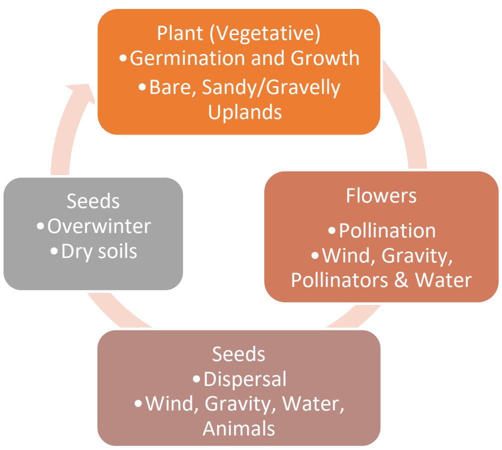
Species Ecology

Western Spiderwort (*Tradescantia occidentalis* var. *occidentalis*) is a slender, somewhat succulent perennial plant, with fleshy and slender roots that allow for greater access to water in the soil. Interestingly, this plant belongs to the spiderwort family, named for the sticky, thread-like strands that can be pulled from its stems. When these delicate threads harden, they resemble intricate cobwebs[1].



During the blooming season, which typically spans from after snow melts and temperatures warm in May through to July (and occasionally extends later), this plant has striking flowers in shades of rose, blue, or purple[1,2,3,4]. This plant produces papery capsules that are up to 7mm long that hold multiple seeds that are up to 4mm long. After flowering, the plant stalk dies back, and concentrates on reproducing vegetatively through their roots in preparation for overwintering.

Habitat Ecology

Western spiderwort is found on partially or completely bare, south-facing slopes[1]. These warm, open slopes are part of a larger sand and dune complex, where steeply-sloping sand dunes are found throughout the larger undulating sand habitat.

Within this habitat complex, called a dynamic landscape mosaic, disturbance and stabilization processes are continuous. The balance between the two processes has historically maintained enough suitable habitat patches to support the spiderwort population. This landscape feature was historically deposited through wind action on sands deposited when a glacial lake occupied the area[5].

Rarity

Western spiderwort is considered rare because it has only been found at one location in Alberta—within a large sand dune complex northeast of Pakowki Lake, and as such any alteration to the natural disturbance and stabilization dynamics could impact the availability of bare areas crucial for the plant's survival and establishment[1, 7].

Provincial Conservation Status Rank[6]	**Critically Imperiled (S1)**
Wildlife Act Regulations (Schedule 6)[7]	**Endangered (2007)**
COSEWIC Status[1]	**Threatened (2002)**
Species-at-risk Act (Schedule 1)[8]	**Threatened (2005)**

Movement Behaviour

While plants themselves do not move, they can expand within a suitable habitat patch through vegetative growth and seed germination. Additionally, plants can also "move" across the landscape via pollination or seed dispersal, which can occur via wind, gravity, water and on wildlife (e.g., cattle and pollinators)[1].

The fairly large seeds of Western spiderwort are normally not dispersed far from where they are dropped by the plant; however, seed dispersal can happen across a great distance through major surface run off or wind events[1], which can also result in burying the seeds, preventing establishment. It is not known if seeds can survive deep burial. Wildlife and livestock may also transport seeds in dirt clods or after being digested, although the effect of rumination on seeds is not known.

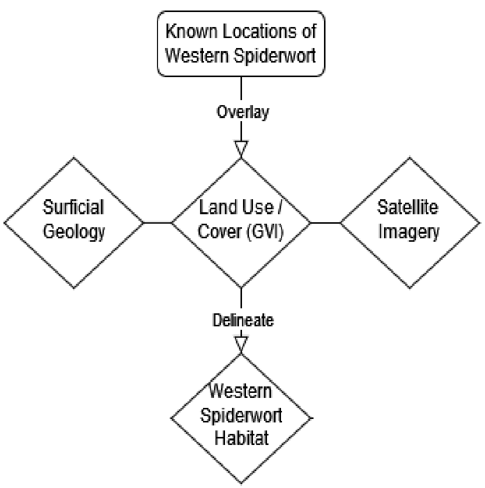
Movement corridors are areas between suitable bare habitat patches that do not pose a barrier to seed dispersal or pollination but are not considered suitable habitat for plants to grow.

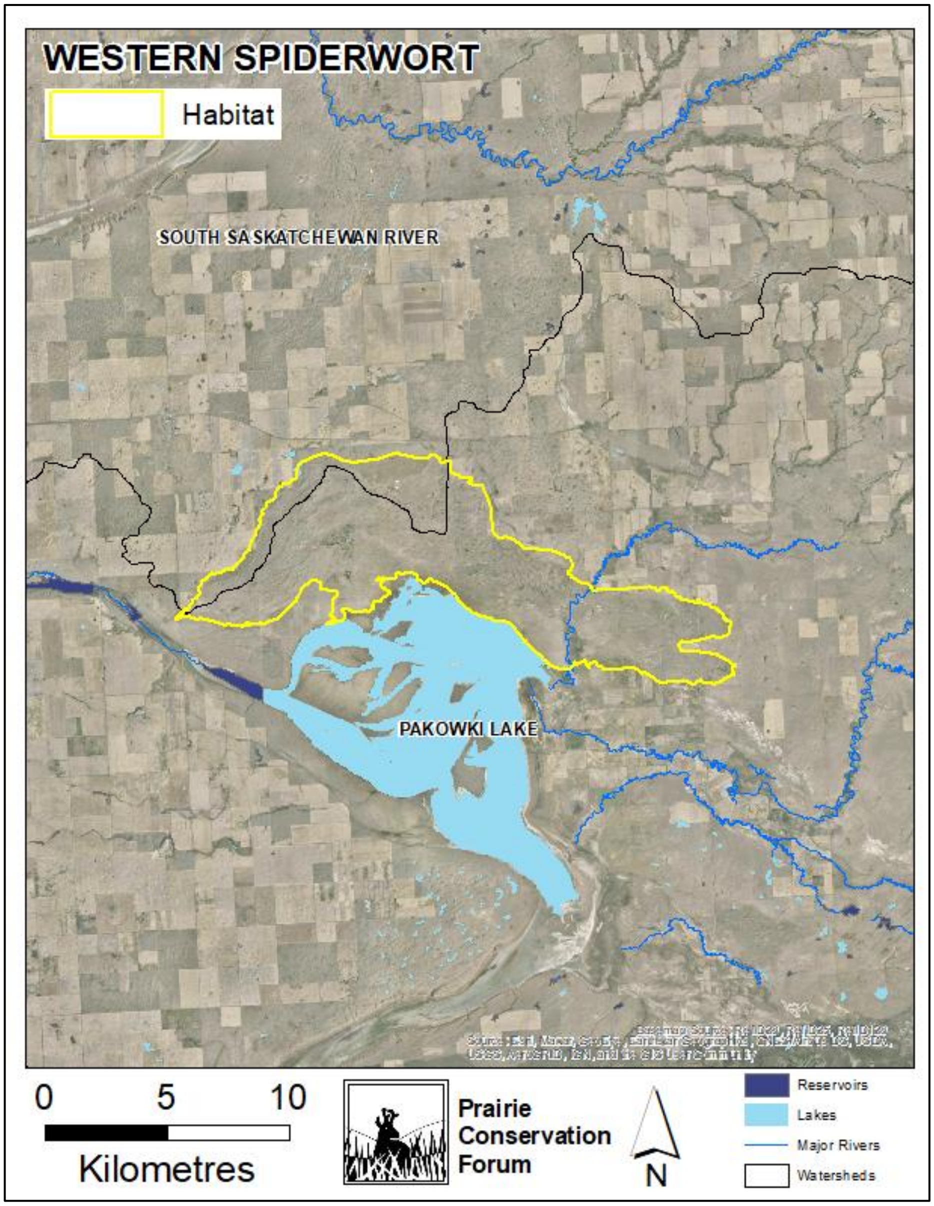
Western spiderwort exists within a single, large dynamic landscape mosaic, with the plants occupying suitable bare patches. Seed dispersal is assumed to occur throughout the entire habitat complex, given the multiple movement mechanisms – wind, water, gravity and animals.

Where is Western spiderwort's habitat?

In Alberta, Western spiderwort is exclusively found in the southeast of the province at one location, north of Pakowki Lake[2]. Its unique habitat exists within a landscape habitat mosaic characterized by a mixture of Choppy Sandhills and Sand site types[9]. The complex landscape feature extends from the northeast to the northwest of Pakowki Lake, spanning across the lake's northern edge.

The landscape habitat mosaic was mapped using known locations of the plant and overlaying them on land cover mapping from the Grassland Vegetation Inventory[9] (GVI), surficial geology mapping[10], and a recent satellite image, and manually digitizing the edge of the landscape feature.





What does 'isolated habitat' mean?

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

~Taylor 2022

How would the landscape habitat mosaic become isolated?

Within the habitat mosaic of the Western spiderwort, a dynamic interplay of disturbance and stabilization processes occurs. Any alterations to these natural dynamics could impact the availability of crucial bare areas necessary for the plant's establishment and survival.

What are barriers to this plant's movement?

While seeds from this plant can be dispersed over large distances, their long-term viability remains uncertain. Therefore, extensive gaps between suitable growing habitat patches may negatively affect seed longevity. Furthermore, established plant patches may not persist if invaded by more aggressive plant species.

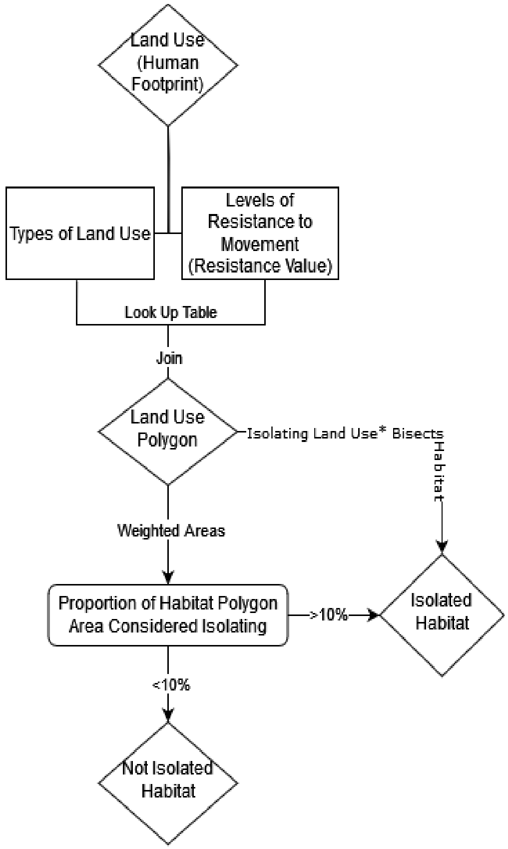
Stabilization within the habitat mosaic might be occurring at a faster-than-normal rate due to cumulative effects resulting from human activities[1] (such as introducing invasive plants), climate change effects (such as burial during high precipitation or wind events), or incompatible land management practices (such as fire suppression or prolonged heavy grazing).

How were isolating conditions for the landscape habitat determined?

To determine isolating conditions within Western spiderwort's habitat mosaic, land use activities were analyzed to determine if they might change the rate of stabilization, thus the movement of Western spiderwort seeds.

Isolating conditions in the habitat mosaic were determined as follows:

- Mapped land uses were clipped to the habitat polygon,
- Land uses within the habitat were assigned a value that represented the anticipated level of resistance to seed movement across the landscape (i.e., potential of the land use for habitat loss or stabilization),



*Isolating land uses are those with a resistance value >50

- The proportion of habitat area occupied by land uses with a high resistance value (RV) was calculated, and
- Habitats were designated as isolated if more than 10% of its area was high resistance land uses, or high resistance land uses bisect the landscape habitat mosaic.

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,

What were the isolated habitat analysis results?

With only 5% of the habitat mosaic occupied by high resistance land uses and no bisecting high resistance areas, the Western spiderwort habitat was not considered isolated.

- To view the 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

Interested in species-at-risk 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. In the grasslands, it is often the case where habitat patches of one SAR overlap habitat patches of another. In some cases, the presence of one SAR, like a Ferruginous Hawk nest, may be a barrier to another, like a Swift Fox den.

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 establish a legacy of SAR habitat conservation.