

The Prairie Gopher

The Story of Richardson's Ground Squirrels



The bane of many land managers in the prairie region, Richardson's ground squirrels, or gophers, actually lead fascinating lives and play a critical role in maintaining the healthy functioning of the prairie ecosystem. Their most significant roles are as a major prey source for predatory species (e.g., hawks and badgers) and as excavators of underground refuges for many native species (e.g. burrowing owls). This fact sheet provides some insights into the complex lives of Richardson's Ground Squirrels.

In Canada, Richardson's ground squirrels are found throughout the mixed-grass and fescue prairies of Alberta, Saskatchewan, and Manitoba. They are native to the prairies.



Interested landowners are encouraged to contact:

OPERATION GRASSLAND COMMUNITY
or
PARKLAND STEWARDSHIP PROGRAM

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WHAT ROLE DO RICHARDSON'S GROUND SQUIRRELS PLAY IN PRAIRIE BIODIVERSITY?

- Richardson's ground squirrels are the favoured prey of many native species on the prairie. For many of the common hawk species, as well as for weasels, badgers, and coyotes, ground squirrels make up more than 80% of their diet.
- Burrowing owls nest in ground squirrel burrows that have been enlarged by animals such as badgers, so the best habitats for burrowing owls are tracts of prairie occupied by both Richardson's ground squirrels and badgers. No ground squirrels means no holes and no burrowing owls.
- Even Bumblebees, important pollinators of prairie plants, often nest in ground squirrel burrows!

People who are concerned about raptor populations or have a general interest in prairie diversity and survival of the native plant and animal species of the prairie recognize the importance of Richardson's ground squirrels in the prairie ecosystem.

PREDATORS – A NATURAL GOPHER CONTROL MECHANISM

A major cause of mortality of Richardson's ground squirrels is predation. Main predators include long-tailed weasels, badgers, hawks and falcons. These species rely on a steady supply of ground squirrels in their diets.

Long-tailed weasels Long-tailed weasels raid nests in search of infants, and weasel predation alone can reduce the juvenile population by 50% during a single season!

Badgers Although North American badgers occasionally ambush ground squirrels above ground, they specialize in digging ground squirrels out of their burrows. This method of hunting is especially effective in autumn when the ground squirrels are torpid and the ground is not yet frozen. Badgers can capture up to 50% of hibernating ground squirrels in areas of high prey density. Because of their ability to use excavation to capture hibernating ground squirrels, badgers are the only predators that hunt ground squirrels both in the summer and winter.

Hawks and Falcons During the chick-rearing period in southern Alberta, Richardson's ground squirrels account for over 80% of total prey biomass for ferruginous hawks, red-tailed hawks, and Swainson's hawks. Although hawk and falcon populations are relatively small when compared to those of ground squirrels, hawks and falcons have been estimated to kill 15% of a ground squirrel population in one season. A single pair of ferruginous hawks raising a brood of chicks is estimated to consume over 400 ground squirrels in a season!

Other Predators Other predators include bald eagles and great horned owls, both of which target adults and juveniles. Terrestrial predators such as the red fox and coyote also feed on both adult and juvenile ground squirrels. In contrast, prairie rattlesnakes primarily capture juveniles, and will often seek them out in their burrows.

GROUND SQUIRRELS AS PESTS

The two main complaints about Richardson's ground squirrels are their tunneling behaviour and their foraging behaviour:

- Mounds are unwelcome additions to farmer's fields if they become large enough to interfere with field machinery.
- In cultivated fields, ground squirrels eat the seeds and seedlings of various domesticated cereals.

Due to these behaviours, many farmers have adopted a zero-tolerance attitude towards Richardson's ground squirrels.

Given the time, costs, and effort of attempting to control ground squirrels, more information is needed on their economic impact to ensure that farmers and ranchers are spending their resources wisely if they choose to undertake control measures.

Certainly, ground squirrels can be a significant irritant to the land manager; however, given the critical importance of this species for the survival of other prairie species, control efforts are more effective when confined just to areas that require it most, leaving other areas under the natural control efforts of predators. After all, maintaining healthy predator populations means increasing success of natural control measures into the future.

Gophers and Ranching The effect of burrowing rodents such as ground squirrels and prairie dogs in a ranching economy is complex. By maintaining a diversity of grazing species, such as cattle, rodents, and other wildlife, virtually all plant species are cropped in a complementary grazing strategy that may improve range productivity in the long term. Recent research indicates only 4-7% competition between burrowing rodents and cattle, with market weight of steers unaffected.

THE BIOLOGY OF RICHARDSON'S GROUND SQUIRRELS

SOCIAL ORGANIZATION

Though they live in aggregations, Richardson's ground squirrels base their social organization on female kinship. Females form small social units with close relatives like daughters and sisters, but they are generally antagonistic towards all other squirrels.

Male Richardson's ground squirrels form no social associations with either sex. After the mating season, males restrict their movements to a smaller area, due in part to the aggressiveness of pregnant and lactating female ground squirrels.

HIBERNATION

Richardson's ground squirrels hibernate alone in a special chamber called a hibernaculum. The hibernaculum system is a closed system consisting of a hibernaculum chamber, a drain tunnel to carry away moisture, and an exit tunnel that reaches almost to the surface. In spring, the animal emerges above ground by connecting the exit tunnel to the surface.

- Adults hibernate for 7-9 months, juvenile females for 6-7 months, and juvenile males for 4-5 months.
- The only predator able to gain access to the hibernaculum is the badger.

- During winter hibernation, a ground squirrel's body temperature drops to that of the surrounding soil. By late winter, body temperature may fall as low as 0°C.

COMMUNICATION

The basic 'vocabulary' of Richardson's ground squirrels consists of a variety of squeals, chirps, chirrs, whistles, and teeth clatters. They also give two distinct alarm calls, which humans can easily learn to recognize.

- One alarm call is for aerial predators, which tend to approach rapidly in a straight line. It consists of a short, low-pitched chirp that changes frequency. Upon hearing this call, ground squirrels run for cover.
- The other alarm call is for terrestrial predators, which tend to approach relatively slowly. This one consists of a long, high-pitched whistle with a constant frequency. When this call is heard, ground squirrels stand up and scan the area.

DIET

Richardson's ground squirrels are predominantly herbivores, with vegetation composing 80-100% of their total diet. The remainder is comprised mostly of insects. Richardson's ground squirrels do not kill for food, but they sometimes nibble on easy-to-obtain meat such as road kills.

On native prairie, Richardson's ground squirrels primarily eat leaves, flowers and seeds. In cultivated areas, where little native vegetation remains, Richardson's ground squirrels will eat the seeds and seedlings of domesticated cereals such as wheat, barley and oats.

BURROW SYSTEMS

The burrow itself is a network of winding tunnels and chambers. Burrow systems can be up to 10m long and go as deep as 1m. A single burrow system has 5-7 surface exits, 2-5 grass-lined sleeping chambers, and a lavatory.

POPULATION STRUCTURE

Although the sex ratio of male and female Richardson's ground squirrels is 1:1 at birth and at weaning, males experience much higher mortality than females thereafter such that the sex ratio among adults is strongly biased toward females, often with 3 to 5 times as many females as males!

You would think this skewed sex ratio would mean that males could get as many females as they want. But, because a female Richardson's ground squirrel is in estrus for only 2-3 hours on just one afternoon a year, sexually receptive females are actually a commodity in short supply.

LITTER SIZE

- Female Richardson's ground squirrels produce a single litter each year, with litter sizes at birth from 6 to 8 young.
- Unless the litter is killed by predators such as long-tailed weasels or badgers, most mothers are able to rear all offspring to weaning age; However, over two-thirds of young ground squirrels die of natural causes before adulthood.
- At birth, infants are hairless and helpless, and weigh an average of only 6.5 grams. They are totally dependent on their mother.
- At the age of 29-30 days and weighing between 65 and 85 grams, the young first emerge from their natal burrow. They immediately begin eating solid food, soon becoming nutritionally independent of their mother.

Interesting Facts About Gophers

- Richardson's ground squirrels only come above ground during daylight hours. Their eyes are specially adapted to make the transition from the total darkness of the burrow to the bright light above ground.
- Females are only sexually receptive for a few hours on one afternoon of one day of the entire year! These few hours are the only time they tolerate the proximity of males.
- A female can only produce one litter a year.
- At no time are males dominant over females even though they are physically larger than females.
- Except for the brief time as juveniles, all male-male interactions in Richardson's ground squirrels are antagonistic, involving fights, chases and sparring.
- Longevity: Males rarely live to 2 years of age and females rarely live to 4 years of age
- Males disperse from their birth sites, whereas females stay close by with their female kin. This difference in dispersal helps to decrease incidence of inbreeding.
- Although Richardson's ground squirrels are seen in Alberta from March to October, no individual is active for this long. Adults are active from March to July, young females from May to August, and young males from May to October.
- Richardson's ground squirrels are named after Sir John Richardson, a British explorer who collected the first scientific specimens in 1820. Early settlers adopted the name "gopher", a term also used to describe several other animals.

This factsheet was adapted by permission from information on Dr. Gail R. Michener's website <<http://home.uleth.ca/~michener/frames.htm>>, and from a joint article by Dr. Michener and Dr. Joseph Schmutz (full article available on the following site): <http://www.albertapcf.ab.ca/PDF_Documents/Richardsons.pdf>

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