preliminary Signature Site Strategy	Preliminary Strategy
6. Approved Signature Site Strategy	Approved Signature Site Strategy
7. Preliminary Park and EMA Plans	Preliminary Park and EMA Plans
8. Approved Park and EMA Plans	Approved Park and EMA Plans
9. Implementation	None

1.2 Land Use Designations

St. Raphael Provincial Park

St. Raphael Provincial Park, a 90,521-hectare waterway class park (P2287) includes the lower portions of the St. Raphael River, De Lesseps River and the Miniss River systems as they meet to flow into Lake St. Joseph. Minchin Lake, on the eastern side of the signature site, is part of a fourth river system, the Pashkokogan River.

An Interim Management Statement has been approved for St. Raphael Provincial Park which will guide management of the park until a park management plan is completed.

Miniss Enhanced Management Area

The Miniss EMA is a 62,705-hectare remote access category EMA surrounded by, and adjacent to, St. Raphael Provincial Park. The intent of this EMA, which lies within the Caribou Forest, is to carry out forest management activities in a manner that will recognize tourism activities and backcountry recreational activities that are consistent with policy.

2.0 Regional Context

2.1 Overview

The St. Raphael Signature Site is located approximately 430 kilometres northwest of Thunder Bay and 150 kilometres northeast of the town of Sioux Lookout between Wabakimi Provincial Park to the east and Woodland Caribou to the west (Figure 1). It encompasses the drainage systems of three rivers, the St. Raphael River, Miniss River and De Lesseps River. These three rivers merge into Miniss Bay just before emptying into Lake St. Joseph, a natural lake that serves as storage for the Lake of the Woods Drainage Basin.

The St. Raphael Signature Site is located entirely within the Ministry of Natural Resources Sioux Lookout Administrative District.

2.2 Local Communities

The closest communities to the signature site are the First Nation communities of Ojibway Nation of the Saugeen to the south, and Mishkeegogamang First Nation to the north, along Highway 599. A small group of Mishkeegogamang First Nation members live along Highway 599. Other regional centres within close proximity to the site are the Town of Pickle Lake, the community of Savant Lake, and the Municipality of Sioux Lookout.

The Mishkeegogamang First Nation is found 20 kilometres north of the signature site on Lake St. Joseph. This community, with a population of approximately 900, has a small store, gas station and a nursing station. Members of the Mishkeegogamang First Nation have a long history in the area of the signature site, and several families have traplines and hunting grounds within its boundaries.

The Ojibway Nation of the Saugeen, located 40 kilometres southeast of the site along Highway 599, is a smaller community with a population of approximately 150, and limited services. Members of this First Nation also use the signature site for hunting and trapping purposes.

A small group of 32 members of Mishkeegogamang First Nation live along Highway 599 between Mile 29 and 50. Native habitations are found both within and adjacent to the boundaries of the signature site. This group maintains strong ties to the land base.

Pickle Lake was established as a gold mining town in the 1920s. With a current population of 500, the community is serviced by air and Highway 599. It is a transport supply centre to some 20,000 people living in remote communities to the north. A number of tourist operators offer fly-in and canoe adventure packages. Pickle Lake is a full-service community, supplying goods, gas and transport services to the signature site.

Savant Lake is a small community of approximately 100 residents located along the CNR line at Highway 599. The community provides gasoline and food sales, a hotel and several tourism establishments offering fly-in services to remote lakes in the area.

Sioux Lookout grew from a railway construction camp in the early 1900s to become the Municipality of Sioux Lookout, with a population of over 5,000. Sioux Lookout is the areas largest community and offers full retail, transportation, government, and medical services. Air service is provided from both water bases and from one of the busiest airports in northwestern Ontario.

Local communities around the signature site are home to many First Nations families and descendents of Scandinavian and European settlers. Many of these families maintain their cultural and traditional ties to the natural environment around them and enjoy outdoor pursuits.

2.3 Access and Transportation to the Site

The St. Raphael Signature Site is easily accessed by both air and road networks. It is roughly a three hour drive northwest of Thunder Bay on Highway 17 to Ignace and one-and-a-half hours north on Highway 599. You can also reach the site from the west, flying into or driving to Sioux Lookout, then traveling by vehicle approximately one hour east on Highway 516 to Highway 599 near Savant Lake. At Highway 599 you drive north for another hour to reach the site. From Pickle Lake in the north, the signature site can be reached by highway travel south on Highway 599 for one hour.

The most common form of travel to remote areas within the signature site is by floatplane operated by local tourism operators. Due to the extensive water cover there are few places in the signature site that cannot be reached by plane.

There are a limited number of logging roads approaching the exterior edge of the site. In a forestry management block to the northwest of the site, older logging roads approach the edge of the provincial park boundary. To the south of the site in the vicinity of Lawson Lake there are newer logging roads, but these roads have been posted under the Public Lands Act preventing their use for the purpose of accessing the provincial park.

2.4 First Nation Communities

Although the signature site appears to fall within the watershed boundary of the Nishnawbe-Aski Nation (Treaty #9), Aboriginal activities within the signature site involve both Nishnawbe-Aski and Treaty #3 peoples. The Osnaburg Band (now Mishkeegogamang First Nation) was the first to sign Treaty # 9 in 1905 and have a reserve set aside for them at Rat Rapids off Lake St. Joseph in 1907. Some members of the Mishkeegogamang First Nation can be found residing off the reserve in areas traditionally used for trapping and hunting as far south as Lac Seul, and as far north as the Albany River. Several trap-lines are located within the northern portion of the signature site, as are traditional hunting and fishing grounds. Many families also make their homes in the larger communities of Pickle Lake, Savant Lake and Sioux Lookout.

The Ojibway Nation of the Saugeen was enacted in 1915 with the Province of Ontario. Reserve lands were set aside for this group in 1997 (Department of Indian Affairs, 2003). Prior to the establishment of the reserve, many families resided in the community of Savant Lake along Highway 599. Some families still reside in this area. Members of the Ojibway Nation of the Saugeen maintain trap-lines and hunt and fish in the southern portion of the signature site.

3.0 Planning Area

3.1 Access inside the Signature Site

The limited access inside St. Raphael has played a key role in maintaining the areas pristine natural beauty and remoteness. Entry into the site is currently limited to a boat launch, a winter road, unregulated snowmobile trails, air transport and canoe. Several active canoe routes make use of parts of the park waterways and access the park from several different locations. Canoe routes are described in a later section (Section 6.4 – page 26).

There are two small unofficial boat launch locations at Minchin Lake, located along Highway 599 on the eastern boundary of the park. Boats launched at Minchin Lake must then travel over two short portages to reach De Lesseps Lake before connecting to the sites circular water routes. South of Minchin Lake, an old winter road running from Highway 599 to Guardian Eagle Resort on De Lesseps Lake is used occasionally for transport of winter supplies for outpost camps in the area and does provide an access point for recreational snowmobiling. This road is impassable to most vehicles when not in frozen condition.

Boat access to the signature site can also be achieved from the small landing on Pashkokogan Lake at Highway 599. Boats can then travel into Medcalf Lake to access the park as it abuts the southern shore of Medcalf Lake. A steep portage then connects Medcalf Lake to Miniss Lake and the interior of the signature site. Boats can also access the site from Lake St. Joseph at Miniss Bay.

Several unregulated snowmobile trails enter the signature site from various locations, used by trappers, baitfishermen and recreational users. These trails are also occasionally used in the summer months by all-terrain vehicles and canoeists, dependant on conditions and water levels. In the southern portion of the signature site, trails exist between Armit Lake and Lawson Lake, and newer trails exist south off Lawson Lake creating links to forest access roads in the area known as the Normandy Block. As a condition of the Caribou Forest Management Plan, roads approaching the park in the Normandy Block have been posted under the Public Lands Act prohibiting their use to access the park.

Along the northwestern boundaries of the signature site, trails have been established off of Race Lake Road and other logging roads in the Lac Seul Forest accessing Churchill Lake. Access points identified in this area are adjacent to Dunn Lake and the southern tip of Churchill Lake. Access has also been established in the northern portion of the signature site from the Trist Block; a winter cut block. Trails found here are in poor condition, but are used in the winter and in the summer months when water levels permit.

An historic freight trail once ran through the signature site to Central Patricia Mine at Pickle Lake. This trail was originally established to house horses used to transport supplies to the mine, and was later upgraded to house freight trains and tractors. The trail can still be observed in some areas, but is mostly over grown and has not been active since Highway 599 was built in the early 1950s. Remnant freight trains and tractors are scattered adjacent to where this trail once stood.

Entry to the Miniss EMA for forest management purposes required that road corridors be established through St. Raphael Provincial Park. Options were evaluated by the Ontario Forest Accord Advisory Board, which determined that two crossings identified within the 2002-2022 Forest Management Plan met the intent of the Ontario Forest Accord Article 20. The St. Raphael Park Management Plan will recognize these two crossings, when written. Any additional crossings would have to be consistent with the overall intent of the signature site strategy, and would be planned through the forest management planning process and may require amendments to the park management plan (Terms of Reference, 2003).

3.2 Land Tenure, Existing Land Use and Development

Remote tourism is a significant activity in the St. Raphael Signature Site, attracting over 3,000 visitors a year.

Existing development within the St. Raphael Signature Site is limited to facilities and structures related to outdoor recreation, tourism operations, trap cabins, and First Nation habitations (Figure 2). There are no MNR facilities located in the signature site.

The Miniss EMA is located in the Caribou Forest and is part of the SFL held by Bowater Forest Products. The park area has been removed from the licenses of both the Caribou Forest and Lac Seul Forest. There are no active mining claims in the St. Raphael Signature Site, and mineral exploration is not permitted in St. Raphael Provincial Park.

Current land use activities in the signature site include traditional First Nation resource harvesting, trapping, hunting, angling, remote commercial tourism, and general public recreation. There are several trappers cabins associated with 11 traplines, either completely or partially in the signature site, 12 Bear Management Areas (BMAs), and 17 baitfish blocks.

There are ten commercial tourism facilities in operation within the boundaries of the signature site. These tourism facilities are located on Little Miniss Lake, Miniss Lake, Arc Lake, Taper Lake, De Lesseps Lake, Hooker Lake, Churchhill Lake and St. Raphael Lake. The main base lodge found on Hooker Lake is located on a patent parcel of land and is excluded from the provincial park, although it utilizes park land for its activities. Eight of the nine remaining commercial tourism facilities are established under Land Use Permits (LUPs) and are characterized as outpost camps. One main base lodge on De Lesseps Lake is operated under a Crown Land Lease and holds a LUP to operate a small airstrip to serve its guests. Four commercial boat caches also exist within the signature site. These boat caches are located on Ghost Lake, Spirit Lake, St. Raphael Lake and Dawson Lake. All existing tourism operations in the signature site are permitted to continue as outlined in the policy direction of the OLL LUS. Several informal campsites, portages, shore lunch areas, and picnic sites are documented throughout the signature site. These areas vary in the level of associated development and maintenance, from simple campfire rings to established picnic tables and fire pits.

4.0 Inventory and Evaluation of Natural and Cultural Resources

4.1 Climate

The St. Raphael Signature Site has a modified continental climate with long, cold dry winters and short warm summers. Because of its location in the northwestern part of the province, St. Raphael is influenced by Polar Continental air masses (as is the rest of the province), and also by the warmer Continental air masses originating in the foothill and prairies regions to the west. The drier prairie air masses have their greatest influence in the summer resulting in decreased precipitation.

The daily mean temperature for January from 1971 to 2000 in Sioux Lookout was –18.6 degrees Celsius, with a temperature minimum of -45 degrees. In July the daily mean temperature is 18.6 degrees Celsius, with a maximum temperature of 36 degrees. Snowfall in this area is heaviest in January, at a mean of 34 centimetres, although maximum snow depth is not reached until February with an average depth of 52 centimetres. Rainfall is heaviest from June through to September, with an average of up to 97.2 millimetres per month. Thunderstorm activity is heaviest in July, which is an important indicator of forest fire activity caused by lightning strikes (Environment Canada, 2000).

In nearby Pickle Lake, the growing season is considerably shorter with only 100 frost-free days extending from June 15 to September 15, although this is compensated by the longer days during the summer. Generally, the various climatic factors in the study area combine to produce a summer period that, while short, is well suited to water based recreational activities, and a dependable, although harsh, winter climate for snow based activities.

4.2 Bedrock Geology

The entire St. Raphael Signature Site lies within the Canadian Shield, an extensive rolling bedrock dominated plain consisting predominately of Precambrian crystalline igneous and metamorphic rocks with minor occurrences of sedimentary rocks. The Canadian Shield is further divided up into a number of provinces and sub-provinces on the basis of overall differences in internal structure and folding styles (Stockwell in MNR, 1987). The bedrock geology of the St. Raphael Signature Site is within the Superior Province of the Precambrian Canadian Shield and straddles the mutual boundary of three of its structural-tectonic subdivisions: the English River, Wabigoon and Uchi sub-provinces (Figure 3) (Frey and Duba, 2002).

The Lake St. Joseph Fault boundary between the Uchi and the English River sub-provinces is considered regionally significant. This area may contain the rare element potential of possible pegmatites in the Trist Lake stock. Rare element pegmatites may host several economic commodities, such as tantalum, lithium and cesium (Frey and Duba, 2002). One tourmaline occurrence has been documented on Dawson Lake, and several exposures of white granite and pegmatites along Churchill and Miniss Lakes suggest an interest in lithium prospecting in the area during the 1950s (Frey and Duba, 2002). The Churchill Lake batholith is considered provincially significant in its extensive exposure of peraluminous granite and the regional intrusive relationship of the granite, postdating granulite grade metamorphism. The representation of major intrusive rock types on the English River sub-province is considered regionally significant (Frey and Duba, 2002).

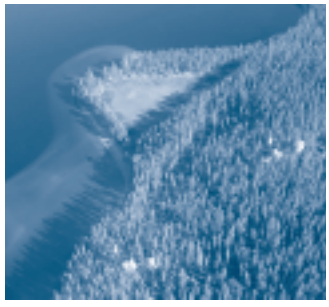
The Miniss River Fault is located within the Wabigoon sub-province and divides the signature site in half from Medcalf Lake to Hooker Lake. This fault has a horizontal displacement of approximately 10 kilometres, and forms a zone of mylonitic to cataclastic rock up to four kilometres wide. The fault is considered provincially significant due to its extent and accessibility (Breaks et al., 1979; Blackburn et al., 1991). Kimberlites, lamproites and host lamrophyres, alkali basalts and alpine type peridotites are mantle derived igneous rocks that are often associated with diamonds, a high-pressure form of carbon. Linear trends, such as those displayed by the Miniss River Fault and the Gravel River Fault farther south, are related to major crustal fractures and have significant potential for hosting kimberlite and diamond deposits. These occurrences may be found within a corridor extending 60 kilometres on both sides of such fractures (Thurston and Newsome, 2002). The Miniss River Fault extends southward to Sioux Lookout and meets with the St. Joseph Fault in the northern extremity of the signature site. Because of its extent and the possibility of deposits occurring within a 60 kilometre radius of this geological fracture, the signature site encompasses just a fraction of the area of interest for diamond exploration. However, its potential for future economic development and exploration activity in association with this special feature must be given consideration during signature site planning.

The bedrock geology of the St. Raphael Signature Site contributes to the geological conservation objectives of Ontario Parks with its representation of regional structural-tectonic boundaries and its inclusion of important elements of three geological sub-provinces and significant fault lines within the Superior Province of the Canadian Precambrian Shield (Frey and Duba, 2002).

4.3 Surficial Geology

The surficial geology of the signature site has been shaped by a pattern of repetitive glaciation over the last 2 million years or so. Several broad esker-kame complexes were deposited by the Rainy Lobe ice sheet when it receded. These features are evident as long mounded hills running linearly within the signature site. These complexes were further modified by shoreline processes in glacial Lake Aggasiz. The most prominent esker segments form straight to sinuous ridges adjacent to Churchill Lake, the St. Raphael River, St. Raphael Lake, Arc Lake, Vincent Lake, Hooker Lake and De Lesseps Lake. Eskers within the park display a wide range of sizes and morphologies, including simple singular ridges, compound ridges (two or more parallel ridges), bifurcated or "birdsfoot" ridges, and beaded forms (Figure 4) (Cowell, 2000).

The Rainy Lobe continental icesheet left a ground moraine of thin sandy till with abundant cobbles and boulders. In the area between northeastern De Lesseps Lake and Medcalf Lake; a fluted till plain occurs with a strong southwestern trend. Whalebacks and bedrock striae also provide indicators of past ice movement (Frey and Duba, 2002).



Within the boundaries of the provincial park there is an excellent example of a double tombolo trending from the northeast corner of Medcalf Lake to the northeast arm of Miniss Lake. In this instance of modern lacustrine processes, two spits grew from the shore of Medcalf Lake extending to an esker "bead" lying just offshore to form a double tombolo. A shallow graminoid marsh has formed in the wet basin behind the two tombolos and the esker bead (Cowell, 2000).

4.4 Topography

The topography of the St. Raphael Signature Site is generally low; however, occasional cliffs rise to 60 metres above segments of some lakeshores. The elevation in the signature site ranges from ~374 metres above sea level (a.s.l.) on Lake St. Joseph, to 491 metres (a.s.l.) in the uplands between the northeast arm of Hooker Lake and the northern part of Lawson Lake (Frey and Duba, 2002). The topography of the western part of northwestern Ontario, with the exception of the largest end moraine systems, is dominated by an eroded bedrock surface generally displaying weakly to moderately broken relief with abundant large and small lakes. The signature site is relatively flat, with occasional hills and depressions. These subtle changes in topography correspond largely to the eroded terraces of eskers and drumlinoid ridges left from the last glaciation. In general, these slight rises in elevation are limited to those areas within the enhanced management area, and between the courses of the larger waterways within the park.

4.5 Watershed and Drainage

The St. Raphael Signature Site captures many of the lakes connected with the St. Raphael River and the Miniss River, as well as one lake connected to the Pashkokogan River. The lakes and rivers of the signature site all form part of the Albany Watershed and the Upper Albany River tertiary waterway. There are over 400 permanent water bodies in the signature site and some 2,500 kilometres of shoreline.

The headwaters of the St. Raphael River are found in the small lakes and streams in the southwest portion of the site at an elevation of 390 metres. From here, the river flows through St. Raphael Lake, into Churchill Lake along the western side of the signature site and then terminates in Miniss Bay, part of Lake St. Joseph.

The headwaters of the Miniss River originate in Hill Lake just outside the signature site in the southeast at an elevation of 396 metres. From there the Miniss River flows southwest into Armit Lake and into the signature site at Lawson Lake, a long narrow lake running northeast following the Miniss River fault. However, the Miniss River itself flows west and then north through Yam, Peg, Vincent, Hooker and Arc lakes before finally entering Miniss Lake at an elevation of 378 metres. Here the Miniss River meets the De Lesseps River and De Lesseps Lake, another linear lake encompassed by the Miniss River fault.

The Pashkokogan River flows out of the signature site from Minchin Lake in the northeastern edge of the site, and through to Hamilton and Pashkokogan lakes connecting to the Albany River at Osnaburgh Lake.

The meeting of the three sub-provinces: Uchi, Wabigoon and the English River shape the direction of waterflow in the signature site. The results are watersheds that are intertwined, creating circular canoe routes and interconnecting portages leading north to Lake St. Joseph and the Cat River system and east to the Albany River. Connections are also made in the southwest through the Marchington River to Sioux Lookout and Lac Seul in the southeast, connecting to the waterways of Wabakimi Provincial Park.

As with many areas in northern Ontario, the waters tend to have a slight tannin stain that gives the water a yellow-brown tinge (tannin is a naturally occurring dark substance found in organic matter). All lakes drain north toward Lake St. Joseph and the Albany River. The major lakes found in the St. Raphael Signature Site include Churchill, Cutcliffe, De Lesseps, Hooker, Lawson, Minchin, Miniss, Peg, St. Raphael, and Vincent.

4.6 Vegetation Communities

Forests

Black spruce (*Picea mariana*) and jack pine (*Pinus banksiana Lambert*) conifer, and conifer dominated mixed-wood stands comprise up to 70 per cent of the forest cover of the signature site (Figure 5). These stands are typically uniform, even-aged stands, with the predominant age of 70 to 100 years old (Harris and Foster, 2002). There are, however, significant areas of stands between 100 and 140 years of age. These older stands may trend toward a range in forest structure and age, as well as species diversity through natural successional processes (Caribou Forest, 2002 FMP).

Low shrubs, such as labrador tea (*Ledum groenlandicum Oeder*), mountain cranberry (*Vaccinium vitis-idaea*) and other ericaceous species are common, along with occasional green alder (*Alnus viridis*). Common herb species include bunchberry (*Cornus canadensis*), dwarf rattlesnake plantain (*Goodyera repens*) and stemless ladyslipper (*Cypripedium acaule Aiton*). A dense feathermoss carpet (of *Pleurozium schreberi*, *Hylocomium splendens* and *Ptilium crista-castrensis*), often up to 20 centimetres thick, insulates the soil maintaining its cold temperature, and limiting the availability of soil nutrients to some vascular plant species. This limiting factor accounts for the lower plant diversity commonly found at the site (Harris and Foster, 2002).

Hardwood and hardwood dominated mixed-wood forests make up less than 10 per cent of the signature site and are limited to richer, mesic sites found along the river banks, lakeshores and till uplands, such as those found on eskers and drumlinoid hills. Stands dominated by trembling aspen (*Populus tremuloides Michaux*) occupy the crests of eskers and drumlinoid hills, while mixed forests of trembling aspen, white birch (*Betula papyrifera*), white spruce (*Picea glauca*) and balsam fir (*Abies balsamea*) can be found in the valleys along the rivers and other low lying areas with warmer than average temperatures. Forests found on river floodplains, such as those found at the mouth of the Miniss River exhibit the greatest species diversity and contain many species at the northern limit of their range.

Jack pine and trembling aspen stands associated with the sandy soils found on eskers and outwash areas make up less than one per cent of the forest composition of the signature site. A few sporadic patches of balsam poplar (*Populus balsamifera*) can be found along the moist silty lakeshores around Lawson Lake and Yam Lake (Harris and Foster, 2002).

Sites dominated by shallow soils and rocky outcrops comprise up to seven per cent of the signature site and are dominated by jack pine and black spruce, with reindeer lichens (*Cladina spp.*) and ericaceous shrubs in the lower structural layer. These species poor sites often constitute winter habitat for woodland caribou. In shady areas of these forest types, a feathermoss carpet is often present.

Peatland forests of intermediate to poor black spruce swamps with a sphagnum (*Sphagnum capillifolium*) carpet make up to 14 per cent of the signature site, and usually contain deep peat layers of over 50 centimetres or 25 to 50 centimetres over sand or sandy loam soil. Tamarack (*Larix laricina)* is sometimes a dominant tree species, with labrador tea and speckled alder (*Alnus incana*) being observed as shrub species. A black ash (*Fraxinus nigra Marshall)* swamp is found in one area of the site, and cedar (*Thuja occidentalis L.*) swamps can be found in limited areas where there is ground water seepage (Harris and Foster, 2002).

There are five red pine stands on Hooker Lake. These forest communities are found at the northern extent of their range globally, and are the only known old growth red pine stands in Eco-region 3S (Simpson, 1996). Scattered individual red pine and a small stand also exist in the Miniss Lake area. The Hooker Lake red pine stand on the north shore was identified as an Area of Natural and Scientific Interest (ANSI) at a provincially significant level in the Life Sciences category before its inclusion in the provincial park. This site was chosen due to its representation of old-growth red pine growing on a glacio-fluvial sand and gravel esker. Some of the individual trees in the Hooker Lake stand reach a metre in diameter and are over 300 years old (Noble, 1998). The stand appears to have had minor logging activity and fire activity in the early 1900s as indicated by the stumps and fire scars. Regeneration of red pine and balsam fir was observed during field studies and velvet-leaved blueberry, wild lily-of-the-valley (*Maianthemum canadense*) and feathermoss were dominant under-story species, with scattered occurrences of Canada yew (*Taxus canadensis*) also being noted (Harris and Foster, 2002). The St. Raphael Signature Site Advisory Committee visited the red pine stands during its September 2003 field trip, and noted a decided lack of regeneration in an aging stand. The only red pine regeneration noted was in a small burn area behind a trappers cabin, and in the previously disturbed area surrounding the old freight train camp.

Wetlands

Open wetlands are limited, comprising up to two per cent of the signature site, and are primarily characterized by treed bogs found in kettle holes or bedrock depressions and poorly drained flat areas. Bog vegetation is generally composed of open black spruce, with carpets of sphagnum moss, labrador tea and cloudberry (*Rubus chamaemorus*). An extensive bog complex, the Medcalf Lake Peatland, exists on Medcalf Lake. This complex extends over 180 hectares and is composed of a raised bog, a rich patterned fen, treed fen and a poor fen. These communities are restricted to where there is significant groundwater flow, and are home to nesting sandhill cranes and palm warblers. The Medcalf Lake Peatland was designated as an ANSI in the Life Sciences category before its inclusion into St. Raphael Provincial Park, and was listed as provincially significant due to its size and representation of several wetland or bog communities (Noble, 1998). An immature bog dominates the central region of the peatland, but comprises merely 10 per cent of the total area. Bog formations comprise 26 per cent of the total area, while fens comprise 25 per cent and swamp the remaining 49 per cent. This site is the only wetland where horizontal juniper (*Juniperus horizontalis*) was noted and one of only three where marsh timothy (*Phleum pratense*) occurs (Noble, 1998).

Shoreline wetlands are rare in the site and are restricted to areas along Churchill Lake and Miniss Lake. These communities are species poor marshes with common bur-reed (*Sparganium emersum*), hardstem bulrush (*Scirpus acutus*), and sedge species (*Carex spp.*) entwined with patches of pondweed (*Potamogeton spp.*) in sites where there is deep water and organic substrate at the mouth of creeks. Marshes found on Churchill Lake tend to be more diverse than those found on Miniss Lake. Shore fens are restricted in the signature site to the banks and mouths of slow moving streams, most notably on the De Lesseps River. A floating organic mat with sporadic occurrences of few-seeded sedge (*Carex oligosperma*), wire sedge (*Carex lasiocarpa*), and low shrubs such as leatherleaf (*Chamaedaphne calyculata*) characterizes these ecological communities. A rare seepage fen was also documented on De Lesseps Lake where natural flooding-drawdown occurs (Harris and Foster, 2002).

Thicket swamps occur sporadically in the signature site where beaver activity promotes annual flooding cycles that maintain these communities by restricting peat accumulation. These communities contain speckled alder and bluegrass (*Poa annua*) vegetation communities. Another wetland type uncommon to the site is black ash swamp, such as that found at the mouth of the St. Raphael River. These swamps have established where there is a warmer than average microclimate that allows vegetation such as black ash, round-leaved dogwood (*Cornus rugosa*) and monkey flower (*Mimulus ringens*) to persist. Other black ash stands exist on the western shores of Churchill Lake and on De Lesseps Lake (Harris and Foster, 2002).

Shorelines

There is over 2,500 kilometres of shoreline within the signature site, predominately wooded to the edge of the water or characterized by exposed bedrock, such as those shorelines surrounding Lawson, Churchill and the west side of Miniss Lake. The shorelines of Miniss, Churchill and Yam lakes have a nearly continuous fringe of white cedar, shrubby cinquefoil (*Potentilla fruticosa L.*), northern grass of parnassus (*Parnassia palustris*) and kalms lobelia (*Lobelia kalmii*). The presence of these vegetation types suggests these shorelines consist of calcareous till or parent material.

Sand beaches can be found on shores adjacent to esker or outwash landforms along Miniss, Hooker and Arc Lakes. Shrub communities with sweet gale (*Myrica gale*) and leatherleaf dominate most beaches. Active sandbars on the De Lesseps River suggest fluvial processes are still shaping the shores of this river (Harris and Foster, 2002).

4.7 Fire History

Large fires play an important role in maintaining a diverse forest mosaic and creating habitat for woodland caribou.

Wildfire has been an important ecological influence at the St. Raphael Signature Site with large fires having helped determine present forest makeup. Most of the forest is 70 to 100 years old, though stem core samples taken from red pine stands on the shores of Hooker Lake reveal ages greater than 200 years. The dendrochronological records derived from these core samples indicate wildfire occurrences during that period. This reflects the higher survivability trait of red pine from multiple fires (W. Moxam pers. comm., 2003).

In 1996, a large fire covering 8,443 hectares of the signature site caused fire damage in the vicinity of Medcalf Lake and Miniss Lake (Figure 6). Other small fires have been recorded over the years since fire records have been kept in the 1920s. In 1976, approximately 200 hectares of forest burned on the south shore and on an island on Miniss Lake, and in 1962 a small fire covering 50 hectares was recorded on the east shores of Hooker Lake. In 1961, two significantly large fires occurred immediately adjacent to the western boundary of the signature site, burning 90,000 hectares and 135,000 hectares respectively. A 560-hectare fire occurred west of De Lesseps Lake in the 1930s (W. Moxam pers. comm., 2003).

Jack pine, red pine and, to a lesser extent, black spruce are dependent on fire for their regeneration. Of all the boreal conifers, jack pine is the best adapted to fire and hot temperatures are required for the cones to open and release seeds for regeneration. Red pine is fire resistant. The red pine located on Hooker Lake in this signature site is at the northern edge of its native range. Black spruce is easily killed by fire because of its thin bark and shallow roots. Trees of this species are often killed even from low intensity surface fires. Typically in Canadas boreal region, spruce stands burn at 50 to 150 year intervals, thus preventing the development of uneven aged stands. The uniformity of this dominant species in the signature site reflects this trend (W. Moxam pers. comm., 2003).

Forest fire management will be an important consideration for the St. Raphael Signature Site, as large fires play an important role in maintaining a diverse forest mosaic and creating suitable habitat for woodland caribou and other boreal wildlife and in the regeneration of fire dependant forests, such as jack pine. Eco-region 3S, in which the signature site is located, has among the highest fire frequencies in Ontario, however the numerous lakes and water bodies in the signature site limits fire activity in this site (Harris and Foster, 2002).

4.8 Flora

The vegetation found at the signature site is typical of the boreal forest found in northwestern Ontario and, as such, displays low species diversity (290 observed species) as a reflection of the corresponding lack of diversity in soils, forests and wetland types. However, due to the unique physiography of St. Raphael, several significant species have flourished under ecological conditions found uncommon to the region (Harris and Foster, 2002).

The vegetation in St. Raphael is generally native; few invasive or non-native species exist in the site, and those that do are limited to areas that have been disturbed by development. These species include red top grass (*Agrostis gigantea*), common burdock (*Arctium minus*), dandelion (*Taraxacum officinale*) and common plantain (*Plantago major*). These species are common pioneer species in sites that have been disturbed or are barren of the required nutrients for native plants. They often act as organic substrate for the re-establishment of native species over time.

Significant Species

Fieldwork completed in 2001 confirmed four provincially rare plants and seven regionally significant plants grow in the signature site. Several other species were noted as being locally significant. Provincially rare plant species include fir club-moss (*Huperzia selago*), interior rush (*Juncus interior*), vaseys rush (*Juncas vaseyi)* and inland blue grass (*Poa interior*). Regionally significant plants are sitka clubmoss (*Lycopodium sitchense*), hidden-scaled sedge (*Carex cryptolepis*), sterile sedge (*Carex sterilis)*, ovate spikerush (*Eleocharis ovata*), floating club-rush (*Scirpus subterminalis*), white-stemmed pondweed (*Potamogeton praelangus*), slender pondweed (*Petamogeton pusillus*), water shield (*Brasenia schreberi*), Canadian St. Johnswort (*Hypericum candenses*), and marsh speedwell (*Veronica scutellata*). Other significant species noted during field surveys were broad-leaved water plantain (*Alisma plantago-aquatica*), norway sedge (*Carex norvegica*), northern pipewort (*Eriocaulon aquaticum*), floating bur-reed (*Sparganium flutuans*) and joe pye weed (*Eupatorium maculatum*) (Harris and Foster, 2002).

4.9 Fauna

The fauna of St. Raphael is also relatively species poor, typical of the boreal forest. Large mammals such as moose (*Alces alces*), woodland caribou, black bear (*Ursus americanus*) and timber wolf (*Canis lupis*) are present on the site, but exist in low density. A total of 17 species of mammals were recorded in the signature site. One of these species, woodland caribou, is considered to be provincially significant (Harris and Foster, 2002). The Life Science Inventory for the St. Raphael Signature Site (Harris and Foster, 2000) lists 80 bird species, three frog species, one species of snake, 21 species of fish and 24 different dragonfly species. On a provincial level, two of the birds are considered rare, as is one of the fish species and four of the dragonflies. Two of the bird species are regionally uncommon.

Although 17 mammals have been recorded for the signature site, population and habitat surveys are only conducted for woodland caribou and moose. Records associated with trapping and hunting of fur-bearers and black bears are also kept.

Woodland Caribou have been classified as threatened nationally (COSEWIC, 2000) and the forest-dwelling sub-population is also ranked as threatened at the provincial level (Harris, 1999). Surveys for caribou revealed that this species

is occupying portions of the St. Raphael Signature Site year round, although individual animals may move in and out of the area. To protect woodland caribou and ensure their persistence in the signature site, large areas greater than 10,000 hectares of suitable winter habitat must be available. To achieve this while allowing forest harvesting to occur, a pattern of large reserve blocks and harvesting disturbances has been planned for a 100 year period through the 2002-2022 Forest Management Plan (FMP) for the Caribou Forest (Figure 7). This same strategy is employed on the adjacent Lac Seul Forest. Special consideration for calving lakes and associated summer range should also be given.

The capability of the signature site to produce caribou winter habitat was assessed by applying the habitat criteria from the *Forest Management Guidelines for the Management of Woodland Caribou* (1999). Currently, most of the signature site is suitable winter habitat for caribou, with small areas of very high quality (preferred) habitat. In the winter, ground and tree lichens make up a large component of the caribou diet. It generally takes 60 years or more after a forest fire for a forest to produce enough lichen to support caribou populations (Environment Canada, 2003).

In general, records of caribou sightings and tracks in the signature site are concentrated in the western half of the signature site, with the highest concentrations being found around the southern portion of St. Raphael Lake and in the southwest block of the EMA west of Arc Lake. The caribou sign west of Arc Lake is associated with a very high concentration of preferred winter habitat types.

Ground surveys indicate that many of the large lakes in the signature site form important components of the summer range of cow-calf pairs. There are confirmed calving sites and nursery areas located on islands or peninsulas of Churchill, Miniss and Payne lakes. Although surveys have not been conducted for Hooker, Vincent and De Lesseps lakes, the structure of these lakes makes it probable that caribou cows with calves are using them as an important part of their range in the summer season (J. Graham pers. comm., 2003).

Moose populations are assessed every three years in the signature site as part of the regular MNR aerial survey cycle to assess moose population in Wildlife Management Units across the province. They currently exist in a density of about one moose per every 12 square kilometres. The target for moose in Wildlife Management Unit 16B is approximately double this number, but is currently under revision (J. Graham pers. comm., 2003).

Wolverine (*Gulo gulo*) have not been recorded in the signature site, although it is within the range of this species and sightings have been reported just off Highway 599, opposite Minchin Lake (John Derouin, pers. comm., 2003). Wolverine habitat in general, includes large, sparsely inhabited wilderness areas with adequate food supplies. The signature site has large expanses of wilderness that could potentially provide for wolverine populations.

Birds

During a preliminary survey of the site in 2001, 80 species of bird were recorded, 73 of which likely nest in the signature site. Bird species recorded for the site are characteristic of the boreal forest, dominated by warblers, thrushes and vireos. Few wetland species were observed in the signature site, most likely due to the lack of wetland habitat in the area (Harris and Foster, 2002).

Ontario was the first province to list the bald eagle as an endangered species in 1973, when the only breeding pairs of this species were limited to the northwestern region of the province. This raptor experienced a sharp decline in population throughout the province beginning in the 1940s as a result of the bioaccumulation of toxins, such as mercury, lead and DDT in the food chain. Populations of these birds are recovering following the control of these substances. Bald eagles are also sensitive to disturbance and habitat loss through logging and increased recreational activity in remote areas. Breeding pairs prefer undisturbed areas for nesting and raising young (The Canadian Peregrine Foundation, 1994). Several nesting sites have been observed within the signature site.

A pair of sandhill cranes has been observed in the Medcalf Lake Peatland. They were showing agitated behaviour that indicates a nest may have been nearby. Another crane was also observed at this site. Sandhill cranes are widespread across northern Ontario but nesting pairs are uncommon to the Thunder Bay District (Harris and Foster, 2000). Sandhill crane populations are healthy but in the past have experienced declines due to loss of habitat along its migratory routes. Increased attention toward the conservation and restoration of wetlands has also led to the recovery of this species throughout its former range (International Crane Foundation, 1999).

A common tern (*Sterna hirunda*) colony, with 23 adults and three juveniles, was observed on a small island in the north end of Miniss Lake. These birds are also uncommon nesting birds in the Thunder Bay region (Harris and Foster, 2000). Common terns have been experiencing population declines in the Great Lakes region due to loss of habitat along shorelines and habitat displacement by gulls. This species is vulnerable to predation by larger birds and mammals and requires protected islands and shorelines for nesting (Environment Canada, 2003).

Reptiles/Amphibians

Information pertaining to reptiles and amphibians within the signature site is limited. Northern spring peeper (*Pseudacris crucifer*), boreal chorus frog (*Pseudacris maculata*) and wood frog (*Rana sylvatica*) have been observed in the signature site. Eastern garter snake (*Thamnophis sirtalis*) was the only recorded reptile in the signature site. These species of amphibians and reptiles are considered common throughout northwestern Ontario.

Dragonflies and Damselflies

Several species of dragonfly and damselfly were observed during field surveying of the site in 2001. Dragonfly species included members of several families including the Darners, Emeralds, Clubtails, Skimmers and Cruisers. Four species from three of these families are considered provincially rare species. Three species of damselflies were also recorded during field surveys, belonging to the Jewelwings, Bluets and Spreadwings family (Harris and Foster, 2002).

The subarctic darner (*Aeshna subarctica*) was collected between the St. Raphael River, St. Raphael Lake and Churchill Lake and is commonly associated with bog pools in peatlands. This northern species was found near the southern edge of its range, and is considered rare throughout northwestern Ontario.

A lake emerald (*Somatochlora cingulata*) dragonfly was also observed in the signature site along the northern edge of Hooker Lake. This species is widespread but limited in numbers in boreal Ontario and is usually associated with lakes and large rivers.

Williams emerald (*Somatochlora williamsoni*) is another rare dragonfly species found in St. Raphael. It was collected on the St. Raphael River between St. Raphael and Churchill lakes and is at the northeastern limit of its range.

Black meadowfly (*Sympetrum danae*) is the last of the provincially rare species found at the site. It is poorly documented in Ontario, but was found to be common to the De Lesseps River.

4.10 Fish

The St. Raphael Signature Site supports a rich sports fishery, and has historically supported several commercial fisheries as well. The fish community generally is comprised of walleye, northern pike, lake whitefish, white sucker and yellow perch. Cisco (lake herring) and burbot are also very common. The primary sport fish are walleye and northern pike.

Baitfish common to the signature site include johnny darter, iowa darter, log perch, blacknose shiner, spottail shiner and mimic shiner. These species and other less common baitfish provide a forage base for the larger sport fish found in St. Raphael.

Fish species common to the signature site are listed in Table 2 by lake. These species have been documented during MNR aquatic habitat inventories conducted in the larger lakes within the site. Two species, lake sturgeon and lake trout have not been documented recently but have been recorded in commercial fishing records from the late 1950s/early 1960s.

Significant Fish Species

River darter was reported from Churchill Lake on a 1974 MNR aquatic habitat inventory. This species is considered provincially rare in Ontario, with a range extending into southern Manitoba and northwestern Ontario.

Table 2: Fish Species by Lake

Common Name	Latin Name	Churchill	Peg Lake	Cutcliffe	St. Raphael	Hooker	Vincent	Minchin	De Lesseps	Miniss	Little Miniss
Walleye	*Stizostedion vitrium*	•	•	•	•	•	•	•	•	•	•
Northern pike	*Esox lucius*	•	•	•	•	•	•	•	•	•	•
Lake whitefish	*Coregonus clupeaformis*	•	•	•	•	•	•	•	•	•	
Lake herring	*Coregonus artedii*	•	•			•	•	•	•		•
Burbot	*Lota lota*	•	•	•	•	•	•			•	
Sauger	*Stizostedion canadense*	•	•		•	•					
Yellow perch	*Perca flavescens*	•	•	•		•	•	•	•	•	
White sucker	*Catostomus commersoni*		•	•	•	•	•	•	•	•	•
Rock bass	*Ambloplites rupestris*							•			
Lake chub	*Couesius plumbeus*							•			
Lake trout (historical)	*Salvelinns namoycush*					•			•		
Lake sturgeon (historical)	*Acipenser fulvescens*									•	
Longnose sucker	*Catostomus catostomus*	•									
Quillback	*Cariodes cyprinus*	•									
Trout perch	*Percopsis omiscomaycus*	•					•				
Mimic shiner	*Notropus volucellus*	•	•		•			•	•	•	
Golden shiner	*Notemigonus crysoleucas*	•						•			
Log perch	*Percina caprodes*	•	•			•	•		•		
Johnny darter	*Etheostoma nigrum*	•	•			•	•	•	•	•	
Iowa darter	*Etheostoma exile*	•				•		•	•	•	
Spottail shiner	*Notropis hudsonius*	•	•	•	•	•		•	•	•	
Ninespine stickleback	*Pungitius pungitius*	•							•		
River darter	*Percina shumardi*	•									
Blacknose shiner	*Notropis heterolepis*		•	•	•	•		•	•	•	
Mottled Sculpin	*Cottus bairdi*					•	•		•		
Emerald shiner	*Notropis atherinoides*								•		

(OMNR, unpublished.)

5.0 Cultural Resources

5.1 Archeological and Heritage Sites

Little evidence or documentation of human activity exists for the St. Raphael Signature Site due to its remoteness. Aside from First Nation use of the area, it remained relatively undeveloped until commercial tourism development in recent years. There was, as previously mentioned, a major freight train route through the signature site to the Central Patricia mines in the early 1900s. Hooker Lake was used as a camp during the time the freight trains were used, as is observed through cut stumps and from remnants of a structure dating back to the early 1900s. Several cut stumps were observed in the larger red pine stand on Hooker Lake. These trees may have been cut to provide wood for several buildings that would have been built to house workers and horses moving freight. Remnants of these structures remain on the shores of Hooker Lake, although the buildings have long since disappeared. Metal objects, such as pots and pans and rotted wooden beams partially covered by moss still exist at the site, which validates the stories of this station by local residents.

Pictographs found in the signature site identify the long and rich history of First Nations in the area.

The early ancestors of the Ojibway moved into the area approximately 1,000 years ago. These people were the earliest pictograph artists (West Patricia Land Use Plan, 1981). Several archeological sites, in the form of ceremonial sites and pictographs, exist in the signature site, and demonstrate First Nation cultural and traditional use of the area. With concern for the sensitivity and nature of these sites, they will not be discussed within the text of this paper, but will be considered during the planning process.

During the late 1700s and throughout the 1800s, the Hudson Bay Company established trading posts and trade links throughout the region, with two posts being established on Lake St. Joseph and on Lac Seul. The waterways contained within the signature site were used during this period by local First Nations for the transportation of furs and trading goods. Several traditional trap lines and hunting territories are found in the signature site.

6.0 Natural Resource Use

6.1 Fisheries Resource Use

Fisheries

The St. Raphael Signature Site is located in Fisheries Division 31. No commercial fisheries are active within the signature site, although subsistence fishing may still occur in those lakes easily accessible to nearby First Nations communities. A commercial fishery on De Lesseps Lake in conjunction with the Guardian Eagle Resort was active on the lake up to 1997 and was licensed for white fish (MNR, 1997).

Several commercial fisheries existed in the signature site during the 1950s to the early 1970s. A commercial fishery was located on Hooker Lake and Cutcliffe Lake until 1971, both of which focused on walleye, whitefish, northern pike and lake trout. However, lake trout has not been caught in either location since 1966. Whitefish, walleye and northern pike were harvested in commercial fishing operations on St. Raphael, Churchill, Miniss and Minchin lakes. Commercial fishing did not necessarily occur each year on a lake, but spanned a period from 1952 to 1971 on St. Raphael, from 1958 to 1971 (and again in 1981) on Miniss Lake, from 1950 to 1985 on Churchill Lake, and occurred on Minchin Lake in three different years (1952, 1954 and 1959) (OMNR, unpublished).

Bait Fishery

There are 17 baitfish blocks located either entirely or partially within the signature site boundary. These blocks are licensed to six holders. The baitfish industry in the signature site provides for businesses in Sioux Lookout and tourism operators. Some of the baitfish found and caught in the signature site include johnny darter, iowa darter, log perch, blacknose shiner, spottail shiner and mimic shiner.

Usually these baitfish lakes are small and hard to access. The licensees currently fly into the baitfish lake or nearby lake and then use trails to move the baitfish back to the plane for transport. Harvesting normally occurs over short periods during the spring and summer. Baitfish operators have indicated that baitfish lakes are very sensitive to road construction and use, as game fish can be unwittingly transported on old minnow traps and fishing gear. Once established, game fish will quickly deplete minnow stocks making the lake uneconomical as a baitfish lake.

6.2 Forestry Resource Use

Forestry

The Miniss EMA is contained within the larger Caribou Forest Sustainable Forest Licence (SFL) # 542481, licensed to Bowater Canadian Forest Products Incorporated. Forest management activities for the EMA are planned within Forest Management Plans (FMP) for the Caribou Forest, under the authority of the Crown Forest Sustainability Act, 1994. The current FMP for the Caribou Forest covers the strategic period of 2002-2022 and outlines specific operational plans for the five-year term of 2002-2007.

Within the 2002-2007 FMP for the Caribou Forest, forestry operations have been planned within the St. Raphael Signature Site. An area of approximately 1,600 hectares between Vincent and Ghost lakes has been scheduled for harvest. Planned operations for the term of 2002-2007 include an access corridor through St. Raphael Provincial Park.

Harvest operations on the Caribou Forest are primarily conducted by contractors for Bowater and Buchanan Forest Products. This forest supplies softwood round-wood to the McKenzie Forest Products sawmill in Hudson, which in turn supplies softwood chips to Bowaters Thunder Bay pulp and paper mill complex, through a fibre exchange agreement. Softwood roundwood from the Caribou Forest is also directly processed by Bowater within their Thunder Bay and Ignace sawmills, with chips again being utilized by Bowaters Thunder Bay pulp and paper mill. Hardwood supply agreements exist between Bowater and Weyerhaeuser committing hardwood volumes from the Caribou Forest to Weyerhaeusers Dryden Mill. These wood supply arrangements are formal components of the Caribou Forest SFL, Schedule E. The Miniss EMA forms part of the wood supply area contributing to the achievement of these formal commitments (S. Allen pers. comm., 2003). Silviculture operations for the Caribou Forest are the responsibility of Bowater Canadian Forest Products.

No commercial forest harvesting has occurred within the St. Raphael Signature site in the last several decades. Recent forestry operations have occurred outside the signature site in the vicinity of Churchill Lake and Lawson Lake.

Non-commercial use of timber resources within the signature site is not well documented but would include cutting of timber for building construction and fuel, associated with remote tourism establishments, mineral exploration, and First Nations subsistence use. Some forest clearing associated with historic and recent winter roads has also occurred (S. Allen pers. comm., 2003).

Non-timber Forest Products

The use of non-timber forest products from the St. Raphael Signature Site is largely un-documented, but includes known harvest of mushrooms and blueberries for personal use. Commercial harvest of these products is likely occurring on a minor scale. First Nations harvest of plant material for subsistence, medicinal and ceremonial use is understood to occur, although the level and nature of this use is unknown (S. Allen pers. comm., 2003).

6.3 Wildlife Harvesting

Bear Management Areas

There are 12 Bear Management Areas (BMAs) within or partially within the signature site, although only three of these BMAs, near Churchill Lake, south of Spirit Lake and south of Minchin Lake have been used in the past several years. Seven of the BMAs belong to five outpost camp operators, three are available for issue and two that are completely within the provincial park and have never been used, will not be re-issued. The hunting of black bears is not currently a primary activity in the signature site, but does contribute revenue to tourist outfitters who coordinate hunting operations.

Fur Harvesting

The signature site is located in Wildlife Management Unit 16B. There are 11 traplines either wholly or partially within the signature site, operating under 11 different trappers in four trap-line areas including, Mishkeekogamang, Lac Seul, Sioux Lookout-North and Savant Lake. There are several trapping cabins located within the signature site. Trap cabins are generally constructed to a minimal standard to provide shelter to trappers while in the area.

6.4 Recreational Use

Many of the lakes found in the signature site are named after lost pilots during World War One, such as Colonel Frederick Minchin, co-pilot of the plane St. Raphael; Lieutenant James Victor Medcalf; and Count De Lesseps; all pilots who were lost in 1927.

Recreational Features

Recreational features vary widely throughout the St. Raphael Signature Site, reflecting the three separate subdivisions of the Canadian Shield as they meet. The result is that the character of each of the main lakes within the site is different.

De Lesseps Lake is a large linear lake, stretching from the De Lesseps River in the north and parallel to Wertheim Lake to the east. The lake covers an area of 3,591 hectares. Islands are common in the northern portion of the lake. De Lesseps Lake is characterized by tombolos and spits of provincial significance, suggesting fluvial processes are still active and shaping the lake today. These features are points of interest on the landscape. The lake has a maximum depth of 38 metres and an average depth of 6.3 metres, with a predominantly sand based shoreline and scattered shallow weedy areas where warmer temperatures are observed.

Miniss Lake is the largest lake within the signature site and provides excellent opportunities for boating and canoeing. Numerous large and small islands, with sandy and rocky shorelines characterize the lake. Miniss covers an area of 6,956 hectares with a maximum depth of 39 metres and an average depth of six metres. Beaches in this zone are some of the largest in the signature site and have high aesthetic value. The lake contains relatively few facilities considering its size but does have several campsites and picnic areas. Portage routes in this area lead to Hooker and De Lesseps, as well as Medcalf Lake and into the EMA. A route through the Miniss River also leads through a scenic set of rapids to Lake St. Joseph.

Minchin Lake is the smallest of the main lakes within the signature site, but it plays a significant role in that it provides the only direct access into the provincial park. This access point is not well developed but is heavily used. Two additional access points are found on Minchin Lake, but require development or are restricted seasonally by water drainage. The direct access point on Minchin Lake offers entry to the parks circular canoe routes. Developed campsites are plentiful in this area with portage routes leading to De Lesseps Lake and Wertheim Lake being well cleared and maintained. Year round fishing occurs on this lake (Baljko and Winsor, 2001). Minchin Lake covers an area of 1,523 hectares. This lake was observed to contain several wetland areas with submergent and emergent aquatic vegetation taking up large parts of the lakes extensive shallows, as well as rocky outcrops. Minchin has a maximum depth of 21 metres and an average depth of 5.9 metres. Minchin Lake is moderately productive with good potential for water based recreation. Limited shoreline development has meant that nutrient input is low and associated algae growth has not occurred. The clarity of water is quite good with a maximum seechi disc reading of 4.2 metres. From all indications, nutrient input into the lake from tributary inflow, groundwater and surface runoff appears to be low.

Hooker Lake is a large lake connecting to Vincent Lake to the north and Peg and Cutcliffe lakes to the south. This lake and Vincent Lake are characterized by numerous sandy beaches and contain few islands. The presence of tombolos, sandbars and spits suggest this lake is still undergoing active fluvial processes. The maximum depth of Hooker Lake is 32 metres, with an average depth of 5.9 metres. Vincent Lake has a maximum depth of 33 metres and an average depth of 6 metres. A canoe route travels through the entire length of the area surrounding Hooker and Vincent lakes, and is amply provided for by numerous campsites and shore lunch sites in the southern portion of Hooker Lake. Portages in this zone connect to St. Raphael, Miniss and De Lesseps, as well as Lawson Lake and Armit Lake when water levels are low. There is great potential for this area to support wildlife viewing due to various concentrations of wildlife (Baljko and Winsor, 2001).

St. Raphael Lake covers an area of 3,257 hectares. It is a large shallow lake with an average depth of 4.8 metres and a maximum depth of 27.4 metres. St. Raphael Lake has poorly developed beaches due to a higher incidence of submergent and emergent aquatic and beach vegetation. A number of shore lunch sites are distributed with higher concentrations in proximity to an outpost camp on this lake. These picnic facilities are the best examples of this type of value in the western portion of the signature site, including the recreational area surrounding Churchill and Hooker. Several beaches are located within this area as well, some of which have caribou evidence.

Churchill Lake, formerly called Lindberg Lake, is a shallow water lake characterized by large islands, rocky outcrops and reefs that limit navigation between the St. Raphael River and St. Raphael Lake. It provides a direct link to Lake St. Joseph to the north. The lake covers an area of 4,009 hectares and has an average depth of 5.2 metres. Churchill Lake is the least developed in terms of campsites and shore lunch sites in St. Raphael. Rocks and reefs in the southern portion of the lake make it difficult to navigate, making it inaccessible by boat and difficult by canoe. Very little fishing activity takes place on the St. Raphael River because of the time required to travel there and hidden reefs along the route. A canoe route passes through this lake and access to Lake St. Joseph is offered through two portages. A portage to St. Raphael Lake can also be accessed from this area, although all portage routes are in varying degrees of use. A few campsites are located in the northeast section of the lake and are used primarily by the outpost camp on this lake. Two rapids are located in this area, as is the signature sites highest cliff, estimated to be nine metres in height (Baljko and Winsor, 2001).

Remote Commercial Tourism

Remote tourism is a significant commercial activity within the signature site, with two main base tourist lodges and another eight outpost camps located within the larger lakes system in the area. The majority of tourists visiting the signature site enter as guests of the many commercial tourism operators with facilities contained within the site. These operators play host to over three thousand visitors each year. Their clients take part primarily in sport fishing and to a lesser extent in sport hunting, wildlife viewing, canoeing, boating, berry picking, mushroom picking and hiking.

The two largest facilities are the main base camps at De Lesseps Lake and Hooker Lake. The facility at De Lesseps Lake has its own airport and recreational activities varying from wind surfing to angling. Hooker Lake is unique, in that the facility is located on private land that is completely surrounded by the provincial park, and uses the park for its activities.

There are also four commercial boat caches in the signature site, located on Dawson, St. Raphael, Ghost, and Spirit lakes. These boat cache permits allow operators to fly anglers into these remote lakes for a day of sport fishing separate from outpost camp operations.

All of the facilities utilize shore lunch spots on the shores and islands of the lakes. These shore lunch spots vary in nature from a simple clearing with a fire ring, to a picnic area with table, barbeque and propane fuel.

Table 3 depicts the calculated fisheries capacities for the major lakes in the signature site and outlines lakes on which further development using the fisheries resource could be considered. Additional capacity is available on Churchill, Cutcliff, Lawson, Minchin, Miniss, Payne, Peg, St. Raphael, and Vincent lakes. Allocation of the fisheries on the other major lakes is at, and in some cases, possibly exceeds, the calculated capacity. Ensuring that these lakes operate at a sustainable level is being addressed by MNR district staff. Due to the interconnected nature of many of the lakes, this issue may be a consideration in the signature site planning process.

Non-commercial Recreation

The signature site attracts both local and non-local recreational users. Day-use of the area includes such activities as sport hunting, sport fishing, boating and canoeing in the summer months and sport hunting, ice fishing, snowshoeing and snowmobiling in the winter. Local and provincial recreational groups make use of the area for backcountry canoe trips.

Canoe Routes

The St. Raphael Signature Site is a place backcountry canoeist dream about. The setting is remote, the lakes protected, the scenery outstanding, and you can take a multi-day trip never passing the same point twice and ending right where you started. You can also follow age old routes linking to the Albany River system to the northeast, or the Marchington River to the southwest. Links are also made to Savant Lake and the English River system to the southeast, or Lake St. Joseph on to the Cat River, or Lac Seul by going north. The circular routes within the signature site were created by the meeting of three geological faults zones. The importance of the site as a meeting place has long been recognized by First Nations people and is evidenced by the many old portages crossing the site.

Table 3: Fisheries Capacities and Potential Additional Opportunities on Signature Site Lakes

Lake Name	Total potential yield (kg/yr) all species	Total potential yield (kg/yr) walleye	Existing number of beds	Per cent of lake capacity available for additional opportunities	Estimated unused fisheries capacity (kg walleye/yr)	Approximate number of additional beds (or equivalent use) that could be added.**
Arc	903	291	12	No additional opportunity	0	0
Churchill	13,288	4,252	17	36	1,532	10
Cutcliff	852	273	0	100	273	2
De Lesseps	12,977	4,153	26	No additional opportunity	0	0
Hooker	6,319	2,022	26	No additional opportunity	0	0
Lawson	847	272	0	100	272	2
Minchin	4,823	1,543	0	100	1,543	10
Miniss	17,743	5,678	22	38	2,158	13
Payne	1,373	438	0	100	438	3
Peg	1,193	382	0	100	382	3
St. Raphael	13,371	4,279	8	70	2,999	19
Taper	624	200	9	No additional opportunity	0	0
Vincent	4,021	1,287	0	100	1,287	8
Little Miniss	1,458	467	6	No additional opportunity	0	0

** Note: Bed capacity is calculated on the Northwest Regional standard bed allocation (200 kg fish/bed), and using an estimated 80% of the catch as walleye.

Within the signature site portages are generally in good condition and are currently maintained by outpost camp owners and their guests. Some of the lesser used portages can be difficult to locate and may be hard to traverse due to blowdown. Some of these lesser traveled routes include the portages from Miniss Lake to Medcalf Lake, Minchin Lake to De Lesseps Lake, De Lesseps Lake to Lawson Lake, and the three portages from Miniss Lake to Lake St Joseph. Canoeist planning to use these routes should remember they are in a remote area, and should be prepared to handle unpredictable situations.

A few portages in the site may not be suitable for todays recreational canoeist. In particular, the portages now in use between Miniss Lake and Arc Lake appear to have been left over from the freighting era of the 1950s. They are long, and located well away from the river.

Canoe routes and portages leading outside the signature site are not currently maintained. Portages linking to canoe routes outside the signature site area found at:

a) Lawson Lake to Armit Lake – Linking to the Marchington River and the Albany River.
b) Miniss Lake to Wetheim Lake – Linking to Savant Lake and the Marchington River.
c) Miniss Lake to Hamilton Lake – Linking to Pashkakogun Lake and the Albany River.
d) Medcalf Lake to Pashkakogun Lake –Linking to the Albany River
e) Spirit Lake to Ragged Wood Lake – Linking to the Marchington River
f) Miniss Bay to Lake St Joseph – Linking to the Cat River System and Lac Seul.

Within the signature site canoeing is generally by lake travel, while routes outside the site, especially on the Marchington, Albany, or English Rivers can be classed as river travel, and may require more experience. However, none of the routes are well used, and while offering canoeists a true backcountry experience, require good planning and expertise. While there are currently no outfitters operating exclusively in the signature site, there are outfitters in the Sioux Lookout and Pickle Lake area that are familiar with the area, and can assist in planning trips.
The following list of specific issues and opportunities has been identified by the project team, advisory committee, and through correspondence with the public. The following list is by no means complete and is subject to public and stakeholder review. As the planning process continues, issues will be added or redefined. Please note the issues are not listed or ranked by order of significance.

7.0 Challenges and Opportunities

First Nations

- Local First Nation communities have a number of interests in the signature site, including protection of cultural and traditional values, tourism development interests, and increased involvement in resource management decisions.
- Protection of wildlife and natural resources, in particular water quality, is an important value to local First Nation communities. Balancing these values with economic, recreation, and commercial activities in the signature site may be difficult to achieve.

Access into St. Raphael

- Roads into the signature site are required for forestry purposes. Two crossings of the provincial park have been approved in the Land Use Strategy. However there is a need for the St. Raphael Signature Site Strategy to give suitable direction to the forest management plan in the areas of location, time of use, standards, densities, use management, and rehabilitation to ensure the remote character of the site is protected. Roads inside the Miniss EMA will have a direct impact on remoteness and must be carefully planned.
- There are no developed or official entry points to the site. The need for and location of such development areas will impact on recreational users, existing tourism and First Nation traditional uses. The strategy must ensure there is coordination between park goals, resource needs and traditional uses in any access developments.
- Historical trails and camps within the site are beginning to disappear through decay and growth of the surrounding forest. Decisions must be made to either reuse these routes if practical, let them vanish naturally, or protect them in some fashion.
- Snowmobiles and ATVs are a relatively new phenomena that have resulted in increased winter use of the site. This use has created several new trails and routes into the site and the long term impact of this activity needs to be addressed.
- Use of access roads in the signature site for commercial resource harvesters other than forestry (ie. baitfish, trappers) needs to be considered.

Land Tenure

- Currently, tourism operators within the park operate on Land Use Permits and this activity is permitted to continue. However, there is the potential to offer tourist operators improved tenure (e.g. Crown Land Lease). The extent and size of facilities operators choose to offer their clients needs to be discussed in concert with the development of the strategy for the site.
- There is currently one piece of private land within the signature site that it is operated as a tourism main base camp. The strategy must contain suitable policies and permitted uses that ensure the camp continues to operate in a sustainable, environmentally sound manner, consistent with the overall site strategy.

Geology

- The geology of the area is of interest to prospectors and the mining sector. While there clearly will be no mining in the park, the strategy must account for the needs of the industry in finding, accessing, and possibly developing future discoveries within the Miniss EMA.

Vegetation Communities

- Much of the forest in the signature site seems to have escaped natural forest fire for extended periods. This may inadvertently be affecting successional pathways for the current aging forest. The strategy should examine if the expected successional pathways are indeed natural or desirable, and what might be done to alter the situation.
- The red pine stands on Hooker Lake are aging, and regeneration is limited or non-existent. The strategy must examine the options of letting nature take its course, or stepping in to ensure the species is present on the site into the future.
- The Medcalf Peatland has been identified as unique, and the strategy must address some method of protecting this site.
- Invasive species were found in the signature site where disturbances, such as campsites, and trails occur. The strategy should consider the need for steps to keep invasive species out of the site and appropriate actions when invasive species are found within the signature site.

Shorelines

- Sand beaches are uncommon in the signature site and the strategy should outline steps to ensure they remain available for public use.
- Active sandbars located on several lakes are an indication of continuing fluvial processes within the site. The strategy should ensure that permitted uses do not interfere with these processes.

Fire Management

- Fire management may be required to maintain natural ecosystems. The role of fire and appropriate zoning needs to be determined for the park and EMA to permit use of wildfire or prescribed burning, if appropriate.

Fauna

- The signature site contains high quality caribou habitat and important calving sites. The strategy must consider these values and determine the best method of protecting and enhancing habitat by coordinating park and EMA activities within the broader caribou mosaics established on the Lac Seul Forest and the Caribou Forest.
- Nesting sites for sandhill cranes are uncommon in the Thunder Bay region, but were indicated to exist in the Medcalf Peatland. Increased attention should be given toward conservation of the Medcalf Peatland.
- A common tern colony was observed in Miniss Lake. The strategy should coordinate/ ensure permitted activities protect the colony.

Fisheries

- Literature suggests that lake trout and lake sturgeon were once found in lakes within the signature site. The strategy should examine the advantages, and problems that might be associated with reintroduction of these species to the specific lakes they were previously found in.
- Fisheries in a few lakes may have been over allocated, while surpluses exist on other lakes. The strategy should direct appropriate actions to ensure the fishery is sustainable and suggest where and how further allocations might be made.
- Baitfish lakes have been shown to be sensitive to access and inadvertent introduction of game fish. The use, transport and protection of baitfish and baitfish lakes needs to be addressed to ensure this industry and the natural species are protected.

Recreational

- St. Raphael contains circular canoe routes that are ideal for backcountry canoeing. However, the associated portages and services were developed in a previous era as a result of trapping or freight hauling. If the signature site is to promote canoeing, the strategy will have to examine the need to improve the portages and level of services.

Forest Management

- Forest management activities, including road construction and harvesting, can have a negative impact on the remote character of an area. The strategy will have to balance the needs of the industry with the potential impacts on remoteness. It will be necessary to compromise and ensure permitted uses and guidelines for the park and EMA are well coordinated.
- Wood supply is tight in northwestern Ontario and balancing the needs of sustainable supply and no increase in costs with the needs of other resource users will be a challenge.

User Management

- Acceptable uses and levels of use need to be determined for the signature site, including the allocation of resources for both commercial and non-commercial activities.
- Several recreational pursuits in the signature site are, by nature, conflicting. Backcountry camping and canoeing, and motorized boating are an example of activities that are not always complementary. The strategy will have to define the term remote and ensure uses and users in the park and the EMA all contribute to and sustain the accepted definition.

Park Operations and Zoning

- There is a commitment to establish at least one natural environment zone (minimum 2000 hectares in size) within the park that will meet the natural environment class target requirement for this site district. Values requiring protection need to be reviewed, and candidate areas evaluated in the context of best achieving overall signature site objectives.
- Potential restrictions associated with park zoning need to take into account existing uses and values.
- Fee collection, staffing, funding and maintenance of park facilities and operations need to be determined over the long term.

- At some point there may be a need to improve services for the park. The type and location of these services and the method of delivery needs to be coordinated with the overall site strategy, to ensure existing tourism businesses, and the remote character of the signature site are not compromised.

Your Personal Invitation

As someone interested in the long-term management of Ontario's provincial parks and Crown lands, you are invited to participate in the development of the signature site strategy. Any comments or suggestions regarding this background information document or any other aspects of the planning process are welcome. Please take the opportunity to submit your comments to either the Ministry of Natural Resources Project Lead, or the Chair of the St. Raphael Signature Site Advisory Committee, at the address below:

49 Prince Street
Box 309
Sioux Lookout, ON P8T 1A6

or by email to: siouxlookoutdropbox@mnr.gov.on.ca

8.0 Glossary of Terms and Acronyms

Age Class (Forestry) – One of the intervals into which the age range of forest stands is divided for classification and use. [modified]

Alkali Basalts – Igneous rocks that contain more alkali metals than is considered average for the group of rocks to which it belongs. Usually contain high degrees of sodium.

Area of Natural and Scientific Interest (ANSI) – Designations to help protect representative and special natural areas, plants and animals on Crown and private land. Currently all ANSIs on Crown land have been regulated as Provincial Parks or Conservation Reserves. The ANSI program is still used on private land holdings.

Batholith – A large plutonic mass that has more than 100 square kilometres of surface exposure and no known floor.

Beaded Esker – As with an esker, but discontinuous blobs like beads on a string.

Bio-accumulation – An increase in the concentration of a chemical or biological agent over time.

Bog – Wet spongy ground of decomposing vegetation with poorer drainage than a swamp. Can be cut and dried for fuel.

Calcareous Till – Distinguished by light colored mall deposits around ponds and in valleys. Parent material consists of shallow stony silt loam, underlain by limestone bedrock.

Cataclastic – Pertaining to the structure produced in a rock by the action of severe mechanical stress. Features include bending, breaking and granulation of minerals.

Cesium – A rare earth metal with a silvery white, soft character. Reacts explosively with water.

Crown Forest Sustainability Act (CFSA) – An Act of the Ontario legislature to provide for the sustainability of Crown forests and, in accordance with that objective, to manage Crown forests to meet social, economic and environmental needs of present and future generations.

Cobbles and Boulders – Coarse grained glacial debris.

DDT – A banned insecticide Dichloro-dipheryl-trichloroethane.

Dendrochronological – The science of dating events and variations in environment in former periods by comparative study of growth rings in trees and aged wood.

Drumlin – A hill shaped deposit of till. Shape resembles an elongated teaspoon lying down. The tapered end of a drumlin points to the direction of glacial retreat. Lengths range from 100 to 5000 meters and up to heights of 200 meters.

Ecological Community – Recurring assemblages of plants and animals having a consistent composition, structure and habitat.

Ericaceous – Belonging to the Heath family of plants, a group of evergreen shrubs and small trees including the blueberry, azalea and arbutus.

Erratic Boulders – Boulders lying in the middle of nowhere emplaced by glacial transport.

Esker – A deposit of glacial sand and gravel debris formed in long sinuous columns formed underneath a receding glacial ice sheet as a result of deposition of glacial meltwater.

Fault – A fracture or fracture zone in crustal rocks along which there has been displacement of the two sides relative to one another parallel to the fracture. The displacement may be a few inches to many kilometres long.

Fen – Low-lying, nutrient rich wetland with grassy vegetation, usually a transition zone between land and water composed of vegetation such as sedges and mosses.

Fluvial Deposits – All sediments, past and present, deposited by flowing water, including glacio-fluvial deposits.

Folding – A curve or bend in rock layers. A product of deformation.

Forest Management Plan (Forestry) (FMP) – A document containing pertinent information and prescriptions by means of which forest policy, aims, and objectives are translated into a continuity of specific treatments on a management unit for a specified period of years. [Modified]

Forest Sustainability Act – Legal authority based on 127 recommendations of the Class Environmental Assessment for Timber Management on Crown Lands that outlines the roles and procedures for forest management in Ontario.

Gneissic – A foliated rock formed by regional change in structure. Commonly feldspar and quartz rich.

Granite – A rock of quartz and feldspar composition.

Granulite Grade Metamorphism – A relatively coarse, granular rock formed at high pressures and temperatures.

Igneous – A rock or mineral solidified from molten or partially molten material.

Intrusive – In geology, a mass of igneous rock that, while molten, was forced into or between other rocks.

Invasive Species – A species that does not naturally occur in a specific area likely to cause environmental harm or displace native species.

Kame – A steep conical hill composed of glaciofluvial materials formed when glacial crevasses are filled with deposits from sediments in glacial meltwater.

Kettle Hole – A feature of former glaciated landscapes where a depression (usually lake filled) occurs because of the melting of a residual of buried ice.

Kimberlite – Occurs in vertical pipes, dikes and sills. It is the principal environment of diamonds. Name is derived from Kimberly, South Africa.

Lamproites – Dark coloured extrusive rocks with a high percentage of mafic materials.

Lands for Life – An integrated land use and wilderness protection planning process initiated in 1997 covering central and northern Ontario and resulting in the *Ontario's Living Legacy Land Use Strategy.*

Lithium – A soft silvery white metallic element found in association with nearly all igneous rocks and mineral springs. Metal is corrosive.

Marsh – Periodically flooded or continually wet areas having the surface not deeply submerged. It is covered dominantly with sedges, cattails, rushes or other submergent plants.

Mesic – Well drained soil

Metamorphic – Rock subjected to heat and pressure resulting in the alignment of mineral grains and giving a banded appearance.

Micro-climate – Variations of the climate within a given area, usually influenced by hills, hollows, structures or proximity to bodies of water.

Moraine – A hill of glacial till deposited by a glacier.

Nishnawbe-Aski Nation (NAN) – NAN evolved out of Grand Council Treaty #9 and was established in 1973 as the regional organization representing 49 First Nations in northern Ontario who were signatories to Treaty No. 9 and 5 (In Ontario).

Ontario Forest Accord Advisory Board (OFAAB) – Commitments by representatives of the forest industry, Partnership for Public Lands and the Ministry of Natural Resources as an accepted approach to establish protected areas while considering the needs of the forest industry in central and northern Ontario.

Pegmatite – An exceptionally coarse-grained igneous rock with interlocking crystals, usually found as irregular dikes, lenses or veins at the edges of batholiths. May include rare minerals rich in elements such as lithium, uranium and other rare earth elements.

Peridotites – A coarse grained plutonic rock. Commonly altered into serpentine.

Physiography –The descriptive part of natural sciences, dealing with physical features and their characteristics.

Pictograph – A graphic character used in picture writing, representing and expressing an idea.

Pioneer Species – Species in which are capable of invading bare sites and persist until surpassed by successional species.

Public Lands Act – Regulates all government owned land.

Rare Element Potential – Oxides of a series of 15 metallic elements. These elements are not espessially rare in the earths crust, but concentrations are. The rare earth metals resemble one another very closely in chemical and physical properties, making it difficult to separate them.

Sedimentary – Formed by aggregation of mineral grains eroded from another source of rock.

Secchi Disc – Measures the light penetrating through a water body to determine water quality and its ability for biological productivity.

Seepage Fen – A fen located on slowly draining nutrient enriched seepage slopes. Peat is usually less than two meters thick.

Silviculture – Branch of forestry dealing with the development and care of forests.

Spit – A narrow tongue of sand that extends from the shore and created by long shore drift.

Structure – Development of planar (faults) or curved features (folds) in rock due to deformation exposure to earth movement and pressure.

Structural-tectonic Subdivisions – Structural domains which are the result of the movement of crustal plates and distinguished by different deformation styles and possibly different rock units.

Succession – Process of change in species structure of an ecological community over time.

Sustainable Forest Licence (SFL) – A 20 year renewable licence through which the licence holder becomes responsible for all aspects of forest management planning and renewal within Ministry of Natural Resource set standards.

Swamp – An area saturated with water throughout much of the year. Characterized by woody vegetation, such as trees and shrubs.

Tantalum – A rather brittle, lustrous, hard and heavy gray metallic element.

Till – Glacial debris consisting variously of sand and gravel and coarser and finer debris and derived by glacial erosion of pre-existing rocks and soils.

Tombolo – A spit that connects the mainland to an island with beaches on each side.

Tourmaline – Forms prisms of various colors found in pegmatites, felsic igneous rocks and metamorphic rocks. Transparent crystals may be cut for gems.

Watershed – A line that divides two adjacent river systems.

Whaleback – Rounded bedrock outcrops formed by the scouring and erosive action of advancing glacial ice; resembling a hump.

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