COSEWIC
Assessment and Update Status Report

on the

Furbish's Lousewort
Pedicularis furbishiae

in Canada

ENDANGERED
2000

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada

COSEPAC
Comité sur la situation
des espèces en péril
au Canada

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COSEWIC
Assessment Summary

Assessment Summary – May 2000

Common name
Furbish's Lousewort

Scientific name
Pedicularis furbishiae

Status
Endangered

Reason for designation
Highly restricted range with natural and human-induced habitat loss and significant population decline at the three remaining sites.

Occurrence
New Brunswick

Status history
Designated Endangered in April 1980. Status re-examined and confirmed Endangered in April 1998 and in May 2000.

COSEWIC
Executive Summary

Furbish's Lousewort
Pedicularis furbishiae

Description

The Furbish's Lousewort is a perennial herbaceous, hemiparasitic plant. It has a basal rosette of leaves and one or more upright flowering stems when mature. It is on average 2.5 feet tall. Its stem is simple or has a few branches on the upper portions of some of the stems. A distinguishing feature is the deeply incised pinnae, especially those on the lower leaves of the plant.

Distribution

This species only occurs in the state of Maine and in New Brunswick. The three Canadian populations occur along or near the Saint John River.

Habitat

The Furbish's Lousewort occupies temporary habitats that are periodically destroyed. In this manner, it is considered to be a typical "fugitive" species. They are primarily found in a shrub-dominated transition zone on the riverbank, between the conifers and deciduous hardwoods of the upper portion of the riverbank and the sparse herbaceous vegetation of the lower cobble substrate portion of the riverbank. The species prefers calcareous well-drained sandy soils that are subject to erosion by high water and ice on the lower part of the riverbank and landslides on the upper portion of the riverbank. Similar conditions were created when the upsloping railroad embankment was cleared by Canadian-Pacific Railway crews.

General biology

The Furbish's Lousewort is thought to be an obligate outcrosser and is pollinated by bees. The plant produces seeds in the late summer and early fall. Seeds are not transported by wind or animals but their small size and loose reticular outer seed coat enable them to float in water for several days. In addition, seedling development relies on the close proximity of other plants (i.e. nurse plants).

Population size and trends

Surveys of the three sites where the species occurs in Canada were carried out in 1997. At this time, 22 plants (18 flowering and 4 nonflowering), 62 plants (12 flowering and 50 nonflowering) and 136 plants were found in the three sites respectively. The general trend is a loss in lousewort plant numbers. If the trend continues, it is thought that the species will disappear from two of the sites. The third site is dynamic in nature; numbers of plants fluctuate. There is a possibility that new plants could become established along this stretch of shoreline.

Limiting factors and threats

The most important limiting factor for this species is habitat degradation, the main cause of which is human disturbance. Human disturbances to this species include the creation of headponds behind dams for hydroelectric generation on the St. John River, site disturbances from trampling and collecting, and the cessation of brush cutting by railroad crews). In addition, seed parasites destroy over one third of maturing seed in some populations of this species.

Existing protection

The Furbish's Lousewort is listed as an endangered species under the New Brunswick Endangered Species Act. As such, both the plant and its habitat are protected.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.

** Formerly described as “Not In Any Category”, or “No Designation Required.”

*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.

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Update
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in Canada

1998

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INTRODUCTION

Due to the limited number of locations in Canada and the continued threat from hydroelectric generating stations on the St. John River, Furbish's Lousewort was designated as endangered in 1980 based on a report by Stirrett (1980). Natural disturbances such as river bank erosion and increased competition have also contributed to its decline. The plant is known from three sites in Canada, specifically in New Brunswick. All populations that were previously reported were on the banks of the St. John River in Maine and New Brunswick; one that this author located is on a railroad embankment (Canadian-Pacific Railroad) about 1/4 km from the confluence of the Aroostook and St. John Rivers. In September, 1997 the author surveyed all the known sites and noted any changes of habitat or in numbers of individuals present. These results are summarized below.

DISTRIBUTION

The species occurs worldwide only in the state of Maine in the United States and in New Brunswick, Canada. The three New Brunswick populations occur along or near the St. John River between Aroostook, N.B. and close to the U.S./Canada border near Hamlin, Maine, a linear distance of about 27 km.

PROTECTION

Furbish's Lousewort is listed as an endangered species under the New Brunswick Endangered Species Act. As such both the plant and its habitat are protected. Although this gives the plants special status, in practical terms, the plants are essentially ignored by the New Brunswick Department of Natural Resources and Energy. This is perhaps due to the fact that the largest population of louseworts, near the mouth of the Little River on the St. John River, is now under the protection of the Nature Trust of New Brunswick, who own the site. This station is protected by monitors who live nearby and watch over the site in terms of litter, angler traffic, plant poachers, natural predation and erosion of the bank habitat. There is no formal protection for the other two stations.

POPULATION SIZE AND TRENDS

Site 1

The railroad embankment site, now abandoned, was once cleared of brush by railroad crews, but has been allowed to grow back, for the most part, and a segment of the Trans Canada Trail has been constructed upon the railroad bed. This may have harmed some of the plants on the lower part of the upward sloping embankment, but there is still a quantity of mostly mature plants along the edge of the trail. Access to the site has been greatly enhanced by a road entry to the trail not far from the louseworts.

Local plant monitors who watch over this site, try to keep the area clear of overarching woody vegetation. The first count for this site was done by this author and Stephen Clayden in 1977. At this time 63 flowering and 115 nonflowering plants were counted. Before 1997, the last recorded count was by Scott Drummond (Drummond 1987) who was working for the New Brunswick Department of Natural Resources and Energy. He counted 50 flowering and 121 nonflowering plants at this site. The highest count for this site was done by Don Brown for DNRE in 1984 when 234 plants were located. This author's count in 1997 found only 22 plants, 18 flowering and 4 nonflowering.

Site 2

The Maine/NB border crossing site is very difficult to access because it occurs at the base of a steep slope at the edge of the Grand Falls headpond. The population has drastically declined in abundance as the habitat is being actively eroded by the waters of the headpond. The bank rises very steeply from the shore at about a 45 degree angle. Most plants are very close to the water's edge and the bank is being undercut. A few are as close as 2 m from the water's edge. The level of the headpond varies according to the amount of water drawn down for hydroelectric generation purposes. The raising of the headpond could seriously affect those plants closest to the water. Drummond's survey in 1987 turned up 41 flowering and 79 nonflowering plants, a total of 120 plants. The highest count for this site was in 1983 with a total of 125 plants. This author's count on October 2, 1997 found 12 flowering and 50 nonflowering plants.

Site 3

The St. John River site near the mouth of the Little River at Tilley, New Brunswick has been inventoried for louseworts almost yearly since 1977 when found by George Stirrett and Fred Tribe. The counts were as high as 225 in 1984 (Brown 1984), and as low as 136 in 1997 when the site was surveyed by the site monitors for the Nature Trust of New Brunswick, Pat and Graham O'Brian. Recently there has been increased ice scour and erosion of the site with several trees falling on some of the plants.

There has been no recent concerted effort to search the St. John River in New Brunswick to look for other Furbish's Lousewort populations. The last time this was conducted was in 1977-78 by George Stirrett, this author and Fred Tribe. This author has searched small stretches of the river above and below existing sites without finding any more populations.

The general trend has been a loss in the numbers of lousewort plants and some degradation of their habitat. If this trend continues I believe the louseworts will disappear from the Maine/New Brunswick border and the railroad embankment sites. The Little River site remains dynamic with numbers fluctuating between 225 (1984) and 136 (l997). There is the possibility that new plants could establish themselves along this stretch of shoreline.

HABITAT

Furbish's Lousewort is a typical "fugitive" species (Grime 1979) occupying temporary habitats that are periodically destroyed. They are mainly confined to a shrub-dominated transition zone on the riverbank below conifers and deciduous hardwoods of the northern boreal forest and above a cobble zone with sparse herbaceous vegetation. They prefer calcareous, well-drained, sandy loams of river terraces subject to erosion by high water and ice below and landslides above. The former maintenance of the upsloping railroad embankment by clearing crews for the Canadian-Pacific Railroad created a similar effect.

The lousewort zone bears the brunt of ice scour during high-water spring runoff. This prevents tree establishment and ultimately controls shrub dominance. Censuses taken over the entire range of the lousewort have documented radical variation in population size over time, including frequent local extinctions (Menges 1988).

BIOLOGY

Furbish's Lousewort is a perennial herbaceous, hemiparasitic plant consisting of a basal rosette of leaves and one or more upright flowering stems on mature plants. Since the first and second years' growth after germination consists of only the basal rosette, they are particularly susceptible to overtopping by other herbs and woody plants (Gawler et al. 1987).

It is reported to be an obligate outcrosser, requiring bumblebees to carry pollen from one plant to another (Menges 1988). Seeds are released in late summer or early fall and lack sophisticated mechanisms for wind or animal dispersal. However, their small size and loose reticulate outer seed coat enable them to float in water for several days (Menges 1988).

Seedlings require a nearby host in order to develop (Macior 1980). Plants have been successfully grown in flats with clover as nurse plants. However, transplanting the seedlings to the wild has not been especially successful (Fred Tribe, personal communication). Mature plants, however, when transplanted likely would have a good chance of surviving if done with care and placed in appropriate sites.

LIMITING FACTORS

The most important limiting factor in New Brunswick is habitat degradation. This has been caused primarily by human disturbances, especially the creation of headponds behind dams for hydroelectric generation on the St. John River. The dynamic processes of ice scour, which provide new habitat and keep down woody plant competition is absent on headpond shores. Site disturbances by trampling and collecting, especially seeds, also has a negative effect on lousewort seedling

establishment and survival. The cessation of brush cutting by railroad crews has had a negative effect on seedling establishment at the former Canadian-Pacific railroad cut near the confluence of the St. John and Aroostook Rivers (site 1).

The hemiparasitic behavior is probably not a limiting factor for the lousewort since the roots of any host can serve as a site for attachment (Macior 1980). Colonization of unvegetated disturbed riverbanks therefore would not be successful. Seed parasites such as the plume moth caterpillars, *Amblyptilia pica*, destroy up to 39% of maturing seed in some populations (Menges 1988). Spittlebugs are found on the stems of many lousewort plants. Their effect, however, appears to be minimal as far as seed set is concerned (Menges 1988).

EVALUATION AND STATUS RECOMMENDATION

The 1980 designation of endangered for Furbish's Lousewort by both the New Brunswick and Canadian governments was based on the two populations on the St. John River and the one on the railroad embankment. Since that time no further populations have been located in New Brunswick. Although there have been fluctuations in the number of plants counted at each known site this may be partly due to counting error because of the somewhat inconspicuous nature of the plants. However it now appears that the Grand Falls headpond (site 2) and the railroad embankment (site 1) populations are at risk of being completely destroyed. For this reason it is important that the population near the mouth of Little River (site 3), owned by the Nature Trust of New Brunswick, be carefully monitored and perhaps some mediation provided to prevent the loss of individual plants. This might include cutting up and removing fallen trees and clearing of some brush to cut down on overshading and competition.

This author recommends that an attempt be made to transplant the remaining plants of the Grand Falls headpond population to a suitable site such as that owned by the Nature Trust. There is strong evidence to suggest that this population will completely disappear within the next year or so. With the permission of the New Brunswick and Canadian governments, I will suggest that the New Brunswick Power Commission help provide support for removal of louseworts from the headpond site and transplant them to the Nature Trust site. Every effort should be made to put plants in situations near existing colonies where conditions should be right for their reestablishment.

Since all the populations of louseworts in New Brunswick are seriously declining and two of the three populations will probably soon disappear, the status of endangered is all the more strengthened.

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THE AUTHOR

Harold R. Hinds has a B.Sc. and MSc. in biology. He is author of the Flora of New Brunswick and numerous publications dealing with botanical subjects. He is founder of the Nature Trust of New Brunswick and has conducted many natural area surveys for the Trust and other agencies. He is a scientific advisor for Nature Conservancy Canada. Hal is Senior Teaching Associate Emeritus and was employed by the University of New Brunswick before his retirement in 1997. He continues to serve as curator of the UNB Biology Department's Connell Memorial Herbarium and his own specimens have increased the herbarium holdings by 11,350 specimens. He is an authority on the plants of New Brunswick and on natural area preservation. Hal has previously written the COSEWIC status report on the Bathurst saltmarsh Aster *Aster subulatus* var. *obtusifolius*.