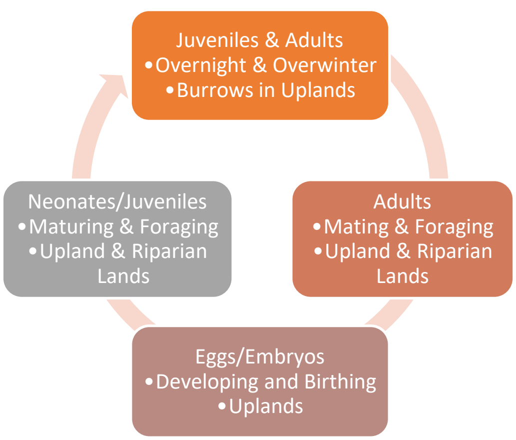
Species Ecology

The Mountain (Greater) Short-horned Lizard (*Phrynosoma hernandesi*) is a slow-moving reptile that uses air temperature to keep its body warm, and burrows in loose soils over night and over the winter[1,2,3]. Lizards live from one to five years, during which time females can have multiple litters.

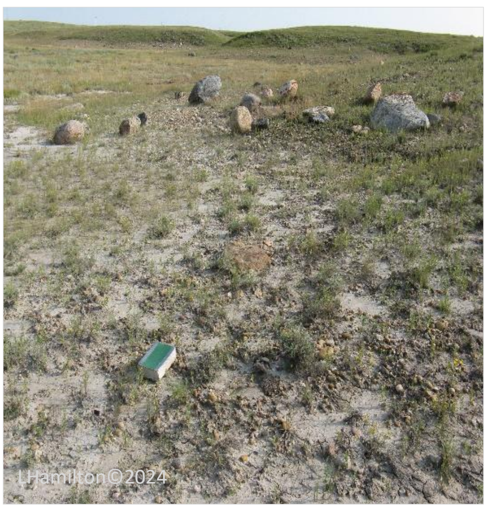
Lizards emerge from their burrows in the spring and begin foraging for ants and other insects. Lizards are mainly solitary, even when they overwinter, and females stay within a small area (territory), sometimes only moving 40m in a day or season, while males travel farther to mate. After mating, females gestate fertilized eggs, and give birth to fully-formed, small lizards, in late July and early August. These juvenile lizards, called *neonates*, are then left to fend for themselves.



Habitat Ecology

In Alberta, these lizards are found in the dry grasslands along steep, south-facing badland/coulee slopes[1,2,3].

Lizards have been observed from the top of the slopes to the bottom, preferring sandy and gravelly soils near Choppy Sandhills, Badlands and Thin Breaks site types, which characteristically have loose soils and little to no vegetation. Habitat patches are also associated with bare or lightly vegetated Subirrigated, Overflow and Shallow to Gravel site types, associated sagebrush and greasewood shrubs. When burrowing over the winter, lizards prefer locations that are lower down the slopes to minimize exposure.



Rarity Designations

Conservation Status Rank[4]	Imperiled
General Status Category[5]	At Risk
Wildlife Act Regulations[6]	Endangered
COSEWIC Status[1]	Special Concern
Species-at-risk Act[7]	Special Concern

Rarity

These lizards are rare because[1,3].

- In Alberta, they are at the northern extent of their range,
- They are difficult to detect as they are slow-moving and well-camouflaged,
- There are not a lot of lizard sightings,
- There are not a lot of lizard populations,
- Habitat loss from past land uses, and
- Habitat degradation caused by the cumulative effects of land use activities that have resulted in changes in lizard movement, accidental deaths, invasive plant cover, and extreme weather events resulting from climate change.

Movement Behaviour

These lizards live out their lives in a small area (as small as 40m to more than 1km), within which they forage, reproduce, mature and overwinter during their mostly solitary, approximately one- to five-year-long lives[1,3].

These slow-moving lizards only move during the warmest time of day, and they usually wait for their food - ants and beetles - to come to them.

Lizards live in a specific environment: steep, south-facing coulee slopes, within which they are not known to wander far, once they have found a sunny spot, except neonates/juveniles which disperse after birth, and males which wander farther to mate.

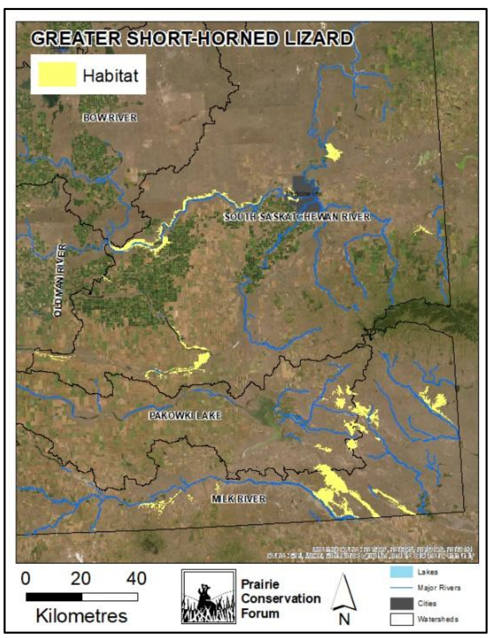
Greater Short-horned Lizard (*Phrynosoma hernandesi*)

What are Greater Short-horned Lizard habitats?

For female lizards, the small areas within which they do all of their life's activities are referred to as *territories*. Male lizards move between territories to mate, so travel farther distances within the larger home range. Little is known about how far male lizards travel in a day or during mating season, spring to summer. [1,3]

For this project, home ranges were mapped based on the Government of Alberta's Grassland Vegetation Inventory[8] (GVI) polygons, by interpreting connections between lizard ecology, observations, and GVI mapping.

Thirty (30) home ranges were mapped in Southern Alberta, in association with Badlands and Choppy Sandhills site types in the South Saskatchewan and Milk River Watersheds.



What does 'isolated habitat' mean?

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

~Taylor 2022

How do habitats become isolated?

In general, factors that create isolating conditions are associated with many types of land use activities and land cover within home ranges that prevent or deter access or movement or create a barrier to movement.

What are barriers to movement?

Barriers to movement can be associated with impassable physical barriers to movement, such as open water or major highways, or the cumulative or indirect affect of land use activities or land cover conditions that prevent or deter lizards from crossing an area (such as thick vegetation) or accessing the other side, known as isolating conditions.

What are potential barriers to Greater Short-horned Lizard movement?

Land uses or land cover that create isolating conditions for these lizards include[1]:

- Highways, which often increase accidental mortality rates such that they are significant enough to affect population size or behaviour,
- Wide rivers and canals, which are usually filled with water year-round, thus impassable and avoided,
- Development of roads, cities/towns, oil and gas infrastructure, rural residences, dugouts/reservoirs, and quarries/pits cumulatively or additively reduce the quality and quantity of habitat, as well as create physical barriers or increase in accidental death. In particular, invasive plants can proliferate, even after temporary land uses/activities, markedly reducing the bare areas,
- Hayed or heavily grazed lands, where ongoing, long-term activities can reduce insect habitats and causes accidental death from heavy equipment, particularly when irrigation spigots are used, and
- Cultivated lands, where various ongoing activities, such as tilling or applying pesticides, reduces insect habitats, and causes accidental death from heavy equipment, particularly when irrigation spigots are used.

What are isolating conditions?

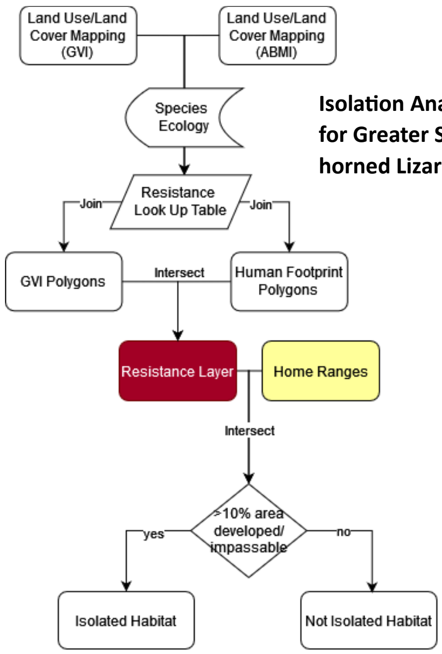
Isolating conditions are land use activities and land cover types that result in either a direct loss of habitat or degradation to the habitat, where one or more activities within the area can contribute to the introduction and proliferation of invasive plants. Changes in plants also changes insect habitat, and thick plant cover reduces the sun that can reach their bodies, and eventually becomes impassable.

How were isolating conditions for Greater Short-horned Lizard habitats determined?

Land use activities and land cover types were analyzed to determine if they might change lizard movement within a home range.

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

Isolation Analysis for Greater Short-horned Lizard



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

What were the isolated habitat mapping results?

Of the thirty (30) home ranges mapped, two (2) were considered isolated due to the higher level of potentially incompatible land use activities that cumulatively create deterrents to movement (Figure 1).

- ❖ 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

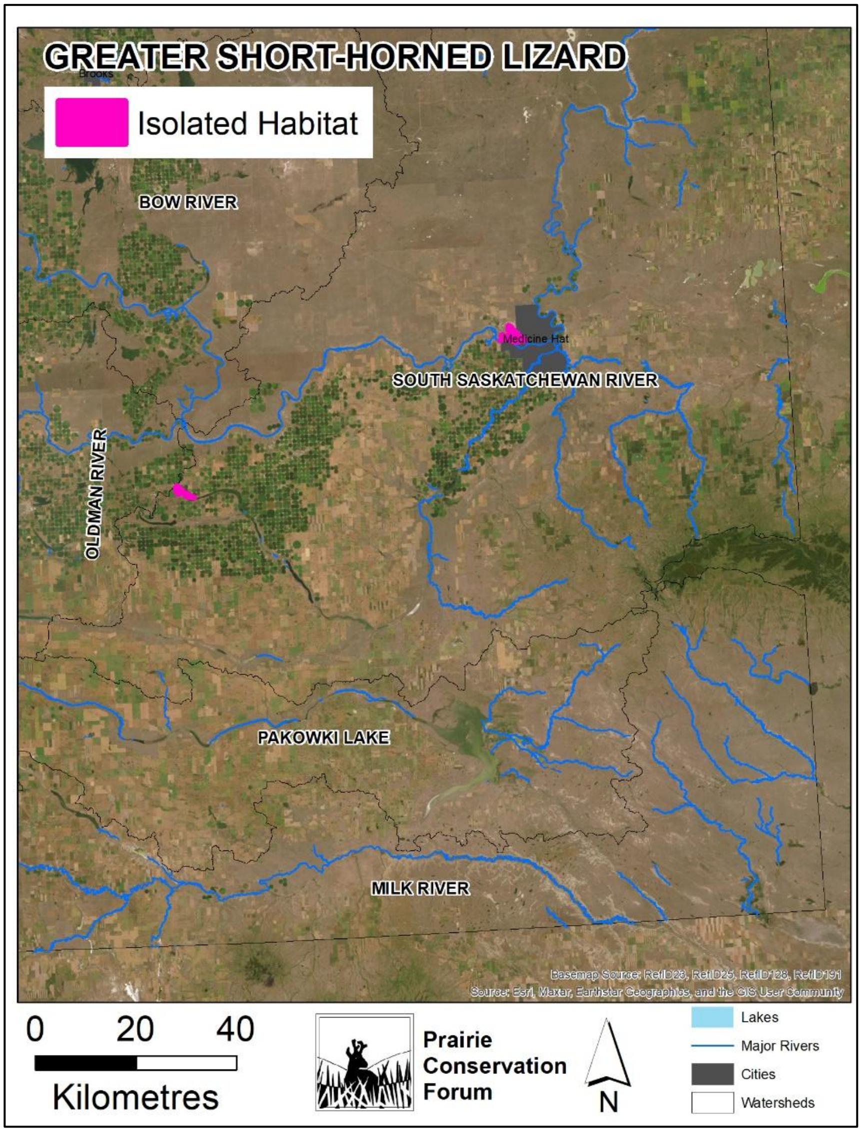


Figure 1 Greater Short-horned Lizard Isolated Home Ranges

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. 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 to establish a legacy of SAR habitat conservation.