

The Status of
Gmelin's Watercrowfoot
(*Ranunculus gmelinii*)

in Newfoundland and Labrador



Photo: John E. Maunder

**THE SPECIES STATUS ADVISORY COMMITTEE
REPORT NO. 17**

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">• Only one recently confirmed and one historical population• Number of mature individuals estimated at < 10• Extremely restricted, EO and AO << 0.01 km²• Occurs in river floodplain below road culvert• 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

Ranunculus gmelinii de Candolle

Gmelin's Watercrowfoot, Small Yellow Water Crowfoot; Fr. renoncule de Gmelin

Synonyms:

Ranunculus gmelinii subsp. *purshii* (Richardson) Hultén

Ranunculus gmelinii var. *hookeri* (D. Don) L. D. Benson

Ranunculus gmelinii var. *limosus* (Nuttall) H. Hara

Ranunculus gmelinii var. *prolificus* (Fernald) H. Hara

Ranunculus gmelinii var. *purshii* (Richardson) H. Hara

Ranunculus purshii Richardson

Ranunculus purshii var. *hookeri* D. Don

Family: Ranunculaceae (Buttercups)

Life Form: Herbaceous, perennial, amphibious forb.

Distribution

Global:

North America: Canada [see more detail below]. United States of America: several northern and northwestern states *including* Maine, Michigan, Wisconsin, Illinois, Minnesota, Iowa [possibly extirpated (Nature Serve Explorer)], North Dakota, Montana, Wyoming, Colorado, New Mexico, Idaho, Utah, Washington, Oregon, Nevada, Alaska; with the main concentrations centered in northwestern regions (Whittemore and Parfitt 1997).

Eurasia: Japan, Mongolia, Russia (Northern Europe and Siberia) (Wang *et al.* 2001).

National:

Newfoundland and Labrador (Newfoundland only), Nova Scotia, Prince Edward Island, New Brunswick, Québec (including Ungava Bay), Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, Northwest Territories, Nunavut (Scott 2004); rare and disjunct east of Ontario (Whittemore and Parfitt 1997).

Provincial:

Known only from 2 closely-situated localities in St. George's Bay (Figure 1).

Annotated Range Map

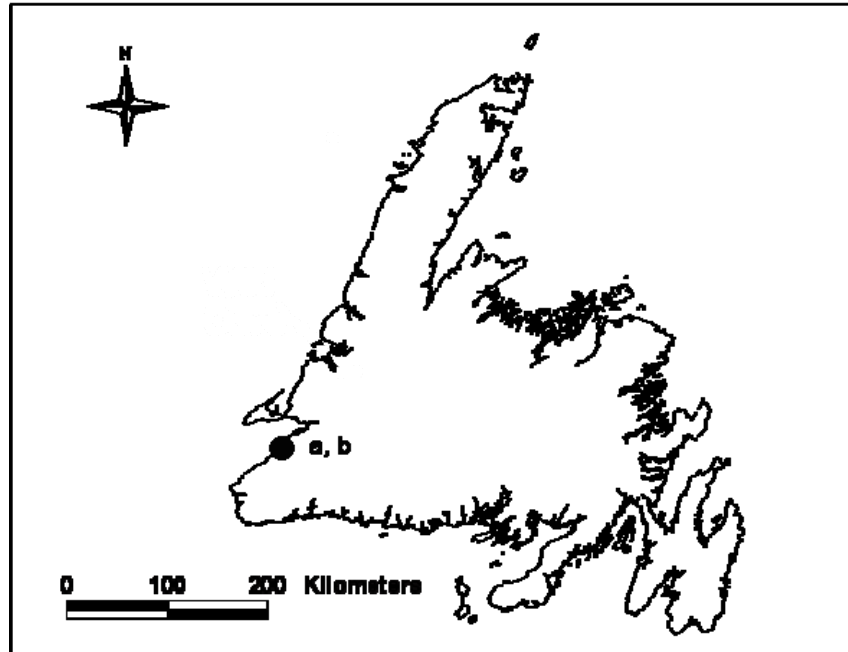


Figure 1. Known localities for *Ranunculus gmelinii* in Newfoundland: [a] Robinsons River, [b] Middle Barchois River (historical).

Description

An amphibious or totally aquatic buttercup, with medium-sized yellow flowers; floating in shallow water, or sprawling on muddy shores or meadows; often forming extensive tangled underwater masses. Leaves divided into numerous segments which become progressively more divided, and more slender, towards the base of the plant, and with increasing water depth.

Habitat

Shallow water, or muddy wet meadows, swamps, marshes, ponds, sloughs, shores and backwaters of rivers; 0-2800 m (Whittemore and Parfitt 1997).

In Newfoundland, the species has been found in backwater pools bordering the outflow floodplains of medium-sized rivers. Specifically, at Robinsons River, the habitat is a single isolated backwater, marginal to the river outflow floodplain, sheltered by a dense alder thicket with some yellow birch on the north side, and by mixed woods on the south side; with soft, muddy substrate in pool bottoms, and soft, muddy emerged substrate with lush, semi-amphibious herb flora including, notably, Pennsylvania Bittercress (*Cardamine pensylvanica*), and One-row Watercress (*Nasturtium microphyllum*).

Overview of Biology

Generally flowering from late May through late autumn (Scott 2004). In Newfoundland, the species has been observed to flower in late July. Flowers appear to produce viable seeds. Heterophylly (ie. leaves not all looking the same) is quite marked.

Population Size and Area of Occupancy

In Newfoundland, only two populations of *Ranunculus gmelinii* have yet been recorded; one of these being of historical occurrence. While the Robinsons River population has apparently persisted for at least 77 years, since the time of its discovery by R. B. Kennedy in 1930, the fate of the nearby Middle Barachois River population remains unknown.

Peter J. Scott, who relocated and collected the species at Robinsons River, in 1971, was of the opinion that there were no more than 5 plants present at the time, all in a single backwater pool (personal communication, October 24, 2006). When John Maunder re-collected the species at what was almost certainly the exact same locality, in 1999, he estimated that there were no more than 10 plants present, and probably less. When he photographed the species again, at the same locality, on two occasions in 2003, he similarly estimated a maximum of 5 plants present. In 2007, members of the Wildflower Society of Newfoundland and Labrador estimated the population to be about the same.

That said, estimating exact population numbers for this amphibious species is no easy task, given the plant's trailing and branching habit, and the fact that it tends to root in up to a metre of water, often overlying very soft, and almost untraversable, muddy substrate.

Simply locating/relocating the species can also be a challenge. The Robynsons River population, first visited by John Maunder in 1999, had moved about 10 metres downstream by 2003, and had moved even further downstream by 2007. The mechanism behind this apparent downstream movement at Robynsons River is not at all understood. Clearly, there must be some way that this possibly unique Newfoundland population maintains its “upstreamness”; otherwise, it would have long ago found its way to the rivermouth, and extinction.

An additional, intermittent challenge to locating/relocating the species in Newfoundland, has proven to be high water levels. At the Robynsons River locality, water levels in the river backwater at the single known *Ranunculus gmelinii* locality can rise by as much as a metre after only one heavy summer rainfall. Indeed, two recent attempts by John Maunder, to relocate the Robynsons River population, in August 2006 and October 2006, were defeated by such high water levels.

Robynsons River population (as surveyed in 1999, 2003, and 2007):

Approximate area of occupancy: <25m²
Estimated population of individuals: ≤10

Middle Barachois River population:

Not recently re-located. Status and size unknown.

Traditional and Local Ecological Knowledge

No published or other evidence has been found regarding the aboriginal use of *Ranunculus gmelinii* in Newfoundland. In particular, a specific inquiry to the Federation of Newfoundland Indians in 2007 yielded no definitive information. Arnason *et al.* (1981) do not mention the species in their study of eastern Canada ethnobotany.

Trends

Unknown. Kennedy’s 1931 paper is uninformative. However, considering the subsequent observations of P. J. Scott [1971], J. E. Maunder [1999 and 2003] and the members of the Wildflower Society of Newfoundland and Labrador [2007], it would appear that the Robynsons River population has not changed appreciably during the past 36 years. On the other hand, the continuing failure to relocate the Middle Barachois River population, despite at least 6 attempts in the last 10 years, may, perhaps, indicate that the latter population has been lost.

Threats and Limiting Factors

The Robinsons River population is located extremely close to the main town road and adjacent service corridor, in a river backwater, immediately downstream from a culvert that periodically carries high volumes of water. Any repairs or changes to the highway, the culvert, or adjacent town services, would pose a serious threat. For example, until recently, the Robinsons River population was quite difficult to access; but, in 2007, the cutting of a narrow hydro right-of-way through the dense, formerly protective, surrounding, alder thicket, unexpectedly opened up direct walking-access to the culvert outlet area.

If the Middle Barchois River population still exists, very similar threats probably apply.

Rank or Status

Global	
G-rank	G5T5
IUCN	Not assessed
National	
N-Rank	NNR (not listed)
National General Status	4
COSEWIC	Not assessed
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	S3
Nova Scotia General Status	4
Prince Edward Island S-Rank	S2
Prince Edward Island General Status	3
New Brunswick S-Rank	S2
New Brunswick General Status	4
Québec S-Rank	S3S4
Québec General Status	4

[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

None.

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Collections Examined

Provincial Museum of Newfoundland and Labrador:
One herbarium collection.

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)</i>	0.000025 km ² [Robinsons River only]
<i>Area of occupancy (AO) (km²)</i>	0.000025 km ² [Robinsons River only]
<i>Number of extant locations</i>	possibly 2; but, only one of these has been relocated within the last 25 years
<i>Specify trend in # locations, EO, AO (decline, stable, increasing, unknown)</i>	unknown; possible loss of one of the two populations during the last 75 years?
<i>Habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat</i>	unknown
<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>	<10
<i>Total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals or number of populations</i>	unknown; possible loss of one of the two populations during the last 75 years?
<i>Are there extreme fluctuations (>1 order of magnitude) in number of mature individuals, number of locations, AO and/or EO?</i>	unknown; but probably not
<i>Is the total population severely fragmented (most individuals found within small and isolated populations)</i>	only one verified Newfoundland population presently known
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, secure; Prince Edward Island, sensitive; New Brunswick, secure; Québec, secure
<i>Is immigration known or possible?</i>	unknown
<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).

Robinsons River:

July 15, 1999. Robinsons Brook [*sic*]. Small brook just S of bridge across river floodplain. In hidden backwater, under a substantial yellow birch, near muddy bank, in water. Muddy bottom. [Observer: J. E. Maunder. Collection: NFM 7300 (Provincial Museum of Newfoundland and Labrador)]

July 11, 2003. Same location. [Observer: J. E. Maunder. Diagnostic photos: J. E. Maunder (see: Maunder (ongoing) and the present report).]

July 21, 2003. Same location. [Observer: J. E. Maunder. Diagnostic photos: J. E. Maunder (see: Maunder (ongoing) and the present report).]

July 10, 2007. Robinsons River. Just S and W of bridge across river floodplain. Backwater pool, with *Typha* and *Sparganium*; water ~ 50 cm deep, bottom organic muck with rocks. Area about 3 m². Five patches. [Observers: Claudia Hanel, Nathalie Djan-Chékar, J. E. Maunder, and other members of the Wildflower Society of Newfoundland and Labrador. Collection: none. Diagnostic photos: J. E. Maunder (see: Maunder (ongoing) and the present report).]

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).

As well, on the west coast of the Island, B. Hellquist and G. Crow surveyed for aquatic species in 1986.

Comprehensive surveys, specifically aimed at locating *Ranunculus gmelinii*, and/or finding additional sub-localities for the species, were carried out on the floodplains of both Robinsons River and Middle Barachois River, typically upstream as far as the old railway bridge, on at least 6 occasions since 1999 [four times by John Maunder, once by Claudia Hanel and Nathalie Djan-Chékar, and once by personnel from the Université de Montréal]. Additionally, the headwaters of both of these rivers, as well as the floodplain of Fischells Brook were searched for *Ranunculus gmelinii* by Claudia Hanel and Nathalie Djan-Chékar in 2000.

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

Robinsons River :

August 10, 1930. Robinsons Brook, in quiet water (Kennedy 1931: 208). [Collection: R. B. Kennedy 476. GH (Gray Herbarium). Verified by M. L. Fernald.]

June 20, 1937. Robinsons Brook: in a pool. [Collection: R. B. Kennedy 906. GH (Gray Herbarium)].

June 26, 1937. Robinsons Brook. [Collection: R. B. Kennedy 908. GH (Gray Herbarium)].

August 24, 1971. P. J. Scott. Robinsons Brook. Small pool [in backwater] south of [main] river, still shallow water. 18" water. Flowers 4 or 5 petals. [Collection: P. J. Scott 1799 = NFLD 23617 (A. M. Ayre Herbarium, Memorial University of Newfoundland)]. 2n=32.

Middle Barachois River :

June 22, 1937. Barachois Brook. Pool on right bank, near highway bridge [presumably the one on the shore road]. [Collection: R. B. Kennedy 907 GH. (Gray Herbarium)].

Other Observations (unverified occurrences)

None.

Potential Sites Unexplored

Searches of all of the medium-to-large river estuaries on the south and southwest coasts have been carried out, primarily by the Newfoundland Rare Plant Project; nonetheless, the two known occurrences are/were very small; indicating that other small populations may well have escaped detection. Further targeted searching may possibly prove fruitful.

Appendix B. Supplementary Details

Taxonomic Clarifications

NatureServe Explorer continues to follow Kartesz (1994) in recognizing a number of varieties of *Ranunculus gmelinii*. However, these varieties are based primarily upon variation in plant hairiness, and flower size, and seem variable and poorly correlated with one another (Whittemore and Parfitt 1997).

Scott (1974) simply considered the species to be highly variable, and reduced all varieties to synonymy, pointing out that the high phenotypic plasticity of the species seems entirely the result of varying environmental conditions. This view has been generally accepted.

Description (Figures B-1 and B-2)

Perennial herbs, palustrine to totally aquatic. **Stems** elongate, 10-40 cm, creeping or sometimes floating in shallow water, or sprawling on muddy shores or meadows, sparsely short branched, glabrous or appressed puberulent above, freely rooting at the nodes. **Roots** fibrous, subequally thick. **Basal leaves** absent. **Submersed leaves**, alternate, long-petioled, flaccid and pellucid, semi-orbicular to orbicular, with 3-5 cuneate linear-cleft lobes that may divide again more than once, 1.5-4 cm broad. **Emersed or floating blades** smaller, thicker, reniform to orbicular, less divided. **Bracts** small, subsessile, leaflike, or undivided and narrowly ovate. **Inflorescence** essentially terminal, 1-4 flowers borne singly either terminally or in axils of bract leaves. **Flowers** 4-9 mm in diameter. **Pedicel** to 3.5 cm, glabrous or sparsely puberulent. **Receptacle** sparsely puberulent to hispid. **Sepals** 4-5, round-obovate to ovate-elliptic, spreading or reflexed from base, 2.2-5 mm, glabrous or sparsely pilose. **Petals** usually 5, golden yellow, narrowly obovate or obovate, 3-9 mm × 1.5 mm; nectary scale variable. **Stamens** 10-40; anthers ellipsoid. **Fruit aggregate** subglobose, or ovoid, 3-8 × 3-7 mm; carpels numerous. **Achene** broadly ellipsoid or obliquely obovoid, glabrous; margin with corky thickening; style persistent. **2n** = 16, 32, 64. (After Fernald 1950; Whittemore and Parfitt 1997; Scott 2004).



Photos: John E. Maunder

Figure B-1. Description: [a] tip of floating branch with flower buds, [b] flowering stem, [c] flower, [d] fruit aggregate.



Photos: John E. Maunder

Figure B-2. Description: [a] floating leafy stem, [b] terminal floating leaf, [c] median floating leaf, [d] submerged leaf.

Habitat



Photo: John E. Maunder

Figure B-3. Habitat: A view of about 80% of the single known locality of *Ranunculus gmelinii* at Robinsons River. A muddy pool in a backwater of the river floodplain.

Collections Examined

Provincial Museum of Newfoundland and Labrador:
NFM 7300 [see Appendix A for details]

Agnes Marion Ayre Herbarium (Memorial University of Newfoundland):
NFLD 23617 [see Appendix A for details]