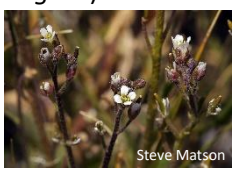
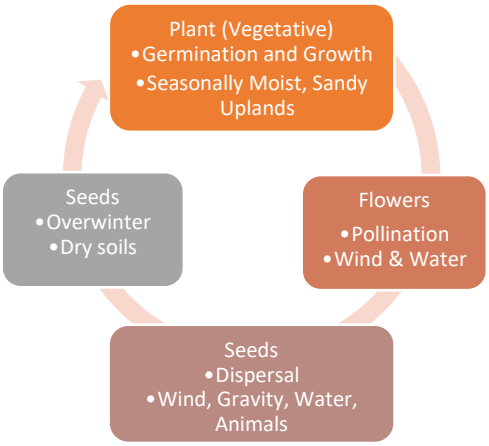
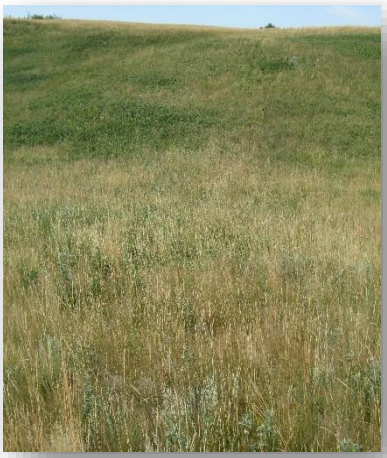
Species Ecology

Slender mouse-ear-cress (*Crucihimalaya virgata*) is a slender, herbaceous plant that belongs to the mustard family[1,2]. This plant lives for one or two years, during which time the seeds germinate in late April to early May, grow and start flowering in late May, sometimes through July, after which they set seed and die. Often the seeds will germinate in the first year, and then flower in the following year.







Habitat Ecology

In the grasslands of Alberta, this plant is found in a dynamic landscape mosaic habitat, where patches of open habitat appear and disappear throughout the mosaic over time. Openings are created through disturbance processes, both natural and human-caused. Openings disappear over time when vegetation cover increases through succession after disturbances.

Generally, this plant has been found in seasonally-moist upland sites and grows in alkaline, sandy soils on hillsides and in depressions[1,2]. These plants like full sun and moist to dry environments but need a certain level of moisture to germinate.

Rarity

Slender mouse-ear-cress plants are rare for a number of reasons[1]:

- They are hard to detect as they are fairly diminutive plants that grow, flower and set seed in a couple of months and then disappear,
- There are not a lot of observations of this plant,
- Where observed, there are not a lot of plants growing together,
- These plants do not have a wide distribution in Alberta,
- Habitat loss from past land uses has reduced the amount of suitable habitat for this species,
- Habitat degradation, a cumulative effect of past land use activities, has resulted in habitat loss or habitat changes due to invasive plants, and
- They are susceptible to extreme weather events resulting from climate change.

Movement Behaviour

Plants are stationary; however, they can move across the landscape through pollination and dispersal, which occurs via wind, gravity, water and on wildlife (e.g., cattle and pollinators). Given their extensive capacity for movement across the landscape in the water, on the land and in the sky, there are no known land uses or land cover types that create a complete physical barrier to movement across the landscape.

Although sedentary, movement in the landscape occurs in plant populations through pollination or seed dispersal. In general, dispersal and pollination can occur through gravity, pollinators, animals, burial, wind and water. Dispersal/pollination methods depend on the plant species, and the mechanisms for dispersal depend on the habitat as well as plant/seed physiology.

This plant exists within a landscape habitat mosaic, occupying small bare patches within it, and can disperse widely across unsuitable (stabilized or developed) habitats through multiple different mechanisms.

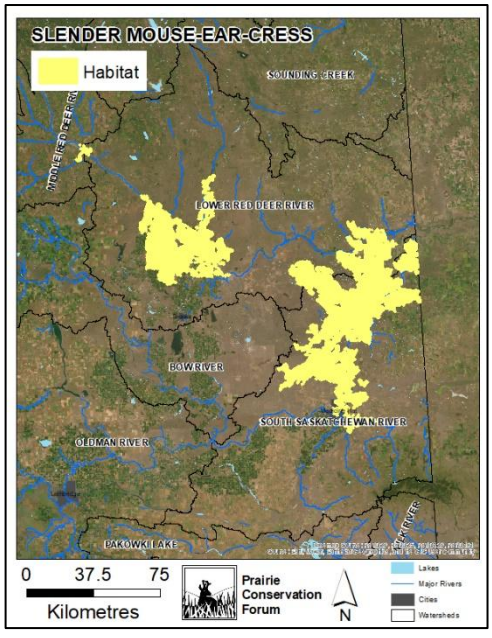
Rarity Designations

Conservation Status Rank[5]	Imperiled
***Wildlife Act* Regulations**[6]	Endangered
COSEWIC Status[7]	Threatened
Species-at-risk Act[8]	Threatened

What are Slender mouse-ear-cress habitats?

In Alberta, this plant grows in seasonally moist small-patch habitats within open, sandy grassland ecosystems. Slender mouse-ear-cress is found on level to slightly undulating grasslands, at the flat base of slopes, and on the edge of low-lying lands. Habitat patches and the larger landscape habitat mosaic consist of the following Grassland Vegetation Inventory[8] (GVI) site types: Sandy, Sand, Choppy Sandhills, Subirrigated, Overflow, and Shallow to Gravel.

To map habitats, existing observations of this plant were overlaid on GVI mapping to identify the extents of their landscape mosaic habitat polygons. Three (3) habitat polygons were mapped, and of these, two are large landscape habitat mosaic areas, and the third, a small area that represents an old observation. Habitat polygons are found in the Middle and Lower Red Deer River watersheds and the South Saskatchewan River watershed.



What does 'isolated habitat' mean?

…the degradation or loss of connections between resource patches [habitat].

~*Taylor 2022*

How do habitats become isolated?

Cumulative effects of changes in land management can cause habitat degradation resulting in stabilizing soils, thick thatch/sod, and invasive plants. Additionally, effects of climate change, such as severe weather events, has also been identified as a threat.

Are there barriers to Slender Mouse-ear-cress movement?

Given the multiple mechanisms for pollen or seed dispersal, landscape-level barriers for this plant have not been identified; however, looking at barriers to growth of a plant may provide insight into isolating conditions within the larger mosaic.

Unsuitable conditions include those that reduce the ability of the seed to receive adequate moisture and light for germination, and the plant for growth, flowering and setting seed. If these requirements are not met then that patch is no longer suitable habitat. This is often the result of natural stabilization, as well as changes in land use activities.

- To view the isolated habitat mapping for this species, check out PCF's Map Viewer
- For more specifics on PCF's Isolated Habitat initiative, check out PCF's *Isolated Habitat Website*
- Click on the superscript numbers in the text to access more knowledge

What are isolating conditions for Slender Mouse-ear-cress?

For habitat patches deemed suitable for growing, barriers to growth can occur when changes to natural ecosystem processes occur, which may result in growth of thick thatch or dense invasive plant cover. Land uses or land cover types that create isolating conditions for slender mouse-ear-cress, include[1,2]:

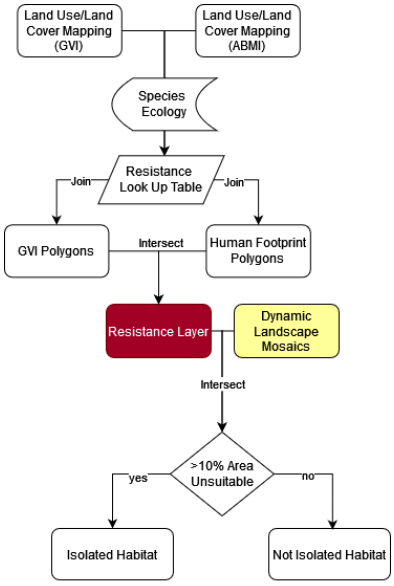
- Habitat degradation, where compatible (e.g., light to moderate grazing and recreation use) and incompatible (e.g., industrial activities, heavy grazing and recreational use in April through August) cumulatively reduce the number of suitable habitat patches in a landscape mosaic,
- Habitat loss through cultivation of crops and hayed lands, where various ongoing activities, such as tilling or applying herbicides, have resulted in loss of suitable habitat,

- Energy and infrastructure development, including oil and gas, wind turbines, and solar farms, which have small, but cumulative losses of grasslands, and which also change native plant and weed management regimes, and
- Extreme weather events, such as drought due to the effects of climate change.

How did you determine isolating conditions within the landscape habitat mosaics?

Land use activities were analyzed to determine if they might change slender mouse-ear-cress movement within a landscape habitat mosaic.

To do this, land cover mapping was used in combination with the Government of Alberta's Recovery Plan[9] threats assessment, where each land use type was assigned a resistance value, based on the severity of the threat and the area impacted.



Resistance Values (RVs) based on level of threat and total area exposed

What were the mapping results?

Of the three landscape habitat mosaics mapped in the grasslands of Alberta; one was deemed isolated (Figure 1).

Interested in SAR habitat conservation?

Species-specific habitat management activities are meant to reduce isolating conditions and re-connect isolated habitat patches for a given SAR; however, there is no one-size-fits-all approach.

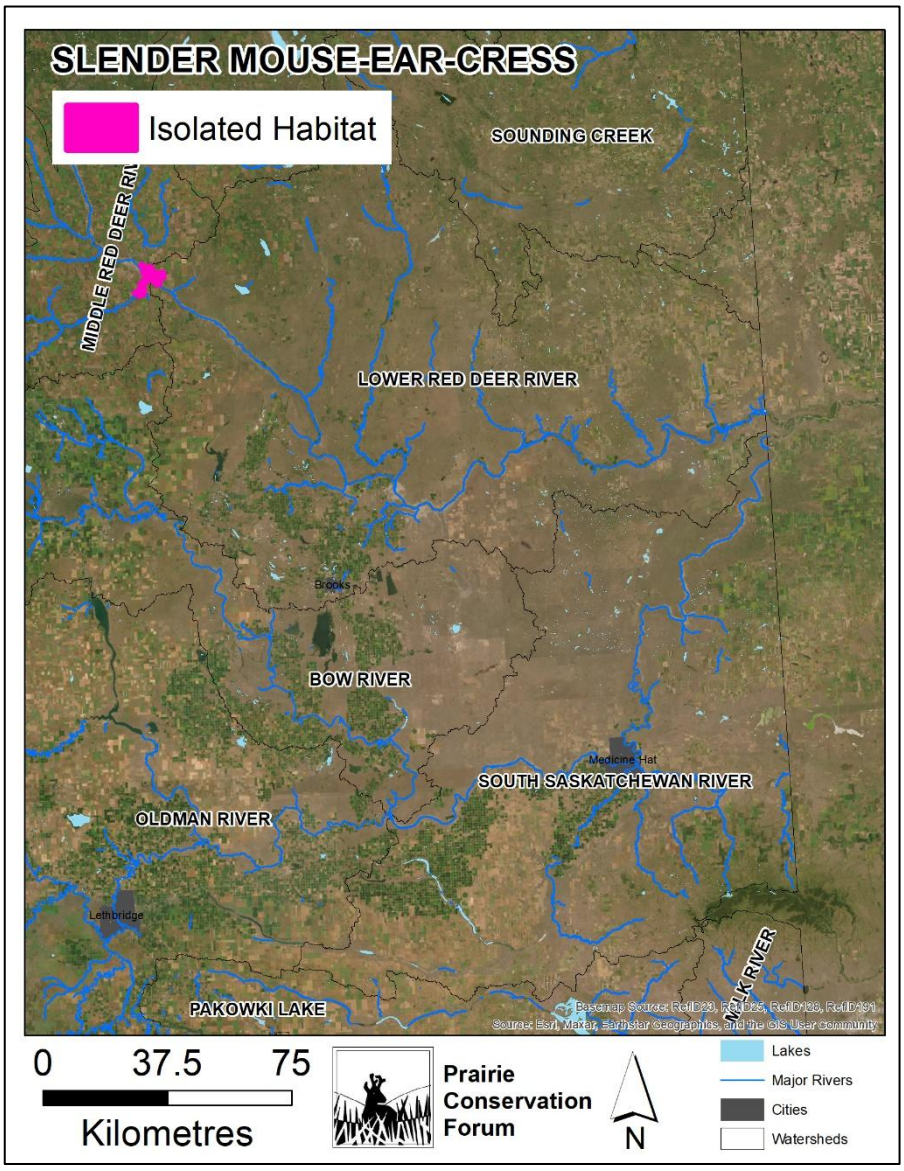


Figure 1 Slender Mouse-ear-cress Isolated Landscape Mosaic

In the grasslands, it is often the case where habitat patches of one SAR overlap habitat patches of another.

Visit PCF's *Isolated Habitat Webpage* to check out a list of member organizations that can provide specific opportunities for habitat enhancement, development, and restoration of native prairie habitats, as well as organizations that can help you to establish a legacy of SAR habitat conservation.

User Notice

Isolated habitat maps represent general areas that might benefit from SAR-specific habitat conservation efforts. PCF makes no representation or warranty, either expressed or implied, in fact or in law, with respect to the accuracy.