

SANDY COVE

Ecological Reserve

Management Plan



Recommended citation:

Government of Newfoundland and Labrador. 2013. Sandy Cove Ecological Reserve Management Plan. Parks and Natural Areas Division, Department of Environment and Conservation, Deer Lake, NL. 19 pp.

For more information about the management plan or Sandy Cove Ecological Reserve contact:

**Parks and Natural Areas Division
Department of Environment & Conservation
Government of Newfoundland & Labrador
33 Reid's Lane, Deer Lake
Newfoundland & Labrador
A8A 2A3**

Phone: 709.635.4520

Fax: 709.635.4541

Website: www.gov.nl.ca/env/parks

Email: parksinfo@gov.nl.ca

March 2013

Management plan prepared by: Tina Leonard, Erika Pittman, Jeri Graham, Luise Hermanutz, Crystal Breon, Susan Squires, Sian French, Christine Doucet, Claudia Hanel, John Maunder, Paul Taylor, Geoff Bailey.

Cover Photos (left to right): Willow (*salix sp.*), Erika Pittman; Long's Braya (*braya longii*) Susan Squires; Island Gentian (*Gentianopsis nesophila*), limestone barrens and background image, Erika Pittman

Back Cover Photo: John McCarthy

**Sandy Cove Ecological Reserve
Management Plan**

Foreword

Newfoundland and Labrador's protected areas are special places. They preserve examples of woodland caribou herds, diverse seabird colonies, globally important fossil sites, endangered and threatened plants and animals, and globally rare habitats. Our protected areas provide natural venues for scientific research, education, and enjoyment for current and future generations.

Parks and Natural Areas Division of the Department of Environment and Conservation currently manages 32 provincial parks, 2 wilderness reserves, 18 ecological reserves, 2 Canadian heritage rivers, and 1 public reserve. Establishing and maintaining a system of protected areas is the foundation for sustainable and responsible development in Newfoundland and Labrador.

Our vision for a system of natural areas is:

A comprehensive system of publicly supported parks and protected areas for citizens present and future that protects the province's rich biodiversity and natural heritage, helps support a vibrant culture and sustainable economy, and enhances public understanding, appreciation, and enjoyment of our natural environment.

Sandy Cove Ecological Reserve is an example of our vision in action. The reserve protects a globally endangered plant species and its rare limestone barrens habitat. Parks and Natural Areas Division is committed to working with the Wildlife Division, Limestone Barrens Species at Risk Recovery Team, local stakeholders, and other agencies to maintain ecological integrity and enhance public understanding and enjoyment. This management plan for Sandy Cove Ecological Reserve demonstrates the Division's commitment to protect and present one of Newfoundland and Labrador's special places.



PNAD, Erika Pittman

Silky willow (*Salix vestita*)

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PNAD, Erika Pittman

1 SANDY COVE ECOLOGICAL RESERVE

1.1 Significance of Sandy Cove Ecological Reserve

Long's Braya (*Braya longii* Fernald; Fig. 1) is endemic to the Great Northern Peninsula of insular Newfoundland and is listed as Endangered under both provincial and federal legislation (Government of Newfoundland and Labrador 2002, Environment Canada 2008a). This small vascular plant is restricted to a few locations along a narrow strip of coastal limestone barrens (approximately 25 km long) within the Strait of Belle Isle Barrens Ecoregion (Damman 1983, Hermanutz et al. 2002; Fig. 2). Sandy Cove Ecological Reserve is globally significant because it contains 95% of the world's population of Long's Braya occurring on undisturbed habitat.

There has been extensive disturbance of the coastal limestone barrens on the Great Northern Peninsula, primarily through quarrying for gravel and developments associated with human infrastructure. While Long's Braya does occur on disturbed sites, plants in these locations have altered population dynamics and mortality rates and appear to be less persistent than populations occurring on undisturbed habitat (Susan Squires, pers. comm., 2008). Sandy

Cove Ecological Reserve (SCER) contains some of the last remaining undisturbed limestone barrens habitat populated by Long's Braya and represents critical habitat for this species (Hermanutz et al. 2002; Luise Hermanutz, Limestone Barrens Species at Risk Recovery Team, pers. comm., 2008).



PNAD, Erika Pittman

Figure 1. Long's Braya (*Braya longii*)

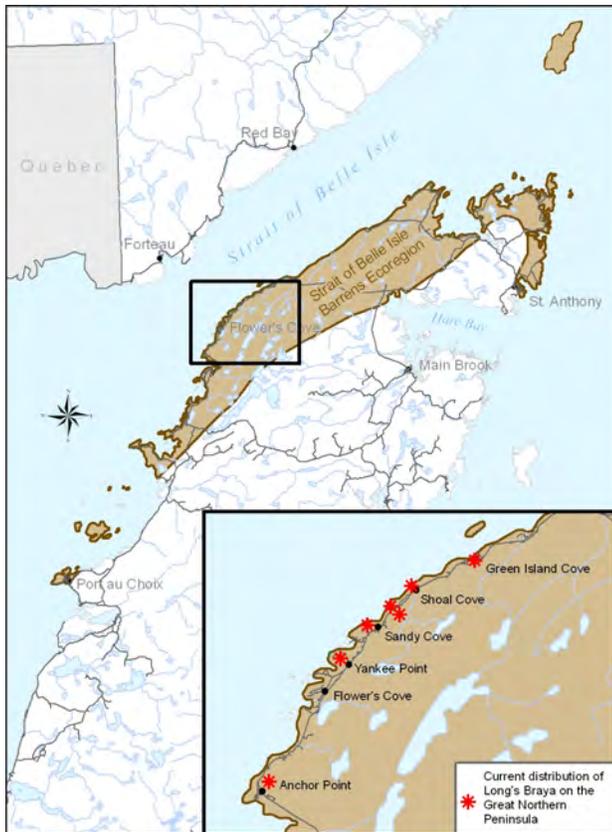


Figure 2. Global distribution of Long's Braya (from Hermanutz et al. 2002)

A 2008 population survey indicated that the total global population of Long's Braya is approximately 5,500 flowering plants, about 700 of which are situated within the boundaries of SCER (Fig. 3). Of the global population, only 500 flowering braya exist on natural, undisturbed habitat and 475 of these occur within SCER: 400 of those are in the south parcel, while 75 occur in the north parcel (Susan Squires, pers. comm., 2008). There are approximately 230 other Long's Braya individuals in the Reserve; these are located on limestone barrens that are considered disturbed.

SCER is classified as a Special Feature or Component 3 Reserve in the Newfoundland and Labrador Natural Areas System. For more information see *Caring For Our Special Places: A Framework* (Government of Newfoundland and Labrador 2004).

1.2 History of Discovery and Establishment

Long's Braya was originally discovered and described in 1924 at Sandy Cove by botanists Bayard Long, Curator of the Philadelphia Botanical Club, and Merritt Lyndon Fernald, Curator of the Gray Herbarium at Harvard University (Fernald 1926). The most likely location of this initial discovery of Long's Braya is within the northern parcel of SCER. Fernald returned to this location and collected more specimens in 1925. In 1925, Fernald also found Long's Braya growing at a second location near Sandy Cove, now contained in the south parcel of SCER. Subsequent confirmations of Long's Braya at these two sites were conducted by J. Harris in 1981-1983, the botanical team of the University of Montreal in 1987, S. Meades in 1995 and 1996, and the Braya Recovery Team in 1998 (Hermanutz et al. 2002).

In 1997, Long's Braya was designated Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In response, the Government of Newfoundland and Labrador appointed the Braya Recovery Team to develop a Recovery Plan for the species.

In 1999, the Braya Recovery Team approached the provincial Wilderness and Ecological Reserves Advisory Council (WERAC) with the goal of establishing an ecological reserve to protect Long's Braya. The Braya Recovery Team made a recommendation that the Sandy Cove south parcel and north parcel be protected under the *Wilderness and Ecological Reserves Act*; these sites are two of the three remaining locations of Long's Braya habitat having relatively low levels of human activity.

The species status was re-examined and confirmed Endangered by COSEWIC in May 2000. In 2002, Long's Braya was legally listed as Endangered both federally under the *Species at Risk Act* and provincially under the *Endangered Species Act*, and the Braya Recovery Team released its National Recovery Plan for Long's Braya (*Braya longii* Fernald) and Fernald's Braya (*Braya fernaldii* Abbe; Hermanutz et al. 2002).

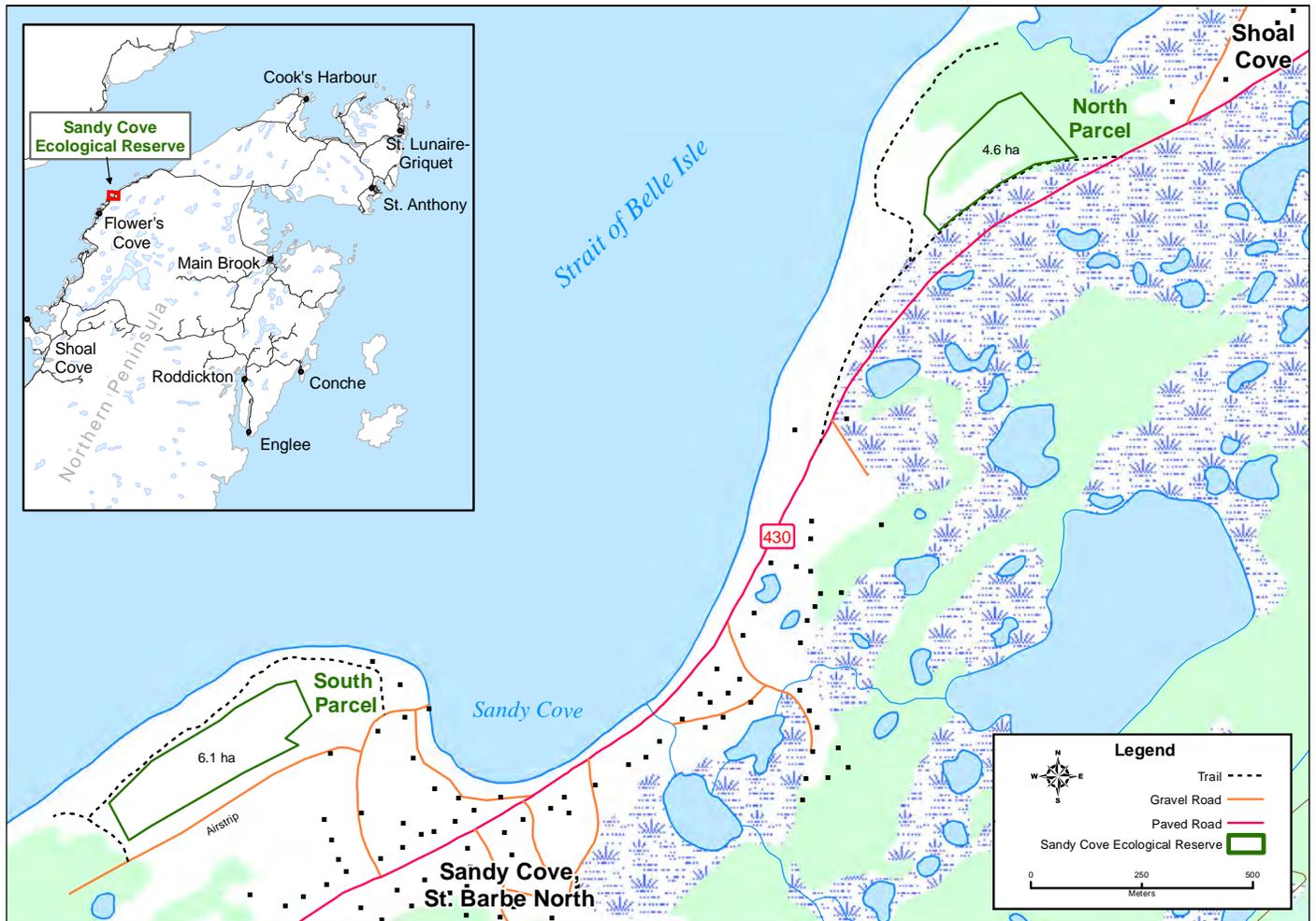


Figure 3. Map of Sandy Cove Ecological Reserve

In the recovery plan, the Braya Recovery Team recommended that limestone barrens near Sandy Cove be established as a protected area because of their significance to the global population of Long's Braya.

On June 16, 2005 WERAC formally submitted a recommendation to the Minister of Environment and Conservation to establish Sandy Cove Provisional Ecological Reserve. With the publication of the Sandy Cove Provisional Ecological Reserve Order in the Newfoundland and Labrador Gazette, the Provisional Reserve was formally established on April 5, 2007.

On June 19, 2007 Parks and Natural Areas Division hosted an information session in the community of Flower's Cove for the residents of Sandy Cove and surrounding areas.

On March 29, 2008 and May 3, 2008, public notices announcing Sandy Cove Provisional Ecological Reserve were published in three local and regional newspapers. The notices also advised of a public consultation to be hosted by WERAC to discuss the proposed ecological reserve. The public consultation was held on June 11, 2008, at the Sandy Cove Lion's Club. WERAC members discussed the implications of the permanent establishment of SCER, the preliminary management plan, and proposed reserve regulations.

On March 8, 2013, with the publication of the Sandy Cove Ecological Reserve Order in the Newfoundland and Labrador Gazette, the Reserve was given full reserve status under the *Wilderness and Ecological Reserves Act*.

1.3 Location and Nature of the Reserve

Sandy Cove Ecological Reserve is located on the Great Northern Peninsula of insular Newfoundland near the community of Sandy Cove (Fig. 3); the largest nearby community is Flower's Cove. The Reserve consists of two parcels comprising 10.6 ha: the south and north parcels contain areas of 6.1 ha and 4.6 ha respectively. The Reserve is located along the rocky, flat, coastal lowlands at approximately 15 m above sea level and is dominated by limestone barrens habitat.

In Newfoundland and Labrador, the majority of limestone barrens are located in the Strait of Belle Isle Barrens Ecoregion. Limestone barrens primarily occur along a continuous 70 km stretch of coastline on the Great Northern Peninsula from Burnt Cape Ecological Reserve south to Anchor Point. Patches of this habitat type are also found at Table Point Ecological Reserve, Port au Choix National Historic Site, and in a number



John McCarthy

Calcium-rich limestone



Susan Squires

Figure 4. Frost boil

of small communities along the coast. Limestone barrens are located on the Port au Port Peninsula in the Western Newfoundland Forest Ecoregion as well (Meades 1990, Hermanutz et al. 2002, Limestone Barrens Species at Risk Recovery Team 2008).

During the late Cambrian/early Ordovician period (approximately 500 million years before present), the limestone barrens existed as the floor of a productive, shallow tropical ocean. For approximately 480 million years, calcium-carbonate shells of marine organisms accumulated on the sea floor and eventually solidified into calcium-rich limestone and magnesium-rich dolostone. Through the process of continental drift, this ancient ocean floor was thrust up and became land. Since that time, numerous glaciations have scoured the landscape, and thousands of years of weathering have produced the limestone barrens landscape as it currently exists.

The climate along the northwest coast of the Northern Peninsula is characterized by cool, short summers

and long, cold winters. The growing season lasts on average fewer than 110 days. Soils on the limestone barrens are shallow. They are composed primarily of gravel and silt sized particles of calcium carbonate with some admixture of marine sand. This is often covered by a thin layer of peat. Cycles of freezing and thawing have produced patterned ground in the form of frost boils and frost polygons (Fig. 4).

The flora of SCER mainly comprises species that are adapted to the environmental conditions found on limestone barrens. Unlike most plants in Newfoundland and Labrador, those found in the Reserve are able to tolerate soils high in calcium and are called 'calciphilic' or 'calcium loving'. They are able to survive in nutrient-poor soils and can tolerate conditions similar to those found in arctic or alpine environments. Examples of such conditions include a short growing season, frequent fog, strong winds, severe freeze/thaw events, flooding and droughts, harsh winters, lack of insulating snow, and rocky, shallow soils. Plants found at SCER generally are small, grow close to the ground, and have long roots allowing for sufficient anchorage. Also included in the

Reserve at inland locations are patches of krummholz (gnarled trees shaped by the wind) consisting of Balsam fir (*Abies balsamea*) and White spruce (*Picea glauca*).

Long's Braya is a member of the Mustard Family (Brassicaceae). It is a small herbaceous perennial



PNAD, Kristin Powell

Flowering Long's Braya (*Braya longii*)



PNAD, Erika Pittman

Purple saxifrage (*Saxifraga oppositifolia*)



PNAD, Erika Pittman

White mountain-avens (*Dryas integrifolia*)

with a deep taproot, simple to branched stem, and fleshy basal leaves (Fig. 1). Plants are 1-10 cm tall with greyish-green to blue fleshy basal leaves that are 1.4-4 cm long. Flowers are borne in clusters and have white petals and greenish-purple sepals. It is a self-pollinator; seeds are dispersed passively by wind or water seepage. This results in production of small, isolated groups of plants. The optimal habitat for this species is found only on undisturbed limestone barrens and is often situated at the edges of frost boils. Long's Braya grows very slowly and is long-lived. Plants die back to the crown in winter and regrow each spring.

A number of other plants that are considered to be rare in the province are found in SCER, including Meadow bittercress (*Cardamine pratensis* subsp. *angustifolia*) and Bristle sedge (*Carex microglochin*). Common species found in the reserve that are associated with arctic-alpine habitats include Purple saxifrage (*Saxifraga oppositifolia*), Moss campion (*Silene acaulis*), White mountain avens (*Dryas integrifolia* subsp. *integrifolia*), and Common butterwort (*Pinguicula vulgaris*). See Appendix A for a list of plant species recorded to date in the Reserve.

The Reserve provides habitat for a number of breeding birds that are commonly found in Newfoundland. (See Appendix B for a list of bird species). Various raptor species use the Reserve during the breeding season and fall migration; the most notable of these is the Short-eared owl (*Asio flammeus*), which is listed as a species of Special Concern (Environment Canada 2008b). SCER also provides habitat for numerous species of migrating shorebirds and overwintering gulls.

There is evidence that mammals such as moose (*Alces alces*) and voles (*Microtus* spp.) are also found within the Reserve.



Lichen on limestone

PNAD, Erika Pittman



PNAD, Erika Pittman

Roseroot (*Rhodiola rosea*)

2 MANAGEMENT POLICIES

2.1 Introduction

Ecological reserves are established under the *Wilderness and Ecological Reserves Act (1980)* to preserve areas of the province which contain unique or representative species, ecosystems or natural phenomena. Sandy Cove Ecological Reserve contains the best representation of undisturbed habitat in the world for the endangered Long's Braya. The limestone barrens, specifically the natural, undisturbed sites, represent critical habitat for Long's Braya. These limestone barrens are very fragile and are easily degraded.

Sandy Cove is established as an ecological reserve primarily to protect a globally significant population of Long's Braya, but also serves a variety of other objectives. As per Section 5 of the *Wilderness and Ecological Reserves Act*, Sandy Cove Ecological Reserve is established:

- a. To preserve the habitat of an animal or plant species that is rare or endangered;
- b. To preserve organisms in their natural habitat to ensure the preservation of their gene pools;
- c. To preserve representatives of distinct ecosystems in the province;
- d. To provide standards against which the effects of development in other areas may be measured; and
- e. To provide for scientific research and educational purposes in aspects of the natural environment.

This management plan provides guidelines for protection and use of the site for scientific research, educational programs, and other purposes.

2.2 Vision

Sandy Cove Ecological Reserve is a globally significant botanical site where protection of Long's Braya is the primary goal.

An active research and monitoring program provides vital information for reserve management and offers opportunities for local involvement and stewardship. Research conducted in the Reserve on Long's Braya and the limestone barrens informs global understanding of this incredible rare plant and its unique habitat.

We are leaders in protection, education and sustainable tourism experiences. We work as partners with the community to protect and communicate the importance of Long's Braya and the limestone barrens.

2.3 Goals

- Goal 1. Long's Braya Protection and Ecological Integrity
To maintain the Reserve's ecological integrity and natural processes
- Goal 2. Research and Monitoring
To develop and maintain an active research and monitoring program
- Goal 3. Education and Sustainable Tourism
To encourage and support high quality educational and sustainable tourism experiences
- Goal 4. Partnerships
To create and maintain active partnerships with local communities, educational institutions, organizations and government agencies in research, education and stewardship activities



PNAD, Tina Leonard



Limestone rock pile from old quarry site

2.4 Management Policies

The overall approach to resource management in the Reserve will be one which emphasizes the persistence of Long's Braya and the retention of the Reserve area in as natural a state as possible. The management approach for SCER is consistent with IUCN Protected Area Management Category II. In keeping with this approach, the following overall management policies are established:

- a. Scientific research will be encouraged where it does not conflict with the general objectives of site protection.
- b. Use of the site for educational purposes may be permitted where it does not conflict with the general objectives of site protection and scientific research.
- c. Use of the site for purposes other than (a) and (b) may be permitted where it does not conflict with the general objectives of site protection. Visitor access is allowed, but may be restricted in the event of unacceptable levels of visitor impact.
- d. To encourage survival of rare plants that occur in the Reserve some habitat restoration may be undertaken.

For a summary of the regulations see Appendix C. The full *Wilderness and Ecological Reserves Act* and *Botanical Ecological Reserve Regulations* are available online at http://www.env.gov.nl.ca/env/parks/wer/r_sce/rules.html.

3 IMPLEMENTATION GUIDELINES

In addition to the requirements of the *Wilderness and Ecological Reserves Act* and the *Botanical Ecological Reserve Regulations*, the following statements are to serve as a guide to users and managers of the Reserve.

3.1 Reserve Management

- a. The managing agency of the Reserve is Parks and Natural Areas Division, Department of Environment and Conservation.
- b. The existence of the Reserve shall be noted by signs placed at appropriate locations along its boundary. Other signs may be erected in the Reserve with the written approval of the Manager of Natural Areas.
- c. For the purpose of monitoring populations of rare plants, permanent sample plots may be established in the Reserve.
- d. Parks and Natural Areas Division commits to mapping the Reserve, including the location of Long's Braya, braya monitoring plots, and areas of undisturbed Long's Braya habitat.

- e. In order to conserve Long's Braya, Parks and Natural Areas Division will work in cooperation with Wildlife Division, Department of Environment and Conservation, which is the agency primarily responsible for the protection of species listed under the Newfoundland and Labrador *Endangered Species Act*. Collaboration with the Wildlife Division will help ensure that the integrity of populations of Long's Braya within SCER is maintained.
- f. Re-introduction of Long's Braya to unpopulated areas in the Reserve may be permitted in the event that the Wildlife Division or the Limestone Barrens Species at Risk Recovery Team recommends such action as part of the recovery strategy for the species.
- g. The use of motorized vehicles by the managing agency is permitted under the *Botanical Ecological Reserve Regulations*, but is intended solely for the purpose of habitat restoration, and then only with written permission from the Manager, Natural Areas, Parks and Natural Areas Division.
- h. In the event of unacceptable levels of visitor impact, Parks and Natural Areas Division may restrict visitor access or implement a permit system to ensure reserve integrity is maintained. Group size, visitor numbers, or areas permitted for visitation may be restricted to protect against trampling of vegetation, soil compaction and other negative impacts on reserve flora.
- i. As a general guideline, there will be no travel in the Reserve for any reason when soil conditions are wet, such as following snow melt or after periods of heavy rainfall. Travel on the fine-particled soils of the limestone barrens during wet conditions can cause irreparable soil compaction and damage to critical braya habitat.
- j. Parks and Natural Areas Division commits to a continuing program to compile complete species inventories of various taxa in the Reserve and to implement associated monitoring programs where necessary.
- k. Commercial and non-commercial enterprises such as guided tours and professional photographic or videographic ventures may be permitted where it does not conflict with the general objectives of site protection and scientific research. Interested parties must obtain a permit from Parks and Natural Areas Division.
- l. Regular patrols of the Reserve will be made by staff of Parks and Natural Areas Division to ensure that regulations are being adhered to. Every effort will be made to ensure local support for the site and local involvement in site protection.



Measuring height of flowering Long's Braya stem

PNAD, Tina Leonard

3.2 Scientific Research

Providing areas for long-term scientific research is one of the main reasons for creating and managing the province's ecological reserves. It is therefore important that research be carried out in such a way that the scientific value of the Reserve is not diminished for future investigators. Accordingly, researchers proposing to conduct research within SCER require a permit from Parks and Natural Areas Division. Applications for permits should provide a description of the proposed research, including the objectives, methodologies and time frame involved.

The following conditions shall be stipulated for each permit issued:

- a. All published material related to research conducted in the Reserve will acknowledge the existence of the Reserve and the research permit from the Government of Newfoundland and Labrador, Department of Environment and Conservation.
- b. A report of the results of each research project will be filed with Parks and Natural Areas Division, and a copy of all scientific papers will be forwarded to the Division upon publication.



Luise Hermanutz

Researchers measuring plant growth and reproduction



Luise Hermanutz

Roncalli Highschool field trip with Wilf Nichols, MUN Botanical Garden

Parks and Natural Areas Division staff may apply additional conditions to permits as required.

3.3 Educational Use

The site may be used for educational purposes provided such use does not damage the integrity or scientific value of the Reserve. Permits are required for institutions and groups wishing to visit the area. Such permits can be obtained from Parks and Natural Areas Division.

In keeping with the general management policy to retain the site in as natural a state as possible, the only on-site development for educational use will be the posting of signs, as stipulated in 3.1(b).

Information concerning the Reserve will be distributed to the public through Parks and Natural Areas Division.

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APPENDIX A – Flora Detected to Date at Sandy Cove Ecological Reserve

Table 1. Flora recorded to date in Sandy Cove Ecological Reserve. Some species can be further differentiated into subspecies or varieties; n/a indicates cases where species could not be identified at the subspecies or variety level and where some of those subspecies or varieties are rare while others are not, and where some are native while others are not. All species identified by Claudia Hanel, Botanist, Wildlife Division, NL Department of Environment and Conservation. Species information from Meades et al. 2000*.

Scientific name	Common name	Family	Rare in insular Newfoundland	Native or Introduced
<i>Abies balsamea</i>	Balsam fir	Pinaceae	no	n
<i>Achillea millefolium</i> ¹	Yarrow	Asteraceae	no	n/a
<i>Agrostis stolonifera</i>	Spreading bentgrass	Poaceae	no	i
<i>Alchemilla filicaulis</i> ¹	Lady's mantle	Rosaceae	no	n/a
<i>Anaphalis margaritacea</i>	Pearly everlasting	Asteraceae	no	n
<i>Andromeda glaucophylla</i>	Bog rosemary	Ericaceae	no	n
<i>Anemone parviflora</i>	Northern anemone	Ranunculaceae	no	n
<i>Angelica atropurpurea</i>	Purplestem angelica	Apiaceae	no	n
<i>Arctostaphylos uva-ursi</i>	Common bearberry	Ericaceae	no	n
<i>Arctous alpina</i>	Alpine bearberry	Ericaceae	no	n
<i>Arenaria humifusa</i>	Low sandwort	Caryophyllaceae	no	n
<i>Argentina anserina</i>	Silverweed	Rosaceae	no	n
<i>Armeria maritima</i> subsp. <i>sibirica</i>	Labrador sea thrift	Plumbaginaceae	no	n
<i>Betula glandulosa</i>	Glandular birch	Betulaceae	no	n
<i>Betula pumila</i> var. <i>pumila</i>	Dwarf birch	Betulaceae	no	n
<i>Braya longii</i>	Long's braya	Brassicaceae	yes	n
<i>Calamagrostis canadensis</i> ¹	Bluejoint Canada reedgrass	Poaceae	no	n
<i>Campanula rotundifolia</i>	Harebell	Campanulaceae	no	n
<i>Cardamine pratensis</i> var. <i>angustifolia</i>	Meadow bittercress	Brassicaceae	yes	n
<i>Carex capillaris</i> subsp. <i>capillaris</i>	Hair sedge	Cyperaceae	no	n
<i>Carex flava</i>	Yellow sedge	Cyperaceae	no	n
<i>Carex glacialis</i>	Glacier sedge	Cyperaceae	no	n
<i>Carex microglochin</i>	Bristle sedge	Cyperaceae	yes	n
<i>Carex scirpoidea</i>	Scirpus sedge	Cyperaceae	no	n
<i>Carex viridula</i> subsp. <i>viridula</i> var. <i>viridula</i>	Little green sedge	Cyperaceae	no	n
<i>Cerastium fontanum</i> subsp. <i>vulgare</i>	Common mouse-ear chickweed	Caryophyllaceae	no	i
<i>Chamerion angustifolium</i> ¹	Fireweed	Onagraceae	no	n
<i>Clintonia borealis</i>	Cornlily	Liliaceae	no	n
<i>Conioselinum chinense</i>	Hemlock parsley	Apiaceae	no	n
<i>Cornus canadensis</i>	Bunchberry	Cornaceae	no	n

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Scientific name	Common name	Family	Rare in insular Newfoundland	Native or Introduced
<i>Cornus stolonifera</i>	Red osier dogwood	Cornaceae	no	n
<i>Cornus suecica</i>	Swedish bunchberry	Cornaceae	no	n
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	Rosaceae	no	n
<i>Deschampsia flexuosa</i>	Wavy hairgrass	Poaceae	no	n
<i>Draba incana</i>	Hoary whitlowgrass	Brassicaceae	no	n
<i>Dryas integrifolia</i> subsp. <i>integrifolia</i>	White mountain avens	Rosaceae	no	n
<i>Dryopteris</i> sp.	Unidentified wood fern	Dryopteridaceae	no	n
<i>Elymus repens</i>	Quackgrass	Poaceae	no	i
<i>Empetrum nigrum</i> ¹	Black crowberry	Ericaceae	no	n
<i>Epilobium</i> sp.	Unidentified willowherb	Onagraceae	n/a	n
<i>Equisetum arvense</i>	Field horsetail	Equisetaceae	no	n
<i>Equisetum scirpoides</i>	Dwarf souring rush	Equisetaceae	no	n
<i>Equisetum variegatum</i> subsp. <i>variegatum</i>	Variegated souring rush	Equisetaceae	no	n
<i>Erigeron hyssopifolius</i>	Hyssopleaf fleabane	Asteraceae	no	n
<i>Euphrasia</i> sp.	Unidentified eyebright	Orobanchaceae	no	n
<i>Festuca frederikseniae</i>	Viviparous fescue	Poaceae	no	n
<i>Festuca rubra</i> ¹	Viviparous red fescue	Poaceae	no	n
<i>Fragaria virginiana</i> ¹	Northern wild strawberry	Rosaceae	no	n
<i>Gentianella amarella</i> subsp. <i>acuta</i>	Northern gentian	Gentianaceae	no	n
<i>Gentianopsis nesophila</i>	Island gentian	Gentianaceae	no	n
<i>Geum rivale</i>	Purple avens	Rosaceae	no	n
<i>Heracleum maximum</i>	Cow parsnip	Apiaceae	no	n
<i>Iris</i> sp.	Unidentified iris	Iridaceae	no	n
<i>Juncus alpinus</i>	Alpine rush	Juncaceae	no	n
<i>Juncus arcticus</i> var. <i>balticus</i>	Baltic rush	Juncaceae	no	n
<i>Juncus triglumis</i> var. <i>albescens</i>	Northern white rush	Juncaceae	no	n
<i>Juniperus communis</i> ¹	Common juniper	Cupressaceae	no	n
<i>Juniperus horizontalis</i>	Creeping juniper	Cupressaceae	no	n
<i>Kalmia polifolia</i>	Bog laurel	Ericaceae	no	n
<i>Larix laricina</i>	Larch	Pinaceae	no	n
<i>Leontodon autumnalis</i>	Fall dandelion	Asteraceae	no	i
<i>Leucanthemum vulgare</i>	Oxeye daisy	Asteraceae	no	i
<i>Linnaea borealis</i> subsp. <i>americana</i>	Twinflower	Caprifoliaceae	no	n
<i>Lomatogonium rotatum</i> subsp. <i>rotatum</i>	Marsh felwort	Gentianaceae	no	n

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Scientific name	Common name	Family	Rare in insular Newfoundland	Native or Introduced
<i>Lonicera villosa</i>	Mountain flyhoneysuckle	Caprifoliaceae	no	n
<i>Luzula</i> sp.	Unidentified woodrush	Juncaceae	no	n
<i>Maianthemum canadense</i> subsp. <i>canadense</i>	Canada mayflower	Convallariaceae	no	n
<i>Matricaria recutita</i>	Wild chamomile	Asteraceae	no	i
<i>Mitella nuda</i>	Naked miterwort	Saxifragaceae	no	n
<i>Myrica gale</i>	Sweet gale	Myricaceae	no	n
<i>Oxytropis campestris</i> var. <i>minor</i>	Newfoundland oxytrope	Fabaceae	no	n
<i>Packera paupercula</i>	Balsam ragwort	Asteraceae	no	n
<i>Parnassia parviflora</i>	Smallflower grass-of-Parnassus	Parnassiaceae	no	n
<i>Persicaria vivipara</i>	Alpine bistort	Polygonaceae	no	n
<i>Phleum pratense</i>	Common timothy	Poaceae	no	i
<i>Picea glauca</i>	White spruce	Pinaceae	no	n
<i>Picea mariana</i>	Black spruce	Pinaceae	no	n
<i>Pinguicula vulgaris</i>	Common butterwort	Lentibulariaceae	no	n
<i>Plantago major</i>	Common plantain	Plantaginaceae	no	i
<i>Plantago maritima</i> subsp. <i>juncooides</i>	Seaside plantain	Plantaginaceae	no	n
<i>Platanthera</i> sp.	Unidentified orchid	Orchidaceae	no	n
<i>Poa alpina</i>	Alpine bluegrass	Poaceae	no	n
<i>Prenanthes trifoliolata</i>	Tall rattlesnakeroot	Asteraceae	no	n
<i>Primula laurentiana</i>	Laurentian primrose	Primulaceae	no	n
<i>Primula mistassinica</i>	Mistassini primrose	Primulaceae	no	n
<i>Pyrola asarifolia</i>	Pink pyrola	Pyrolaceae	no	n
<i>Ranunculus acris</i>	Common buttercup	Ranunculaceae	no	i
<i>Rhamnus alnifolia</i>	Alderleaf buckthorn	Rhamnaceae	no	n
<i>Rhinanthus minor</i> ¹	Yellowrattle	Orobanchaceae	no	n/a
<i>Rhodiola rosea</i>	Roseroot	Crassulaceae	no	n
<i>Rhododendron groenlandicum</i>	Labrador tea	Ericaceae	no	n
<i>Rhododendron lapponicum</i>	Lapland rosebay	Ericaceae	no	n
<i>Ribes glandulosum</i>	Skunk currant	Grossulariaceae	no	n
<i>Ribes lacustre</i>	Bristly black currant	Grossulariaceae	no	n
<i>Rubus arcticus</i> subsp. <i>acaulis</i>	Plumboy	Rosaceae	no	n
<i>Rubus chamaemorus</i>	Bakeapple	Rosaceae	no	n
<i>Rubus idaeus</i> subsp. <i>strigosus</i>	Wild red raspberry	Rosaceae	no	n

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Scientific name	Common name	Family	Rare in insular Newfoundland	Native or Introduced
<i>Rubus pubescens</i>	Dewberry	Rosaceae	no	n
<i>Rumex acetosella</i>	Sheep sorrel	Polygonaceae	no	i
<i>Sagina procumbens</i>	Procumbent pearlwort	Caryophyllaceae	no	n
<i>Salix calcicola</i> var. <i>calcicola</i>	Limestone willow	Salicaceae	no	n
<i>Salix candida</i>	Hoary willow	Salicaceae	no	n
<i>Salix glauca</i> var. <i>callicarpaea</i>	Beautiful willow	Salicaceae	no	n
<i>Salix reticulata</i> subsp. <i>reticulata</i>	Netvein willow	Salicaceae	no	n
<i>Salix uva-ursi</i>	Bearberry willow	Salicaceae	no	n
<i>Salix vestita</i>	Hairy willow	Salicaceae	no	n
<i>Sanguisorba canadensis</i> subsp. <i>canadensis</i>	Bottlebrush	Rosaceae	no	n
<i>Saxifraga aizoides</i>	Yellow mountain saxifrage	Saxifragaceae	no	n
<i>Saxifraga oppositifolia</i>	Purple mountain saxifrage	Saxifragaceae	no	n
<i>Selaginella selaginoides</i>	Northern spikemoss	Selaginellaceae	no	n
<i>Shepherdia canadensis</i>	Soapberry	Elaeagnaceae	no	n
<i>Sibbaldiopsis tridentata</i>	Threetooth cinquefoil	Rosaceae	no	n
<i>Silene acaulis</i> var. <i>exscapa</i>	Moss campion	Caryophyllaceae	no	n
<i>Solidago hispida</i>	Hairy goldenrod	Asteraceae	no	n
<i>Solidago macrophylla</i>	Largeleaf goldenrod	Asteraceae	no	n
<i>Stellaria longipes</i> subsp. <i>longipes</i>	Longstalk starwort	Caryophyllaceae	no	n
<i>Symphotrichum novi-belgii</i> var. <i>novi-belgii</i>	New York aster	Asteraceae	no	n
<i>Thalictrum alpinum</i>	Alpine meadowrue	Ranunculaceae	no	n
<i>Tofieldia glutinosa</i>	Sticky tofieldia	Tofieldiaceae	no	n
<i>Tofieldia pusilla</i>	Small tofieldia	Tofieldiaceae	no	n
<i>Trichophorum cespitosum</i>	Deer grass	Cyperaceae	no	n
<i>Trifolium pratense</i>	Red clover	Fabaceae	no	n
<i>Trifolium repens</i>	White clover	Fabaceae	no	n
<i>Triglochin maritima</i>	Seaside arrowgrass	Juncaginaceae	no	n
<i>Triglochin palustris</i>	Marsh arrowgrass	Juncaginaceae	no	n
<i>Trisetum spicatum</i>	Narrow false oats	Poaceae	no	n
<i>Vaccinium uliginosum</i>	Alpine bilberry	Ericaceae	no	n
<i>Vaccinium vitis-idaea</i> subsp. <i>minus</i>	Partridgeberry	Ericaceae	no	n
<i>Viburnum edule</i>	Squashberry	Adoxaceae	no	n
<i>Vicia cracca</i> subsp. <i>cracca</i>	Cow vetch	Fabaceae	no	i

*, Meades, S. J., S. G. Hay, and L. Brouillet [online]. 2000. Annotated checklist of the vascular plants of Newfoundland and Labrador. The Provincial Museum of Newfoundland and Labrador, St. John's, NL. <<http://www.digitalnaturalhistory.com/meades.htm>> (30 September 2008).

¹, unidentified to subspecies or variety.

APPENDIX B – Birds of Sandy Cove Ecological Reserve

Table 2. Birds which are predicted to occur in Sandy Cove Ecological Reserve. This list was compiled based on best available information on the status and distribution of birds on the Great Northern Peninsula, insular Newfoundland and Labrador. Season: s, summer; sp, spring; f, fall; w, winter.

Scientific name	Common name	Season	Rare in NL
<i>Circus cyaneus</i>	Northern harrier	spsf	no
<i>Accipiter striatus</i>	Sharp-shinned hawk	spsf	no
<i>Accipiter gentilis</i>	Northern goshawk	spsfw	no
<i>Haliaeetus leucocephalus</i>	Bald eagle	spsf	no
<i>Pandion haliaetus</i>	Osprey	spsf	no
<i>Falco columbarius</i>	Merlin	spsf	no
<i>Pluvialis squatarola</i>	Black-bellied plover	sf	no
<i>Pluvialis dominica</i>	American golden-plover	sf	no
<i>Charadrius semipalmatus</i>	Semipalmated plover	sf	no
<i>Charadrius vociferus</i>	Killdeer	spsf	no
<i>Tringa melanoleuca</i>	Greater yellowlegs	spsf	no
<i>Tringa flavipes</i>	Lesser yellowlegs	spsf	no
<i>Actitis macularia</i>	Spotted sandpiper	spsf	no
<i>Numenius phaeopus</i>	Whimbrel	sf	no
<i>Calidris alba</i>	Sanderling	sf	no
<i>Calidris alpina</i>	Dunlin	sf	no
<i>Calidris melanotos</i>	Pectoral sandpiper	sf	no
<i>Calidris fuscicollis</i>	White-rumped sandpiper	sf	no
<i>Calidris pusilla</i>	Semipalmated sandpiper	sf	no
<i>Calidris minutilla</i>	Least sandpiper	sf	no
<i>Limnodromus griseus</i>	Short-billed dowitcher	sf	no
<i>Larus delawarensis</i>	Ring-billed gull	spsf	no
<i>Larus argentatus</i>	Herring gull	spsfw	no
<i>Larus glaucooides</i>	Iceland gull	spfw	no
<i>Larus hyperboreus</i>	Glaucous gull	spfw	no
<i>Larus marinus</i>	Great black-backed gull	spsfw	no
<i>Zenaidura macroura</i>	Mourning dove	spsf	no
<i>Asio flammeus</i>	Short-eared owl	spsf	yes
<i>Nyctea scandiaca</i>	Snowy owl	spfw	no
<i>Colaptes auratus</i>	Northern flicker	spsf	no
<i>Empidonax flaviventris</i>	Yellow-bellied flycatcher	spsf	no
<i>Lanius excubitor</i>	Northern shrike	spfw	no
<i>Perisoreus canadensis</i>	Gray jay	spsfw	no

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Scientific name	Common name	Season	Rare in NL
<i>Corvus corax</i>	Common raven	spsfw	no
<i>Corvus brachyrhynchos</i>	American crow	spsf	no
<i>Eremophila alpestris</i>	Horned lark	spsf	no
<i>Poecile hudsonica</i>	Boreal chickadee	spsfw	no
<i>Sitta canadensis</i>	Red-breasted nuthatch	spsfw	no
<i>Regulus calendula</i>	Ruby-crowned kinglet	spsf	no
<i>Oenanthe oenanthe</i>	Northern wheatear	spsf	yes
<i>Turdus migratorius</i>	American robin	spsf	no
<i>Catharus minimus</i>	Gray-cheeked thrush	sf	no
<i>Anthus rubescens</i>	American pipit	spsf	no
<i>Bombycilla garrulus</i>	Bohemian waxwing	sfw	no
<i>Vermivora peregrina</i>	Tennessee warbler	spsf	no
<i>Dendroica coronata</i>	Yellow-rumped warbler	spsf	no
<i>Dendroica striata</i>	Blackpoll warbler	spsf	no
<i>Spizella arborea</i>	American tree sparrow	spf	no
<i>Passerculus sandwichensis</i>	Savannah sparrow	spsf	no
<i>Zonotrichia albicollis</i>	White-throated sparrow	spsf	no
<i>Zonotrichia leucophrys</i>	White-crowned sparrow	spsf	no
<i>Passerella iliaca</i>	Fox sparrow	spsf	no
<i>Melospiza lincolnii</i>	Lincoln's sparrow	spsf	no
<i>Junco hyemalis</i>	Dark-eyed junco	spsf	no
<i>Calcarius lapponicus</i>	Lapland longspur	spsf	no
<i>Plectrophenax nivalis</i>	Snow bunting	spsfw	no
<i>Pinicola enucleator</i>	Pine grosbeak	spsfw	no
<i>Carpodacus purpureus</i>	Purple finch	spsfw	no
<i>Loxia leucoptera</i>	White-winged crossbill	spsfw	no
<i>Carduelis flammea</i>	Common redpoll	spsfw	no
<i>Carduelis hornemanni</i>	Hoary redpoll	spw	yes
<i>Carduelis pinus</i>	Pine siskin	spsfw	no



PNAD, Erika Pittman

APPENDIX C - Summary of Regulations

As per the *Wilderness and Ecological Reserves Act* and the *Botanical Reserve Regulations*, within Sandy Cove Ecological Reserve a person shall not:

1. Remove, damage or destroy a plant, animal, fossil or object of historical or scientific interest.
2. Construct a road, path, building, fence or other structure.
3. Cut or log trees, or carry out agriculture, mining, prospecting or claims staking.
4. Cause alterations to the course or amount of water flowing inside a reserve.
5. Use motorized vehicles of any kind, including landing aircraft.
6. Dispose of garbage.
7. Hunt.
8. Introduce a plant or animal species.
9. Remove soil, sand, stone or gravel.
10. Apply any chemicals within the reserve.
11. Destroy, damage or remove a sign or other government property.
12. Operate a commercial or non-commercial enterprise, except guiding, touring, photography, videography or sound recording, and then only with a permit from Parks and Natural Areas Division.
13. Display or post advertisements.
14. Graze animals.
15. Light a fire or camp.
16. Use a bicycle.

