# New Brunswick Feasibility of Recovery Assessment
# - Furbish's Lousewort -

**Summary of analysis:** The recovery of the Furbish's Lousewort (*Pedicularis furbishiae*) in New Brunswick is currently only considered to be feasible if management techniques are implemented (in-situ and potentially ex-situ). Recovery in this context will be defined as the persistence of a viable and self-sustaining population of the species within New Brunswick. The Furbish's Lousewort occurs along ice-sourced riverbanks below the forest edge and above the summertime water's edge [3]. The species uses disturbance-created habitats that will become unsuitable due to succession and erosion. The provincial population has declined 73 per cent since 2002 and three of the five subpopulations are nearing extirpation [3]. The recovery of Furbish's Lousewort will likely require site management, stewardship on private lands, and in-situ measures.

**Major threat or barrier to recovery[3]**

i. Severe flooding and ice scouring.

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| **Biological Feasibility Assessment – Furbish's Lousewort** | **Feasibility** | | | | **Rationale / Supporting Commentary** |
|---|---|---|---|---|---|
| | **Yes** | **Uncertain** | **Unknown** | **No** | Include explicit rationale |
| The following are questions (adapted from earlier guidance developed by Environment and Climate Change Canada) to assist in assessing if it is biologically and technically possible to prevent an Endangered or Threatened species from becoming extirpated from New Brunswick or to re-establish a viable population of an Extirpated species.<br><br>**1.** Are there currently enough individuals of the wildlife species within the province that are capable of reproduction now to *ensure survival* of the species at a viable population level in the wild? | | | | X | **No.** During the 2022 plant count surveys, there was 244 individuals found and 41 individuals were flowering. There are currently only five subpopulations left and three of them are close to extirpation. 75 per cent of individuals occur at one site [3]. |
| a) Are there enough individuals of the wildlife species on Crown lands within the province that are capable of reproduction now to ensure:<br>I. *survival* of the species at a viable population level within the province?<br>II. *recovery* of species across its *natural ecological distribution*? | | | | X<br>X | **No.** See question 1.<br>**No.** See question 1. |
| b) Are there enough individuals of the wildlife species on private lands that are capable of reproduction now to ensure:<br>I. *survival* of the species at the level of a viable population within the province?<br>II. *recovery* (or persistence) of the species across its *natural ecological distribution*? | | | | X<br>X | **No.** See question 1.<br>**No.** See question 1. |

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|---|---|---|---|---|---|
| | **Yes** | **Uncertain** | **Unknown** | **No** | Include explicit rationale |
| **2.** Will there be enough individuals of the wildlife species within the province that are capable of reproduction in the foreseeable future (10 years) to ensure *survival* at the level of a viable population of the species? If no, will there be enough individuals to prevent extirpation? | | | | X | **No.** There are currently only 244 individuals within the province and the New Brunswick provincial status report [3] states that "Over the last 20 years, however, the number of plants lost to flood-related erosion and bank slumping has far exceeded the numbers of new plants recruited into the population". Projections of flooding within the Saint John River is anticipated to increase and will likely result in continued loss of plants [2]. |
| | | | X | | **Unknown.** There are still flowering plants at four of the subpopulations that may continue to reproduce in the next 10 years, but the threat of flood-related erosion and bank slumping is expected to increase within future years and will likely remove flowering individuals that are unlikely to be replaced [3]. |
| **3.** **Extirpated species:** Is there an appropriate source population outside of the province from which individuals could be sourced to re-establish a *viable population*? | | | | | **N/A.** The species is not considered extirpated. |

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|---|---|---|---|---|---|
| | Yes | Uncertain | Unknown | No | Include explicit rationale |
| **4.** Is there enough suitable habitat available within the province currently to *prevent extirpation,* ensure *survival* at the level of a viable population or *re-establish* the species, or could it be made available through habitat management or restoration? If applicable, include trends and changes in habitat supply. | | X | | | **Uncertain.** A terrestrial habitat suitability model was created for Furbish's Lousewort in 2023; this model was supported by hydrogeological data [4]. The model focused on the Saint John River and other tributaries that may have suitable habitat for the species. Based on the model, there is estimated to be ~3200 $m^2$ of suitable habitat along the shore of the Saint John River. It is expected that the Saint John River will continue to have severe flooding events and more mid-winter thaws and rainfalls, resulting in unsuitable habitat for the species [3]. The model also investigated suitable habitat on other tributaries and estimated ~3400 $m^2$ of suitable habitat [4]. The habitat suitability model will need to be ground-truthed to assess accuracy. |
| a) Is there enough suitable habitat available on Crown land within the province to maintain, *recover* or *re-establish* the species across its *natural ecological distribution*, or could it be made available through habitat management or restoration? | | | | X | **No.** Based on the habitat suitability model for Furbish's Lousewort, there is 359 $m^2$ of suitable habitat for the species on Crown land along the Saint John River and other tributaries. 57 $m^2$ of this habitat is solely along the Saint John River [4]. |

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|---|---|---|---|---|---|
| | **Yes** | **Uncertain** | **Unknown** | **No** | Include explicit rationale |
| b) Is there enough suitable habitat available on private land within the province to maintain, *recover* or *re-establish* the species across its *natural ecological distribution*, or could it be made available through habitat management or restoration? | | X | | | **Uncertain.** Based on the habitat suitability model for Furbish's Lousewort, there is ~5340 $m^2$ of suitable habitat on private land along the Saint John River and other tributaries [4]. |
| **5.** Are the primary threats to the species or its habitat identified (including threats outside New Brunswick and Canada)? | X | | | | **Yes**. The primary threat to the species is flood-related erosion and bank slumping along the Saint John River as plants are being lost during these events. The severity of the Saint John River flood and ice jam events has increased in the last 80 years and is expected to increase in the future [3]. Although the species requires disturbance-created habitats, the natural regime is now too extreme to allow the plant to persist.<br><br>Other threats include temperature extremes and invasive/native plant species. |

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|---|---|---|---|---|---|
| | **Yes** | **Uncertain** | **Unknown** | **No** | Include explicit rationale |
| **6.** Do the management techniques (ex-situ and/or in-situ) exist to avoid and mitigate threats to the extent required to *prevent extirpation*, ensure *survival*, *recover* or *re-establish* the species, or can they be developed in a reasonable timeframe? | X | | | | **Yes.** Since 2018, the Canadian Forest Service has completed work testing seed viability of the Furbish's Lousewort and has successfully propagated the plant. Two field banks have been established in the province to plant the propagated specimens, which are now successfully producing seed. It is likely that the best management technique to re-establish the species is to use in-situ and ex-situ measures to maintain the current existing populations and plant additional populations in suitable habitat along other tributaries identified in the habitat suitability model [1]. |
| **7.** **Extirpated species:** Do management techniques exist to re-establish an extirpated species if the threats have been addressed? | | | | | **N/A.** The species is not considered extirpated. |

**References**

[1] Gyllström, M. 2021. Ex Situ conservation of Furbish's Lousewort in New Brunswick –Potential for aligning future work with IUCN guidelines. Prepared for the New Brunswick Department of Natural Resources and Energy Development. Fredericton.

[2] Monk, W. 2020. Modelling potential habitat for Furbish's Lousewort and identifying trends in important hydrologic variables: Exploring statistical trends in key ecohydrological and ice variables to support the assessment of potential Furbish's Lousewort habitat. Nature Trust of New Brunswick, Fredericton NB. 13 pp.

[3] New Brunswick Department of Natural Resources and Energy Development. 2023. Furbish's Lousewort *Pedicularis furbishiae* in New Brunswick: Status Report. NBDNRED, Fredericton, NB. 25 pp. + apps.

[4] Ogilvie, J., and W. Monk. 2023. Terrestrial habitat model supported by hydrological data analyses for Furbish's Lousewort (*Pedicularis furbishiae*). Prepared for the New Brunswick Department of Natural Resources and Energy Development.

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## INTRODUCTION TO FEASIBILITY OF RECOVERY ASSESSMENTS

After a species is listed as an extirpated species, an endangered species, or a threatened species under the New Brunswick *Species at Risk Act* (NB SARA), the Minister of Natural Resources and Energy Development (DNRED) is required to undertake an assessment to determine whether the *recovery* of the species is feasible (NB SARA 21(1)). The assessment is to consider biological and technical feasibility and, where applicable, identify potential significant social and economic challenges to the recovery of the species. It is intended to be a rapid assessment process based on the available information. The DNRED Species at Risk Unit will focus on determining the biological and technical feasibility for recovery along the recovery continuum. In addition, the major threats or barriers to the recovery of the species, as documented in the species status report, will be listed as the starting point for social and economic considerations, which may be further explored at several steps in the recovery planning process and the protection assessment. In particular, members of the New Brunswick Interdepartmental Species at Risk Committee (ISARC) will be invited to identify significant potential social and economic impacts to the sectors of society and business identified in their mandate.

Recovery outcomes can range from solely *preventing extirpation,* which implies significant intervention for persistence, to ensuring *survival* of a largely self-sustaining population of the species in the wild and on through to *recovery of* a species across its *natural ecological distribution*.

In keeping with the precautionary principle, the Minister will proceed with the preparation of a recovery strategy if the recovery of the species is determined to be either feasible or uncertain (21(4)). If the assessment concludes that recovery is not feasible, the Minister shall publish the conclusion, together with an explanation, in the NB SAR public registry without delay (21(3)).

The feasibility assessment not only provides the information required by the Minister to make a statement on recovery feasibility, it also provides information to supplement the recovery planning stage of species at risk conservation. Under the NB SARA, the recovery outcome is prescribed in the NB Recovery Strategy for the species. Unless otherwise directed, it is at this stage (post Feasibility of Recovery) that major social and economic barriers may be further explored (NB SARA 21(2)), especially where recovery options beyond preventing extirpation and ensuring *survival* involve private lands and interests.

**Biological and Technical Feasibility Outcomes** This aspect of the feasibility of recovery assessment establishes if it is biologically and technically possible to:

a) ***Prevent Extirpation*** of the species from the province (requiring sustained conservation attention, may include ex-situ and in-situ approaches);

b) Ensure ***Survival*** of the species at a *viable population* level in the wild;

c) ***Recover*** (or maintain) a species to *viable population* levels across its *natural ecological distribution* on Crown land and potentially on private lands in New Brunswick, or as understood previous to the effects of human activities that have resulted in its at-risk status; and

d) ***Re-establish*** a *viable population* of a species that has been extirpated from New Brunswick.

## Glossary

***Extirpation –*** The species is no longer regularly present in the wild in the province.

***Naturally precarious*** – A species whose natural condition (low abundance, limited/periodic distribution, narrow habitat specificity) within New Brunswick puts it at some level of risk of extirpation even in the absence of human impacts.

***Prevent Extirpation*** – The presence of the species in the wild in the province is maintained through focused and often intensive management efforts that may rely on the ongoing contribution of ex-situ conservation efforts.

***Survival*** – The species is present and at a *viable population* level in the wild within the province. Though self-sustaining, the species may no longer occupy the full extent of its *natural ecological distribution* in the province on Crown or private land.

***Recover*** – The species is present and at *viable population* levels across its *natural ecological distribution* on Crown land and possibly private lands in the province.

***Natural Ecological Distribution*** – The known or expected distribution of the species across ecological zones of the province considering the habitat requirements of the species and the distribution of those habitats in the absence of human influences. Ecological distribution will be interpreted, as appropriate, at the scale of Province, Eco-Region, Eco-District, or Primary (*e.g.,* Saint John River), Secondary (*e.g*., Nashwaak River), or Tertiary Watershed (*e.g.,* Tay River).

***Viable population*** – Self-supporting populations with sufficient numbers and genetic variety among healthy individuals and breeding pairs that are well enough distributed to ensure a high probability of survival despite the foreseeable effects of demographic, environmental and genetic events, and of natural catastrophes (https://biodiversitya-z.org/content/viable-population).

***Feasible*** – It is biologically and technically possible to achieve the survival or recovery outcome and the preliminary estimates of social or economic impacts are not significant enough to preclude undertaking the recovery planning stage to at the very least prevent extirpation of the species from the province. Staff will be directed to work with the appropriate experts and interests to develop a Recovery Strategy as guidance for the province.

***Not feasible*** – It has been determined that it is not biologically and/or technically feasible to achieve the survival or recovery outcome for the species, or it is biologically and technically feasible, however, the demonstrated social and/or economic impacts are catastrophic. Under such a determination, further recovery planning will not be pursued by the province. The feasibility of recovery will be re-evaluated if circumstances change or if new information becomes available.

***Feasibility Uncertain*** – The causes of population decline, threats to the population, ability to reverse threats, or evidence that suggests potentially major impacts to society or the economy of the province are not fully understood. In keeping with the precautionary principle, staff will be directed to work with the appropriate experts and interests to develop a Recovery Strategy as guidance for the province.

***Recovery Strategy*** – A strategy for the recovery of a wildlife species that is listed as an extirpated species, endangered species, or threatened species prepared or adopted by the Minister under section 21. A recovery strategy constitutes advice to governments, landowners, and others as to the requirements that, in the opinion of the Minister, will assist in the recovery or survival of a wildlife species (section 22(1)).