Atlantic Canada CDC Canada Atlantique

Report to the Western Newfoundland Model Forest

Newfoundland Rare Plant Project

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Report to the Western Newfoundland Model Forest
(R014 2001 WNMF)

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Abstract

The goal of the Newfoundland Rare Plant Project (NFRPP) is to support management efforts towards the conservation of over 200 rare vascular plant species found on the island of Newfoundland. This three-year project, involving eight partner organizations and 15 principal investigators, comprises intensive and systematic field botanical surveys across Newfoundland to document the occurrence, distribution and density of, and disturbance threats to, rare vascular plant species.

The year 2000/2001 marked the second year of the project. Field botanists visited 29 sites and 500 sampling stations, collected approximately 3,000 vascular plant (and some bryophyte and lichen) specimens, and generated approximately 8,000 new occurrence records for species of interest.

As a result of summer 2000 fieldwork, six vascular plant species previously unknown to occur in Newfoundland or known only from scant historical records were confirmed as being present. Newfoundland's vascular plant species tracking list was substantially revised to better reflect the rarity and conservation status of the island's flowering plants. Data from the fieldwork was (and is being) used for species status reports, protected areas planning and management, and environmental review of development projects.

Introduction

Due to its location, climate and geological substrate, Newfoundland possesses an unusual diversity of vascular plant species. In 1991, a team of expert botanists from the University of Montreal determined that 271 of these species were rare on the island, including some disjunct or endemic species and 26 species that were also considered nationally rare at that time (Bouchard *et al.*, 1991, The Rare Vascular Plants of the Island of Newfoundland, Syllogeus No. 65, Canadian Museum of Nature, Ottawa). The majority of rare species are found on the west coast, in particular along the Northern and Port au Port peninsulas. Here, undisturbed limestone barrens habitat is critical to the survival of over 100 rare species—including three species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Long's Braya, *Braya longii* (Endangered); Fernald's Braya, *Braya fernaldii* (Threatened); and Fernald's Milk-vetch, *Astragalus robbinsii* var. *fernaldii* (Special Concern).

Although much work to document and characterize the presence of Newfoundland's rare vascular flora has been accomplished within the past 20 years, significant knowledge gaps remain. For conservation, it is necessary to go beyond presence-absence information and to document species density at known locations, long-term viability of populations at risk, and existing or potential disturbance threats. Such data should then be applied in a science-based method for conservation site selection. As well, the data and/or more general conservation education information should be directed to those in position to use it for decision-making (e.g. government re: parks and protected areas, development of stewardship initiatives, and environmental review, and industry and individuals re: best management practices).

The conservation and protection of biodiversity, generally, and rare plants and their habitat, specifically, is receiving increased attention from the Government of Newfoundland and Labrador. A new provincial endangered species law may come into effect in 2001, providing a strengthened regulatory environment for conservation. In

the past two years, the Newfoundland and Labrador Department of Forest Resources & Agrifoods (NLDFRA) stepped up support for its Endangered Species Program by hiring a full-time botanist in 1999 and a biodiversity specialist in 2000. (The Inland Fish & Wildlife Division and Endangered Species Program were transferred to the Department of Tourism, Culture & Recreation (NLDTCR) in February 2001.)

To support management efforts towards the conservation of rare vascular plant species found on the island of Newfoundland, the Newfoundland Rare Plant Project (NFRPP) was conceived in 1998 and initiated in 1999. The principal objectives of this three-year project are to:

1) Substantially update and augment available occurrence, distribution, density and disturbance data for the rare plants of Newfoundland;
2) Provide this data to interests whose decisions may affect the occurrence and viability of rare plant species of conservation concern;
3) Provide this data in support of status evaluation and future status report preparation; and
4) Establish a framework for long-term monitoring of those rare vascular plant species especially vulnerable to disturbance and that, because of such disturbance, could become listed by COSEWIC or under new provincial endangered species legislation.

The principal deliverables of the NFRPP include:

1) Developing and updating a vascular plant tracking list for the island of Newfoundland (list of all extremely rare, rare and uncommon vascular plant species);
2) Incorporating georeferenced location data and population and habitat information within the "element occurrence" database of the Atlantic Canada Conservation Data Centre (AC CDC);
3) Using the rarity ranking and element occurrence data to respond to formal requests for rare plant data;
4) Producing maps showing the occurrence and distribution of the species of conservation concern; and
5) Completing, by March 2001, a detailed report including background information on the project, the most current vascular plant tracking list, location, habitat/range, status and notational information on each species of conservation concern, as well as maps showing the occurrence and distribution of species.

This report summarizes work undertaken and results achieved in the second year of the NFRPP.

Methods

The first two field seasons involved the collaboration of the following eight organizations as project partners:

- NLDFRA (lead for 1999/2000 and 2000/2001);
- NLDTCR (lead for 2001/2002);
- Atlantic Canada Conservation Data Centre (AC CDC);
- Gros Morne National Park (GMNP);
- Institut de recherche en biologie végétale, Université de Montrèal (IRBV);
- Memorial University of Newfoundland (MUN), Biology Department;
- Memorial University Botanical Garden Inc.;
- Sir Wilfred Grenfell College, Biology Department.

A project Steering Committee, with members drawn primarily from the above organizations, has guided the work of the principal investigators (botanical team members), listed as follows (* denotes Steering Committee member):

- Teuvo Ahti (University of Helsinki)
- Marilyn Anions (GMNP)
- Douglas Ballam (NLDTCR) *
- Luc Brouillet (IRBV) *
- René Charest (AC CDC)
- Nathalie Djan-Chékar (NLDFRA) * (Project Manager)
- Claudia Hanel (AC CDC / MUN)

- Stuart Hay (IRBV)
- Laurence Lavers (NLDFRA)
- Henry Mann (Grenfell College, MUN) *
- John Maunder (Newfoundland Museum) *
- Sue Meades (independent botanist)
- Beth Pollock (GMNP)
- Shawna Powell (summer student, MUN)
- Carson Wentzell (GMNP)

Other participants have included the following:

- Sean Avery (NLDFRA) *
- Mike Bennett (NLDFRA)
- Dick Brake (NLDFRA)
- Joe Brazil (NLDFRA) *
- Michael Burzynski (GMNP)
- Stephen Flemming (GMNP) *
- Kim Furey (summer student, MUN)
- George Gibbons (NLDFRA)
- Luise Hermanutz (MUN) *
- Pat Lavers
- Anne Marceau (GMNP)
- Debby Meades
- Jeff Motty (summer student, NLDFRA)
- Wilf Nichols (MUN Botanical Garden Inc.) *
- Bruce Pike (NRCAN/CFS) *
- Randy Power (Terra Nova National Park) *
- Rob Rainer (AC CDC) *
- Hubert Smith (NLDFRA)
- Leah Soper (NLDFRA)

In 1999 field teams surveyed coastal and mountainous areas along the west coast of the island of Newfoundland from the Port au Port Peninsula to the northern tip of the Great Northern Peninsula (Figure 1). Efforts were concentrated on limestone barren habitats. Teams also met in southeastern Labrador to survey similar habitats as those surveyed on the island, and joined the Braya Recovery Team for a workshop and intensive surveys.

For 2000, the main area of investigation between late June and early September was southwest Newfoundland between Deer Lake and Port-aux-Basques. Field teams also surveyed a number of sites of special interest on the Great Northern Peninsula (Figure 2). Efforts were concentrated on coastal, aquatic, riparian and alluvial habitats with some work in forested and limestone barren habitats as well. As in 1999, vascular plants were the focus of the surveys, although during a two-week expedition to the Soufflets and Main River watersheds, an expert lichenologist joined the team and complemented the vascular plant inventories with an important lichen collection.

The sites visited in 2000 are listed as follows:

- Bay of Islands (Raglan Head, North Arm Mountain, Penguin Arm, Goose Arm)
- Big Brook
- Bottom Brook (First Pond, Second Pond, Third Pond)
- Cape Anguille (Anguille Mountains)
- Cape Norman
- Codroy Valley
- Crabbe's River (upper reaches, TCH crossing)
- Doctor's Brook

Figure 1. 1999 Field season of the Newfoundland Rare Plant Project - Areas surveyed on the island of Newfoundland.

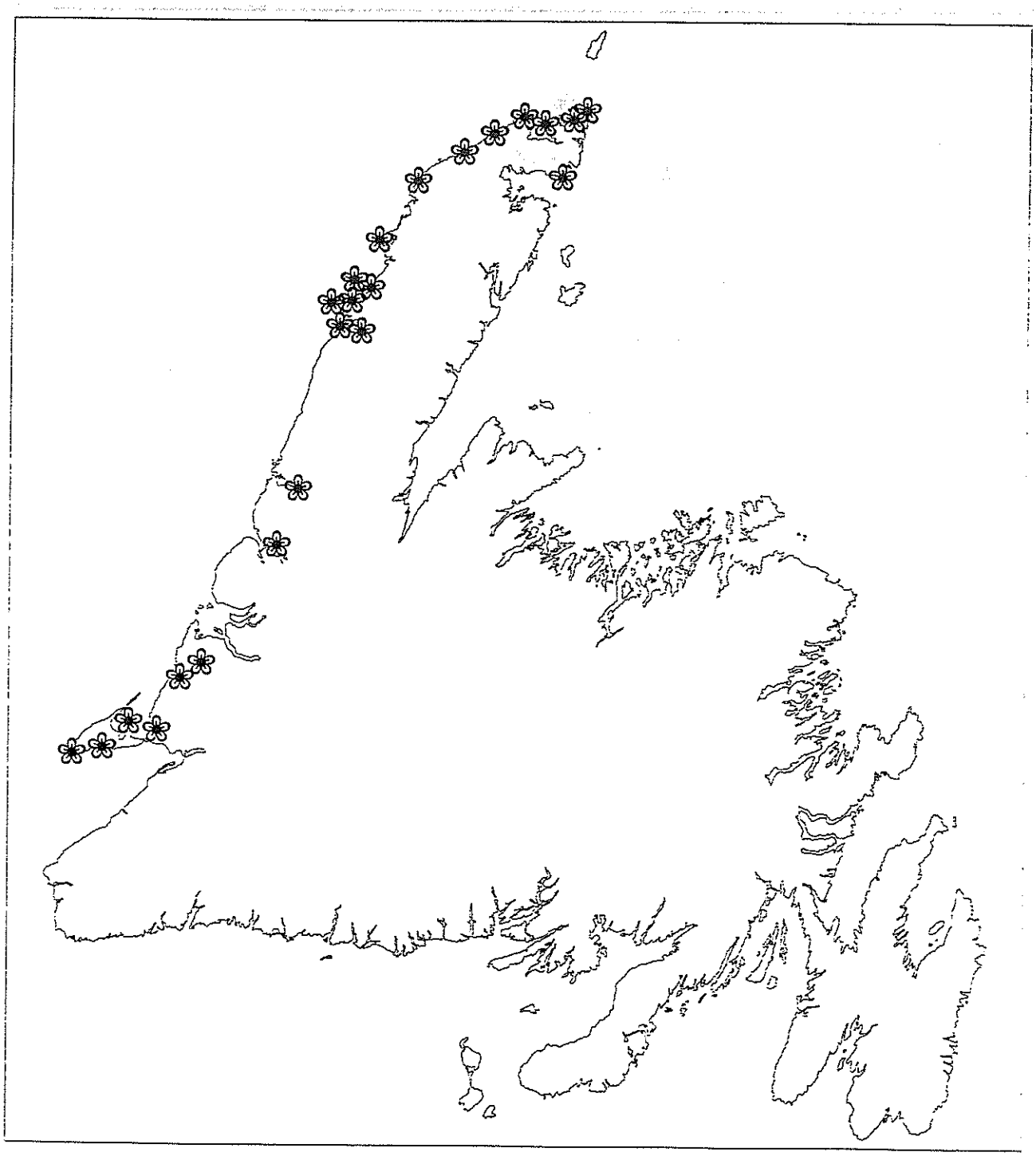
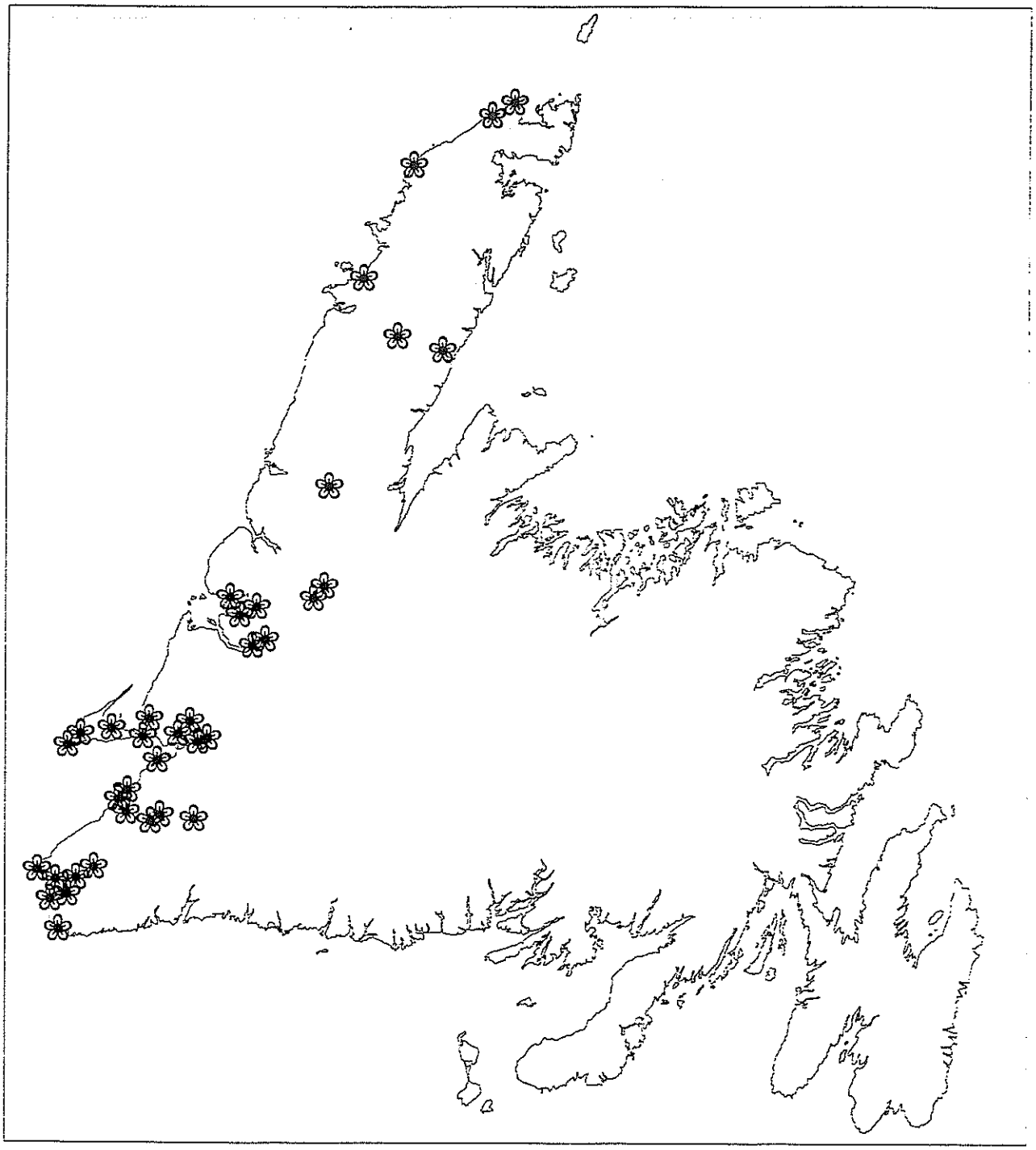


Figure2. 2000 Field season of the Newfoundland Rare Plant Project - Areas surveyed on the island of Newfoundland.



- Fishells River (near mouth)
- Flat Bay/Sandy Point
- Fox Island River
- Grand Bay West
- Harry's River (Dump Pool, Black Duck)
- Humber Gorge
- J.T. Cheeseman Provincial Park
- Main River (Eagle Mountain Pond area)
- Middle Barachois River (upper reaches, near mouth)
- Osmond
- Point au Mal
- Port au Port Peninsula (Piccadilly, Cape St. George, Garden Hills, White Hills)
- Robinson's River (The Grasses, near mouth)
- Romaine's River
- Saddle Mountain (Tompkins)
- Savage Cove
- Soufflets River (Middle Gulch Pond, Great Harbour Deep)
- Southwest Brook (near mouth)
- Table Mountain (north part)
- Upper Humber River (Harriman's Steady, Reidville, Nicholsville)
- Wild Cove Brook and Hughes Brook

Over the course of the summer the field teams made observations at approximately 500 stations spread among the sites listed above. At most stations general habitat and precise locality information were recorded. For about a third of the stations complete lists of species present were compiled, thus generating close to 8,000 occurrence records and providing information on presence/absence of rare taxa.

Voucher specimens were collected for rare plants or plants of special interest, as well as plants which could not be identified in the field. The summer's collection numbered over 3,000 specimens, mostly vascular plants but also lichens, bryophytes and a small set of charophytes. Experts are presently working on the identification of some vascular plant and lichen specimens and the information collected is being compiled into a database. Vascular plant specimens will be deposited at the Newfoundland Museum in St. John's with a duplicate collection at the Marie Victorin Herbarium at the University of Montreal. Lichen specimens will be deposited at the herbarium of the University of Helsinki with a duplicate collection at the Newfoundland Museum.

Results

Additions to the checklist of vascular flora for Newfoundland

Proserpinaca pectinata is an aquatic species of the eastern North American coastal plain. The closest locality where it occurs is in Nova Scotia. The collection made in Newfoundland by project botanists represents a significant extension of the range of the species to the north.

Bartonia virginica is an eastern North American species previously reported in the region from the island of St. Pierre. Collections from two different localities confirm its presence in southern Newfoundland as well.

Carex retrorsa was reported for Newfoundland before in Scoggan (1978, The Flora of Canada). Meades et al. (2000, Annotated Checklist of the Vascular Plants of Newfoundland and Labrador) rejected the report because proof could not be found in herbarium records. A collection made in the summer of 2000 provides firm documentation of the occurrence of this species in Newfoundland.

Relocation of historical populations

Carex petricosa var. *misandroides* is rare in Canada, known only from Quebec and Newfoundland. It had not been collected in Newfoundland since the late 1950s. The project team relocated a population discovered by Ernest Rouleau in 1948 in the Bay of Islands.

Common in eastern North America, *Oclemena acuminata* was known from only two localities in western Newfoundland where Fernald, Long and Dunbar collected it in 1924. A population of this plant was found in 2000 in J.T. Cheeseman Provincial Park by the project botanists and park staff. This is a new locality for this species.

The first and only collection known so far of *Equisetum hyemale* var. *affine* was by Fernald and Wiegand at Middle Birchy Pond in 1910. Unfortunately the specimen is poor and its identity questionable. A population attributable to this taxa was found in 2000 near the mouth of Fischells River over 100 km from the original locality. Examination of the specimens collected in 2000 may help to shed some light on the 1910 collection.

Revised vascular plant tracking list for Newfoundland

A first draft of the revised vascular plant tracking list for Newfoundland has been completed. All taxa have been assigned at least a tentative rank and, in the case of ferns, fern allies and orchids, ranks have been subject to thorough expert review and 'finalized'. Appendix A contains the ranks of the ferns, fern allies and orchids. The species rarity ranks shown on this list reflect current knowledge on and assumptions behind the various criteria used to determine the ranks, for example, provincial abundance and range, abundance and distribution trends, number of protected element occurrences and threats to populations.

Input into conservation efforts

A COSEWIC status report on Barrens willow (*Salix jejuna*) was under preparation concurrently with the first two years of the project. Data collected on this species was passed on to the author of this status report. The data provided important additional information on the distribution, abundance and ecology of the species.

Several of the sites visited during the first two field seasons are designated as candidate ecological reserves under the proposed Natural Areas Plan for the province. The information obtained at these sites will help to better define boundaries and strengthen the knowledge base necessary to defend them.

Some of the sites visited are within the boundaries of existing parks or reserves. Accurate information on rare plants occurring within protected areas is necessary to ensure appropriate protection, develop management strategies and education programs. As an example, at Port aux Choix National Historic Site, a proposed trail was rerouted to avoid a sensitive area (limestone barrens) as a result of fieldwork with the Rare Plant Project team. Using the Rare Plant Database, federal and provincial park staff are preparing reference material containing information on rare plants in the parks.

There is interest in forest harvesting at some of the sites surveyed. The data collected during the course of the project could assist in better mitigating impacts of commercial cutting on rare plants.

Inland Fish and Wildlife Division staff regularly use the Rare Plant Database to review development proposals (forestry, mining, cabin development). They are also using the database as a resource in the preparation of management plans for stewardship areas around the province.

The project is increasing awareness for rare plant conservation in the province. Botanists in the field meet members of the public. The group has also been by approached by individuals, tourism organizations, the media and conservation organizations for information on rare plants.

Prospects for the final field season

In November 2000, the NFRPP Steering Committee met to review the 2000 field season and establish priorities and plans for 2001. Work started in the past two years will continue, that is relocating rare plant populations to improve location data, and surveying for rare plants in areas where there has been little or no collecting in the

past. The geographic search area will be expanded to include the valley of Exploits River and the northeastern portion of the island from White Bay to Bonavista Bay.

Financial support and budget

The NLDFRA, Endangered Species Recovery Fund, EJLB Foundation, Western Newfoundland Model Forest and Parks Canada (Gros Morne National Park) provided $63,500 in direct financial support for the second year of the project. An additional and estimated $96,000 in in-kind support was provided among the NLDFRA, NLDTCR, MUN, IRBV, Newfoundland Museum, Parks Canada (Gros Morne National Park) and volunteer expert field botanists.

The following table provides total project revenue and expense figures for 2000/2001. The AC CDC directly managed $25,000 in funding including the $10,000 grant from the Western Newfoundland Model Forest. Other funds were managed by the NLDFRA, Parks Canada (Gros Morne National Park) and MUN Botanical Garden Inc.

Revenue	**2000/2001**	**Notes**
Government of Newfoundland and Labrador	87,000	$20,000 cash, $67,000 in-kind
IRBV	19,000	All in-kind
Endangered Species Recovery Fund	15,000	Cash
Parks Canada	13,000	$8,500 cash, $4,500 in-kind
EJLB Foundation	10,000	Cash
Western Newfoundland Model Forest	10,000	Cash
Memorial University	2,500	In-kind
Volunteer expert botanist (U. of Helsinki)	2,000	In-kind
Total Revenue	**$159,500**	**$63,500 cash, $96,000 in-kind**
Expenses	**2000/2001**	
Project Manager	35,000	Covered in-kind
Assistant Botanist (to June 15 2001)	31,500	Covered in cash
Field, equipment, and travel expenses	28,486	$18,986 covered in cash, $9,500 covered in-kind
Herbarium curators	25,000	Covered in-kind
Conservation officers (as field workers)	10,500	Covered in-kind
Volunteer botanists	8,000	Covered in-kind
Herbarium supplies	8,000	Covered in-kind
Data management	5,000	Covered in cash
Summer student	4,000	Covered in cash
Materials and supplies	2,160	Covered in cash
Miscellaneous	794	Covered in cash
Shipping	560	Covered in cash
Communications	500	Covered in cash
Total Expenses	**$159,500**	

The 2000 WNMF grant for this project was applied to the time of the Assistant Botanist.

For more information

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Appendix A: Conservation data centre ranks for Newfoundland orchids, ferns and fern allies - at March 21, 2001

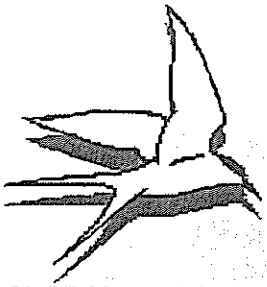
ELCODE	Scientific name	Common name	Family	Grank	Nrank	SrankNF
PMORC01010	*Amerorchis rotundifolia*	Round-Leaved Orchis	Orchidaceae	G5	N?	S2S3
PMORC04010	*Arethusa bulbosa*	Swamp-Pink	Orchidaceae	G4	N4?	S4S5
PMORC0C040	*Calopogon tuberosus*	Tuberous Grass-Pink	Orchidaceae	G5	N?	S4S5
PMORC0D011	*Calypso bulbosa var. americana*	Fairy Slipper	Orchidaceae	G5T?	N?	S1
PMORC0K011	*Coeloglossum viride var. virescens*	Long-Bract Green Orchis	Orchidaceae	G5T5	N?	S3S4
PMORC0K012	*Coeloglossum viride var. viride*	Long-Bract Green Orchis	Orchidaceae	G5T4?	N3?	S2S3
PMORC0M010	*Corallorhiza maculata*	Spotted Coralroot	Orchidaceae	G5	N?	S3S4
PMORC0M041	*Corallorhiza striata var. striata*	Striped Coral-Root	Orchidaceae	G5T?	N?	S1
PMORC0M050	*Corallorhiza trifida*	Early Coral-Root	Orchidaceae	G5	N?	S3S4
PMORC0Q010	*Cypripedium acaule*	Pink Lady's-Slipper	Orchidaceae	G5	N?	S4
PMORC0Q090	*Cypripedium parviflorum*	Small Yellow Lady's-Slipper	Orchidaceae	G5	N?	SU
PMORC0Q0C0	*Cypripedium pubescens*	Large Yellow Lady's-Slipper	Orchidaceae	G5	N?	S3S4
PMORC0Q0D0	*Cypripedium reginae*	Showy Lady's-Slipper	Orchidaceae	G4	N?	S2
PMORC0S02unkn1	*Dactylorhiza praetermissa var. praetermissa*	a Southern Marsh Orchid	Orchidaceae			SE
PMORC0S02unkn2	*Dactylorhiza praetermissa var. junialis*	a Southern Marsh Orchid	Orchidaceae			SE
PMORC11020	*Epipactis helleborine*	Eastern Helleborine	Orchidaceae	G?	NE	SE
PMORC17010	*Goodyera oblongifolia*	Giant Rattlesnake-Plantain	Orchidaceae	G5?	N?	SH?
PMORC17030	*Goodyera repens*	Dwarf Rattlesnake-Plantain	Orchidaceae	G5	N?	S3S4
PMORC17040	*Goodyera tesselata*	Checkered Rattlesnake-Plantain	Orchidaceae	G5	N?	S3?
PMORC1M040	*Liparis loeselii*	Loesel's Twayblade	Orchidaceae	G5	N?	SR
PMORC1N010	*Listera auriculata*	Auricled Twayblade	Orchidaceae	G3	N3	S2S3
PMORC1N030	*Listera borealis*	Northern Twayblade	Orchidaceae	G4	N?	SH
PMORC1N050	*Listera convallarioides*	Broad-Leaved Twayblade	Orchidaceae	G5	N?	S3S4
PMORC1N061	*Listera cordata var. cordata*	Heartleaf Twayblade	Orchidaceae	G5T?	N?	S4
PMORC1N090	*Listera x veltmanii*	a Hybrid Twayblade	Orchidaceae	HYB	N?	S?
PMORC1R010	*Malaxis brachypoda*	White Adder's-Mouth	Orchidaceae	G4Q	N4	S3
PMORC1R0A0	*Malaxis unifolia*	Green Adder's-Mouth Orchid	Orchidaceae	G5	N?	S3
PMORC1Y011	*Platanthera albida var. straminea*	Straw-Coloured Fringed Orchid	Orchidaceae			S3
PMORC1Y023	*Platanthera blephariglottis var. blephariglottis*	White-Fringe Orchis	Orchidaceae	G4G5T?	N?	S4
PMORC1Y02unkn1	*Platanthera X vossii*	a hybrid Orchis	Orchidaceae			S?
PMORC1Y050	*Platanthera clavellata*	Small Green Woodland Orchid	Orchidaceae	G5	N?	S5
PMORC1Y072	*Platanthera dilatata var. dilatata*	Leafy White Orchis	Orchidaceae	G5T?	N?	S5
PMORC1Y090	*Platanthera grandiflora*	Large Purple-Fringe Orchis	Orchidaceae	G5	N?	S2S3
PMORC1Y0A0	*Platanthera hookeri*	Hooker Orchis	Orchidaceae	G5	N?	S2S3
PMORC1Y0B0	*Platanthera hyperborea*	Leafy Northern Green Orchis	Orchidaceae	G5	N?	SRF
PMORC1Y0B2	*Platanthera hyperborea var. huronensis*	Green Orchid	Orchidaceae	G5T?	N?	S4
PMORC1Y0B6	*Platanthera hyperborea var. hyperborea*	Green Orchid	Orchidaceae	G5T?	N?	S2S3
PMORC1Y0E0	*Platanthera lacera*	Green-Fringe Orchis	Orchidaceae	G5	N?	S3S4
PMORC1Y0J0	*Platanthera obtusata*	Small Northern Bog-Orchid	Orchidaceae	G5	N?	S4
PMORC1Y0K0	*Platanthera orbiculata*	Large Roundleaf Orchid	Orchidaceae	G5?	N?	S3S4
PMORC1Y0K1	*Platanthera orbiculata var. macrophylla*	Large Round-Leaved Orchid	Orchidaceae	G5?T4	N?	S1
PMORC1Y0M0	*Platanthera psycodes*	Small Purple-Fringe Orchis	Orchidaceae	G5	N?	S3S5
PMORC1Y0unkn3	*Piperia unalascensis*	Alaska Rein Orchid	Orchidaceae		N9	S1
PMORC1Y0X0	*Platanthera x andrewsii*	a hybrid Orchis	Orchidaceae	HYB	N?	S3S5
PMORC1Y110	*Platanthera x media*	a hybrid Orchis	Orchidaceae	HYB	N?	SRF
PMORC1Y140	*Platanthera x keenanii*	a hybrid Orchis	Orchidaceae	HYB	N?	S?
PMORC21010	*Pogonia ophioglossoides*	Rose Pogonia	Orchidaceae	G5	N?	S4
PMORC2B0D0	*Spiranthes lacera*	Slender Ladies'-Tresses	Orchidaceae	G5	N?	
PMORC2B0V0	*Spiranthes romanzoffiana*	Hooded Ladies'-Tresses	Orchidaceae	G5	N?	S4S5
PPADI030Qunkn1	*Adiantum aleuticum*	Aleutian Maidenhair Fern	Adiantaceae			S3
PPADI0B020	*Cryptogramma stelleri*	Fragile Rockbrake	Adiantaceae	G5	N?	S3
PPASP021K2	*Asplenium trichomanes ssp. trichomanes*	Maidenhair Spleenwort	Aspleniaceae	G5T5	NR	S1

Appendix A: Conservation data centre ranks for Newfoundland orchids, ferns and fern allies - at March 21, 2001

PPASP02250	*Asplenium trichomanes-ramosum*	Green Spleenwort	Aspleniaceae	G4	N?	S4S5
PPDEN01050	*Dennstaedtia punctilobula*	Eastern Hay-Scented Fern	Dennstaedtiaceae	G5	N?	S1
PPDEN08018	*Pteridium aquilinum var. latiusculum*	Bracken Fern	Dennstaedtiaceae	G5T?	N?	S4S5
PPDRY02010	*Athyrium americanum*	Alpine Lady Fern	Dryopteridaceae	G4G5	N?	S3
PPDRY02021	*Athyrium filix-femina ssp. angustum*	Lady Fern	Dryopteridaceae	G5T5	N?	S4S5
PPDRY07010	*Cystopteris bulbifera*	Bulblet Fern	Dryopteridaceae	G5	N5	S3
PPDRY07030	*Cystopteris fragilis*	Fragile Fern	Dryopteridaceae	G5	N?	S4S5
PPDRY07040	*Cystopteris laurentiana*	Laurentian Bladder Fern	Dryopteridaceae	G3G4	N3?	S1S2
PPDRY07050	*Cystopteris montana*	Mountain Bladder Fern	Dryopteridaceae	G5	N?	SH?
PPDRY0A030	*Dryopteris campyloptera*	Mountain Wood-Fern	Dryopteridaceae	G5	N?	S4S5
PPDRY0A040	*Dryopteris carthusiana*	Spinulose Shield Fern	Dryopteridaceae	G5	N?	S4S5
PPDRY0A090	*Dryopteris cristata*	Crested Shield-Fern	Dryopteridaceae	G5	N?	S4S5
PPDRY0A0A0	*Dryopteris expansa*	Spreading Woodfern	Dryopteridaceae	G5	N?	SH?
PPDRY0A0B0	*Dryopteris filix-mas*	Male Fern	Dryopteridaceae	G5	N4N5	S3S4
PPDRY0A0C0	*Dryopteris fragrans*	Fragrant Cliff Wood-Fern	Dryopteridaceae	G5	N?	S2S3
PPDRY0A0H0	*Dryopteris intermedia*	Evergreen Woodfern	Dryopteridaceae	G5	N?	S4S5
PPDRY0A0K0	*Dryopteris marginalis*	Marginal Wood-Fern	Dryopteridaceae	G5	N?	S1
PPDRY0A0U0	*Dryopteris x boottii*	a Hybrid Wood-fern	Dryopteridaceae	HYB	N?	S?
PPDRY0A120	*Dryopteris x triploidea*	a Hybrid Wood-fern	Dryopteridaceae	HYB	N?	S?
PPDRY0A130	*Dryopteris x uliginosa*	a Hybrid Wood-fern	Dryopteridaceae	HYB	N?	S?
PPDRY0D030	*Gymnocarpium dryopteris*	Oak Fern	Dryopteridaceae	G5	N?	S4S5
PPDRY0D060	*Gymnocarpium robertianum*	Limestone Oak Fern	Dryopteridaceae	G5	N3	S3
PPDRY0K010	*Matteuccia struthiopteris*	Ostrich Fern	Dryopteridaceae	G5	N5	S3S4
PPDRY0P010	*Onoclea sensibilis*	Sensitive Fern	Dryopteridaceae	G5	N?	S4
PPDRY0R040	*Polystichum braunii*	Braun's Holly-Fern	Dryopteridaceae	G5	N?	S3S4
PPDRY0R0F0	*Polystichum lonchitis*	Northern Holly-Fern	Dryopteridaceae	G5	N?	S3
PPDRY0R0N0	*Polystichum scopulinum*	A Holly-Fern	Dryopteridaceae			SH
PPDRY0U010	*Woodsia alpina*	Northern Woodsia	Dryopteridaceae	G5	N3	S1S2
PPDRY0U040	*Woodsia glabella*	Smooth Woodsia	Dryopteridaceae	G5	N?	S2
PPDRY0U050	*Woodsia ilvensis*	Rusty Woodsia	Dryopteridaceae	G5	N?	S3S4
PPDRYunkn7	*Dryopteris campyloptera X cristata*	a hybrid Wood-fern	Dryopteridaceae			S?
PPEQU01010	*Equisetum arvense*	Field Horsetail	Equisetaceae	G5	N?	S4S5
PPEQU01020	*Equisetum fluviatile*	Water Horsetail	Equisetaceae	G5	N?	S4S5
PPEQU01030	*Equisetum hyemale*	Rough Horsetail	Equisetaceae	G5	N?	SU
PPEQU01031	*Equisetum hyemale var. affine*	Scouring Rush	Equisetaceae	G5T5	N?	SU
PPEQU01050	*Equisetum palustre*	Marsh Horsetail	Equisetaceae	G5	N?	S2S3
PPEQU01060	*Equisetum pratense*	Meadow Horsetail	Equisetaceae	G5	N?	S2
PPEQU01080	*Equisetum scirpoides*	Dwarf Scouring Rush	Equisetaceae	G5	N?	S3
PPEQU01090	*Equisetum sylvaticum*	Woodland Horsetail	Equisetaceae	G5	N?	S4S5
PPEQU010B2	*Equisetum variegatum var. variegatum*	Variegated Horsetail	Equisetaceae	G5T?	N?	S3?
PPEQU010C0	*Equisetum x litorale*	a Hybrid Horsetail	Equisetaceae	HYB	N?	S?
PPEQU010H0	*Equisetum x mackaii*	a Hybrid Horsetail	Equisetaceae	HYB	N?	S?
PPISO01040	*Isoetes echinospora*	Spiny-Spored Quillwort	Isoetaceae	G5	N?	S3S5
PPISO01090	*Isoetes lacustris*	Western Quillwort	Isoetaceae	G4G5	N?	S2S3
PPISO010N0	*Isoetes tuckermanii*	Tuckerman's Quillwort	Isoetaceae	G4?	N?	S2S3
PPISO010Q0	*Isoetes acadiensis*	Acadian Quillwort	Isoetaceae	G3?	N?	S1
PPISO01200	*Isoetes x harveyi*	a Hybrid Quillwort	Isoetaceae	HYB	N?	S?
PPLYC01020	*Lycopodium alpinum*	Alpine Clubmoss	Lycopodiaceae	G5	N?	S2
PPLYC01030	*Lycopodium annotinum*	Stiff Clubmoss	Lycopodiaceae	G5	N?	S4S5
PPLYC01080	*Lycopodium clavatum*	Running Pine	Lycopodiaceae	G5	N5	S3S5
PPLYC01090	*Lycopodium complanatum*	Trailing Clubmoss	Lycopodiaceae	G5	N?	S4S5
PPLYC010B0	*Lycopodium dendroideum*	Treelike Clubmoss	Lycopodiaceae	G5	N?	S4S5
PPLYC010D0	*Lycopodium digitatum*	Fan Club-Moss	Lycopodiaceae	G5	N?	S2

Appendix A: Conservation data centre ranks for Newfoundland orchids, ferns and fern allies - at March 21, 2001

PPLYC010W0	*Lycopodium sabinifolium*	Ground-Fir	Lycopodiaceae	G4	N?	S4S5
PPLYC01100	*Lycopodium sitchense*	Alaskan Clubmoss	Lycopodiaceae	G5	N?	S3S4
PPLYC01130	*Lycopodium tristachyum*	Deep-Root Clubmoss	Lycopodiaceae	G5	N?	S3?
PPLYC011E0	*Lycopodium hickeyi*	Hickey's Clubmoss	Lycopodiaceae	G5	N?	SRF
PPLYC011K0	*Lycopodium clavatum var. monostachyon*	Running Pine	Lycopodiaceae	G5T?	N?	S1
PPLYC02060	*Huperzia lucidula*	Shining Fir-Clubmoss	Lycopodiaceae	G5	N?	S4S5
PPLYC02070	*Huperzia selago*	Fir Clubmoss	Lycopodiaceae	G5	N?	S?
PPLYC020J0	*Huperzia appalachiana*	Appalachian Fir-Clubmoss	Lycopodiaceae	G4G5	N4N5	S4S5
PPLYC020L0	*Huperzia chinensis*	Pacific Fir Moss	Lycopodiaceae			S2
PPLYC020N0	*Huperzia occidentalis*	Western Clubmoss	Lycopodiaceae			S3S5
PPLYC020T0	*Huperzia X buttersii*	a hybrid Clubmoss	Lycopodiaceae			S?
PPLYC020unkn2	*Huperzia appalachiana X selago*	a hybrid Clubmoss	Lycopodiaceae			S3S5
PPLYC03020	*Lycopodiella appressa*	Southern Bog Clubmoss	Lycopodiaceae	G5	N?	S2S3
PPLYC03060	*Lycopodiella inundata*	Bog Clubmoss	Lycopodiaceae	G5	N?	S4
PPOPH01071	*Botrychium lanceolatum var. angustisegmentum*	Lance-Leaf Grape-Fern	Ophioglossaceae	G5T4	N?	SH
PPOPH01072	*Botrychium lanceolatum var. lanceolatum*	Lance-Leaved Moonwort	Ophioglossaceae	G5T4	N?	S1
PPOPH01080	*Botrychium lunaria*	Moonwort Grape-Fern	Ophioglossaceae	G5	N?	S3
PPOPH010A0	*Botrychium matricariifolium*	Chamomile Grape-Fern	Ophioglossaceae	G5	N?	S2S3
PPOPH010B0	*Botrychium multifidum*	Leathery Grape-Fern	Ophioglossaceae	G5	N?	S2S3
PPOPH010E0	*Botrychium simplex*	Least Grape-Fern	Ophioglossaceae	G5	N?	S2
PPOPH010H0	*Botrychium virginianum*	Rattlesnake Fern	Ophioglossaceae	G5	N?	S3
PPOPH010R0	*Botrychium minganense*	Mingan Moonwort	Ophioglossaceae	G4	N?	SU
PPOSM01010	*Osmunda cinnamomea*	Cinnamon Fern	Osmundaceae	G5	N?	S4S5
PPOSM01020	*Osmunda claytoniana*	Interrupted Fern	Osmundaceae	G5	N?	S4
PPOSM01032	*Osmunda regalis var. spectabilis*	Royal Fern	Osmundaceae	G5T?	N?	S4S5
PPPOL02110	*Polypodium virginianum*	Rock Polypody	Polypodiaceae	G5	N?	SU
PPPOL0211unkn1	*Polypodium virginianum s.l.*	Rock Polypody	Polypodiaceae			SU
PPPOL02140	*Polypodium appalachianum*	Appalachian Polypody	Polypodiaceae	G4G5	N?	SU
PPSCH03040	*Schizaea pusilla*	Curly-Grass Fern	Schizaeaceae	G3	N?	S3S4
PPSEL01110	*Selaginella selaginoides*	Low Spike-Moss	Selaginellaceae	G5	N?	S4S5
PPTHE02010	*Phegopteris connectilis*	Northern Beech Fern	Thelypteridaceae	G5	N?	S4S5
PPTHE050X0	*Thelypteris noveboracensis*	New York Fern	Thelypteridaceae	G5	N?	S3S4
PPTHE05121	*Thelypteris palustris var. pubescens*	Marsh Fern	Thelypteridaceae	G5T?	N?	S2S3
PPTHE051A0	*Thelypteris quelpaertensis*	A Fern	Thelypteridaceae			S1



GLOBAL RANK DEFINITIONS - GRANKS

G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
G2	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individual) or because of vulnerability to extinction due to some natural or man-made factor.
G3	Either very rare and local throughout its range (21 to 100 occurrences or less than 10,000 individuals) or locally in a restricted range or vulnerable to extinction from other factors.
G4	Apparently secure globally (may be rare in parts of its range).
G5	Demonstrably secure globally.
GH	Of historical occurrence throughout its range, may be rediscovered.
GX	Believed to be extinct throughout its range.
GXC	Extirpated in the wild but still known from captivity or cultivation.
G#?	Tentative rank (eg. G2?)
G#G#	Range of rank; insufficient data to assign specific global rank (eg. G2G3).
G#T#	Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definitions as above (eg. G3T1).
G#Q	Rank of a questionable species - ranked as species but questionable whether it is a species or subspecies; numbers have same definitions as above (eg. G2Q).
G#T#Q	Same as above, but validity as subspecies or variety is questioned.
GU	Due to lack of information, no rank or range can be assigned.
G?	Not yet ranked (temporary).

Definitions of Provincial (subnational) ranks - SRANKS

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 in at some locations. (21 to 100 occurrences).
S4	Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the Element is of long-term concern (e.g. watch list). (100+ occurrences).

S5	Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions.
S#S#	Numeric range rank: A range between two consecutive numeric ranks. Denotes range of uncertainty about the exact rarity of the Element (e.g., S1S2).
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.
SU	Unrankable: Possibly in peril throughout its range in the province, but status uncertain; need more information.
SX	Extinct/Extirpated: Element is believed to be extirpated within the province.
S?	Unranked: Element is not yet ranked.
SA	Accidental: Accidental or casual in the province (i.e., infrequent and far outside usual range). Includes species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded.
SE	Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coltsfoot); may be native in nearby regions.
SE#	Exotic numeric: An exotic established in the province that has been assigned a numeric rank.
SP	Potential: Potential that Element occurs in the province, but no occurrences reported.
SR	Reported: Element reported in the province but without persuasive documentation which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report.
SRF	Reported falsely: Element erroneously reported in the province and the error has persisted in the literature.
SZ	Zero occurrences: Not of practical conservation concern in the province, because there are no definable occurrences, although the species is native and appears regularly. An NZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations) or transitory. In other words, the migrant regularly passes through the province, but enduring, mappable Element Occurrences cannot be defined.

Qualifiers

Breeding Status

B	Breeding: Basic rank refers to the breeding population of the element in the province.
N	Non-breeding: Basic rank refers to the non-breeding population of the element in the province.

Other Qualifiers:

?	Inexact or uncertain: for numeric ranks, denotes inexactness, e.g., SE? denotes uncertainty of exotic status. (The ? qualifies the character immediately preceding it in the SRANK)
C	Captive or cultivated: Element is presently extant in the country or province only in captivity or cultivation.