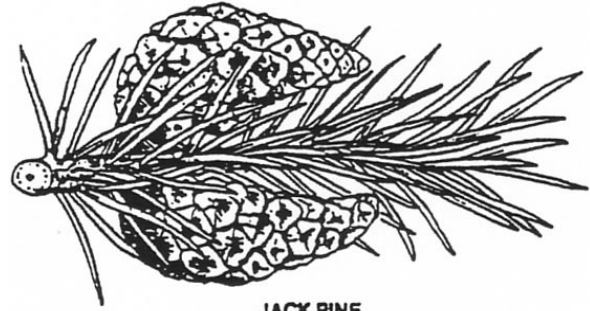

MANAGEMENT PLAN



JACK PINE

REDFIR LAKE - KAPITAGAS CHANNEL ECOLOGICAL RESERVE



PARKS AND NATURAL AREAS DIVISION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

1999

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1.0 INTRODUCTION

The **Wilderness and Ecological Reserves Act (WER Act)**, 1980 provides for the protection of important natural areas in Newfoundland and Labrador. These areas are established for preservation of natural ecosystems, outdoor recreation pursuits, scientific research and public education. More specifically, the WER Act provides the following objectives for establishing ecological reserves:

- to provide for scientific research and educational purposes in aspects of the natural environment;
- to preserve the habitat of an animal or plant species that is rare or endangered;
- to provide standards against which the effect of development in other areas may be measured;
- to provide an opportunity for study of the recovery of ecosystems from the effects of modification by human beings;
- to preserve rare botanical, zoological, geological or geographical characteristics;
- to preserve representatives of distinct ecosystems in the province; or
- to preserve organisms in their natural habitat to ensure the preservation of their gene pools.

The Act provides for an Advisory Council, appointed by Cabinet, to advise government on all matters relating to reserves. The Advisory Council, in cooperation with Parks and Natural Areas Division, Department of Environment and Conservation, oversees a rigorous establishment process involving an interagency review of reserve proposals, followed by public hearings, before an area is fully designated as a reserve by Cabinet decision. Throughout the process, public input is encouraged, particularly in communities near proposed reserve sites. Following establishment, reserves are managed by Parks and Natural Areas Division.

This document describes the history and biophysical characteristics of the Redfir Lake-Kapitagas Channel Ecological Reserve. In addition, it outlines the proposed Reserve management policies, guidelines and regulations.

2.0 BACKGROUND INFORMATION

The Redfir Lake - Kapitagas Channel site supports the only known natural stands of Jack Pine (*Pinus banksiana* Lamb.) in Newfoundland and Labrador. The significance of the Redfir Lake-Kapitagas Channel site was first recognized by government in 1988 when a submission was made to the Interdepartmental Land Use Committee (ILUC) by the provincial Department of Forestry to have the area protected as a crown land reserve. In 1991, the Wilderness and Ecological Reserves Advisory Council (WERAC) initiated another interdepartmental referral to determine if there were any objections to the establishment of an ecological reserve at the site. The comments received indicated that there was support for protecting the site and no land use conflicts were identified. Therefore, WERAC recommended that Cabinet establish the site as a provisional ecological reserve. On June 30, 1995 the Redfir Lake-Kapitagas Channel Provisional Ecological Reserve was officially declared.

3.0 THE REDFIR LAKE-KAPITAGAS CHANNEL ECOLOGICAL RESERVE SITE

3.1 Site Location and Ecological Significance

The Reserve, is located in southwestern Labrador, just south of Ashuanipi Lake. The Reserve is divided into two portions: the Kapitagas Channel site located at 52°27'N, 66°10'W, encompasses 79 square kilometres, and to the south the Redfir Lake site, located at 52°17'N, 66°04'W, encompasses 3 square kilometres (Figure 1). Neither site is accessible by road. These two portions include the only known stands of natural Jack Pine in the Province. The separation of the sites will aid in the management of the species. In the unfortunate event that one site is destroyed, due to disease, infestation, etc., the alternative site may remain intact as a seed source. Furthermore, the reserve design embraces two different successional stages of Jack pine. In the southwestern portion of the Reserve (Redfir Lake) the site is undergoing recolonization following fire, while along the western shoreline of Kapitagas Channel mature, almost pure, stands of Jack pine occur. Existing stands of black spruce within the Reserve represent potential sites for the future invasion of Jack pine. According to the Canadian Council of Forest Ministers (1995) ecosystem resilience is dependent upon having adequate regenerative capacity and a balanced distribution of forest types and age classes. The Reserve includes a variety of successional stages and this is one indicator of ecosystem health.

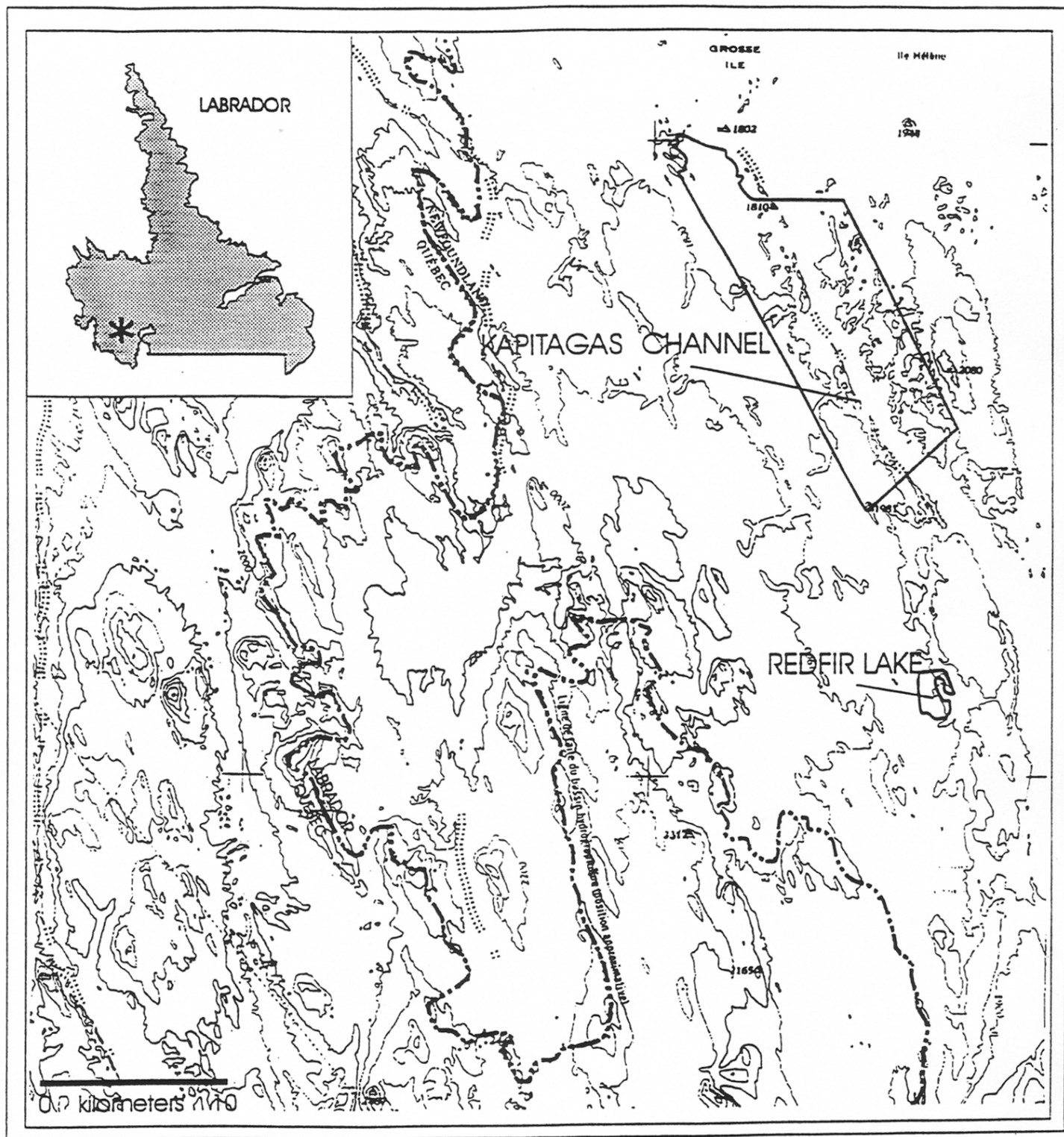


FIGURE 1: Location of the Proposed Redfir Lake-Kapitagas Channel Ecological Reserve.

3.2 Level of Significance

At a provincial level, this site is highly significant. Jack Pine is a boreal forest tree, mostly restricted to the Boreal Forest zone (Figure 2). The range of the Jack pine extends eastward from the Mackenzie River Valley north of Alberta to approximately the middle of Quebec. The Redfir Lake - Kapitagas Channel sites represent out-liers - an example of Jack pine outside of or at the very edge of its range. Further, it lies near the boundary of two forest regions (Mid Subarctic and Low Subarctic Boreal Forest), and, as such, represents a transitional ecological zone (ecotone). Therefore, this site can be considered significant on a national scale given its outlying position and the transitional nature of the landscape surrounding the site.

3.3 Site Description

Jack pine is a short-lived, small to medium sized coniferous tree whose range extends further north than any other North American pine (Fowelts, 1965). Jack pine can be identified by a number of characteristics. Most notably, the leaves or needles are 2 - 4 centimetres long and are usually straight or slightly curved (Figure 3). The cones, when closed, are usually curved and somewhat more pointed and narrow than either Red pine, White pine, or the introduced Scotch pine.

Natural stands of Jack pine occur mainly on sandy, podzolic soils. The species has a fairly wide pH tolerance from 4.5 to 8.2 (Fowells, 1965). Virtually all Labrador soils south of Nain are podzolic. Not all are sandy, but many are, especially in areas where most of the merchantable forests are found. This bodes well for the future spread of Jack pine throughout southern Labrador.

The Kapitagas Channel Site:

The most significant stand for this site occurs on the crest of an extensive esker which parallels the western shoreline of the Channel. Jack pine is the dominant species, although there are infrequent occurrences of black spruce intermingled with the Jack pine at the extreme borders of the stand. The few spruce that are present are small and low in vigour, indicating that at this site the pine must have a strong competitive advantage over the spruce. This Jack pine stand is approximately 50 years old. The typical dominant trees are 46 years old , 11 metres tall and around 20 cm d.b.h.



Figure 2: The native range of Jack pine in North America. Adapted from Rudolph and Laidly, 1990.

(diameter at breast height). Evidence points to a hot fire sweeping through the area in 1938. Remnants of Jack pine, apparently killed by that fire, were at least 100 years old at the time of the fire.

Since then, individual trees and small groups of trees have been sighted. The present distribution of Jack Pine seems to suggest that the species crossed the border from the south with the help of streams flowing northward, and has spread at least as far as Ashuanipi Lake. Where fires have occurred, nearly pure stands have formed. Further exploration of the area may turn up additional individuals and stands.

Jack pine are found along both shorelines of the Kapitagas Channel, as well as the southern end of the Channel. On the eastern shoreline the species occurs within a mixed Black Spruce - Jack Pine open lichen forest. Jack pine seedlings occur in bare mineral soil. In the southwestern portion of the Reserve, there is evidence of a recent fire (circa 1996-1997) which extended for several square kilometres. As Jack pine is a fire dependent species conditions appear favorable for extensive recolonization in this area.

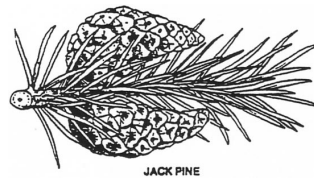
Redfir Lake Site.

The southern portion of the Reserve is called Redfir Lake. This name may be the result of the species being misidentified as Fir, coupled with the fact that the bark of the Jack pine can be reddish brown on young trees, changing to dark brown on older ones.

Jack pine at this site is restricted to a small peninsula. This is a more mixed stand, consisting of Black Spruce and Jack Pine. The Jack Pine in the stand is typically 87 years of age and reaches a height of 11.3 metres with a diameter of 23 centimeters.

In every Jack Pine stand sampled by the Canadian Forestry Service, the growth rate appeared to be good up to the age of about 40-50 years, after which it slowed down considerably. This is cause for some concern. The question is: Is this a genetic trait, or, is it caused by some local environmental factor?

Throughout most of the Redfir site Black Spruce is the dominant tree species and Jack Pine occurs scattered throughout it. The small peninsular stand is, of course, the exception. The forest floor is covered by a discontinuous carpet of lichens. The stand ranges in age from 20 - 30 years to 80 - 90 years old (L. Watkins, pers. comm.). Apparently, fires have periodically burned through sections of the stand, resulting in the regrowth of Jack pine. The growth and



JACK PINE. *Pinus banksiana* Lamb. has leaves that are borne in 2's. 2-4 cm long, yellowish-green, and straight or slightly twisted. The cones are 4-5 cm long, stalkless, commonly curved, and point towards the tip of the branch. The only known natural stands of Jack Pine in the Province occur in southwestern Labrador at Red Fir Lake and Kapitagas Channel.

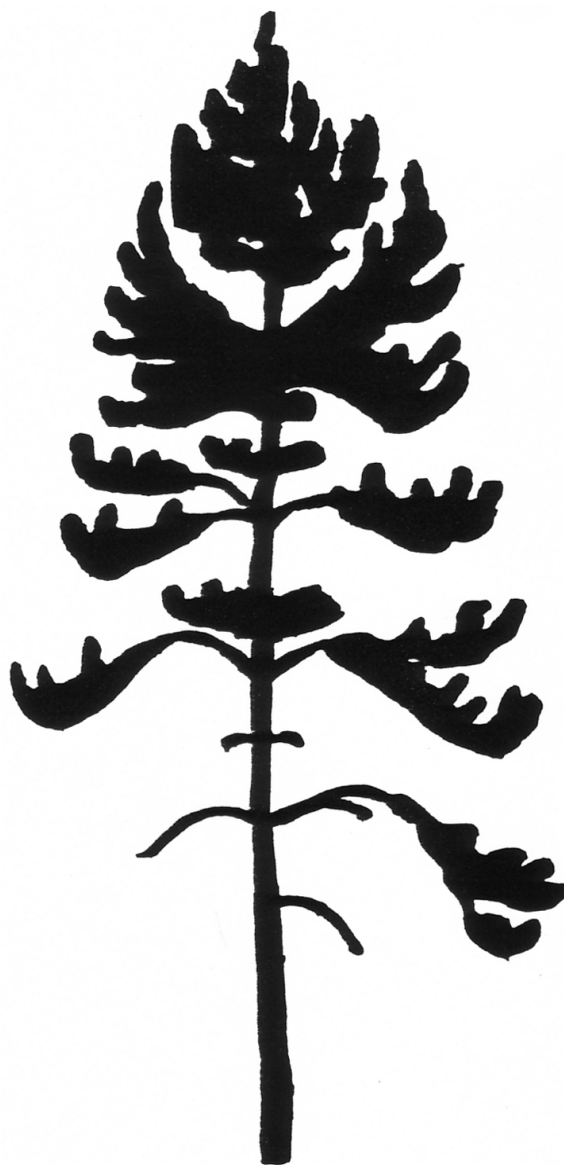


Figure 3: Identifying characteristics of Jack pine , *Pinus banksiana* Lamb.

succession of the Jack pine forest appear to have proceeded without modification by man.

The Redfir Lake-Kapitagas Channel site falls within the Mid-Subarctic Forest Eco-region. Field investigations (Ballam and Mann, 1997) confirm that the site contains a significant number of representative features of the Mid Subarctic Eco-region: open lichen woodlands, ribbed fens, eskers and a variety of representative plant communities.

3.4 Geology

The site is predominantly underlain by granite and gneiss, which belong within the domain of the Grenville structural province of southern Labrador. These granites and gneiss, like most rocks of the Grenville Province, are early Proterozoic in age (i.e. approximately 1.8 - 2.5 billion years ago). As a result of plate tectonics, this area underwent two major periods of mountain building and metamorphism (i.e. Labrador orogeny 1.65 billion years ago and the Grenvillian orogeny 1.0 billion years ago). This mountain building was the result of major plates colliding and subsequently drifting apart. Since that time a number of glaciations and erosion have left their imprint on the geomorphology of the area. The Jack Pine sites occur on mainly sandy podzolic soil.

3.5 Climate

Located in the interior of the Labrador, the site experiences a cold continental climate. The nearest Environment Canada climate station is situated north of the site at Wabush Lake. The mean annual temperature recorded is -3.7°C . The average daily extremes range from -42.0°C to 28.2°C . Total annual precipitation is 869.2 mm, 474.8 mm as rainfall and 445.9 mm as snowfall. Winds are predominantly from the southwest and reach an average annual windspeed of 14 km/hr. These climate indicators were recorded for the period from 1961 to 1993.

3.6 Fauna

Relatively little information is available on the wildlife and avifauna associated with the site. The area is too small to be of critical value to many large mammals, such as moose, caribou, wolf or black bear. All these animals, however, have been sighted in the area (L. Watkins, pers. comm.). It is large enough, however, to support populations of smaller mammals, such as various voles and mice,

snowshoe hare, mink, squirrel, porcupine and marten. As with the mammals, there are no bird records for this site.

3.7 Land Use

The Redfir Lake-Kapitagas Channel area is relatively well known to avid woodsman, trappers, and natives (L. Watkins, pers. comm.). Land use includes research, monitoring, hunting, camping, trapping, and canoeing. The site is visited at least once a year by Provincial and Federal Forestry officials, as well as officials from the Wildlife Division. During these visits, cone samples may be taken, as well as other measurements. The area has a long-standing history of collection and monitoring efforts (since 1987). Visits are made during the summer by residents from Labrador City/Wabush, who normally access the area by boat. During their stay, residents hunt and fish the area. In the winter, trips are made by trappers who access the area by snowmobile. There is no evidence of all terrain vehicle use.

4.0 JACK PINE, PAST AND PRESENT

Scientists believe that Jack pine may have existed in Labrador in prehistoric time. The following information was drawn from a research paper produced by Dr. Charles Harrison, Forest Geneticist and Lindo Watkins, Regional Resource Officer, Western Labrador.

Jack Pine is a cold climate species, and like every northern species it retreated southward during the last Ice Age. Evidence from fossil cones documents the presence of Jack Pine as far south as the Blue Ridge mountains of North Carolina.

When the ice retreated northward, spruce and fir rapidly established themselves behind the retreating glacier. Jack Pine, preferring drier and warmer conditions, and sandier soils, allowed spruce and fir to take the lead. However, shortly after (geologically speaking) Jack Pine followed along. Jack pine invaded spaces vacated by spruce and fir, on sites that were suitable. The species is well adapted to this type of territorial expansion, due to certain peculiarities of its seed production and dissemination.

Jack Pine cones are serotinous (i.e. they require intense heat to shed seeds) and many remain closed until they are exposed to fire. Some, however, do open in

hot dry weather. This dual character of Jack pine seed dispersal allows the species to extend its range in two ways. Between fires, the occasional release of some seeds allows it to establish itself as individuals and small groups in clearings and openings in the stand. This is especially the case when the soil has been disturbed in any way. When fire does occur, copious quantities of seeds are released, from these scattered individuals and small groups, as well as from the main stand. Thus, the leading edge of Jack pine can advance hundreds of metres after a fire.

This infiltration and take-over method can also create outliers - that is, islands of Jack pine (sometimes several square kilometers in extent) at considerable distances from the continuous population of the species. A fire may not even touch the main stand, but if it burns over a dry, sandy hillside, and the advance guard of the species (outliers) has reached the burnt area in the form of a few scattered individuals or groups, they can often seed in the whole burnt area, or most of it, and form a new stand.

The northward and eastward advances of Jack pine, at least in northern Quebec, appears to still be very much in progress. The leading edge of Jack pine apparently crossed the Quebec-Labrador border south of Labrador City within the last 500 years. Barring human intervention, it will probably take another 500 years or so for the continuous range of jack pine to include the Labrador City-Wabush area.

There are probably several contributing factors to the slow post-ice-age advance of Jack pine in the direction of Labrador. Average annual rainfall increases from west to east. In drier areas fires are more likely to occur; the duff layer is not as thick, and is more readily consumed by fire. This exposure and disturbance of the mineral soil layer is advantageous to the spread of Jack pine. Wetter climates are also more likely to produce landscapes broken by bogs, lakes, and wetlands, which are barriers to the spread of Jack pine.

Another possible factor is that rivers and streams can also be a mechanism used in dispersal of seed. The western boundary of Labrador is defined as the divide between drainage directly into the Atlantic (i.e. the Labrador Sea) and drainage into Ungava Bay to the north and the St. Lawrence River to the south. Until the relatively recent spread of Jack pine across the boundary, Jack pine was "swimming upstream" so to speak. All streams flowed back into the range of the species, rather than outward and away from it. Western jack pine, once it crossed the divide between the Atlantic and Arctic drainage, was assisted in its spread by rivers and streams flowing outward from jack pine stands into new territory.

The fact that Eastern Canada is not as far removed from the last Ice Age as other parts of North America, Harrison 1989 contends that the spreading process is still going on and without human intervention in a couple of centuries Jack pine will find its way into central Labrador, and will become an integral part of the native forests. Gradually, it will spread from the stands along the shores of the Kapitagas Channel and Redfir Lake until it occupies the Happy Valley-Goose Bay area and upper Lake Melville. From here, it will extend itself along the shores of Lake Melville, until it eventually covers the boreal forest area of Central Labrador.

5.0 SUMMARY

The Redfir Lake-Kapitagas Channel Ecological Reserve protects the only known native stand of Jack Pine in the Province; hence, it is significant on a provincial scale. It is also significant on a national scale, as it is the most easterly occurrence of Jack Pine in North America and it has not been significantly altered by humans. A number of activities currently take place within the site year round, but do not appear to affect the Jack Pine. Both native and non-native people have fished and hunted geese and duck in this area for some time. Access has traditionally been by boat, canoe or snowmobile.

6.0 MANAGEMENT POLICIES

6.1 Introduction

Ecological reserves are established under **The Wilderness and Ecological Act (1980)** for the preservation of areas in the Province which contain unique or representative ecosystems or natural phenomena.

The Redfir Lake-Kapitagas Channel Ecological Reserve protects the only known native stands of Jack pine in the Province. In addition, it protects an eastern outlier of the species' present range. As stated earlier, research suggests that given sufficient time and appropriate environmental conditions, this site will provide the seed supply for the natural advancement of Jack pine into the interior of Labrador.

6.2 Management Goals

The Redfir Lake-Kapitagas Channel Ecological Reserve is established to:

- (a) preserve the habitat and existing specimens of Jack pine in Labrador, within their natural habitat.
- (b) protect the most easterly occurrence of Jack pine in North America.
- (c) provide an educational opportunity for the general public of Newfoundland and Labrador to share in a unique feature of their natural history.
- (d) provide opportunities for scientific research of the Jack pine species and its habitat.
- (e) ensure the preservation of the diversity of the species gene pool by protecting an example of the eastern outlier in its natural habitat.

6.3 Management Policies

Resource management at the Redfir Lake-Kapitagas Channel Ecological Reserve will emphasize the preservation of the Jack pine forest community, while at the same time, provide opportunities for public education and scientific research. Hunting, trapping and fishing are traditional activities which have occurred prior to the establishment of the Reserve. Furthermore, they are not deemed to pose a threat to the survival of the Red pine and will be permitted to continue.

The primary purpose of the Redfir Lake-Kapitagas Channel Ecological Reserve is to preserve the natural history of the area and to encourage scientific research that does not conflict with the general objectives of site protection. The following management policies apply:

- (a) use of the site for educational purposes will be permitted. Students from local and other institutions will be permitted to visit the Reserve, under supervision, for educational purposes;
- (b) scientific research will be permitted when it does not conflict with the prime objective of site protection. The collection of plant and animal specimens will be controlled by a permit system. Results of such research will be forwarded to the managing agency;

- (c) the introduction of exotic species or the extermination of native species is strictly prohibited;
- (d) since this habitat requires fire for regeneration, strict measures for the prevention and control of fire may not be appropriate.

6.4 Implementation Guidelines

In addition to the requirements of **The Wilderness and Ecological Reserves Act. (1980)**, which apply to all ecological reserves, the following statements are intended to serve as a guide to users and managers of the Redfir Lake - Kapitagas Channel Ecological Reserve.

(a) Reserve Management

- (1) The managing agency of the Reserve is Parks and Natural Areas Division of the Department of Environment and Conservation.
- (2) The boundaries of the reserve will be clearly identified by signs placed along the perimeter.
- (3) Routine patrols will be conducted by the managing agency and/or other designated government officials.
- (4) Priority will be given to undertaking a botanical inventory of the Reserve aimed at providing a systematic checklist of the flora and the location of Jack pine and other species.
- (5) For the purpose of monitoring the long-term environmental quality of the Reserve it may be necessary to establish permanent sample plots within the reserve. Permanent plots should be measured at the time the Reserve is established and every five years thereafter.

(b) Scientific Research

Providing areas for long-term scientific research is one of the main reasons for creating and managing the Province's ecological reserves. It is important, therefore, that research be carried out in such a way that the scientific value of the reserve is not destroyed or diminished for future investigators. Accordingly, persons requesting to conduct research within the Redfir Lake-Kapitagas Channel Ecological Reserve will require a permit from the Parks and Natural Areas Division of the Department of Environment and Conservation.

Application for permits should provide a description and the objectives of the research proposed, methodologies and the time frame involved. The following conditions will apply to each permit issued:

- (1) All published material related to research done at the site will acknowledge the existence of the reserve, the Parks and Natural Areas Division's permission, and the requirements made of the researcher.
- (2) A report of the results of each research project will be filed with the Parks and Natural Areas Division of the Department of Environment and Conservation. A copy of all scientific papers published and unpublished will be forwarded to the Department upon completion.

(c) **Educational Use**

The site may be used for educational purposes as long as such use does not damage the scientific value of the reserve. Permits will be required for institutions, individuals and groups wishing to utilize the area for educational use. Such permits can be obtained from the Parks and Natural Areas Division of the Department of Environment and Conservation.

Regulations

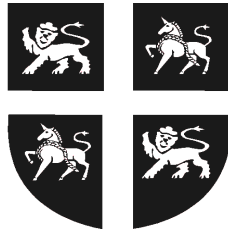
The Botanical Reserve Regulations (refer to Appendix I) will apply to the Redfir Lake-Kapitagas Channel Ecological Reserve. These Regulations provide for the following exemptions at Redfir Lake-Kapitagas Channel Ecological Reserve: snowmobiling, hunting and trapping will be permitted within the Reserve, as these are traditional activities pursued by a small number of local people. There is no indication of any direct negative impacts on the Jack pine stands as a result of these activities.

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Appendix 1

Botanical Reserve Regulations



Published by Authority

NEWFOUNDLAND REGULATION 64/97

Botanical Ecological Reserve Regulations
under the
Wilderness and Ecological Reserves Act
(O.C. 97-247)

(Filed May 21, 1997)

Under the authority of sections 25 and 29 of the *Wilderness and Ecological Reserves Act*, the Lieutenant-Governor in Council makes the following regulations.

Dated at St. John's, May 13, 1997.

John Cummings
Deputy Clerk of the Executive Council

REGULATIONS

Analysis

Section:

1. Short tide
2. Definitions
3. Restrictions
4. Exception
5. Research in reserve

Section:

6. Exception for research
7. Hunting and fishing
8. Permit required
9. Application of regulations
Schedule

Botanical Ecological Reserve Regulations 64/97

- | | |
|--------------|--|
| Short title | <p>1. These regulations may be cited as the <i>Botanical Ecological Reserve Regulations</i>.</p> |
| Definitions | <p>2. In these regulations</p> <p>(a) “Act” means the <i>Wilderness and Ecological Reserves Act</i>;</p> <p>(b) “managing agency” means the Parks and Natural Areas Division of the Department of Tourism, Culture and Recreation;</p> <p>(c) “management plan” means the management plan for a declared botanical ecological reserve on file with the managing agency;</p> <p>(d) “permit” means a permit issued and valid under these regulations;</p> <p>(e) “personal water craft” includes jet-skis, sea-doods, wave-runners and the like but excludes ordinary motorized boats, kayaks and canoes;</p> <p>(f) “reserve” means a botanical ecological reserve set aside under the Act and listed in the Schedule:</p> <p>(g) “structure” means a man-made object intended to be permanent or semi-permanent in nature and includes, but is not limited to, buildings, houses, cottages, cabins, wharves, docks, boathouses, slipways, trailers, mobile homes, tents, tent platforms, and recreational vehicles used for any purpose but does not include semi-permanent blinds and signs erected under the authority of the management plan; and</p> <p>(h) “wildlife” means an animal or plant.</p> |
| Restrictions | <p>3. Within a reserve, a person shall not</p> <p>(a) remove or dislocate a botanical specimen except for scientific study and this only when the researcher is the holder of a valid permit;</p> <p>(b) pollute or obstruct a stream or other body of water or dispose of</p> |

Botanical Ecological Reserve Regulations 64/97

- any garbage;
- (c) build or erect or cause to have built or erected any structure;
 - (d) destroy, damage, remove, disturb, or handle the home, den, or nest of wildlife;
 - (a) destroy, damage, remove, disturb, or handle an egg of any wild bird;
 - (b) destroy, damage and remove any wildlife, fossil or other natural object;
 - (g) destroy, damage, or remove a sign or other government property;
 - (h) remove sand, stone, or gravel;
 - (i) prospect, claim stake, mine or quarry;
 - (j) use, operate or be in possession of a motor car, motor truck, four-wheel drive vehicle, all-terrain vehicle, snowmobile, personal water craft or other motorized conveyance;
 - (k) land an aircraft;
 - (l) operate a commercial establishment or commercial enterprise within the reserve, except guiding, touring and outfitting;
 - (m) display, post or broadcast an advertisement;
 - (n) herd or graze animals within a reserve;
 - (o) light a fire: and
 - (p) camp.

Exception

4. A person engaged in the administration or management of a reserve in the normal course of his or her duties is exempt from paragraphs 3(a), (d), (e), (g), (k) and (m).

Research in reserve

5. Scientific research within a reserve shall require a permit and those permits may be obtained from the managing agency on

Botanical Ecological Reserve Regulations 64/97

submission of a written request outlining the research project, and subject to the terms and conditions that the managing agency may determine.

Exception for	6. A person engaged in scientific study which is approved by the search managing agency and for which a permit has been issued under section 5 may be exempted from paragraphs 3(a),(c), (d), (e) and (f).
Hunting and fishing	7. All hunting and fishing within the West Brook and Watts Point Reserves is allowed in accordance with permits or licenses issued under the <i>Wildlife Act</i> , the <i>Migratory Birds Convention Act</i> (Canada) or the <i>Fisheries Act</i> (Canada).
Permit required	8. (1) A person engaged in a touring, guiding or outfitting enterprise shall obtain a permit for the enterprise from the managing agency. (2) Applications for a permit shall provide a full description of the enterprise planned.
Application of regulations	9. These regulations shall apply to the botanical ecological reserves listed in the Schedule, except to the extent that they have been modified by the Order declaring a given botanical ecological reserve in effect.

Schedule

1. Hawke Hill Ecological Reserve.
2. Watt's Point Ecological Reserve.
3. West Brook Ecological Reserve.
4. King George IV Ecological Reserve.