

The Status of
Northern Bog Aster (*Symphotrichum boreale*)
in Newfoundland and Labrador



(photo used with permission from John E. Maunder)

THE SPECIES STATUS ADVISORY COMMITTEE
REPORT NO. 6

April 12, 2006

ASSESSMENT

Assessment: Endangered	Current designation: None
Criteria met: B1. Extent of occurrence <5,000 km ² B2. Area of occupancy <500 km ² (a) Known to exist at < 5 locations (b) Continuing decline observed, inferred or projected in iii) area, extent and/or quality of habitat	
Reasons for designation: Qualifies as " <i>endangered</i> " under the SSAC/COSEWIC criteria B1, B 2. (a) and B 2. (b) iii): <ul style="list-style-type: none">• Only 1 known population in the province• Restricted to a single valley within the boundaries of the City of Corner Brook• Habitat threatened by current and future industrial activities and development• Recent development caused declined of appr. 3 % in extent of the general habitat• Small population (thought to be less than 500)• Rescue effect unlikely	

This report was completed by Ms. Claudia Hanel, under contract to the SSAC.

STATUS REPORT

Symphotrichum boreale (Torr. & Gray) A. & D. Löve

Northern Bog Aster, rushleaf aster, rush aster, boreal American aster; Fr: aster boréale

Synonyms (from Meades et al. 2004):

- *Aster borealis* (Torr. & A.Gray) Prov.
- *Aster franklinianus* Rydb.
- *Aster junceus* auct. non Aiton
- *Aster junciformis* Rydb.
- *Aster laxifolius* Lindl. var. *borealis* Torr. & A.Gray
- *Aster salicifolius* Rich., non Lam., nec Aiton

Family: Asteraceae

Life Form: Herbaceous perennial plant, forb

Distribution

Global: (from Nature Serve 2005)

Boreal North America, from western Newfoundland west to northern Alaska, south to New Jersey and West Virginia, west to Colorado and Washington.

National: (from Nature Serve 2005)

Western Newfoundland west to the Yukon Territory; south to Prince Edward Island, Nova Scotia and New Brunswick; west to British Columbia.

Provincial:

The only known location within the province of Newfoundland and Labrador is a fen along Wild Cove Brook northeast of Corner Brook on the west coast of Newfoundland.

Annotated range map

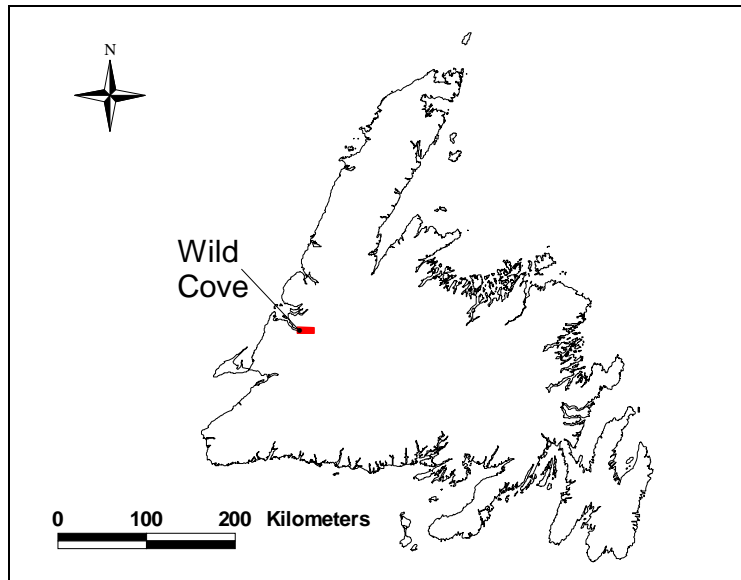


Figure 1. Location of Wild Cove, the only site in Newfoundland and Labrador where *Symphyotrichum boreale* has been observed.

Description and habitat



Figure 2. Northern Bog Aster (*Symphyotrichum boreale*) with deergrass in its open fen habitat. Photo used with permission from John E. Maunder.

The plant and habitat descriptions were compiled from information by Fernald (1950), Nature Serve (2005), and Washington Department of Natural Resources et al. (2003).

Description

This long-lived perennial herb grows from a slender creeping rootstock. The stems are erect, simple or branched above, hairless below, becoming hairy above, and 15 to 80 cm tall. The stem leaves are linear, unstalked with rounded to slightly clasping bases, hairless, entire or inconspicuously toothed; 2 to 7 cm long, 2 to 9 mm wide and becoming smaller above. The basal leaves are smaller, and soon falling. The inflorescence has one (in dwarfed plants) to 20 flower heads in a short, usually broad, cluster. The small, leafy, overlapping involucre bracts are of unequal lengths, with the ones in the outer rows being shorter. They are hairless, often with purplish tips or margins, and are held tight to the head. There are 20 to 50 white, or rarely pale bluish, ray flowers (12 to 20 mm in length) per head. The disk flowers are yellow. The flattened fruits (achenes) have one rib on each side and are sparsely hairy. The pappus is white.

Habitat

Throughout its range, the habitats of *Symphyotrichum boreale* include calcareous bogs, swamps, marshes, fens, wet gravels and shores. The only habitat in which the plant has been observed in Newfoundland is an open area in a rich, calcareous fen in a valley bottom (Figure 2).

Overview of Biology

Little is known about the biology of this species. The unknowns include detailed site requirements, longevity of the plants, generation time, seed output and transport distances, seed germination requirements, and other factors that affect population size or allow the determination of habitat suitability. The flowering time in Newfoundland seems to be August and September. During a visit in July 2003 all of the individuals observed were still in bud, but in early August 2004 they were photographed in flower, and in 2000 they were observed in flower in early September.

Population size

No official survey has been done, but from the best memory of the author of this report the likely number is between 20 and several hundred shoots. The plant is rhizomatous and it is unknown how many shoots are connected below ground to form a single individual.

Traditional and local ecological knowledge

There is no known traditional and/or local ecological knowledge.

Trends

There is insufficient information to detect any recent trends in population or distribution. However, the extent of the relatively open fen declined by approximately 3% in the last 25 years with the establishment of a composting facility, and some of this area may have been suitable habitat for *Symphyotrichum boreale*.

Threats and limiting factors

The area containing *Symphyotrichum boreale* falls within the municipal boundary of the City of Corner Brook and is located approximately 3 km from the built-up area of the city. However, the wetness of the habitat and the absence of residential areas nearby have kept human use of the fen relatively low.

The catchment basin of the fen is relatively small, and is sensitive to hydrological changes. Sub-surface seepage water from the surrounding mountains affects the soil moisture of the fen as does the feeder stream (Wild Cove Brook) and its tributaries, which also arise in the surrounding mountains. Any land uses on the mountain slopes which affect either the quantity or quality of the water traveling through the fen are potential threats to the site.

A gravel road running the length of the valley is used to access gravel pits located on the slopes surrounding the fen. The whole valley is contained within a Fee Simple Mining Grant issued to Corner Brook Pulp and Paper (Fred Kirby, Project Geologist, Quarry Materials Management, Mines Branch, Newfoundland and Labrador Department of Natural Resources, personal communication, March 30, 2006). There is some concern that an expansion of gravel pits upstream of the fen could disrupt or increase the water supply to the fen. Unless the changes in water supply are severe, the effects are likely to be very gradual and long-term habitat changes. In Minnesota the species has been found to appear as the canopy cover of a bog was reduced due to increasing wetness, but most of the plants were located on the drier bog hummocks (Isaak et al. 1959). If the site became wetter, the soil moisture tolerance of the plant may be exceeded, and if the site became drier, the encroachment of trees may pose a threat. From 1:12,500 colour aerial photos taken in 1978, 1986 and 2001 it appears that some encroachment by trees and shrubs has occurred, but the photos vary in quality and exposure. It is possible that the construction of the road and gravel pits have already had a negative impact on the habitat, but in the absence of both baseline data and regular monitoring this is impossible to confirm.

A housing development is planned for an area close to, but downstream of the fen (Christine Doucet, Senior Biologist, Habitat Management Program, Wildlife Division,

Newfoundland and Labrador Department of Environment and Conservation, personal communication, January 2006), and while this development is unlikely to affect the hydrology of the fen the presence of an increased number of residents in the area could result in increased foot traffic and trampling of the plants. Two industries, the City of Corner Brook landfill site, and the Genesis Organics composting facility, would likely affect water quality in the fen if their operations are expanded upstream. Any upstream expansion of the composting facility would be especially harmful as it would reduce the amount of available habitat and might actually destroy individuals of *Symphyotrichum boreale*. Herbivory, seed predation, pathogens, or human harvesting or destruction of individuals of *S. boreale* have not been observed as threats to the population.

Existing protection

Neither the species or its habitat at the Wild Cove location are currently protected.

Special significance

Symphyotrichum boreale is believed to be one of the parents of *S. anticostiense* (Anticosti aster), which originated by hybridization and is listed as threatened under the federal Species at Risk Act. The other putative parent of *S. anticostiense* is *S. novi-belgii*. A plant, which was collected very close to *S. boreale* individuals in the Wild Cove fen, was identified by Luc Brouillet (Université de Montréal, personal communication, Feb. 24, 2006) to be a hybrid between *S. boreale* and *S. novi-belgii*, but definitely not *S. anticostiense*.

Ranks or Status

Global

G-rank:

IUCN:

Rank or Status

G5

not listed

National

N-rank:

National General Status

COSEWIC:

N5

not available

not listed

Provincial

Provincial General Status:

Newfoundland S-rank:

Newfoundland General Status

Labrador S-rank/General Status:

2, may be at risk

S1

2, may be at risk

not present in Labrador

Adjacent Jurisdictions,:

Prince Edward Island S-Rank	S2
Prince Edward Island General Status	2, may be at risk
Nova Scotia S-Rank	S2
Nova Scotia General Status	3, sensitive
New Brunswick S-Rank	S2, (there are a sufficient number of occurrences to re-rank this taxon as S3 during the next rank revision (Sean Blaney, botanist, Atlantic Canada Conservation Data Centre, personal communication, Jan. 31, 2006).
New Brunswick General Status	3, sensitive
Quebec S-Rank	S4
Quebec General Status	4, Secure

Sources of information and list of references

Fernald. M.L. 1950. Gray's Manual of Botany. (8th edition, 1970 printing) D. Van Nostrand Co., New York. 1632 pp.

Hanel, C. 2005. Doctor's Brook Rare Plant Survey, Final Report. Western Newfoundland Model Forest, Corner Brook, NL.

Meades S.J., D. Schnare, K. Lawrence and C. Faulkner. (2004 onwards). Northern Ontario Plant Database Website. Version 1, January 2004. Algoma University College and Great Lakes Forestry Centre, Sault Ste. Marie, Ontario, Canada. <http://www.northernontarioflora.ca/chklst.cfm?speciesid=1004610>. (Accessed January 17, 2006).

Nature Serve. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. 2001. Version 1.6. Arlington, Virginia, USA. <http://www.natureserve.org/explorer>. (Accessed January 19, 2006).

Washington Department of Natural Resources, Washington Natural Heritage Program and the U.S.D.I. Bureau of Land Management. 2003. *Aster borealis* (T. & G.) Prov. [web factsheet]. <http://www.dnr.wa.gov/nhp/refdesk/fguide/pdf/astbor.pdf> (accessed January 17, 2006).

Wildlife Division, Newfoundland and Labrador Department of Environment and Conservation. 2006. Rare Plant Database, January 24, 2006.

Collections examined

The only known specimen of *Symphyotrichum boreale* from Newfoundland was collected by Nathalie Djan-Chékar and the author of this report and is deposited in the herbarium of the Provincial Museum of Newfoundland and Labrador (NFM). Duplicates are located at the Herbar Marie Victorin at the Université de Montréal (MT), and the herbarium of Sir Wilfred Grenfell College, Memorial University of Newfoundland. The specimen at NFM was examined by John Maunder (Curator Emeritus of Natural History at the Provincial Museum of Newfoundland and Labrador, personal communication, February 16, 2006). The specimen contains 4 stems with five flower heads. Four of the five heads are fertile with fully developed seeds.

Another specimen from the same fen containing two plants (a wider-leaved and a narrow-leaved blue aster) is also located at NFM. The sheet was identified as *Symphyotrichum novi-belgii* by Stuart Hay of the Université de Montréal before the presence of *S. boreale* in Newfoundland was recognized. The narrow-leaved plant was re-identified as a hybrid between *S. boreale* and *S.* by Luc Brouillet (Université de Montréal, personal communication, February 24, 2006), who also confirmed the identity of the wider-leaved plant as *S. novi-belgii*.

The significance of the presence of this hybrid is unknown at this point, as neither the population numbers of *Symphyotrichum boreale* or the hybrid are known. If *S. novi-belgii* and the hybrids are abundant relative to *S. boreale*, it is conceivable that hybridization could represent a threat to the persistence of the species within the province.

TECHNICAL SUMMARY

Distribution and Population Information	Criteria Assessment
<i>Extent of occurrence (EO) (km²)</i>	<i>Estimate ~0.0001-0.4 but could be larger</i>
<i>Area of occupancy (AO) (km²)</i>	<i>Estimate ~0.0001-0.4 but could be larger</i>
<i>Number of extant locations</i>	<i>1</i>
<i>Specify trend in # locations, EO, AO</i>	<i>unknown, but likely stable</i>
<i>Habitat trend:</i>	<i>likely stable, but may have declined by ~3% in the last 25 years</i>
<i>Generation time (average age of parents in the population)</i>	<i>unknown, at least one year</i>
<i>Number of mature individuals (capable of reproduction) in the Provincial population (or, specify a range of plausible values)</i>	<i>unknown, but likely 20-500</i>
<i>Total population trend</i>	<i>Unknown, may have declined in last 25 years</i>
<i>Are there extreme fluctuations (>1 order of magnitude) in number of mature individuals, number of locations, AO and/or EO?</i>	<i>unknown, but unlikely</i>
<i>Is the total population severely fragmented (most individuals found within small and isolated populations)</i>	<i>The Newfoundland population is all found in one location and the closest populations in the Maritimes are scattered</i>
Rescue Effect (immigration from an outside source)	
<i>Does species exist elsewhere?</i>	<i>Yes, at least ~350 km away</i>
<i>Status of the outside population(s)?</i>	<i>secure</i>
<i>Is immigration known or possible?</i>	<i>unlikely due to the distance to the nearest population</i>
<i>Would immigrants be adapted to survive here?</i>	<i>unknown, but likely</i>
<i>Is there sufficient habitat for immigrants here?</i>	<i>unknown</i>

Appendix A. Population Information

Recently verified occurrences/range use (verified within the last 25 years)

Verified occurrences consist of observations supported by the collection of a voucher specimen (i.e. a sample to be identified/confirmed by experts and deposited in a herbarium). An observer familiar with the species may collect only one voucher specimen to document occurrence within a given area .

The following data were taken from the plant database of the Wildlife Division (2006) unless otherwise noted.

- Plant first collected by Nathalie Djan-Chékar, Henry Mann and the author of this report in 2000. It was collected because it was unusual looking; however, the collectors were not aware at the time that the specimens were of a species not previously reported from Newfoundland. Location coordinates accurate to 10 m were recorded with a GPS. The specimens were determined to be *Symphyotrichum boreale* by John Maunder, Curator Emeritus of Natural History, Provincial Museum of Newfoundland and Labrador, and this identification was confirmed by Luc Brouillet of the Université de Montréal.
- The site was revisited in July 2003 by Nathalie Djan-Chékar, Gerry Yetman, Luc Brouillet, Christine Doucet and the author of this report using the location coordinates recorded in 2000. The plants were relocated, but were not very conspicuous as they were still in bud. They were not counted.
- John Maunder photographed some plants of the population on August 7, 2003.
- The site was visited in October 2005 by the author of this report and narrow-leaved asters believed to be *Symphyotrichum boreale* were observed in an open area in the fen (no GPS location coordinates were taken). However, the plants were too senesced to permit collection of specimens or definitive identification.

Recent search effort (areas searched within the last 25 years with estimate of effort)

- This plant has not been specifically searched for outside of its known location, nor has any attempt to determine the population size been made.
- Of the known fen location, approximately 25-33% of the suitable habitat has been searched.
- Other calcareous fens in boreal forest areas were visited without locating any *Symphyotrichum boreale*. However, these areas may lie outside of the range of the species and it is also possible that these areas represented unsuitable habitat. Fens in limestone barrens were not listed, as this habitat is likely too harsh for *S. boreale*. Search effort records were extracted from the provincial rare plant database (Wildlife Division, 2006) unless otherwise noted.
 - 2005 Corner Brook Area (Mount Moriah, Blow Me Down Cross Country Ski Park) and one fen northwest of Deer Lake (personal hikes by C. Hanel) (<1 day, 1 person)

- 2003 and 2005, Highlands of St. John, Great Northern Peninsula, Squid Cove Rare Plant Survey and Doctor's Brook Rare Plant Survey (Hanel 2005) (~2 days in fens, 2 people)
- 2001, Serpentine Lake area (<1 day, 3 people)
- 2000, between Eddies Cove West and Highlands of St. John, Great Northern Peninsula, Newfoundland Rare Plant Project (~1 day, 3 people, + ~ ½ day, 2 people)
- 2000, 1999 areas inland of Savage Cove, Great Northern Peninsula, Newfoundland Rare Plant Project (<1 day, 3 people+ <1 day, 2 people)
- 1999, Round Head, western Port au Port Peninsula, Newfoundland Rare Plant Project (~1/2 day, 3 people)
- 1995, South Head, Gros Morne National Park, Great Northern Peninsula (<1 day, 3 people)
- 1989, Sally's Cove, Gros Morne National Park, Great Northern Peninsula (<1 day, 2 people)
- 1984, Lomond River, Gros Morne National Park, (<1 day, 5 people)
- 1972 Berry Hill, Gros Morne National Park, Great Northern Peninsula (~1 day, 2 people)

Historical verified occurrences/range use (not verified in the last 25 years)

- None

Other observations (unverified occurrences)

- None

Potential sites unexplored (explain reason for potential)

- There are many other fens in calcareous areas in the western part of Newfoundland. However, it is not known if the habitat there would be suitable for *Symphyotrichum boreale*. The Wild Cove fen appears to be quite unique among visited fens in western Newfoundland (Nathalie Djan-Chékar, personal communication, January 27, 2006). Some of its unique features include the high relief of the surrounding mountains and the calcareous substrate, which results in a large amount of nutrient-rich seepage from the surrounding hillsides. A search of other potentially suitable wetlands is highly recommended.
- A coarse search for potential *Symphyotrichum boreale* habitat could be performed using NTS 1:50,000 topographic maps, geological maps, and the Newfoundland Forest Inventory. The wetlands could then be further evaluated using air photos, and the most promising sites could be visited to establish whether the species is present.

