Fundy Model Forest

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Report Title: Habitat Pre-Screening Project for Rare and/or Endangered Vascular Plants

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Year of project: 2002

Principal contact information:

File Name:
Biodiversity_2002_Weldon_Genge_Habitat_pre_screening_project_for_rare_and_or_endangered_vascular_plants

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"The Fundy Model Forest (FMF) is a partnership of 38 organizations that are promoting sustainable forest management practices in the Acadian Forest region."

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Canadian Institute of Forestry
Canadian Forest Service
City of Moncton
Conservation Council of New Brunswick
Fisheries and Oceans Canada
Indian and Northern Affairs Canada
Eel Ground First Nation
Elgin Eco Association
Elmhurst Outdoors
Environment Canada
Fawcett Lumber Company
Fundy Environmental Action Group
Fundy National Park
Greater Fundy Ecosystem Research Group
INFOR, Inc.
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KC Irving Chair for Sustainable Development
Maritime College of Forest Technology
NB Department of the Environment and Local Government
NB Department of Natural Resources
NB Federation of Naturalists
New Brunswick Federation of Woodlot Owners
NB Premier's Round Table on the Environment & Economy
New Brunswick School District 2
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Nova Forest Alliance
Petitcodiac Sportsman's Club
Red Bank First Nation
Remsoft Inc.
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Sussex Fish and Game Association
Town of Sussex
Université de Moncton
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Village of Petitcodiac
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Habitat Pre-screening Project for
Rare and/or Endangered Vascular Plants

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February 2002

ABSTRACT

A risk map and guidebook for rare and/or endangered vascular plants was created to assist in the challenge of creating a sustainable approach to forest management across various land ownership within FMF. Habitat affinity information for rare and/or endangered vascular plants in Southeastern New Brunswick was used as the primary source of information. The project focuses on tools that can be used by Harvesting Operations Planners, Harvesting Field Supervisors, Private Woodlot Owners, and other interested parties to help highlight the specific habitats that should be protected to minimize loss of key habitat for rare and/or endangered vascular plants.

Key words: risk map, rare and/or endangered species, guidebook

INTRODUCTION

Conservation is an important aspect to consider in the approach to managing a sustainable forest, therefore the concern for rare and or endangered plants becomes apparent. As we learn more about different forested areas and the results of various impacts of various activities on these areas, we understand that identifying and conserving key habitats is a more proactive approach to maintaining biodiversity then simply protecting the species alone.

As we struggle to identify the criteria to determine the status of many flora throughout our region, we struggle with the many terms used to describe the status of a particular species. With various organizations identifying and working to rank species in terms of their rarity, no one actually uses the term rare. COSEWIC uses terms such as endangered, threatened, concern, extirpated, exotic, etc. However, rare is a term that is commonly used and apparently understood, therefore, the term was used in this project.

In New Brunswick, there are approximately 1700 species of flora.   Of these there are some that are very abundant and have a wide ranges, while there are others that have very low abundance and have a narrow range. Those that are abundant have evolved in a manner to withstand various climatic and microsite conditions. Those that have lower populations levels are those species that can only exist with specific climatic and microsite conditions, have a slower ability to propogate, are simply remnants of pre-glacial populations, and have lower populations levels as a result of habitat alteration by humans.

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We are concerned about protecting rare and/or endangered vascular plants because; maintaining their genetic diversity is vital to their survival; our northern climate compared to other regions has little diversity as it is; the potential medicinal values; the known and unknown biological interactions that are key to the health of our forest ecosystem; and the public concern.

The project created a habitat identification procedure for the forests within the Fundy Model Forest. This procedure includes the development of a risk map and guidebook to assist harvesting supervisors to plan and better allocate time for botanical surveys. This project is aimed at raising a flag or highlighting where the location of these sites could exist. And based on a positive botanical survey response, produce an alternative management recommendation for the site. If sites are deemed appropriate they can be candidate sites for any type of protected areas program.

The limitations of the project include the amount of field-work conducted to verify the risk map. Therefore, the field-work to verify the risk map was limited to findings on the sites at one time period throughout one growing season. Some sites should have been visited earlier in the season, and then revisited at a later date. Unfortunately each site was only visited at one time during the growing season, but many sites were visited to survey potential habitats. A brief summary of the field verification can be found within this report. Another limitation of the project includes the scope of the project including forested habitats only. Many rare and/or endangered species have a high association with non-forested areas (bogs, fens, stream and lake edges, etc.), however, are not included in the scope of this project. Also, the scope of the project includes vascular plants, and does not include lichens, bryophytes, fungus, and molds.

<u>Study Area</u>

The study area is located in southeastern New Brunswick and encompassing parts of Ecoregions Southern Uplands, Eastern Lowlands, Grand Lake and Fundy Coastal as designated by the New Brunswick Ecological Land Classification (DNRE). A map of the study area can be found in the associated risk map for this project (see Communications Officer for copy). The Fundy Model Forest is located near the center of the study area, and remains the focus of the project. Figure 1 is a map of the study area showing the boundaries of the Fundy Model Forest, as well as, the location of the mapped, forested habitats.

The main land use activities within the study area include agriculture farming, small and large-scale forestry activities on both private and crown land, and protected and conservation areas. One of the major land users within the boundaries of the Fundy Model Forest include the use of land for small and large scale forestry activities. Therefore, the focus of this project includes mapping and creating a guidebook to communicate to forestry workers the forested habitats that have a higher potential for hosting rare and/or endangered vascular plant species. This activity was deemed to be an activity where better decisions and improved planning could still allow harvesting to continue, but provide a tool to help locate sites that are critical in maintaining

populations of flora that are rare and/or endangered. The project does not include mapping and descriptions of habitats for non-forested habitats. The main focus is on **forested** habitats.

METHODOLOGIES

The methods of this project involved conducting a literature review, consult with other botanists and scientists, creating a risk map and its field verification, and editing a guidebook.

Literature review and Consultation

The literature review was conducted by reviewing various local reports written for the Fundy Model Forest Area. The key study reviewed for this project included the study using herbarium records for defining conservation areas in the southeastern part of the Province (MacDougall et al., 1998). The MacDougall et al., 1998 study involved a similar approach, however, actual herbarium records were used, whereas in this project, habitat descriptions from various written sources and discussions with local botanist was the main source of information. MacDougall et al. 1998 provided a summary of habitat affinity for many species, however, the ranking system used to classify the individual species was slightly different than was used in this project.

Gap Analysis study conducted by MacDougall and Loo in 1995 was also used to guide the project. Although this project had a variety of scales including smaller (large forested areas encompassing a variety of forest types) to larger scale (bat caves), it included sites on rare and/or endangered species. In some cases, areas identified through the mapping exercise involved in this project overlapped the gap analysis (see risk map).

Consultation

Consultation with local botanists was conducted, and during the initial phase of developing the guidebook for another region (Chipman/Doaktown) of New Brunswick a review of the project was done with individuals such as Jim Goltz (local botanist) and the late Hal Hinds (botanist). Brief reviews were also done with individuals such as Vince Zelazny (DNRE), and Micheal Sullivan (DNRE). More specifically for the Fundy guidebook reviews were done with individuals such as Bruce Matson (DNRE), and Gart Bishop and Bruce Bagnell (B&B Botanicals). Field visits were also conducted with B&B Botanicals to aid in identifying a S-1 species (see photo 1).

Creating a risk map

Using the ranking system adopted by the AC CDC, species ranked as either S1, S2 or S3 were used to create the list of rare and/or endangered vascular plants (Appendix 1), and Table 1 defines the meaning for each S-rank.

Photo 1: Photo taken of Large Round-Leaved Orchid *Platanthera orbiculata* var. *macrophylla* near Donegal, NB.

Table 1. Descriptions of the S-Rank.

S-Rank	Description
S1	Very rare throughout its range in the province (typically 5 or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation.
S2	Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation.
S3	Uncommon throughout its range in the province (21 to 100 occurrences)

Habitat information for each plant was collected, and amalgamated using various sources. Information was found accompanying the list of plants given from the AC CDC, which originated from Flora of New Brunswick (Hinds) and field notes. In some cases this information was vague and even missing, therefore, to add to the habitat information, habitat notes were found using Rolands Flora of Nova Scotia (Zinck), as well as, talking to local botanical experts. Contacts and discussions were made with Sean Blaney, AC CDC, Hal Hinds, UNB, and Jim Goltz, local botanical experts.

The habitat descriptions of all of the plants were then grouped according to their habitat association. This was also done with the help of the experts mentioned above. In some cases one plant would be associated with more than one habitat type. In these cases, the plants would be grouped according to their habitat to which they were most likely be found.

Results

The results of this exercise produced 22 habitats that have an association with R/E plants in New Brunswick (Table 2).

Table 2. List of forested and non-forested critical habitats for rare or endangered vascular species in New Brunswick.

Forested	Non-Forested
Black spruce Swamp (Noncalcareous)	Subalpine rocky mountain summit
Cedar swamp (Calcareous)	Muddy pond areas
Tolerant Hardwood forest	Dry fields and meadows
Rich Tolerant Hardwood forest	Moist fields and meadows
Floodplains	Coastal areas
Older growth white pine stands	Salt marshes and shores
Cliff ledges (moist and dry ledges)	Rich rock outcrop

Cliff talus slope (moist and dry talus)	Poor rock outcrop
	Stagnant or shallow water
	Waste or heavily disturbed areas
	Non-calcareous bog
	Calcareous bog
	Calcareous stream and rivershores
	Non-calcareous stream and rivershores

*the list of plants associated with each habitat can be found in Appendix 2

Habitats that could be described and mapped using the GIS were described using the DNRE Data Dictionary. As well, a forest cover (stratum) was created for each mappable forest. Descriptions included soil unit (calcareous vs. noncalcareous), canopy closure, development stage, and drainage. Ecosites were used in the initial investigation, but proved to be not useful in finding specific sites. Due to limitations of the database the following habitats were not mapped:

Tolerant Hardwood Cove Forest   Cedar Seeps
Cliff Ledges   Oak/Pine Stands
Hemlock Slopes   Talus Slopes

Therefore, the mapped habitats include: Cedar Swamps, Black Spruce Swamps, Tolerant Hardwood (Calcareous and NonCalcaresous), Floodplains, and Older Growth White Pine.

Cedar swamps include sites that had a high percentage of Ce, but not necessarily on calcareous soils. This was done to avoid missing any potential cedar sites (due to their high association and lack of abundance of the stand type in the area) that overlayed areas that soil types were poorly mapped.

Field verification

Upon completion of various stages and trials of the field map, field verification was completed. The purpose of the field verification was to field test the mapped sites. The intent was to get a comfort level with the identified mapped sites. Following each stage of the field verification, small changes were made to the GIS querries to better map the habitats in the field.

The field verification included visiting a variety of the mapped areas. The procedure was to locate the area, conduct a botanical survey of the vascular plants, review the structure and overall physical characteristics of the site to determine whether or not the site was mapped as expected. The field verification was not only for improving the outcome of the map, but to verify the sites for the presence of site potential for rare and/or endangered plants.

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The primary investigator conducted the field surveys, however, in certain instances other individuals participated such as the GIS technician at Fundy Model Forest, Kevin Pugh, and on one occasion Gart Bishop and Bruce Bagnell, B&B Botanicals.

Results of Field Verification

Table 3 indicates the number of surveys conducted in the various habitat types. The table also indicates the percentage of times the site met the expectation. The raw data for the field verification are not available with this report, however can be made available upon request from the primary investigator.

Table 3. Summary of field verification.

Habitat	# sites surveyed	Percentage meeting expectation
Swamp (Calcareous)	8	50%
Swamp (Non-calcareous)	3	33%
Older Growth White Pine	3	0
Tolerant Hardwood (Calcareous)	8	62%
Tolerant Hardwood (Non-calcareous)	10	40%
Floodplain	1	100%

Editing the guidebook

The guidebook was edited as differences were found from conducting the field verification within the Fundy Model Forest area. Edits were made to better reflect the local descriptions of the habitats. Examples of changes included range of species composition, and individual tree species were added and/or deleted. Other changes included adding more species to the list of S1-S3 for different habitats after the review of MacDougal et al. 1998. The final copy of the Fundy guidebook is available at the Fundy Model Forest (contact the Communications Officer).

Communicating results

Communication was done through: meeting with SNB Woodlot, Fundy National Park, and JDI. Further communication will be done through the Communications Officer of FMF.

DISCUSSION OF RESULTS

The interest of mapping and recognizing forested habitats that are associated with rare and/or endangered vascular species is essential when considering maintaining biodiversity within a forest ecosystem. The essential link in carrying this out in the field requires a hands-on, simple approach that focuses on the habitat instead of the overwhelming job of the individual species. This approach will encourage better communication and maintain interest for various types of people.

CONCLUSION/SUMMARY

This project involved developing a guidebook and risk map for the identification of Potential Habitats for Rare or Endangered Plants for the Southeastern part of New Brunswick. The guidebook describes 10 different forested habitat types that have a high or medium association with vascular species ranked as S-1 to S-3 (Atlantic Canada Conservation Data Centre). The guidebook includes sketches and is designed for

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general use and focuses on the identification of the habitat rather than the individual species. The intent of the guidebook is for forestry technician, woodlot owners, and others to assess their woodlands for the identification of sites that have a high association with rare and/or endangered plants. This will provide the tool to able landowners to focus conservation approaches to the appropriate forest type to minimize habitat degradation to those areas that have a higher association with rare and/or endangered vascular plants.

The risk map involved developing a map of the study area identifying the location of the key forested habitats. There were habitats that were not mapped because of their scale and the limitations of the GIS to map fine detailed information. Descriptors such as forest strata, soil unit, crown closure, and drainage were used to describe and map certain forested habitats. The risk map was field verified over a limited time period (one field season) however, the risk map was fine tuned to reflect local conditions.   Together the guidebook and risk map provides a catalyst for developing interest in protecting forested habitats that in turn will help in maintaining small populations of a variety of rare and/or endangered vascular plants with many different land owners.

ACCOUNT OF EXPENDITURES

Item	Expense
Gas	347.55
Travel	919.44
Salary	4913.09
Printing/Edits	1080.00
Other (botanical experts)	239.95
Total	7500.00