DRAFT Recovery Strategy for Furbish's Lousewort (*Pedicularis furbishiae*) in New Brunswick

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Department of Natural Resources and Energy Development

New Nouveau Brunswick

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Recovery Strategy for Furbish's Lousewort *(Pedicularis furbishiae)* in New Brunswick

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PREFACE

Under the provincial *Species at Risk Act* (the *Act)*, the Minister is required to conduct a recovery feasibility assessment for extirpated, endangered, and threatened species and, if recovery of the species is deemed to be feasible, prepare a recovery strategy. Recovery strategies are defined in the *Act* as advice to the Minister, landholders, and others.

Recovery strategies are one piece in a series of five documents that are prepared for the assessment, recovery, and protection of extirpated, endangered and threatened species. Of particular importance in this series is the species status report, a background document that provides foundational material on the species abundance and distribution, ecology, habitat and population trends, and threats. Recovery strategies often incorporate this information in a condensed format, referring the reader to the status report for more details.

In the preparation of a recovery strategy the Minister may adopt, in whole or in part, a document prepared by another party with any modifications considered necessary to meet requirements under the *Act*. This clause favours collaboration with federal partners, a sharing of expertise, and efficiency of time and resources.

This recovery document describes priority threats and conservation measures for Furbish's Lousewort that are specific to New Brunswick.

Executive Summary

Furbish's Lousewort (*Pedicularis furbishiae*) is listed as endangered under both the New Brunswick and Canadian *Species at Risk Acts*. The species only occurs on the banks of the Saint John River in New Brunswick and Maine. Furbish's Lousewort requires periodic flooding to maintain habitat in an early-intermediate stage of succession, but the number of plants lost to flood-related erosion and bank slumping is exceeding the number of new plants recruited into the population. The species has been declining rapidly since the early 2000's and within New Brunswick there is currently only 260 plants, with 96% of these individuals occurring at a single subpopulation. It has become clear that without intervention, Furbish's Lousewort will be lost in Canada.

There has been extensive effort from the Canadian Forest Service (CFS) in the past five years to create a seed bank and seed out planting program for the species which can provide options for future conservation efforts and preserve the species' genetics.

The purpose of this New Brunswick recovery strategy is to provide New Brunswick specific recovery information and to communicate provincial goals and recovery actions. This strategy applies to all lands in New Brunswick.

New Brunswick's recovery goal is to: *Reinforce existing subpopulations and establish new subpopulations to maximize population viability of Furbish's Lousewort and to maintain quality habitat within its range in New Brunswick over the long term.*

Survival and recovery habitat have been identified and measures are recommended to increase the number of Furbish's Lousewort on the landscape.

Table of Contents

List of Tables

List of Figures

Species information

Please note, for more detailed information related to Furbish's Lousewort population, distribution, trends, and threats leading to the classification of the species as endangered, please refer to the New Brunswick Furbish's Lousewort Status Report.[5]

Species status in New Brunswick

Endangered (2023)

Species description

Furbish's Lousewort is a perennial herb that occurs on the intermittently flooded, ice-scoured shores of the Saint John River. The species is a hemiparasitic plant that has fern-like leaves which form a basal rosette. The plant takes two to three years to reach maturity and produce one or more flowering stems. Furbish's Lousewort can be difficult to find as their average height is 75 cm and are normally obscured by competing vegetation. [3,5] It is only known to be pollinated by one species of bumble bee, the Half-black Bumble Bee (*Bombus vagans).* Seeds produced from the flower normally drop near the parent plant as seeds lacks the mechanisms for wind or animal dispersal. As a result, each mature plant usually forms a colony nearby and do not tend to colonize new areas.[8] It is possible that during the spring floods, seeds could disperse down river and colonize new areas.

Species Population and Distribution

Furbish's Lousewort only occurs along the Saint John River in Maine and New Brunswick (Figure 1). The first census of the species in its global range occurred in 1980, which totaled 5,027 flowering stems. [8] In the most recent survey (2021) for Maine, they counted 2,747 flowering stems, and in New Brunswick, the most recent count (2024) totaled 260 individuals.

The total New Brunswick population has declined dramatically since the early 2000s, with most of that decline occurring after 2008. The maximum New Brunswick population of 915 plants was recorded in 2002 which represents a decline of 71%.

Every subpopulation has declined substantially. Relative to the highest totals recorded at each subpopulation, Big Flat, Medford, Aroostook, and Stirrett have lost 98% to 100% of their plants, while Grand Falls has lost 17%, respectively, of their plants. In New Brunswick, the Grand Falls subpopulation now holds 96% of all Furbish's Lousewort individuals in the wild.

In New Brunswick, Furbish's Lousewort is known from five subpopulations along a 35 km stretch of the Saint John River from Grand Falls to the mouth of the Aroostook River (Figure 2), but the Aroostok subpopulation is now extirpated. A historical specimen suggests Furbish's Lousewort once extended at least another 5 to 7 km further downstream prior to loss of shoreline habitat to the Beechwood Dam headpond. [5]

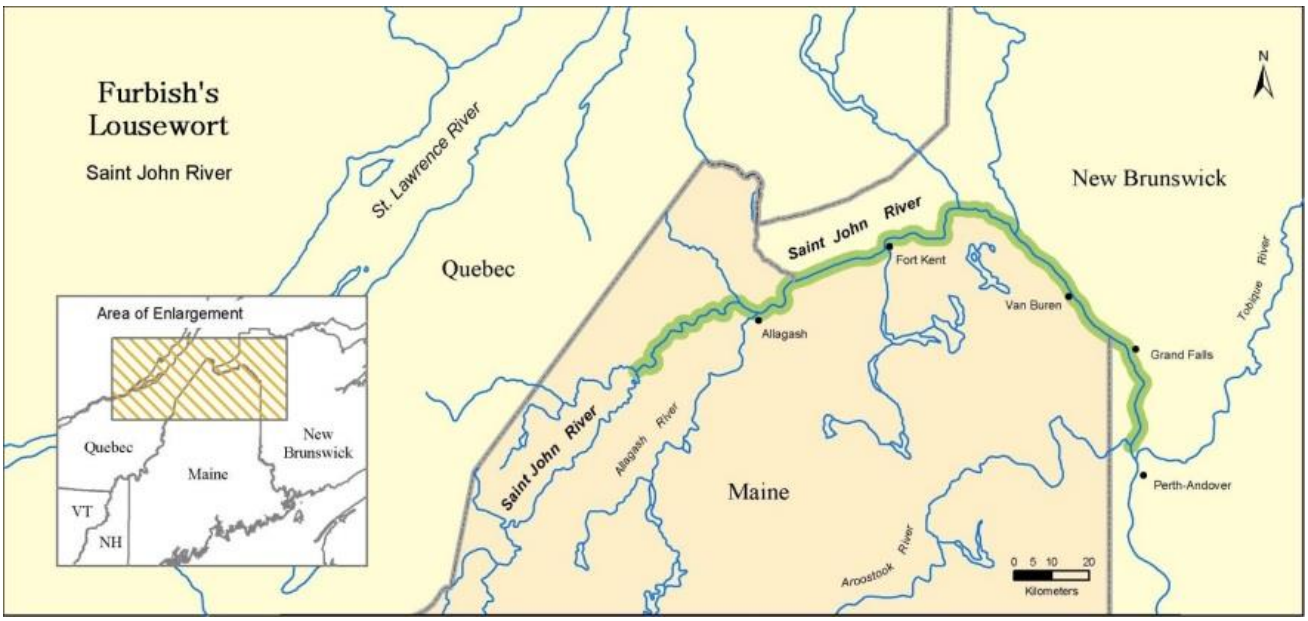

Figure 1. Global distribution of Furbish's Lousewort (*Pedicularis furbishiae*) in New Brunswick, Canada and Maine, United States.[2]

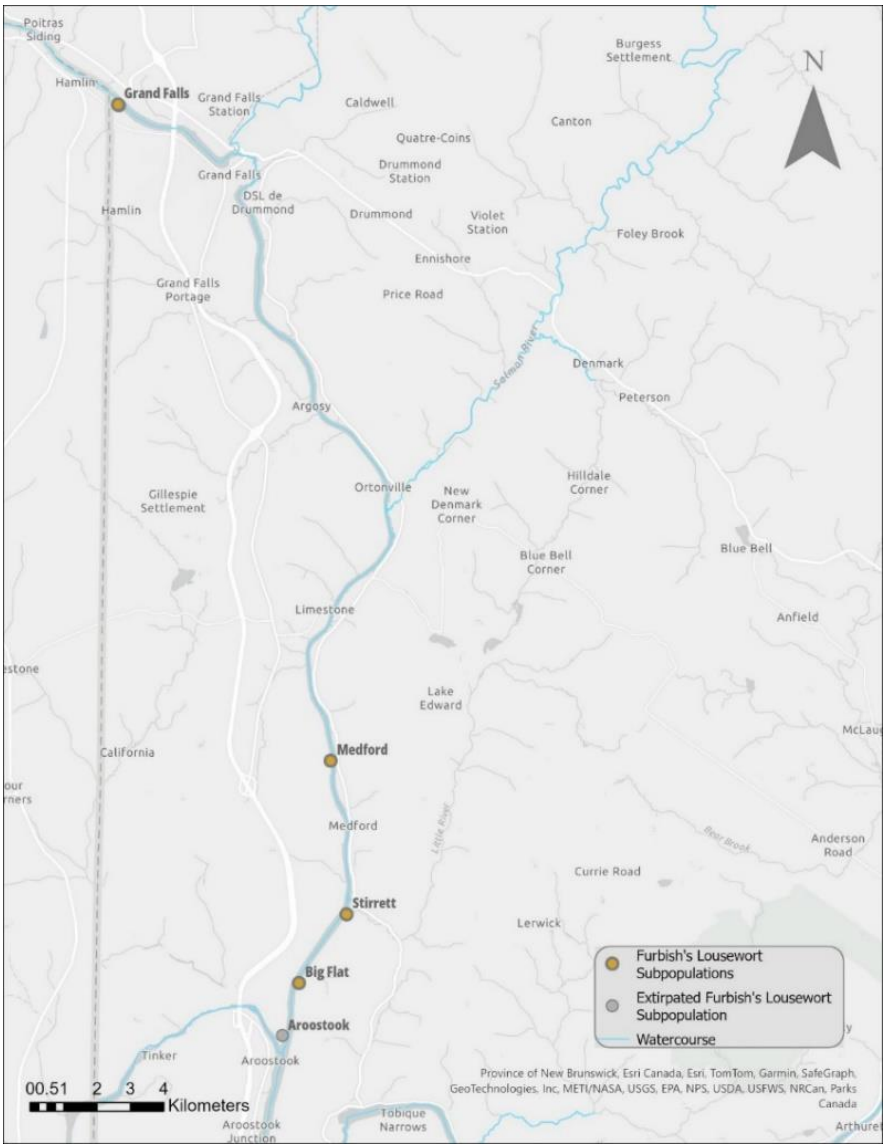

Figure 2. Furbish's Lousewort subpopulations (orange) and an extirpated subpopulation (grey) within New Brunswick.

Habitat

Furbish's Lousewort occupies exposed shorelines of the Upper Saint John River which is subject to spring floods and ice flows. The species only occurs on this river due to the flood and ice dynamics which is critical for maintaining the habitat necessary for the species to thrive as it removes competing vegetation and creates new habitat. However, excessive disturbance can remove more plant's than can be replaced. Furbish's Lousewort requires sloped riverbanks with early-intermediate stage of

succession, a moist climate, and well-drained soils. Furbish's Lousewort occurs mostly within a narrow band of ice-scoured riverbank below the forest edge (Figure 3 and Figure 4). The species is shade tolerant but is a poor competitor and struggles in dense shrub cover. [3,5]

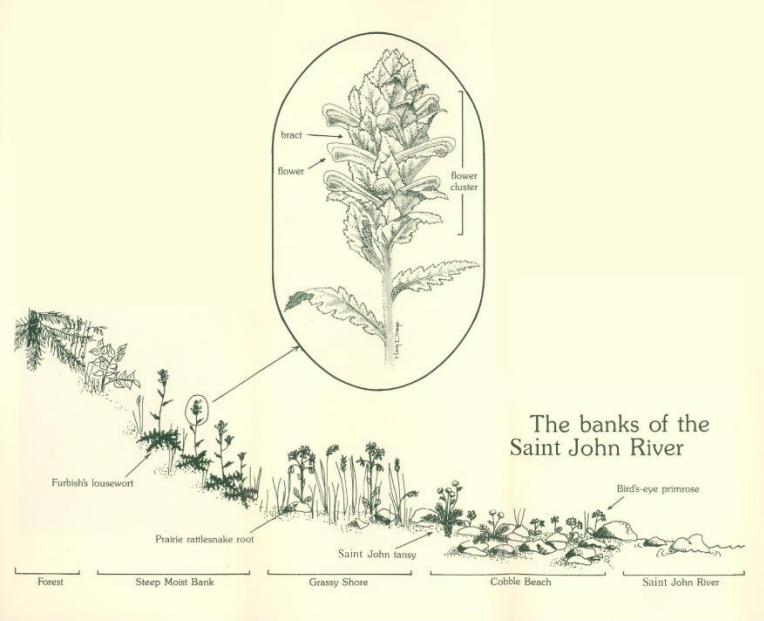

Figure 3. Dynamic ecosystem of Furbish's Lousewort (diagram from Droege, 1993).

Figure 4. Grand Falls Furbish's Lousewort subpopulation habitat.

Threats

The conservation measures proposed for Furbish's Lousewort in New Brunswick are intended to address threats that have been identified as significant in the provincial context. Threats described in this report were taken from the existing threat assessment in the 2006 New Brunswick recovery strategy for the species. [3] Eight threats were assessed at the provincial scale. The threats are listed below using the IUCN- CMP* threat classification from Salafsky et al. [7]

Climate change and severe weather (11.4, 11.3)

Furbish's Lousewort relies on periodic flooding to maintain habitat of an early-intermediate stage of succession. However, in the last couple of decades, the number of plants lost from flooding events and erosion has exceeded the number of

new plants recruited into the population. Evidence is showing that 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. [5]

Ideal temperatures for Furbish's Lousewort are not well understood but USFW (2018) suggests that the species prefer a cool, moist, subboreal climate. With increased summer temperatures in the future, it is possible that Furbish's Lousewort will be negatively impacted.[5]

Invasive and other problematic species (8.1, 8.2)

Succession along riverbank habitats can be problematic for Furbish's Lousewort due to cover and deposits of debris along the shoreline. The Medford and Stirrett subpopulations are now densely covered with Speckled Alder (*Alnus incana*) along the shore, creating unsuitable habitat for the species. At Aroostook, the accumulation of Northern Red Oak (*Quercus rubra*) leaves and dense vegetation led to the extirpation of the subpopulation; however, this habitat is unusual for Furbish's Lousewort and does not pose a widespread threat. Efforts to control competing natural vegetation at Medford and Aroostook have been used but have yet to result in an increase in the local subpopulations of Furbish's Lousewort.[5]

Along the Saint John River, there are many exotic species; none have been noted to directly compete with Furbish's Lousewort. Although not yet observed, it is possible that Colt's foot (*Tussilago farfara*) may become a competitor as it occupies similar habitat to Furbish's Lousewort, forms dense rhizomatous patches, and may be more resistant to flood impacts due to their sturdy, interconnected rhizomes. [5]

Other threats

Below are threats to Furbish's Lousewort that are not consistently impacting the species, but have the potential to become a threat in the future:

- **Roads** (**4.1 Roads and railroad**) close to rivers banks can negatively impact Furbish's Lousewort as roads prevent the sloped shoreline from receding, creating habitat features that are not suitable for the species. Currently, the Stirrett and Big Flat subpopulation have a road in proximity to the subpopulations, which will limit slumping of the bank.

- **Recreational activities (6.1)** have been noted to cause damage at the Aroostook subpopulation from all-terrain vehicles and trail development but neither situation was suggested as the primary cause of extirpation of that subpopulation. At the Stirrett subpopulation, all terrain vehicle use has been observed but it has not caused negative impacts on the species. [5]

- Development along the shoreline (pathways to the shore and removal of trees for a river view) of Furbish's Lousewort habitat is a potential threat (**1.3 Tourism and recreation areas**). At the current subpopulations, this type of development has not occurred, but could become a future threat as shoreline habitats are often developed.

- The primary pollinator species noted for Furbish's Lousewort is the Half-black Bumble Bee and it is possible that pollinator loss could be a potential threat (**7.3 Other ecosystem modifications**). Currently, the Half-black Bumble Bee is secure within New Brunswick, and it is unclear whether Furbish's Lousewort is limited to one species. [5]

Recovery Goals and Actions

Recovery Goal

Reinforce existing subpopulation and establish new subpopulations to maximize population viability of Furbish's Lousewort and to maintain quality habitat within its range in New Brunswick over the long term.

Population and Distribution Objective

Short-term population objective:

By 2035, the population objective is to increase the total population to greater than 1,000 mature individuals with at least six self-sustaining subpopulations, one of which is greater than 250 mature individuals.

Long-term population objective:

By 2055, achieve and maintain a minimum of 11 self-sustaining Furbish's Lousewort subpopulations.

Survival and Recovery Habitat

Under the New Brunswick *Species at Risk Act*, survival habitat and recovery habitat may be identified, in support of population and distribution objectives. Survival habitat is habitat that is *currently or regularly occupied* by individuals of the species. Recovery habitat is defined as *habitat that is necessary for the recovery of a wildlife species, but that is not currently or regularly occupied by an individual of that species*.

Survival and recovery habitat have been delineated in support of four subpopulations through an amalgamation of occurrence records and habitat-analysis (see Figures 5 and 6). Survival habitat was not identified for Aroostok as the subpopulation is extirpated. Survival habitat has been identified as a 30-metre radius circle around occurrence points to allow for minor changes in habitat that could occur as a result of annual ice scouring. Recovery Habitat has been identified as suitable habitat identified from the Furbish's Lousewort habitat suitability model (buffered 30 metres) [6], habitat historically occupied by Furbish's Lousewort, and

buffered survival habitat to allow for potential expansion of Furbish's Lousewort subpopulations.

Currently, there are 1.2 ha of survival habitat and 16.6 ha of recovery habitat in New Brunswick held by over a dozen individual land holders. All survival habitat is owned by individual land holders and recovery habitat includes the Neqotkuk First Nation and individual land holders.

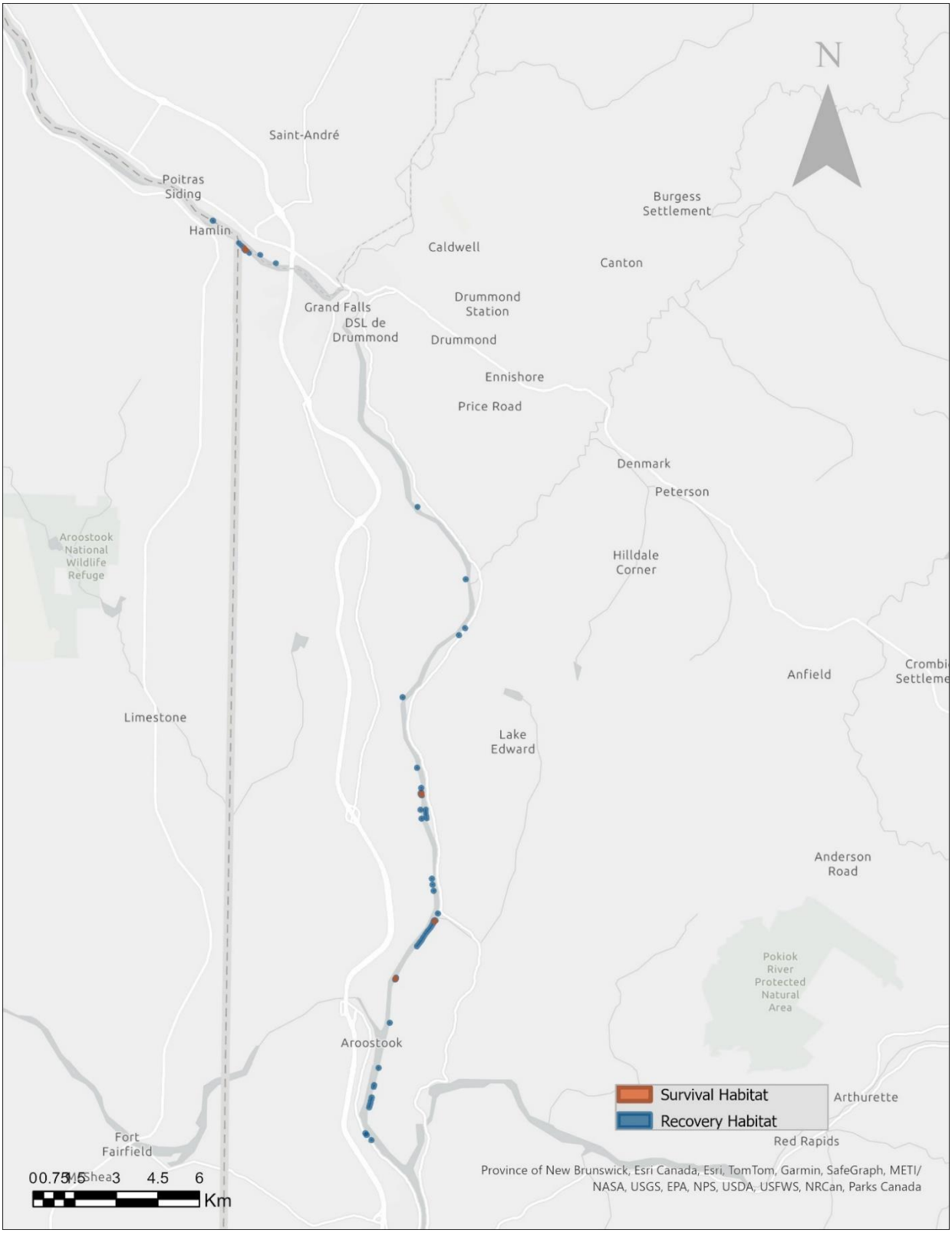

Figure 5. Survival (orange) and recovery habitat (blue) for Furbish's Lousewort in New Brunswick.

Broad Strategies and Conservation Measures

Actions already completed or underway

There has been considerable work on Furbish's Lousewort in New Brunswick since the early 1970's by a variety of researchers, non-governmental organizations, and government agencies.

In the past five years, the Canadian Forest Service (CFS) has created a seed bank and seed out planting program to preserve the genetic diversity of the Canadian population. The CFS have also conducted annual plant counts and their work has rescued plants from imminent erosion at the Big Flats subpopulation.

Recent priority conservation action for the species includes management of competing alders at several subpopulations, habitat modeling along the Saint John River and other tributaries, and investigating potential options for in-situ/ex-situ management. [4,6] In 2024, Environment and Climate Change Canada supported the Department of Natural Resources and Energy Development through the Wolastoq Priority Place fund to hold an Ex-Situ Conservation Planning workshop, designed and facilitated by Conservation Planning Specialist Group Canada to provide guidance on the New Brunswick recovery strategy for Furbish's Lousewort. [1] Participants included provincial and federal governments, species experts and research scientists, land conservancies and land holders, and Indigenous knowledge holders. Outcomes from the workshop have been incorporated in the updated strategy.

Priority Conservation Measures

The following measures have been identified as priority actions by NBDNRED for the conservation of Furbish's Lousewort in New Brunswick. To meet the population objectives above, translocation of plants from the nursery into existing and new subpopulation will be essential for success. Some tasks will be accomplished in collaboration with partners. Actions are described below and the timeframe for implementation is indicated.

Table 1. Priority conservation measures for Furbish's Lousewort.

Priority Conservation Measures	Threat	Priority	Timeline
Broad Strategy 1: Ex-situ conservation			
1.1 Continue long-term preservation and management of the two established Furbish's Lousewort field banks for seed production to preserve options for future conservation strategies. **1.1.1** Continue testing of seed for viability, tolerance to cryopreservation, germination protocols, and other scientific activities related to ex-situ conservation and propagation of the species. **1.1.2** Continue storing seed through cryopreservation for future purposes (translocation, genetic testing, etc.).	All	High	Ongoing
1.2 Continue cultivation of Furbish's Lousewort from seeds sourced from the two field banks and wild subpopulations to support translocation research, the reinforcement of existing subpopulations, and the establishment of new subpopulations.	All	High	Ongoing
Broad Strategy 2: Species Stewardship			
2.1 Maximize the protection of identified survival habitat and minimize threats facing the New Brunswick subpopulations to the greatest extent possible. **2.1.1** Take action to improve habitat conditions at existing subpopulations to increase survival rates until new subpopulations can be established. Mitigation measures could include removal of competing vegetation, bank reinforcement, fence installation, etc. Effectiveness of mitigation measures should be evaluated.	6.1, 8.2, 11.4	High	2025-Ongoing
2.2 Reinforcement of current Furbish's Lousewort subpopulations via translocating individuals propagated from seed collected from the insurance population (i.e. planting). **2.2.1** Develop a planting strategy protocol for translocation activities. Factors could include number of subpopulations, number of mature plants, number of flowering individuals, number of out planting events, etc. Evaluate the effectiveness of each planting strategy after five years.	All All	High High	2025-2035 2025-2026
Broad Strategy 3: Species Re-introduction and translocation			
3.1 Continue to improve and test NBDNRED's habitat suitability model to identify areas for potential translocation sites with particular attention to hydrology variables (including erosion risk mapping). It is expected that the work of ground-truthing and adjusting the model will involve partnerships and will be part of an ongoing and adaptive process.	All	Medium	2025-2035
3.2 Translocate individuals generated from seed sources produced from the insurance population to identified recovery habitat, with the consent of land holders, that is currently unoccupied by the species.	All	High	2027-2035

Priority Conservation Measures	Threat	Priority	Timeline
3.2.2 Ensure long-term protection of established subpopulations.			
Broad Strategy 4: Research and Monitoring			
4.1 Periodic surveys (3-5 years) to detect newly established occurrences.	All	High	2025, 2030, and 2035
4.2 Develop a monitoring protocol to measure success of translocation and monitor habitat changes/threats. Factors that could be measured include number of plants surviving translocation, number of new individuals, number of flowering individuals, seed production (number of full capsules), habitat features (vegetation, bank stability, etc.), distance between plants (expansion of the subpopulation), number of field visits, number of ice scouring events, etc. Evaluate the effectiveness of the protocol after five years. **4.2.1.** Complete a population viability analysis (PVA) to assess drivers of population trends, assess effectiveness of translocation, and obtain a preliminary threshold of a self-sustaining population. Use information collected in the monitoring protocol and collect information regarding current and past dispersal, distribution, and density of the species.	All Knowledge Gap	High Medium	2025-2026 2032-2034
4.3 Conduct beneficial research where possible, including: ▪ Pollination rates in seeded subpopulations with low and high densities of adjacent flower species to identify pollinators and to determine if pollination is a limiting factor in seed production; ▪ Climate change projections on river flows for the Upper Saint John River and other nearby tributaries; ▪ Investigation of life history traits of Furbish's Lousewort, including how the species disperses and breaks dormancy in the wild; and ▪ Evaluate the level of genetic diversity and inbreeding within newly established colonies.	Knowledge Gaps	Low-Medium	2025-2035
Broad Strategy 5: Outreach and communication			
5.1 Mitigation of threats via effective communication and transfer of knowledge between government (Environment and Local Government, Transportation and Infrastructure, Federal Government, Municipalities, and Natural Resources and Energy Development) and First Nations communities through sharing important habitat information for Furbish's Lousewort and flagging potential impacts related to roads/infrastructure, changes in land use, and increased residential development in recovery and survival habitat.	1.3, 4.1	Medium-High	2025-2035
5.2 Increase awareness of Furbish's Lousewort and work with land holders to increase the population of the species and reduce threats.	1.3, 6.1, 8.1	Medium-High	2025-Ongoing

Priority Conservation Measures	Threat	Priority	Timeline
5.2.1 Develop and implement a targeted awareness campaign to the local community regarding Furbish's Lousewort to create a sense of ownership for the species and reduce threat impacts. **5.2.2** Share information with current land holders who have Furbish's Lousewort on their property and seek consent to improve the subpopulations (i.e., vegetation management, translocations). **5.2.3** Share information with land holders who have recovery habitat for Furbish's Lousewort and seek consent to explore translocation of individual from the out-planting program.			
5.3 Maintain a collaborative working group with key knowledge holders, conservation partners, and government partners (federal government and Government of Maine) to share knowledge and implement conservation strategies.	All	High	Ongoing

Measuring results

Key markers of success in the implementation of this strategy are as follows:

- Six self-sustaining subpopulations of Furbish's Lousewort that require no extensive human intervention;
- A total population size over 1,000 mature individuals; and
- The population distribution is unchanged.

Concluding statements

In conclusion, Furbish's Lousewort is critically at risk, with just 260 individuals left in New Brunswick, predominantly concentrated at a single subpopulation. This species is significant, as it is found nowhere else in Canada but along the Saint John River, making its conservation essential. With the species ongoing decline due to flood-related erosion and bank slumping, action is necessary to conserve this species. The extensive efforts by the Canadian Forest Service to establish a seed bank and planting program provide an opportunity for future conservation efforts. Through this recovery strategy, New Brunswick aims to reinforce existing subpopulations and establish new subpopulations, ensuring the long-term viability of Furbish's Lousewort and the maintenance of its habitat. Collaborative efforts are essential to restore and conserve this species within the province.

References

[1] Conservation Planning Specialist Group. 2025. Furbish's Lousewort (*Pedicularis furbishiae*) Ex Situ Conservation Planning Workshop: Final Report. IUCN SSC Conservation Planning Specialist Group – Regional Resource Center Canada.

[2] Environment Canada. 2010. Recovery Strategy for the Furbish's Lousewort (*Pedicularis furbishiae*) in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. vi pp. + appendices.

[3] Furbish's Lousewort Recovery Team. 2006. Recovery strategy for Furbish's Lousewort (*Pedicularis furbishiae*) in New Brunswick. New Brunswick Department of Natural Resources. Fredericton, New Brunswick.

[4] 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.

[5] 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.

[6] Ogilvie, J., Monk, W. 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.

[7] Salafsky, N., Salzer, D., Stattersfield, A.J., Hilton-Taylor, C., Nuegarten, R., Butchart, S.H.M., Collen, B., Cox, N., Master, L.L., O'Connor, S., Wilkie, D. 2008. A Standard Lexicon for Biodiversity Conservation: Unified Classifications of Threats and Actions. Conservation Biology.

[8] United States Fish and Wildlife Service. 2018. Species Status Assessment Report for (*Pedicularis furbishiae*) the Furbish's Lousewort, Version 1.1. Maine Field Office, East Orland, Maine. 73 pages + apps. https://ecos.fws.gov/ServCat/DownloadFile/166496

Appendix A: Survival Habitat Maps

Figure 6. Section of survival (orange) and recovery habitat (blue), around the Grand Falls subpopulation.

Figure 7. Section of survival (orange) and recovery habitat (blue), around the Medford subpopulation.

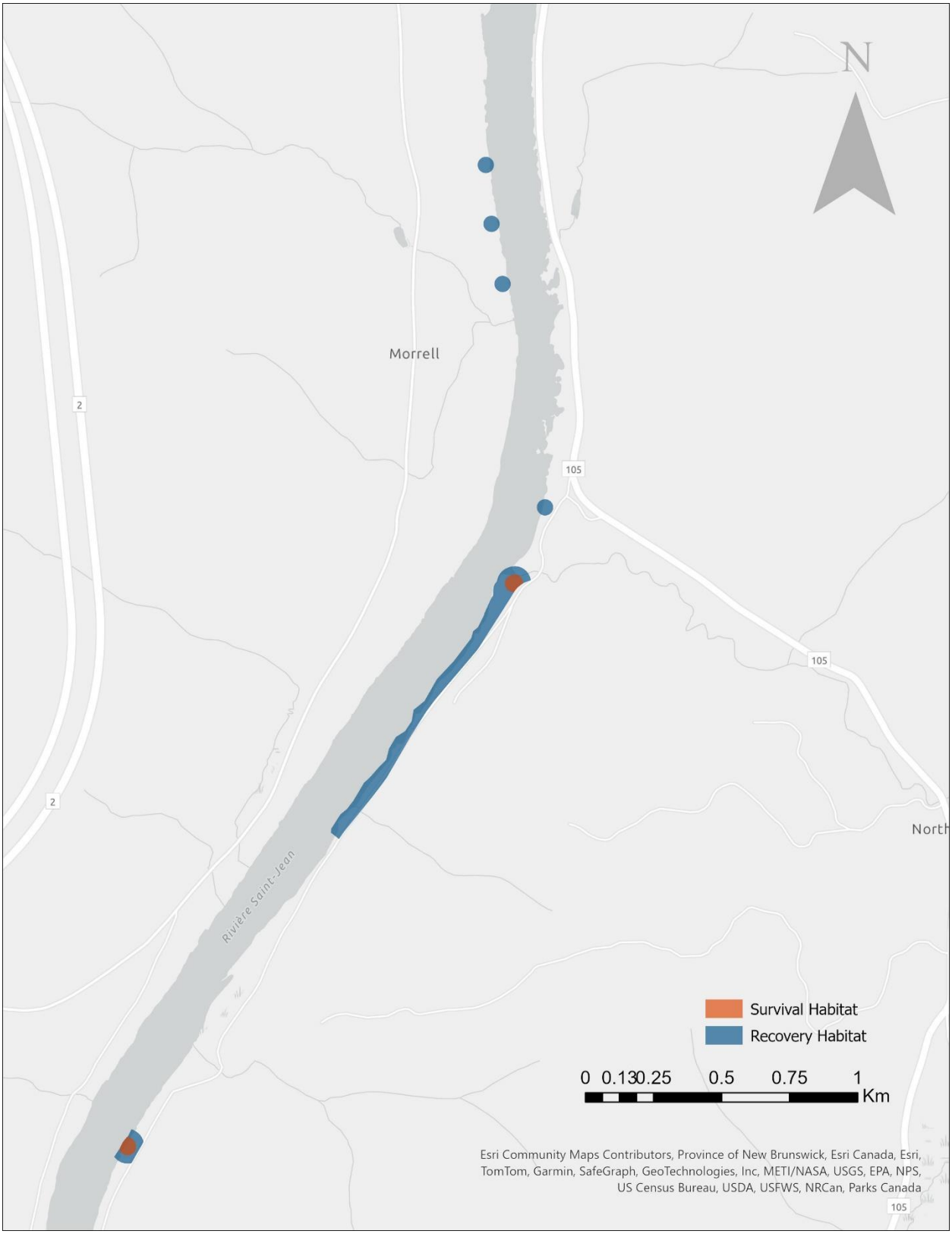

Figure 8. Section of survival (orange) and recovery habitat (blue), around the Stirrett and Big Flat subpopulations.