

The Newfoundland Rare Plant Project
Including an Update to the Rare Vascular Plants of the Island of
Newfoundland

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Table of Contents

Table of Contents.....	ii
Acknowledgments.....	iii
Participants.....	4
Background.....	1
Project description	1
Methodology.....	2
Results.....	3
Revised list of rare vascular plants of the Island of Newfoundland	4
Additions to the list of rare vascular plants of the Island of Newfoundland	4
Deletions from the list of rare vascular plants of the Island of Newfoundland	5
Taxa deleted due to being too common	5
Taxa deleted due to being synonyms of more common taxa.....	6
Taxa deleted for other taxonomic reasons.	6
Native vascular plant watch list for the Island of Newfoundland.....	6
Rare Plant Conservation	7
Atlantic Canada Conservation Data Centre (Atlantic CDC)	7
Inland Fish and Wildlife Division, Newfoundland and Labrador Department of Tourism, Culture and Recreation (IFWD).....	8
General Status of Wild Species in Newfoundland and Labrador	8
Biodiversity.....	8
Species at risk	8
Environment and land use.....	9
Education and stewardship	9
Parks and Natural Areas Division, Newfoundland and Labrador Department of Tourism, Culture and Recreation	10
Parks Canada.....	10
Canadian Wildlife Service, Environment Canada	11
Provincial Museum of Newfoundland and Labrador.....	11
The next step.....	12
Contact Information.....	13
Appendix I. Describing the conservation status of wild species in Newfoundland and Labrador: definitions	16
General Status of Wild Species in Newfoundland and Labrador	16
Conservation Data Centre/Nature Serve Species Ranking System	17

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Participants

Coordination and field work involved the collaboration of a number of individuals and institutions, namely the Inland Fish and Wildlife Division [lead] and the Parks and Natural Areas Division of the Newfoundland and Labrador Department of Tourism, Culture and Recreation (NLDTCR), the Provincial Museum of Newfoundland and Labrador (NFM), the Newfoundland and Labrador Department of Forest Resources and Agrifoods (NLDFRA), the Atlantic Canada Conservation Data Centre (Atlantic CDC), the *Institut de recherche en biologie végétale* of the *Université de Montréal* (IRBV), Memorial University of Newfoundland (MUN), Parks Canada (PC), and the Canadian Forest Service (CFS).

Principal investigators, in alphabetical order (names of members of the steering committee are followed by an asterisk), were:

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Other participants, in alphabetical order (names of members of the steering committee are followed by an asterisk), were:

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Shelley Pardy (Atlantic CDC)	

Background

In 1975, the Canadian Museum of Nature launched an effort to compile lists of rare vascular plants for each of the provinces and territories of Canada. Dr. George W. Argus, botanist at the museum, was head of the project. In 1976, Argus and Peter J. Scott from Memorial University prepared a preliminary list of the rare plants of Newfoundland and Labrador, but it was never published. Argus later sought assistance from the *Jardin Botanique de la ville de Montréal* and the *Institut de recherche en biologie végétale de Montréal*, and a working group led by Dr. André Bouchard was formed in 1985. In 1991, Bouchard *et al.* published a list of 271 species of rare vascular plants for the Island of Newfoundland.

The publication by Bouchard *et al.* (1991) relied mostly upon Ernest Rouleau's mid-twentieth century work, as well as nearly 20 years of field exploration, mostly on the west coast of the Island, by researchers of the *Institut de recherche en biologie végétale de Montréal*. Systematic field surveys led by the Institute went on through the 1990's with floristic studies of the Big Level Plateau in Gros Morne National Park (Brouillet 1998) and Terra Nova National Park (Charest *et al.* 2000). Concurrently, Newfoundland-based naturalists and botanists, continued to collect and document rare native plants.

Recent years have also seen the creation of the Endangered Species and Biodiversity Program of the Inland Fish and Wildlife Division in order to meet the objectives of the National Accord for the Protection of Species at Risk. The listing by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) of three endemic plant species from this region, the beginning of a national initiative on the General Status of Wild Species, and the creation of the Atlantic Canada Conservation Data Centre (Atlantic CDC), all highlighted a gap within the Inland Fish and Wildlife Division in terms of management of the province's botanical heritage. A proposal to update the list of rare vascular plants of the Island of Newfoundland was prepared as an initial project. Interested botanists and institutions were contacted, a working group was established and the Newfoundland Rare Plant Project was developed.

Project description

The Newfoundland Rare Plant Project (NF RPP) is a multi-partner effort to update and augment data on the rare vascular plants of the Island of Newfoundland, in support of plant conservation activities. The initial three years of the project (1999 to 2002) aimed at updating the list of rare vascular plants of the Island, obtaining data to support management efforts and help determine the general status of plants throughout the province, and providing basic information for the preparation of status reports.

Between April 1999 and March 2002, intensive botanical surveys documented the occurrence, distribution and density of, and the disturbance threats to, vascular plant species of conservation concern. Work was performed by a team of qualified botanists supervised by the project steering committee. A report prepared for the committee by Brouillet and Lebrun (1999) directed initial efforts to the limestone barrens of the northern west coast, where numerous provincially and nationally rare species occur. In the second and third year of the project, botanists worked on the central and southern west coast, and in central and eastern Newfoundland; emphasis was placed on coastal, riparian, and aquatic habitats.

Expected results of the NF RPP were:

1. the development and updating of a list of vascular plants of conservation concern for the Island of Newfoundland (a Conservation Data Centre tracking list);
2. the incorporation of georeferenced location data, and population and habitat information within the Biological Conservation Data (BCD) system of the Atlantic Canada Conservation Data Centre (Atlantic CDC);
3. the employment of the BCD system to respond efficiently and as fully as possible to formal requests for rare plant data;
4. the production of maps showing the occurrence and distribution of the species of conservation concern; and,
5. by March 2003, the completion of a detailed report including: background information on the project; the most current vascular plant tracking list; location, habitat/range, status and notational information about each species of conservation concern; and maps showing the occurrence and distribution of these species.

Methodology

As a result of time and funding constraints, survey efforts focused primarily on areas and habitats where concentrations of rare plants had been found in the past (Brouillet & Lebrun 1999), and/or where development pressure might threaten rare plants. Most of these areas were located in western Newfoundland, from the Port aux Basques area, in the south, to the northern tip of the Great Northern Peninsula, in the north. Other areas visited included the Baie Verte Peninsula, the Exploits Valley, and Notre Dame Bay. Field teams identified survey sites based on location data from herbarium specimens, the habitat preferences of rare plants known from the general area, and study of aerial photographs, and topographic and geological maps. All areas visited are shown in Figure 1.

Sampling stations were delineated in the field according to the habitat types specific to a given site: the outline and area of a sampling station corresponding to that of the habitat sampled. In areas for which little botanical information was available, botanists aimed at sampling a large number of different habitat types. In well known areas, however, only habitats where rare plants were found were sampled. A wide range of habitats were visited. Some habitats, such as limestone barrens, salt marshes, coastal sand dunes, coastal rock and heath barrens, wetlands, riparian areas, and aquatic habitats, received special attention because of their rarity on the landscape or the high proportion of rare plants expected to occur. Over the course of the project, field teams surveyed 764 sampling stations. They also made opportunistic collections outside of sampling stations at nearly 1,000 sites.

For each sampling station, a general habitat description and precise location information (UTM coordinates obtained using GPS) were recorded. As a rule, complete lists of species were compiled, providing information about the presence/absence of rare taxa. Observations of actual or potential threats to the site or rare plant populations were noted. Voucher specimens of rare plants or plants of special interest were collected, as well as plants that could not be identified in the field. Botanists also made opportunistic collections outside of sampling stations. Photographs of common and rare species and their habitats were also taken. Finally,

whenever positive identification was possible in the field, rare plant populations were described in terms of size, area and/or coverage. Presence and abundance of juveniles were recorded.

Surveys focused on vascular plants, with some notable exceptions. During an expedition to the Soufflets and Main River watersheds in 2000, the team was joined by Dr. Teuvo Ahti, an expert lichenologist, who complemented the vascular plant inventories with an important lichen collection. Opportunistic collections of lichens, bryophytes, and charophytes were also made throughout the entire project.

Most specimens were identified by project botanists at the *Herbier Marie Victorin* (MT) of the *Université de Montréal* and the Provincial Museum of Newfoundland and Labrador (NFM). Expert advice was sought for difficult taxonomic groups. The following experts offered their contribution: George W. Argus (*Salix*), Teuvo Ahti (lichens), Henry Mann (charophytes), J. G. Chmielewski (*Antennaria*) and A. E. Schuyler (*Scirpus*).

Vascular plant specimens were deposited at the Provincial Museum of Newfoundland and Labrador (NFM) with a duplicate collection at the *Herbier Marie Victorin* (MT) of the *Université de Montréal*. Extra duplicates were given to Gros Morne National Park, the Provincial Parks and Natural Areas Division, and the herbarium of Sir Wilfred Grenfell College in Corner Brook. Charophyte specimens were deposited at Sir Wilfred Grenfell College and NFM. Once identified, bryophyte specimens will be deposited at NFM, and lichen specimens will be deposited at the herbarium of the University of Helsinki (H) with a duplicate collection at NFM.

Results

Between 1999 and 2002, the NF RPP generated more than 20,000 occurrence records. In total, approximately 7,300 specimens were collected as vouchers. Of these, 6,214 were vascular plants, with the remainder consisting of lichens, bryophytes, and charophytes. Project botanists discovered twelve species of vascular plants new to the Island of Newfoundland. A note detailing these findings has been accepted for publication in the scientific journal *Rhodora* (Djan-Chékar *et al.* 2004.).

Of the 271 rare taxa listed by Bouchard *et al.* (1991), 176 were re-located. Six of these re-locations concerned the rediscovery of taxa listed as historically present in Newfoundland (SH). These rediscoveries will also be reported in the note to be published in *Rhodora* (Djan-Chékar *et al.* 2004). On the other hand, a number of taxa could not be re-located, sometimes despite an intensive search. For instance, the botanical team was unsuccessful in its effort to re-locate *Draba aurea*, *Impatiens pallida*, *Polygala paucifolia*, or *Polystichum scopulinum*. It is possible that taxa that are difficult to recognize in the field may have been missed. Furthermore, surveys did not cover the range of all taxa, nor all habitat types. In total, 95 listed taxa were not observed during the course of the project.

Project botanists did locate a number of new populations of rare plants. These include some significant range extensions. Examples include the first western populations of *Myriophyllum farwellii*, *Suaeda calcioliformis*, *Limosella australis* and *Sparganium fluctuans*, all previously known only from central and/or eastern Newfoundland. A population of *Scirpus*

hattorianus (formerly known as *Scirpus atrovirens*), which had never been collected south of the Corner Brook/Grand Falls area, was found in the Codroy Valley. *Potamogeton foliosus*, previously known only from the Humber River, was found on the Northern Peninsula and along the Exploits River. Populations of *Carex silicea*, *Carex deweyana* and *Potentilla pennsylvanica* var. *littoralis*, all previously known only from western Newfoundland, were located in the Notre Dame Bay area. The majority of these range extensions involve species from taxonomic groups or habitat types that are often overlooked by collectors.

Information collected as part of the NF RPP has been compiled into a database maintained by the Inland Fish and Wildlife Division. The database also contains the extensive rare plant data previously compiled by the *Institut de recherche en biologie végétale*, as well as data from several smaller projects that occurred concurrently with the NF RPP. The database includes information about ranks and general status of all vascular plant taxa in Newfoundland and Labrador (see Appendix I). This information is updated regularly based upon data such as that acquired through the NF RPP. The Inland Fish and Wildlife Division and the Atlantic Canada Conservation Data Centre exchange data on a regular basis in order to maintain their respective database systems up-to-date.

The NF RPP has also created a project website, hosted by the Provincial Museum of Newfoundland and Labrador. See <http://nfmuseum.com/naturalhistoryrareplanthome.htm>.

Revised list of rare vascular plants of the Island of Newfoundland

One of the main objectives of the NF RPP was to revise the list of rare vascular plants of the Island of Newfoundland (Bouchard *et al.* 1991). Project botanists started with a list of all vascular plants (Meades *et al.* 2000) and eliminated introduced, or widespread and common species. The conservation status of the remaining taxa was evaluated, based upon knowledge of: size of population, number of occurrences, distribution, trends in population and habitat, threats to population and habitat, and number of protected occurrences. Each taxon was assigned a status and S-rank (see Appendix I). To be considered rare, a taxon would have to have an S-rank containing SH, S1 or S2, and fall within the “May be at risk” or “Sensitive” status categories. Taxa that did not meet these conditions were excluded from the list. The revised list of rare vascular plants of the Island of Newfoundland includes 298 taxa. The list includes the common name, former S-rank (Bouchard *et al.* 1991), revised or new S-rank, N-rank, G-rank, status, and rationale for S-rank and status assigned.

Additions to the list of rare vascular plants of the Island of Newfoundland

The revised list of rare vascular plants contains 62 taxa that were not included in the original version (Bouchard *et al.* 1991). A number of these are newly discovered, or taxa whose presence on the Island has been confirmed since 1991. Others are among taxa that Bouchard *et al.* (1991) considered to be too widespread, or too common in their habitat, even though they might have been restricted geographically. The decision to include some of these taxa was made upon re-examination of the data, and in light of the experience and additional information acquired through the NF RPP. Some were relatively frequent but restricted to a habitat under

threat. Others, despite intense search effort within their range, were simply not observed as often as one would have expected if they were truly widespread. Finally, some taxa could be added because of an improved understanding of their taxonomic status.

Deletions from the list of rare vascular plants of the Island of Newfoundland

The following vascular plant taxa were formerly considered rare on the Island of Newfoundland (Bouchard *et al.* 1991). They have been removed from the rare list for the reasons given below.

Taxa deleted due to being too common

These taxa were found to be more abundant on the Island than previously recognized. As a rule however they remain relatively uncommon and/or restricted and are considered sensitive.

Arceuthobium pusillum Peck
Carex glacialis Mack.
Carex hormathodes Fern.
Carex pedunculata Muhl. *ex* Willd.
Cerastium alpinum L. subsp. *lanatum* (Lam.) Aschers. & Graebn.
Cornus alternifolia L.f.
Eleocharis quinqueflora (Hartm.) Schwarz
Elymus virginicus L.
Empetrum atropurpureum Fern. & Wieg.
Epilobium lactiflorum Haussk.
Festuca vivipara (L.) J.E. Sm. subsp. *hirsuta* (Schol.) Frederiksen (treated by Meades *et al.* (2000) as *F. frederikseniae* E.B. Alexeev)
Fraxinus nigra Marsh.
Galium kamtschaticum Steller *ex* Schultes & Schultes
Gentianella propinqua (Richards.) Gillett subsp. *propinqua*
Gymnocarpium robertianum (Hoffm.) Newm.
Lesquerella arctica (Wormskj. *ex* Hornem.) S. Wats., *s. lat.*
Platanthera albida (L.) Lindl. var. *straminea* (Fern.) Luer (treated by Meades *et al.* (2000) as *Pseudorchis albida* (L.) Á. & D. Löve subsp. *straminea* (Fernald) Á. & D. Löve)
Veronica serpyllifolia L. subsp. *humifusa* (Dickson) Syme

Taxa deleted due to being synonyms of uncommon taxa

The following taxa are now considered in synonymy with other taxa, which as rule however remain relatively uncommon and/or restricted and are considered sensitive.

Antennaria albicans Fern. (treated by Meades *et al.* (2000) as *A. howellii* Greene subsp. *gaspensis* (Fernald) Chmiel.)

- Antennaria cana* (Fern. & Wieg.) Fern. (treated by Meades *et al.* (2000) as *A. alpina* (L.) Gaertn. subsp. *canescens* (Lange) Chmiel.)
- Antennaria columnaris* Fern. (treated by Meades *et al.* (2000) as *A. alpina* (L.) Gaertn. subsp. *canescens* (Lange) Chmiel.)
- Antennaria gaspensis* Fern. (treated by Meades *et al.* (2000) as *A. howellii* Greene subsp. *gaspensis* (Fernald) Chmiel.)
- Antennaria straminea* Fern. (treated by Meades *et al.* (2000) as *A. howellii* Greene subsp. *gaspensis* (Fernald) Chmiel.)
- Antennaria vexillifera* Fern. (treated by Meades *et al.* (2000) as *A. alpina* (L.) Gaertn. subsp. *canescens* (Lange) Chmiel.)
- Antennaria wiegandii* Fern. (treated by Meades *et al.* (2000) as *A. howellii* Greene subsp. *gaspensis* (Fernald) Chmiel.)

Taxa deleted due to being synonyms of more common taxa

The following taxa are now considered in synonymy with more common or more widely distributed taxa.

- Angelica laurentiana* Fern. (treated by Meades *et al.* (2000) as *A. atropurpurea* L.)
- Antennaria howellii* Greene subsp. *petaloidea* (Fern.) Bayer (treated by Meades *et al.* (2000) as *A. howellii* Greene subsp. *howellii*)
- Coeloglossum viride* (L.) Hart. var. *viride* (treated by Meades *et al.* (2000) as *Dactylorhiza viridis* (L.) R.M. Bateman, A.M. Pridgeon, and M.W. Chase
- Cypripedium calceolus* L. var. *planipetalum* (Fern.) Victorin & Rousseau (treated by Meades *et al.* (2000) as *C. parviflorum* Salisb.)

Taxa deleted for other taxonomic reasons.

- Festuca prolifera* (Piper) Fern. (treated by Meades *et al.* (2000) as *F. rubra* L. subsp. *rubra* var. *prolifera* (Piper) Piper in B.L. Robinson; exact number of occurrences and distribution difficult to determine because of taxonomic confusion)
- Salix pedunculata* Fern. (determined to be the hybrid *S. discolor* X *S. pellita* (G.W. Argus, pers. comm.)
- Taraxacum latilobum* DC. (exact number of occurrences and distribution difficult to determine because of taxonomic confusion)

Native vascular plant watch list for the Island of Newfoundland

In addition to the revised list of rare vascular plants for the Island of Newfoundland, NF RPP botanists prepared a watch list. It contains taxa that may not necessarily be rare but are of conservation concern (S3, Sensitive). They may be widespread but relatively uncommon, or restricted in distribution even if abundant at some locations. On the other hand, the

conservation status of certain taxa could not always be assessed with confidence because of insufficient information (SU, Undetermined). These taxa are also included on the watch list as a precaution and to highlight the need for additional information.

Rare Plant Conservation

All partners in the NF RPP share an interest in plant conservation. Participants hoped that tools and resources to guide research and management efforts would be developed as a result of this project. Ultimately, the most important achievement may have been the cooperation and momentum associated with rare plant conservation in Newfoundland. Strong partnerships have been established among institutions and individuals interested in plant conservation in the province, and they provide a solid base for future projects.

The following pages provide examples of the value of the NF RPP for project partners. It illustrates the role that the NF RPP has played so far in rare plant conservation in the province. Its impacts are diverse, involving wildlife management, protected areas, land and resource development, education and stewardship, and research and collections.

The project also generated some public awareness of rare plant conservation in the province. Botanists in the field met members of the public; and the group has also been approached by individuals, tourism organizations, the media and conservation organizations for information about rare plants.

Atlantic Canada Conservation Data Centre (Atlantic CDC)

The Atlantic CDC is a non-profit, registered charitable organization that assembles and provides data and expertise about species and ecological communities of conservation concern, including species at risk, and undertakes field biological inventories to support conservation related decision-making, research, and education in Atlantic Canada. A primary task of the Atlantic CDC is to assess the conservation status of thousands of species native to Atlantic Canada. Sub-national (i.e., provincial) species and community rarity ranks (S-ranks) are developed using available data and expert knowledge (see Appendix I). **The revised list of rare vascular plants produced through the NF RPP provides updated S-ranks to the Atlantic CDC.**

The Atlantic CDC receives data requests from clients seeking data, information, knowledge, and expertise on biodiversity. **In consultation with the Inland Fish and Wildlife Division, the Atlantic CDC answers requests regarding rare plants in Newfoundland and Labrador using data acquired through the NF RPP.** Clients of the Atlantic CDC include:

- Government organizations that regulate or manage natural resources
- Land conservation trusts
- Natural resource users seeking to manage resources sustainably
- Environmental consulting firms that require accurate information about the location of

rare species

- University scientists and students
- Private landowners seeking information and expertise

Inland Fish and Wildlife Division, Newfoundland and Labrador Department of Tourism, Culture and Recreation (IFWD)

The IFWD uses results from the NF RPP for the following:

General Status of Wild Species in Newfoundland and Labrador

In 1998, wildlife ministers from across Canada gave direction that the general status of all wild species in Canada would be evaluated and reviewed every five years. Each province and territory is responsible for status evaluation within its boundaries. In Newfoundland and Labrador, the Endangered Species and Biodiversity Section of the IFWD coordinates the initiative. Additionally, in this province, the status of species is evaluated separately for the Island and for Labrador (see Appendix I). The type of data collected through projects such as the NF RPP is invaluable in the status evaluation process. **So far, using data compiled through the NF RPP, the province evaluated the status of half of the vascular plants in Newfoundland, including all of the Island's rare plants.**

Biodiversity

The province is responsible for implementing the Canadian Biodiversity Strategy within its jurisdiction. This role has been assigned to the Endangered Species and Biodiversity Section of the IFWD. The maintenance of biodiversity is an underlying principle of the strategy. Biodiversity is measured at genetic, species and ecosystem levels. The understanding of species-level biodiversity within the province is being greatly enhanced through projects such as the NF RPP. This kind of work will also contribute to a better understanding of ecosystems and how to describe them. At the same time, it provides an opportunity to learn more about the province's plant life below the species level as botanists become increasingly familiar with the flora.

Species at risk

The IFWD is responsible for the implementation of the provincial Endangered Species Act. The act contains provisions for the listing, protection and recovery of species at risk and their habitat within the province. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) evaluates the conservation status of species that may be at risk in Canada. Evaluations are based on the information gathered in a status report prepared for COSEWIC by various experts. In Newfoundland and Labrador, species designated at risk by COSEWIC are automatically recommended for listing under the provincial Endangered Species Act which is

administered by the IFWD. In the near future, a Species Status Advisory Committee (SSAC), similar to COSEWIC, will be established under the Endangered Species Act to evaluate the status of species of provincial concern. The list of rare vascular plants revised by the NF RPP will be useful to the SSAC to screen for candidate species for status evaluation. Secondly data collected through the NF RPP will be useful in the evaluation process itself.

The recent listing of barrens willow (Salix jejuna) is an example of the role that a project like the NF RPP can play in the protection of species at risk. A COSEWIC status report on barrens willow was in preparation concurrently with the first two years of the NF RPP. Data collected on this species was passed on to the author of the report. It provided important additional information on the distribution, abundance and ecology of the species. In May 2001, the species was designated Endangered by COSEWIC. It has been protected under the Newfoundland and Labrador Endangered Species Act since July 2002. A recovery plan for the species is presently under preparation. The data collected during the NF RPP has been and continues to be used during the recovery planning and implementation process. For example, data collected by the NF RPP botanists is being used to delineate critical habitat for barrens willow.

Environment and land use

The Environment and Land Use programs that are delivered by the IFWD are involved in all aspects of land use planning and environmental assessment specifically related to wildlife species. A component of environmental assessment and land use planning is the identification of the potential impacts of proposed developments or land use on rare plants. The NF RPP has provided valuable information used in program delivery and has allowed the Division to recommend alternatives and mitigation in areas where rare plants exist.

An excellent example is found in the District 17 Forest Management Plan recently submitted to the Department of Environment by the Department of Forest Resources and Agrifoods (DFRA). Data provided by the NF RPP highlighted areas of high rare plant diversity where forestry operations should not proceed without mitigative measures ensuring the protection of rare plant populations. One of these areas is the western slopes of the Highlands of St. John. In consultation with the IFWD, the DFRA designed a survey program to assess rare plant distribution within a contentious area. The results of this survey will be used to determine which area may be harvested and what precautions need to be taken to protect rare plants and their habitat.

Education and stewardship

The stewardship programs being delivered by the IFWD under the auspices of the Eastern Habitat Joint Venture are primarily directed at engaging Municipal Government in stewardship activities. A component of the conservation plans that are developed as a commitment under the stewardship agreements is a comprehensive listing of the fauna and flora of the “stewardship zone”. Communities feel that they have something very special when rare species are identified within their jurisdiction and it provides a focus for engaging local interest

and support for conservation stewardship. The NF RPP has provided valuable information that has been used in the delivery of stewardship programs and has stimulated local efforts towards the conservation of rare species.

An excellent example is found in the web site for the town of Stephenville Crossing, <http://www.townofstephenvillecrossing.com/encounter.htm>, where the community has been made aware of a provincially rare species within their jurisdiction and has highlighted the importance of it to the local wetland habitat.

Parks and Natural Areas Division, Newfoundland and Labrador Department of Tourism, Culture and Recreation

The Parks and Natural Areas Division, Department of Tourism, Culture and Recreation is responsible for protecting Newfoundland and Labrador's natural heritage through a system of Provincial Parks, Ecological Reserves, and Wilderness Reserves.

Accurate information on biological organisms occurring within protected areas is necessary to ensure appropriate protection, develop management strategies and education programs. Currently there are 17 reserves on the Island five of which are botanical reserves (Hawke Hills, Burnt Cape, Watt's Point, West Brook and King George IV). Work conducted by the NF RPP team helps maintain a current record of the rare plants and their conditions in a number of these reserves. Specifically, as a result of the NF RPP, information collected for Burnt Cape Ecological Reserve and Watt's Point Ecological Reserve has helped both the management and promotion of these reserves. NF RPP information about the flora of Provincial Parks, such as J. T. Cheeseman, has helped identify areas that require protection and is useful for interpretative purposes.

There are a number of highly significant sites that have been identified through the NF RPP over the last few years. Areas rich in biological diversity, rare or endangered species and habitats, and/or fragile habitats have been discovered and reported by project botanists. The data collected has been very helpful in identifying sites to be considered as provincial protected areas. It is also helpful in better defining boundaries of existing candidates area and strengthening the knowledge base necessary to defend them.

Parks Canada

Over the past few years, members of the NF RPP team have collected and identified plants at Port au Choix, L'Anse aux Meadows, and Red Bay national historic sites. These surveys have increased our understanding of the sites and have aided both site staff and Parks Canada.

A half-dozen staff from the Parks Canada Western Newfoundland and Labrador Field Unit have accompanied the team in the field on different occasions. For some this has been useful training, for others it has been a chance to work in the field with experts. Because of the

scarcity of botanists on the west coast of the Island, the presence of the team here has been important for establishing and maintaining peer contacts and for sharing information about the flora of this part of the province.

Information gathered by the team is being incorporated into plant lists for the three national historic sites, and will be used to produce plant manuals to help site staff and visitors identify both common and rare plants at the sites. A management plan is currently underway for Port au Choix NHSC. The presence of rare plants will be an important factor in land use decisions. The work of the Rare Plant Team has added to the information available.

Canadian Wildlife Service, Environment Canada

Environment Canada administers the Species at Risk Act (SARA). This legislation prescribes the Department's authority and responsibility with respect to all COSEWIC-listed species at risk. The top priorities of the Department are emergency, endangered and threatened species, listed migratory birds, and federal lands that contain species at risk.

While listed species on federal lands are the top priority, provincial species on federal lands are also important. The NF RPP is the most valuable tool available to determine whether a provincially rare species occurs on federal lands. While these species are under provincial jurisdiction, there are implications for the Government of Canada.

*For example, Cape Norman is a 45.5 hectare compound on the extreme tip of the Great Northern Peninsula administered by the Department of Fisheries and Oceans (Canadian Coast Guard). It contains a road, lighthouse, and helicopter pad. Based on the work conducted by the NF RPP, 80 rare plant occurrences have been recorded in or near this area. The area is also the type locality for *Salix jejuna*, a willow listed by COSEWIC in 2002.*

Provincial Museum of Newfoundland and Labrador

The Herbarium of the Provincial Museum of Newfoundland and Labrador (NFM) houses approximately 15 000 specimen lots of vascular plants, as well as smaller numbers of bryophytes (mosses and liverworts), charophytes (stoneworts), algae, and lichens, all collected within the Province of Newfoundland and Labrador. Significant collections are contributed annually by the NF RPP, for which the herbarium serves as Provincial repository.

In 2001, the Natural History Unit of the Provincial Museum of Newfoundland and Labrador created a web-based collection of photographs of vascular plants called the "Digital Flora of Newfoundland and Labrador" (<http://www.nfmuseum.com/flora.htm>). It also contains a section on "interesting botanical places". Interest in the website has been international. NF RPP botanists have collected numerous photographs of plants encountered during field surveys. A number of these photographs have been added to the digital flora. Well over 100 of the 298 plants listed on the revised list of rare vascular plants are already represented on the website. This website is being used as an important resource by park and reserve interpreters (e.g. staff

at Burnt Cape Ecological Reserve).

The next step

The NF RPP is far from complete. All partners agree that the intensive efforts of the first three years are the foundation for future projects. Some partners continued to survey for rare plants throughout the province in 2002 and 2003, and new projects are being planned for 2004. Many specimens collected by NF RPP botanists remain to be verified. Identification and documentation of specimens held in the province's herbaria will also continue. Finally, data generated during the course of the project will continue to be used to develop and improve management tools for plant conservation in the province.

Owing to time and funding constraints, only a small portion of the total land area of the Island of Newfoundland has been surveyed during the NF RPP (Figure 1). Some major areas of the Island have been incompletely covered. This includes the South Coast and the Long Range Mountains, which are relatively inaccessible, as well as the Avalon Peninsula, the northeast coast and the central interior, which are presumed to have a relatively low diversity of rare plants based on past surveys and geoclimatic factors. Furthermore, survey efforts for the NF RPP were concentrated in specific habitats where rare plants had been observed before or were considered likely to occur. These habitats included limestone and coastal barrens, salt marshes, shores, and rivers and lakes. Other habitat types, especially forests, but also acidic barrens, shrub land and bogs, were under-surveyed relative to the area they occupy in the landscape. NF RPP botanists found new rare plant sites and species in the relatively unexplored regions and habitats that they did visit. This indicates the importance of continuing survey work in areas where little botanical information has been collected.

Finally, several of the partners have expressed an interest in expanding the scope of the NF RPP into Labrador, a large, relatively unexplored territory from a botanical point of view. The works of Meades *et al.* (2000) and Day (1995, 1999) provide a basis for rare plant work in that portion of the province. A number of projects involving botanical inventory are already underway in Labrador and new partnerships are being developed. Partners are also interested in developing projects dealing with other taxonomic groups such as bryophytes and lichens. This would be a significant step in furthering our understanding of biodiversity in the province.

Contact Information

For copies of the Revised List of Rare Vascular Plants of the Island of Newfoundland, the Native Vascular Plant Watch List for the Island of Newfoundland, or any other information on rare vascular plants of Newfoundland and Labrador, please contact:

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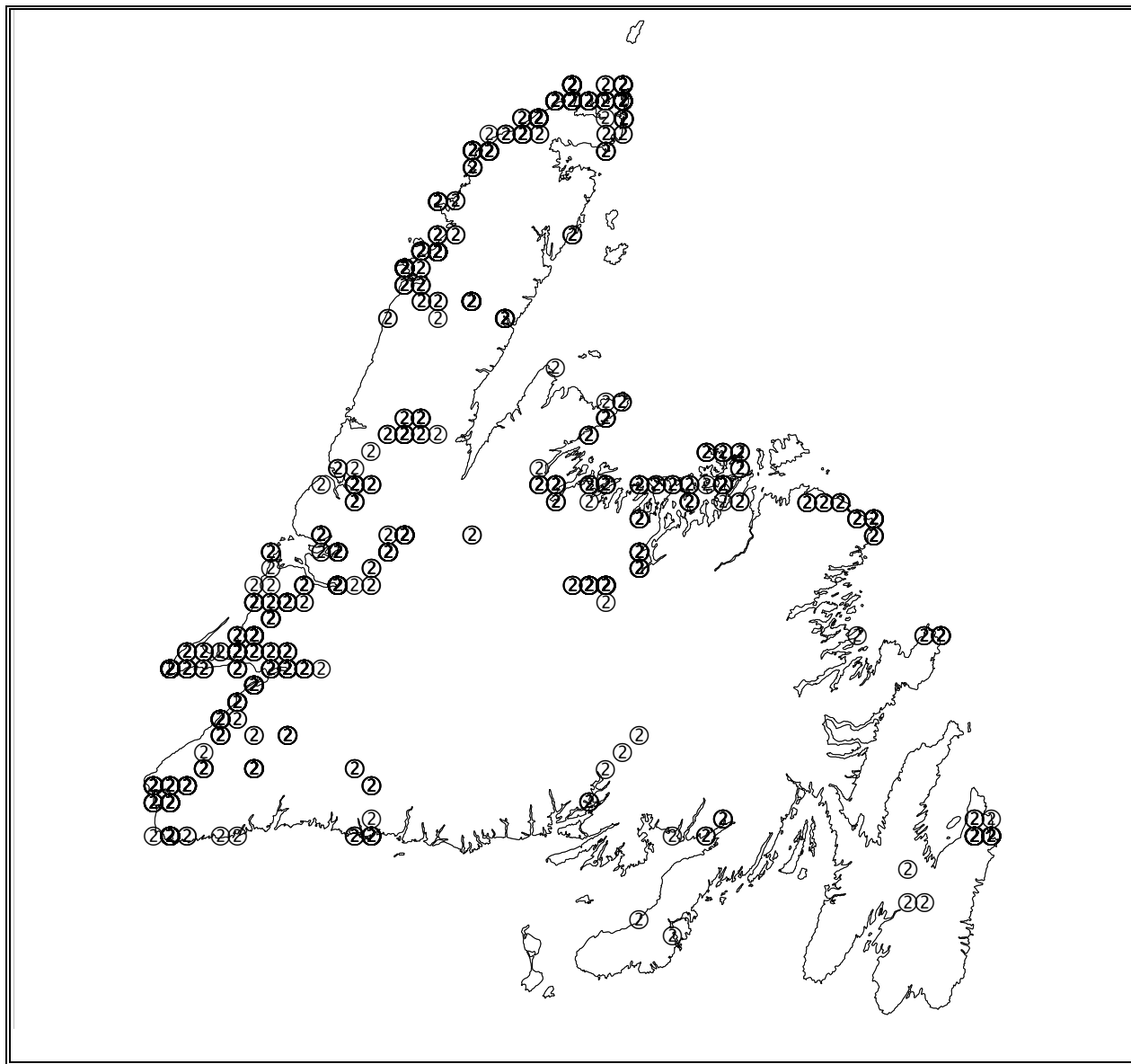
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Figure 1. Newfoundland localities visited by the Newfoundland Rare Plant Project Team between 1999 and 2002.



Appendix I. Describing the conservation status of wild species in Newfoundland and Labrador: definitions

General Status of Wild Species in Newfoundland and Labrador

In 1998, wildlife ministers from across Canada directed that the general status of all wild species in Canada would be evaluated and reviewed every five years. To do so, a National Working Group on the Status of Wildlife in Canada was established with representatives from each province and territory. The working group proposed a methodology and ranking system to evaluate the status of species. The ranking system is based on the number of occurrences of a given species, its distribution, population size, trends in population and distribution, and finally, threats to population and habitat. Each province and territory is responsible for status evaluation within its boundaries, and contributes data to the national status evaluation process. For more information, see <http://www.especessauvages.ca/>.

In Newfoundland and Labrador, this initiative is coordinated by the Inland Fish and Wildlife Division (IFWD, Endangered Species and Biodiversity Section) of the Department of Tourism, Culture and Recreation, in collaboration with the Atlantic Canada Conservation Data Centre (Atlantic CDC). Scientific experts and naturalists are invited to participate and provide input. The status of species is evaluated separately for the Island and for Labrador.

Status categories used in this report:

AT RISK: species for which a formal detailed risk assessment has been completed and that has been determined to be at risk of extirpation or extinction (i.e. endangered or threatened).

MAY BE AT RISK: species that may be at risk of extirpation or extinction, and therefore candidates for a detailed risk assessment.

SENSITIVE: species which is not believed to be at risk of immediate extirpation or extinction but may require special attention or to prevent them from becoming at risk.

STATUS UNDETERMINED: species for which insufficient data, information, or knowledge is available with which to reliably evaluate the status of a species.

Conservation Data Centre/Nature Serve Species Ranking System

Conservation Data Centres (CDCs), as part of an international network (NatureServe), track species and ecological community diversity. Specific species and communities are referred to as **elements** of diversity. Elements are ranked in each jurisdiction (province or state) and at global and national levels.

NatureServe and all CDCs (called Natural Heritage Programs in the US) use a standardized element ranking system that has evolved, with input from hundreds of scientists during the last quarter century. The following describes the CDC/NatureServe element ranking system at the subnational (S) level and explains how ranks are assigned for species.

Subnational (State/Province) ranks (S-ranks) used in this report:

- S1** Extremely 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 due to rarity or other factors.
- S3** Uncommon throughout its range in the province, or found only in a restricted range, even if abundant at some locations. (21 to 100 occurrences).
- SH** Historical: Element occurred historically throughout its range in the province (with expectation that it may be rediscovered), perhaps having not been verified in the past 20 - 70 years (depending on the species), and suspected to be still extant.