

The Status of
Cutleaf Fleabane
(*Erigeron compositus*)

in Newfoundland and Labrador



Photo: Henry Mann

**THE SPECIES STATUS ADVISORY COMMITTEE
REPORT NO. 12**

February 20, 2008

ASSESSMENT

Assessment: Endangered	Current designation: None
Criteria met: D1. Number of mature individuals <250	
Reasons for designation: Qualifies as " <i>endangered</i> " under the SSAC/COSEWIC criteria D1 <ul style="list-style-type: none">• One of only two natural populations now extirpated• Number of mature individuals <120• Extremely restricted, extent of occurrence and area of occupancy << 0.01 km²• Occurs in naturally unstable habitat• Rescue effect unlikely	

The original version of this report was prepared by John E. Maunder on behalf of the Species Status Advisory Committee.

STATUS REPORT

Erigeron compositus Pursh

Cutleaf Fleabane; Dwarf Mountain Fleabane. Fr. vergerette à feuilles segmentées

Synonyms:

Erigeron compositus var. *discoideus* A. Gray

E. compositus var. *multifidus* (Rydberg) J. F. Macbride and Payson

E. gormanii Greene

Family: Asteraceae (Composites)

Life Form: Semi-woody, perennial forb.

Distribution

Global:

North America: Greenland. Canada [see more detail below]. United States of America: several western states including North Dakota, South Dakota, Montana, Wyoming, Colorado, Idaho, Utah, Arizona, Washington, Oregon, Nevada, California; plus Alaska (Nesom 2006).

Asia: Russian Far East (Nesom 2006).

National:

Newfoundland and Labrador (Newfoundland only), Québec, Saskatchewan, Alberta, British Columbia, Yukon, Northwest Territories, Nunavut (Nesom 2006); plus Nova Scotia and Manitoba (NatureServe Explorer).

[The Québec, Nova Scotia and Newfoundland populations are disjunct, and very restricted.]

Provincial:

On the Island of Newfoundland, known only from one very small area along the lower Humber River between Steady Brook and Corner Brook (Fig. 1).

Annotated Range Map

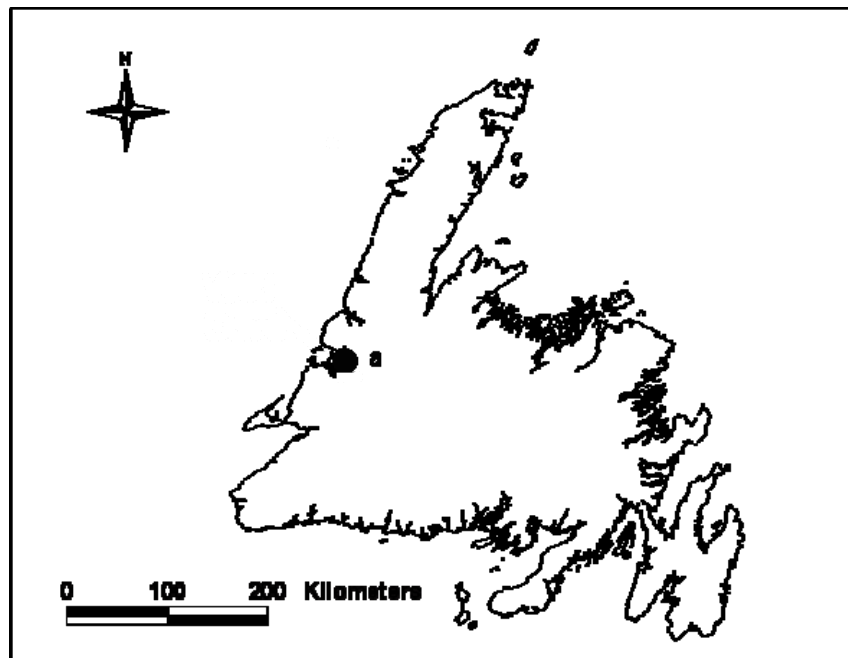


Figure 1. Known locality for *Erigeron compositus* in Newfoundland: [a] lower Humber River

Description

A low, often tufted, semi-woody, tap-rooted perennial, with a thick caudex. Leaves crowded at the base of the plant, and several times dissected or lobed towards the tips. In Newfoundland, the tansy-like flower heads are rayless, and solitary at the ends of the stems.

Habitat

Generally, a high montane and alpine species, preferring open, rocky situations. Sagebrush, rabbitbrush, aspen to aspen-fir, subalpine meadows, cliffs, talus, and boulders. In the east and north, 10–200 m (Nesom 2006).

In Newfoundland, the limited data available suggests that the species prefers dry, bouldery or gravelly limestone substrate associated with scree. Open to sparse vegetation. More specifically, data from a 1987 collection from Breakfast Head

(lower Humber River) by L. Brouillet and L.I. Saucier of the Université de Montréal describes: “boulder talus at bottom of scree slope; slope 30°; altitude 45 m; well-drained.”

Overview of Biology

In Newfoundland, flowers have been recorded from early to late June.

“Agamospermy” is variously defined as the asexual formation of embryos and seeds without the occurrence of fertilization. *E. compositus* is an “agamospermous species complex” comprising many sexual, and asexual (agamospermous) elements (Beaman, 1977; see also: Noyes *et al.* 1995). All sexual representatives of *E. compositus* are apparently from western North America, and of relatively restricted range (Noyes *et al.* 1995, Noyes and Soltis 1996). Thus our Newfoundland form is almost certainly of the asexual type.

Newfoundland plants produce viable seed; H. Mann (personal communication) has managed to grow several seedlings, from Newfoundland seeds, in the Sir Wilfred Grenfell College Garden, in Corner Brook.

Perennial. Calciphile.

Population Size and Area of Occupancy

Breakfast Head.

Data from a 1987 collection from Breakfast Head (lower Humber River) by L. Brouillet and L.I. Saucier of the Université de Montréal MT (Université de Montréal) describe a population of about 100-120 individuals, and an AO of about 100 m².

Riverside Drive [population now extirpated].

H. Mann estimated that 30-40 plants existed at this site in 1990 (personal communication, November 16, 2006). The site was destroyed during the construction of an overpass associated with the twinning of the Trans-Canada Highway along the lower Humber River in 1991.

Sir Wilfred Grenfell College (SWGC) Garden [*ex situ* site, now extinct].

H. Mann reported that this *ex situ* site, originally populated by plants rescued from road construction at the Riverside Drive site in 1991, is now extinct (personal communication, September 21, 2007). Seedlings were used to populate transplant sites (see below) and remaining population was probably crowded out by weeds.

Marble Mountain Quarry [transplant site].

An undetermined number of seeds, collected from the former SWGC Garden population were planted here by H. Mann in 2000. H. Mann estimated that 6-8 plants still exist at this site (personal communication, November 16, 2006).

Humber River gravel pit site [transplant site].

H. Mann established this site in 2006, using seedlings grown from seed produced in the SWGC Garden site (see above). Most of the seedlings (“about 15 plantings, each planting had several seedlings per pot”) apparently survived the winter of 2006-2007 (H. Mann, personal communication, September 21, 2007).

Traditional and Local Ecological Knowledge.

No published or other evidence has been found regarding the aboriginal use of *Erigeron compositus* in Newfoundland. Arnason *et al.* (1981) do not mention the species in their study of eastern Canada ethnobotany.

Trends

The original natural occurrence of *E. compositus* at Breakfast Head was first discovered in 1950. The continuing existence of the population was confirmed in 1987. The site has not been visited since because of difficulty of access. At least from a distance, the site, which can be seen from near the highway across the river, seems to be undisturbed.

The only other known natural site, at Riverside Drive was lost in 1991, due to highway construction.

The transplanted Marble Mountain Quarry population remains very small and may, or may not, be expanding, although H. Mann stated that some plants have flowered (personal communication, November 16, 2006). The new, transplanted Humber River gravel pit site may, or may not, eventually succeed.

Threats and Limiting Factors

The valley of the lower Humber River is rapidly developing as a transportation and recreation corridor. At present, the natural Breakfast Head site remains inaccessible and is probably relatively secure. The two transplant sites remain vulnerable to road and other construction activity. Any, future, recreation-based

disturbance of the scree slopes at the bottom of Breakfast Head could be disastrous.

The known population at Breakfast Head was estimated in 1987 to be less than 120 individuals, and thus is intrinsically at risk.

Rank or Status

Global	
G-rank	G5
IUCN	not accessed
National	
N-rank	N5
National General Status	4
COSEWIC	not accessed
Provincial	
Provincial General Status	2
Newfoundland S-rank	S1
Newfoundland General Status	2
Labrador S-rank	not present
Labrador General Status	not present
Adjacent Jurisdictions	
Nova Scotia S-Rank	S1
Nova Scotia General Status	2
Prince Edward Island S-Rank	not present
Prince Edward Island General Status	not present
New Brunswick S-Rank	not present
New Brunswick General Status	not present
Québec S-Rank	S1
Québec General Status	2

[Note: Where available, ranking data from the biodiversity databases of the individual Provinces has been used. Otherwise, General Status ranks are based upon the “General Status of Species in Canada (2005)”, and S-Ranks are based upon “NatureServe Explorer”. Where there is apparent discrepancy, NatureServe Explorer ranks are considered to be the least current.]

Existing Protection

None.

Special Significance

Disjunct population.

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Collections Examined

Agnes Marion Ayre Herbarium (Memorial University of Newfoundland).
One herbarium collection.

TECHNICAL SUMMARY

Distribution and Population Information	Criteria Assessment
<i>Extent of occurrence (EO)(km²) (natural populations)</i>	probably <0.0001 km ²
<i>Area of occupancy (AO) (km²) (natural populations)</i>	probably <0.0001 km ² , in the single natural population
<i>Number of extant locations</i>	1 natural; plus 2 transplanted [the latter 2 are very small]
<i>Specify trend in # locations, EO, AO (decline, stable, increasing, unknown)</i>	one of two natural locations was lost in 1991; the remaining natural location is probably stable
<i>Habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat</i>	one of two natural habitats was lost in 1991; the remaining natural habitat is probably stable
<i>Generation time (average age of parents in the population) (indicate years, months, days, etc.)</i>	unknown; perennial
<i>Number of mature individuals (capable of reproduction) in the Provincial population (or, specify a range of plausible values)</i>	probably <120 in the single natural population; probably <20 in all transplanted populations
<i>Total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals or number of populations</i>	unknown; but one of the two natural populations was lost in 1991
<i>Are there extreme fluctuations (>1 order of magnitude) in number of mature individuals, number of locations, AO and/or EO?</i>	Unknown
<i>Is the total population severely fragmented (most individuals found within small and isolated populations)</i>	only one known natural Newfoundland population
Rescue Effect (immigration from an outside source)	
<i>Does species exist elsewhere?</i>	Yes
<i>Status of the outside population(s)? [adjacent Provinces only]</i>	Nova Scotia and Québec, may be at risk
<i>Is immigration known or possible?</i>	unknown, but very unlikely
<i>Would immigrants be adapted to survive here?</i>	Unknown
<i>Is there sufficient habitat for immigrants here?</i>	Unknown

Appendix A. Population Information

Recently Verified Occurrences/Range Use (recorded 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).

Natural Sites:

August 8, 1987. Breakfast Head, facing Shellbird Island. Boulder talus at bottom of scree slope. Limestone. [Observers: L. Brouillet and L. I. Saucier. Collection: 87600. MT 6543 (Université de Montréal), also CAN.]

July 17, 1990. Riverside Drive, Corner Brook. Dry grassy/forb gravel bank between Trans Canada Highway and the old railway railbed. [Observer: H. Mann. Collection: SWGC 90-23 a,b,c,d.] [Population NOW EXTIRPATED; destroyed by road construction in 1991].

Ex situ Site:

1991. Sir Wilfred Grenfell College Garden. Several plants were rescued from active road construction site (Riverside Drive overpass and Trans Canada Highway twinning projects) by H. Mann, and transplanted to the Sir Wilfred Grenfell College Garden in Corner Brook. [The SWGC population was continuously monitored until 2006, but is now extinct (“probably crowded out by the weeds” - H. Mann, personal communication, September 21, 2007).]

Transplant Sites:

2000. Marble Mountain Quarry. A number of seeds, collected from the former SWGC Garden population, were planted, by H. Mann, at the nearest available habitat that reasonably resembled the original Riverside Drive locality – the Marble Mountain Quarry near Steady Brook, on the southeast side of the highway, about 2 km east of the Riverside Drive overpass (by road) (H. Mann, personal communication, September 21, 2007).

July 17, 2002. Marble Mountain Quarry (same locality as above). [Observer: J. E. Maunder. Diagnostic photos taken (Maunder (ongoing) and the present report).]

July 2006. Additional seedlings derived from the SWGC Garden population were transplanted, by H. Mann, to a gravel pit in the Humber Valley, on the south side of the highway, about 1 km west of the Riverside Drive overpass. Most of the seedlings survived the winter of 2006-2007 (H. Mann, personal communication (September 21, 2007)).

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

General rare plant surveys of the west and northeast coasts of the Island were conducted by members of the Newfoundland Rare Plant Project (*q.v.*), specifically during 1999 to 2001, when 1645 individual sites were surveyed and 7622 plant collections were made. Additional general rare plant surveys have been conducted within the Province by various National Parks personnel, and by J. E. Maunder of the Provincial Museum and H. Mann of Sir Wilfred Grenfell College (early 1970's to present), as well as by N. Djan-Chékar of the Provincial Museum (2002 to present). Significant additional general collecting has been conducted, on the south coast of the Island, by R. Etcheberry, of St.-Pierre et Miquelon (1986, 1987, 1989, 1990, 1992, and 1993).

Targeted rare plant surveys were conducted by personnel from the Université de Montréal, during the course of the preparation of the publication "The Rare Vascular Plants of the Island of Newfoundland" (Bouchard *et al.* 1991), in: 1984 and 1985 (Gros Morne National Park), 1986 (southwest coast, and the general Port au Port area), 1987 (Great Northern Peninsula), 1988 (Baie Verte Peninsula, Notre Dame Bay, and central and eastern Newfoundland), 1989 (Gros Morne National Park, and the south coast), and 1990 (west coast, and Great Northern Peninsula).

Geographically focused rare plant surveys were conducted by personnel from the Université de Montréal, during the course of the preparation of contracted rare plant reports for Port au Choix National Historic Park (Bouchard *et al.* 1993), L'Anse aux Meadows National Historic Park (Bouchard *et al.* 1993), Gros Morne National Park (Anions, 1994; Bouchard *et al.*, 1985, 1986, 1991, 1994, 1996; and Brouillet *et al.*, 1998), and Terra Nova National Park (Brouillet *et al.* 1997). Additional geographically focused rare plant surveys were conducted in the Squid Cove and Doctors Brook areas, and the Labrador Straits region by C. Hanel (2004, 2005a, 2005b).

The main Corner Brook area search effort has been undertaken by H. Mann (Sir Wilfred Grenfell College), who has monitored the lower Humber River area for about 30 years, and has paid particular attention to the *Erigeron compositus* populations on the south side of the river. General surveys have also been carried out, in the Corner Brook area, by J. E. Maunder (Provincial Museum of Newfoundland and Labrador). Personnel from the Université de Montréal visited Breakfast Head in 1987 and rediscovered Rouleau's 1950 population.

Historical Verified Occurrences/Range Use (recorded prior to the last 25 years)

June 30, 1950. Breakfast Head, facing Shellbird Island. Thin soil over dry limestone talus. [Observer: E. Rouleau. Collection: Rouleau 500 = MUN 1998 (Memorial University of Newfoundland).]

Other Observations (unverified occurrences)

None.

Potential Sites Unexplored

Many of the mountainous limestone areas of western Newfoundland have been only lightly searched. More intensive searches of scree slopes in the northern Bay of Islands area, in particular, may possibly yield additional occurrences.

Appendix B. Supplementary Detail

Taxonomic Clarifications

Cronquist (1947) proposed 3 varieties of *Erigeron compositus* (var. *typicus* Payson, var. *glabratus* Macoun, and var. *discoideus* A. Gray). Of these, the Newfoundland form would, apparently, have been var. *discoideus* (Fernald 1950).

Beaman (1977) later declared that Cronquist's arrangement was "unnatural", and that *E. compositus* was, more properly, an "agamospermous species complex" comprising many sexual, and asexual (agamospermous), elements (see also: Noyes *et al.* 1995).

["Agamospermy" is variously defined as the asexual formation of embryos and seeds without the occurrence of fertilization.] According to Noyes and Soltis (1996), agamic seed in *E. compositus* is probably formed via diplospory (the mitotic formation of an unreduced megagametophyte from the megaspore mother cell) followed by parthenogenesis (the development of the unreduced egg cell directly into an embryo without fertilization).

For *sexual E. compositus*, Beaman informally proposed 5 morphologically and more-or-less geographically distinct subspecies (subsp. "*anticus*", subsp. "*compositus*", subsp. "*pectinipetiolatus*", subsp. "*penicillatus*", and subsp. "*posticus*"). Even though Beaman did not formally describe these "subspecies", his scheme has been generally supported by Noyes *et al.* (1996), Noyes and Soltis (1996), and Nesom (2006).

All *sexual* representatives of *E. compositus* produce ligulate (ie. broad-bladed) ray florets, and abundant pollen. Most are diploid, and $2n=18$. All are from western North America, and of relatively restricted range (Noyes *et al.* 1995, Noyes and Soltis 1996).

Asexual (agamospermous) representatives of *E. compositus* may produce ligulate ray florets, to varying degrees (but, tend not to); and consistently produce either low quality, or no, pollen. All are polyploid, with $2n = (35)36, 45, \text{ and } 54$ (Noyes *et al.* 1995), and comprise a vast swarm of plants which are widespread, and notoriously variable in both vegetative and floral morphology (Cronquist 1947, Beaman 1947).

Since all *sexual E. compositus* are apparently western, and since the Newfoundland form is almost always completely rayless [*some* plants do have *very rudimentary* rays (H. Mann, personal communication, November 17, 2006)],

the Newfoundland form is almost certainly of the agamosperous type. However, this last point has not yet been specifically investigated.

Description (Fig B-1)

Semi-woody perennials. **Plants** 5–15(25 cm) tall; taprooted. **Caudices** simple, or with branches usually relatively thick and short, rarely slender and rhizomelike, covered with persistent leaf bases. **Stems** compact, erect (simple, ± scapiform), sparsely hispid-pilose, minutely glandular. **Leaves** mostly basal (persistent); blades spatulate to obovate-spatulate, 5–50(70) × (2)4–12 mm, margins (1)2–3(4)-*ternately* lobed or dissected, cauline bractlike, mostly entire, faces densely hispiduloso-puberulent to glabrate, minutely glandular. **Heads** [in Newfoundland] disciform. **Involucre**s 5–10 × 8–20 mm. **Phyllaries** in 2–3 series (purple-tipped), hirsute (hairs spreading), minutely glandular. **Peripheral florets** (disciform heads) reduced to tubes, 20–60, pistillate. **Disc florets** 3–5 mm. **Cypselae** [ie. “seeds”] 1.6–2.7 mm, 2-nerved; faces sparsely strigose-hirsute; pappi: outer usually of setae, sometimes 0, inner of 12–20 bristles. **2n** = 18, 36, 45, 54. (Modified after Nesom 2006).



Photos: John E. Maunder [a, b], Nathalie Djan-Chékar [c], Henry Mann [d, e, f]

Figure B-1. Description: [a] swollen caudices (illustrated by sexual plants from the Rocky Mountains, growing in the Memorial University of Newfoundland Botanical Garden, St. John's, Newfoundland), [b] young plant, [c] mature plant, [d] whole plant in flower, [e] flowering stems, and [f] flowering head.

Habitat (Fig B-2)



Photo: Dan Montegue

Figure B-2. Habitat: Breakfast Head, from the south side of the lower Humber River (the river runs through the long gully located between the visible road [Riverside Drive] and the base of the background escarpment and scree slopes ... for a vertical view, see Figure A-1). *Erigeron compositus* presumably still occurs at the base of the scree slopes at the far right of the photo. It formerly also occurred at a locality very close to the place where the people in the photograph are walking (see Figure A-1).

Collections Examined

Agnes Marion Ayre Herbarium (Memorial University of Newfoundland).

MUN 1998 [see Appendix A for details].