SUMMER 2023
VOLUME 53 | NUMBER 2

NATURE ALBERTA
MAGAZINE

A COMMUNITY CONNECTED BY A LOVE OF NATURE

Beauty in the Badlands

Fade to Black: Melanistic Mammals

Five Fascinating Facts about Squirrels

A Spider Is Watching You Read This

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About Nature Alberta
Alberta is home to incredible natural spaces comprised of beautiful and varied landscapes, and rich biodiversity reflected in our abundant and diverse flora and fauna. Across the province, natural history clubs and their members are engaging Albertans in the conservation and appreciation of this natural heritage. Nature Alberta represents a network of these natural history organizations in Alberta.

Nature Alberta acknowledges that the land we know as Alberta resides within Treaties 6, 7, and 8, as well as portions of Treaties 4 and 10, and is the ancestral and traditional territory of First Nations, Inuit, and Métis peoples. We have a responsibility to care for these lands and waters, and to honour the history and culture of those who have been here for generations.

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CITIZEN SCIENCE SPOTLIGHT

Citizen Science Spotlight: Franklin's Ground Squirrel Project

Franklin's ground squirrel was once common in central Alberta; however, it has become increasingly rare over the years. Many naturalists are noting a disappearance of the species in their historic range. The cause of decline is not known and the species is listed as "data deficient" in the province of Alberta. Leaving the squirrel in data limbo means no conservation actions are underway. To help fill the information gap, Nature Alberta initiated a citizen science project in the spring of 2022. This caught the attention of Dr. Jessica Haines at MacEwan University, who is now a contributing partner coordinating active field surveys this summer and collaborating on outreach efforts.

You may see Jessica and her undergraduate student, Cora Kaplan, surveying ground squirrels at provincial parks and other locations in the province. Please say hi and ask about their work! You can also attend Nature Alberta's **Nuts About Wildlife Family Nature Night** on August 16 at the John Janzen Nature Centre in Edmonton and participate in a 20-minute education station to learn all about squirrels!

You can help too. If you spot a Franklin's ground squirrel, please submit a photo to iNaturalist, which is easy to do with the iNaturalist smartphone app. Our goal is to gather more data on this species to help determine whether it is in decline.

To learn more and to participate in this project, visit **naturealberta.ca/ground-squirrel**

— STEPH WEIZENBACH, NATURE ALBERTA PROGRAM DIRECTOR

Top: A Franklin's ground squirrel spotted in May 2023. RICHARD SCHNEIDER

Bottom: Dr. Jessica Haines presenting the project poster at the Prairie Conservation and Endangered Species Conference.

Nature Alberta News

Birding for Nature

Nature Alberta hosted our very first peer-to-peer fundraiser in May and June 2023, called **Birding for Nature**. Participants set up fundraising pages and mobilized birding groups to raise crucial funds for Nature Alberta's important work to be a strong voice and active champion for nature in Alberta. The top two individual fundraisers won a pair of binoculars to level up their birding adventures! Thank you to all who participated in our Birding for Nature fundraiser, increasing awareness for bird conservation while sharing your passion with loved ones.

Our Program Director, Steph Weizenbach, participated in the inaugural event. "Birding for Nature gave us added purpose for my family's usual outdoor adventures. It was a group effort to reach our birding goal during our camping trip in Jasper. We excitedly yelled out new birds as we spotted them — both of my young children developed hawk eyes by the end of the weekend. They are sure to have lasting memories of Birding for Nature and it felt extra special to be doing it for a great cause!"

Volunteer for Family Nature Nights

Nature Alberta needs your help! We are looking for volunteers to assist us with running our popular Family Nature Nights in Edmonton, Red Deer, and Calgary. We have upwards of 150 people attend these events and need your help greeting families when they arrive and helping lead them around to the various activity stations. No previous experience is required. Nature Alberta will brief and train all new volunteers.

If you are passionate about nature and enjoy working with kids, this is the right fit for you! Email Kethu at **naturekids@naturealberta.ca** and say "I want to volunteer for Family Nature Nights" and she will send you more details.

Correction: Spring 2023 Front Cover Caption

A front cover caption on the Spring 2023 issue stated, "Alberta Bats Decimated by Fungal Outbreak." This was a misinterpretation of the accurate facts presented in the article. Although the fungus that causes white-nose syndrome has been detected in Alberta, widespread die-offs of Alberta bats have not yet been reported. The caption should have read, "Alberta Bats Threatened by Fungal Outbreak." We apologize for this miscommunication and any confusion it may have caused.

Family Nature Nights

Join us on select Wednesday evenings this summer. Most events are first-come-first-served registration that opens at 6 p.m., and run 6:30–8:30 p.m., with the exception of **Guardians of Nature**, which will be a "festival style" event. Enjoy an added bonus at **Nuts About Wildlife**: free admission to John Janzen Nature Centre starting at 5 p.m.

Between a Rock and a Hard Place: Conservation Trade-offs

Most conservation problems involve trade-offs between environmental protection and economic development. Getting more of one generally means getting less of the other. But there are also situations where conservation objectives are themselves in conflict. These situations are challenging for conservationists to grapple with and they sometimes lead to divisions within the conservation community.

Current efforts to recover Alberta's struggling caribou herds provide an example. The long-term solution is to

restore the integrity of caribou habitat. But this process will take decades and many herds will not last that long without additional support. The most effective short-term measure is to reduce predation losses by culling wolves, and this is now occurring across seven caribou ranges in the province. This presents a difficult conservation trade-off. Are caribou really more important than wolves? Wolves are at the top of the food chain and their removal has a trickle-down effect on the entire ecosystem. On the other hand, wolf losses from culling are temporary whereas the loss of Alberta's caribou would be permanent. Moreover, the habitat restoration measures now being implemented on behalf of caribou will benefit many other species over the long term (assuming that caribou remain on the landscape).

Another current example involves the transition from fossil fuels to renewable energy to combat climate change. If we are unable to limit the amount of warming to a relatively low level, much of northern Alberta will transition from boreal forest to grassland and parkland. In southern Alberta, high evaporation losses during summer will lead to water bodies drying out. Consequently, aggressive action on climate change is a conservation priority. However, as Lorne Fitch describes in this issue (page 22), the development of wind and solar power has negative effects of its own. For example, solar installations remove native prairie habitat and windmills kill birds and bats. Here we have another difficult conservation trade-off.

These sorts of problems are complex and need to be approached holistically. In the case of caribou recovery, there is much more at stake than the plight of caribou and wolves. Entire ecosystems are affected by the recovery measures. So the real question is: what actions provide the most good for the most species?

There is also the temporal dimension to consider. For example, the Alberta Utility Commission's recent decision to deny plans for a large solar complex near Frank Lake, south of Calgary, is a win for local bird life. But if the transition to renewable energy stalls, Frank Lake itself will dry up as the climate warms in coming decades, resulting in a much greater loss for local wildlife.

The point is, there is more to conservation than the kneejerk rejection of unpalatable activities. We need to identify workable solutions that account for all dimensions of an issue, and this requires planning at the regional scale. Rather than the current open frontier approach to renewable energy projects, and subsequent site-by-site approval battles, we need regional guidelines that direct projects where they will do the least harm.

In the case of caribou, we already have a decent provincial range plan. The problem is the lack of political will to follow through on implementation. The upshot is that conflicting conservation objectives are usually not, in and of themselves, the root problem. Rather, it is the lack of appropriate planning and subsequent implementation that leaves us scrambling to choose between "least worst" options for dealing with intractable crises. ■

A male three-toed woodpecker. In this species as well as black-backed woodpeckers, males have a yellow patch on the top of the head, instead of the red patch seen in other Alberta woodpeckers. TONY LEPRIEUR

Alberta's "Other" Woodpeckers

BY NICK CARTER

Alberta is rich in woodpeckers, from common backyard visitors like the little downy woodpecker to the crow-sized pileated woodpecker with its flaming crest and manic voice. But there are a couple of interesting species that often get overlooked. Walking through an old coniferous forest in Alberta, you might notice their calling cards: patches of outer bark missing from older spruce trees, exposing the pale inner layer underneath. This is a telltale sign of the presence of American three-toed and black-backed woodpeckers.

Three-toed and black-backed woodpeckers are members of the *Picoides* genus, a group of northern woodpeckers that also includes the Eurasian three-toed woodpecker. A defining feature of this group is that they only have three toes on each foot. Most tree-dwelling birds have four toes, and the inner toe, called the hallux, is reversed, enabling them to grasp onto branches. In most woodpeckers, the outer toe is also reversed,

A female three-toed woodpecker feeding a juvenile in the nest. The messy white barring down the back of this bird differentiates it from a black-backed woodpecker.
RICHARD SCHNEIDER

A male black-backed woodpecker. The solid black coloration of the back distinguishes this species from the three-toed woodpecker.
TONY LEPRIEUR

improving their ability to cling to tree trunks. But with *Picoides* woodpeckers, the hallux was lost some time in their evolution, leaving them with just three toes. This may allow for more flexibility on tree trunks while foraging, but no one is quite sure.

At first glance, both of these relatively uncommon species could be mistaken for the more cosmopolitan hairy woodpecker, which is roughly the same size. The hairy woodpecker was once classified as a *Picoides* species too; however, we now know that hairy and downy woodpeckers aren't all that closely related to the three-toed and black-backed species, or to each other for that matter.[1]

Three-toed and black-backed woodpeckers are mostly black and white but can be differentiated from hairy and downy woodpeckers by the presence of black barring on the white flanks, narrower white facial stripes, and the absence of white spots on the secondary wing coverts. Males of both species have a yellow crown instead of a red patch on the head. You might expect that the absence of a toe would be another good field marker, but it is only noticeable close up.

Three-toed and black-backed woodpeckers can be tricky to tell apart for novice birders, but black-backed woodpeckers lack a prominent white eye stripe and, no surprise, have a solid black back. The three-toed woodpecker, meanwhile, has messy white barring — also known as laddering — down the back that

sometimes coalesces into a skunk-like stripe, depending on the region. Both produce sharp, staccato "pips" and trills typical of other woodpeckers. They also drum on trees in the spring in a recognizable pattern that begins rapidly before trailing off at the end. At 23–26 cm long, the black-backed woodpecker is slightly larger than the three-toed woodpecker (20–25 cm).[2]

As might be expected, these woodpeckers excavate tree cavities for nesting. Clutch size is typically six or seven eggs. Incubation time in three-toed woodpeckers is about two weeks, while black-backed woodpeckers can be nearly double that.[3]

Three-toed and black-backed woodpeckers can be found in forested areas across Alberta. They favour mature mixed and coniferous woodland with plenty of old dead and dying trees. This is where their preferred food items, such as wood-boring beetle larvae and hibernating adults in winter, are plentiful. They also frequent recently burned forests. Both species are relatively uncommon and irruptive, appearing more frequently in some years than others. Neither species migrates, though I find them easier to see in winter, when the hubbub of migratory forest birds has died down and the woodpeckers need to work extra hard to get enough to eat.

The signs these woodpeckers leave behind are often easier to find than the birds themselves. Unlike many other woodpeckers, which drill straight into the tree with their beaks to find their insect prey, *Picoides* woodpeckers chip and chisel the outer bark at a sideways angle, flicking it off to expose the layer beneath. Following the dull tapping sound of a foraging American three-toed or black-backed can lead you right to the bird. These woodpeckers often become so focused on what they're doing that they take no notice of people below, allowing for a nice, close-up look. A lucky birder finding themselves directly underneath a foraging *Picoides* woodpecker can wind up with their hair full of wood chips that rain down as the oblivious bird goes about its business.

The reliance of *Picoides* woodpeckers on mature and burned forests is another reason why conserving our old-growth woodlands and informed use of forest fires are so important. In return, they help to keep pine beetle populations in check and create nesting spaces for other species. These tough yet unobtrusive woodpeckers are hardy northern survivors and deserve the respect of all Albertans. ■

A male black-backed woodpecker. If you look closely, you can see that each foot has just three toes. NICK CARTER

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3. The Cornell Lab of Ornithology. https://www.allaboutbirds.org/guide/Black-backed_Woodpecker/lifehistory.

Nick Carter is a writer, photographer, and naturalist from Edmonton. From birds and bugs to flowers and fossils, Nick is always seeking out the natural wonders of this province and sharing his enthusiasm with others.

Bad But Beautiful

BY LORNA ALLEN

The Lakota people called them "mako sica," or "bad lands." French trappers and traders had the same opinion and called them "les mauvaises terres à traverser" — "bad lands to cross." Since then, the term "badlands" has stuck. Unusual landforms, extreme temperatures, and a lack of water are typical of the areas where they are found, and contribute to the "badness" of this rugged landscape. However, these marvellously bleak landscapes are beautiful to my eye.

What Makes Badlands Bad?

Badlands are typically found in deep, broad valleys that were cut by tremendous flows of meltwater as the glaciers of the last Ice Age retreated. Today, erosion continues at an astonishing rate — at least astonishing in geologic terms. For example, the badlands in the Red Deer River valley, which are up to 200 metres deep, have been measured to erode between 1–2 cm per year. The result is a shifting, complex pattern of hills, cliffs, and gullies formed through the interplay of water, wind, and bedrock layers.

Badlands form in areas where the bedrock is composed of horizontal layers of sandstones, siltstones, shales, and clays. These layers are technically "rock" but soft enough to easily erode. Different kinds of layers erode at different rates, and this contributes to the creation of characteristic badlands features. For example, if a hard "caprock" lies on top of softer bedrock, the softer layer may erode away under the caprock and voila — a hoodoo.

Sixty-five million years ago or more, erupting volcanoes spewed large amounts of ash that formed thick layers. The ash transformed over the years to become thick layers of bentonitic clays. These layers of clay are often exposed and eroded in Alberta's badlands, forming what is commonly called "gumbo." It is soft and porous and has the unusual characteristic of swelling up to eight times its size when wet. Then, when it dries it creates an extensively cracked surface. But beware! Although the crust may look dry, there could be a slick layer under the crust waiting to slip under an unwary footstep.

This innocent-looking crusty surface of bentonite may be hiding a slippery layer beneath. LORNA ALLEN

Top of page: The extensive badlands of Dinosaur Provincial Park are made of highly eroded mudstones and sandstones, deposited long ago when the local environment was much wetter than today. LORNA ALLEN

Water flows are also important in creating badlands features. Spots that channel water eventually erode into gullies and valleys, providing a variety of habitats from exposed slopes to protected corners. If rain sinks into softer rocks and then hits an impervious layer, it creates a seep above it. In the dry environment of badlands, these spots of moisture become little gardens. As a result, there are many surprising finds in the nooks and crannies of this seemingly lifeless terrain.

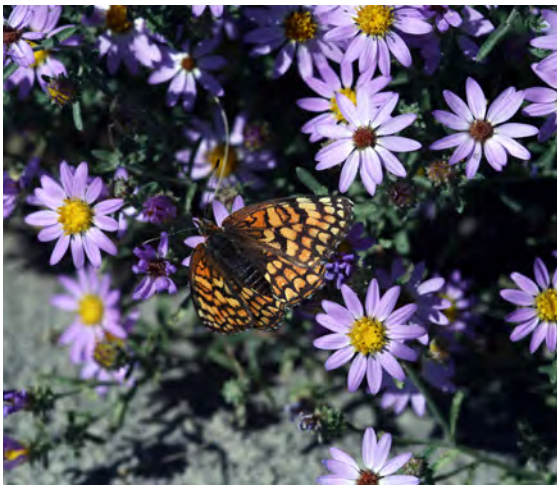
Red Deer River Badlands

Alberta has over 1,300 km^2 of badlands; some are localized patches and some are large, impressive expanses. Most of Alberta's badlands are linked together along the Red Deer River valley, sometimes extending into the steep-sided coulees that branch off the main valley into the prairie. Extensive areas of badlands can be found between Drumheller and Dry Island Buffalo Jump Provincial Park and in Dinosaur Provincial Park. The badlands at Dinosaur Park extend well back from the river and are considered the largest and most spectacular area of badlands in Canada.

The Red Deer River badlands are world-renowned for their fossils, but there is much else of interest as well. Despite this seemingly barren landscape and difficult growing surface, look closely and you might find a few uncommon to rare annuals like Suckley's saltbush (*Atriplex suckleyi)*. These plants sprout, bloom, set seed, and die in a very short time. This is one of a number of strategies that plants have developed to survive in a harsh, hot, low-water environment: flower early while there is still soil moisture from the spring melt, set seed, and complete your life cycle before things get too dry. Also look here for the tufted evening-primrose (*Oenothera caespitosa*), sometimes called the gumbo primrose. Its thick, woody root helps it hang onto the eroding slopes. One or two blooms open at dusk. White at first, they turn pink and begin to wither by the next day, avoiding the drying daytime sun.

May through June is probably the best time to visit these badlands. In some years, the spring blooms can be quite showy. This is the time to look for the purple flowers of tufted milkvetch (*Astragalus spatulatus*) and the white flowers of plains milkvetch (*Astragalus gilviflorus*). Both grow in cushions, low to ground — a strategy to conserve water by limiting overall exposure to drying wind and sun. Hoary-aster (*Dieteria canescens*) is showy, and another plant with a cushion-like growth pattern. This species often plays host to the sagebrush checkerspot butterfly (*Chlosyne acastus*), whose caterpillar feeds on badland plants like hoary-aster.

On some of the driest and most exposed sites, you might find the brilliant blue blooms of waxleaf beardtongue (*Penstemon nitidus*). Taking a closer look, you can see that the beardtongue has another of the classic adaptations of dry-land plants: thick leaves with a



Top: The fragrant blooms of the tufted evening-primrose open at dusk. White at first, they turn pink by the next day as they begin to wither. LORNA ALLEN

Middle: Hoary-aster forms showy tufts that attract the sagebrush checkerspot butterfly. LORNA ALLEN

Bottom: Waxleaf beardtongue has brilliant blue blooms and thick, grey-coloured leaves with a waxy coating. LORNA ALLEN

The badlands in Writing-on-Stone Provincial Park feature large sandstone cliffs, quite different from the badlands of Dinosaur Provincial Park. RICHARD SCHNEIDER

Colorado rubber-plant is a tough little herb often found where nothing else grows. LORNA ALLEN

Scarlet mallow can form extensive patches of brilliant orange. RICHARD SCHNEIDER

waxy coating to reduce evaporation. Plains prickly pear (*Opuntia polyacantha*) is common on the ridges and dry exposed slopes. It too has a waxy coating to reduce water loss, but has gone extreme — the leaves are essentially gone, modified to thorns, and replaced by thickened stems that both store water and carry out the food-producing business of photosynthesis. Although by July the badlands can be dry and crunchy from the summer heat, the hardy prickly pear can be found blooming mid-June into July. Even its lemon-yellow flowers have a waxy coating to prevent water loss.

Look for other splashes of colour. The yellow of Colorado rubber-plant (*Hymenoxys richardsonii*) can be found where nothing else grows. Scarlet mallow (*Sphaeralcea coccinea*) is an easy one to recognize — it can form extensive patches of orange, an unusual colour in this environment. Many a dry-environment plant, like longleaf wormwood (*Artemisia longifolia*), is grey. The light colour helps reflect sunlight and the narrow leaves are less prone to water loss than wide leaves. Looking closely, you can see that the leaves are covered with hairs, which help block the sun and deflect drying winds.

Milk River Badlands

Now let's move south to the badlands along the Milk River, where the landscape is quite different from the Red Deer River badlands. Here we find massive sandstone structures, often carved into large hoodoos, as well as clay flats and narrow ravines with great cliffs. Chemical weathering in the rock provides nooks and crannies and holes for roosts,

Above: The eroded cliffs of badlands are riddled with nooks and crannies, providing shelter for great horned owls and other animals. LORNA ALLEN

Below: A hoodoo forms when a hard stone, such as ironstone, provides a protective cap for softer stone beneath, affecting the erosion process. RICHARD SCHNEIDER

burrows, or nests for creatures ranging from bees to great horned owls. There is so much to see in these badlands! The cliffs also provide the canvas for some of the most significant rock art in the North American Plains in a sacred area, central to the Blackfoot people.

Wandering the maze of hoodoos at Writing-on-Stone Provincial Park, you will find little patches of flowers. Caprocks are erosion-resistant and give a relatively stable platform for small "gardens" perched atop a hoodoo. Splashes of colour are provided by yellow umbrella-plant (*Eriogonum flavum*) and Laxmann's milkvetch (*Astragalus laxmannii*). Finding the uncommon blazing star (*Mentzelia decapetala*) is always a treat. A biennial herb with a prickly rosette of leaves the first year, in year two the blooming stem can get almost a metre tall with beautiful, large, lily-like flowers. Then it sets seed and dies. This plant only needs to hang onto the slope for the two-year life cycle, so it can be found on dry, eroded slopes and banks.

There are so many rare species hidden around the hoodoos, it's like a treasure hunt. If you look, you should have no trouble finding cock's-comb cryptantha (*Oreocarya glomerata*). This is certainly the best place to spot spiny milkvetch (*Astragalus kentrophyta*), another of the cushion plants, this one rare in Canada. Other rare species that might take a little more searching to locate include: nodding umbrella-plant (*Eriogonum cernuum*), narrowleaf four-o'clock (*Mirabilis linearis*), purple three-awn (*Aristida purpurea*), and green milkweed (*Asclepias viridiflora*).

Kleskun Hill

Let's end our brief tour of Alberta's badlands with Kleskun Hill. Found east of Grande Prairie, these badlands are by far the most northerly. While they are composed of different bedrock, they have a similar look to the Red Deer River badlands. There are even fossils here, including a lizard fossil first found in this area and named after it: *Kleskunsaurus grandeprairiensis*. (How cool is that?) These badlands are not as extensive as the others, but they are home to some of the classic badlands species. Perhaps most surprisingly, there are patches of blooming cactus this far north. This time,

though, rather than the plains prickly pear, it is the brittle prickly pear (*Opuntia fragilis*). A brief review of distributions shows the population along the Peace River slopes to be the most northerly cactus — anywhere.

Badlands, with their unusual landforms and species that are often uncommon, if not rare, are truly wonderful locations to enjoy and cherish. Not so "bad" after all — just bring lots of water and avoid the gumbo when it rains. ■

Left: Caprocks erode slowly, providing time for small wildflower gardens to grow, such as this one with yellow umbrella-plant and purple Laxmann's milkvetch. LORNA ALLEN

Right: Brittle prickly pear is a cactus species found surprisingly far north, including in the Kleskun Hill badlands near Grande Prairie. MARGOT HERVIEUX

Lorna Allen is a retired biologist. She worked in Alberta's protected areas for more than 35 years, including working as the Coordinator for Alberta's Conservation Data Centre. Since retiring, Lorna has co-written, with Linda Kershaw, the *Vascular Flora of Alberta: An Illustrated Guide* (2020) and is currently working with Linda on a companion volume to the illustrated guide.

YOUR SHOT Images of Alberta's Natural Heritage

PATIENCE

"A successful heron's hunting style — standing still, waiting, observing, and then striking when the time is right — is similar to a successful photographer's style. I found this black-crowned night heron in an Edmonton ravine. I returned several times to find it in a good location and then waited for the light, hoping the heron wouldn't move in the meantime."

—Bob Bowhay

BISON AT DAWN

"This photo of two plains bison was taken near Torrington, with the sun rising into the dawn. The bison were actually at a considerable distance from me. Using a 600-mm lens with an extender to bring them into closer view had the bonus effect of enlarging the sun to an enormous size, creating a striking silhouette."

—Leo de Groot

Your Shot celebrates the amazing work of Alberta photographers and the special places and species they encounter. Photos are selected from submissions to the Nature Alberta image library, which we draw on to create the magazine and other outreach materials. If you have a special photo you would like to contribute to the image library, and possibly have published in the magazine, please send it as an email attachment, at full resolution, to **images@naturealberta.ca**. Photos of all native species and natural landscapes within Alberta are welcome.

The cat-faced orbweaver (*Araneus gemmoides*) is a native species, commonly found in urban areas. This species is normally seen building their orb webs in backyards, window frames, and fences.
JUDY GALLAGHER

Spiders:
The Misunderstood Jewels of Alberta's Biodiversity

BY JAIME PINZON

Our relationship with animals that use venom, either to hunt or to avoid being eaten, is quite complex. After all, self-preservation is rooted in our very core! Thus, venomous animals provoke strong reactions of fear in many people, and spiders are perhaps near the top of the most dreaded list. Even if you are not a full-blown arachnophobe, you may not feel comfortable with the thought of sharing space with them. (Spoiler alert: very likely a spider is watching you read this!)

With a little bit of positive experience and a better understanding about their fascinating lives, many can overcome their fear of spiders. I have witnessed terrified students of mine turn into spider-loving individuals after just a few weeks of being exposed to them while conducting field work. While I do not expect this article to turn you into an arachnophile, I do hope it will help you to tolerate them, and perhaps even appreciate them.

Spider Diversity

Spiders have populated the Earth since the mid-Devonian Period, 380 million years ago, long before the dinosaurs came on the scene. Their general body plan — a fused head and thorax with four pairs of legs, an abdomen with silk-spinning organs near the end, no wings, and no antennae — hasn't changed much over the eons. In fact, there is a group of spiders still crawling around in the forests of southeast Asia today that retain ancestral characters, including a segmented abdomen with spinning organs in the middle. They look pretty much like those from the Devonian Period and are considered living fossils.

Spiders are a highly diverse group, with over 50,000 species described so far and more than 1,400 species in the fossil record. Alberta has its own fossil spider named *Orchestina albertensis*. This 1-mm-long, late Cretaceous spider was described from a specimen preserved in a piece of amber found close to the hamlet of Grassy Lake.

Except for Antarctica, spiders can be found in every terrestrial ecosystem on Earth, from deep caves to near the top of Mount Everest (a jumping spider has been found thriving at 6,700 m). Our local spider fauna is very well adapted to Alberta's long, cold winters. While many spiders overwinter as eggs within a protective egg sac, other species remain active under the snowpack all winter thanks to antifreeze compounds in their "blood." Next time you are snowshoeing on a warm and sunny winter day, keep your eyes open and you may see spiders crawling on the snow!

Spiders are also found in aquatic environments. One species, the diving bell spider, lives almost entirely submerged underwater inside a bell-shaped web. The spider fills this web with air trapped by hairs on its body when it comes to the surface. The diving bell spider is not found in Alberta, but we do have a very diverse community of spiders associated with wetland areas. Two species, the striped fishing spider and the six-spotted fishing spider, are common inhabitants of ponds, bogs, and fens. Although they do not live underwater like the diving bell spider, females carrying egg sacs can spend long periods of time below the surface, either to regulate the temperature of their precious cargo or to protect it from predators.

Natural History

Most spiders are exclusively carnivorous and prey primarily on invertebrates (mostly insects and other arachnids). Some species occasionally prey on small vertebrates as well, including mammals, frogs, birds, snakes, and fish. Though it is not commonly known, some spiders supplement their carnivorous diet with nectar, sap, and pollen.

Spiders have evolved to subsist entirely on a liquid diet. When they capture their prey, spiders regurgitate enzymes over and inside it, turning it into a nutritious, partly digested soup that is sucked in by a powerful stomach pump. Many species, such as the shamrock orbweaver, grind and masticate their prey, whereas others, such as the goldenrod crab spider, liquefy the insides, leaving behind an empty husk. (Anybody hungry?)

Spiders are perhaps the most abundant predators in terrestrial ecosystems, playing a very important role in regulating populations of other bugs (and also serving as prey for many other species). Estimates suggest a density of 130–150 spiders per square metre in natural habitats, which works out to a weight of 25 million metric tonnes globally and a prey kill of 400–800 million tonnes per year.[1] That is a lot of mosquitoes and other bugs! Although these are estimated values, they bring a heavy truth. If spiders ceased to exist, the ecological, environmental, and social consequences would be devastating, as populations of many insects would explode, including those that feed on our crops and those that can affect our health.

Venom

Most spiders produce venom to kill or paralyze their prey, though there are a few species that lack venom glands. This does not mean that all spiders are dangerous to humans. Most spiders are too small for their fangs to be able to puncture and penetrate human skin. Moreover, among the several thousands of species described to date, only a

The goldenrod crab spider (*Misumena vatia*) is one of the most commonly observed species along trails, fields, and flowerbeds. They are normally found sitting on flowers waiting for flies, bees, and other pollinators. LUC VIATOUR

The zebra jumping spider (*Salticus scenicus*) is an introduced species observed mostly in urban areas of Alberta. Many spiders are able to capture prey larger than themselves. ADAM OPIOLA

The six-spotted fishing spider (*Dolomedes triton*) is perhaps the largest species found across Alberta. It is restricted to freshwater bodies that contain lots of vegetation. They mostly prey on aquatic invertebrates; however, they have also been observed feeding on tadpoles and small minnows.
JAIME PINZON

The taiga sheetweb weaver (*Pityohyphates subarcticus*) is one of the larger species within the sheetweaver group and their sheet webs are quite common in shrubby vegetation along trails.
J. ROBERTIA

handful possess venom potent enough to harm humans. These comprise a couple dozen or so species of medical importance, including black widow spiders, recluse spiders, Australian funnel-web spiders, and armed spiders of Central and South America.

Only one potentially dangerous species, the western black widow, is found in Alberta, usually in dry prairie habitats. If you happen to encounter a western black widow, the likelihood of an unpleasant interaction is small, as these are shy spiders that prefer to flee and rarely bite. If they do bite, they normally will save their costly venom for things they can actually feed on, not you! However, if you suspect a western black widow bite, it is best to seek medical attention, particularly for children and elders. Another notable species of concern is the brown recluse spider. Although it is found in North America, there are no established populations in Alberta and it has not been reported in the province.

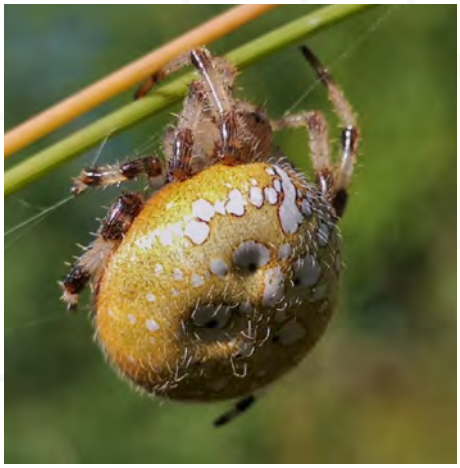
Spiders are often blamed for the mysterious "bites" we all get on occasion. But unless you actually see the eight-legged culprit biting you, it's probably from something else. In most cases, these marks are either from a bloodsucking insect or from bacterial or fungal skin infections, among other non-spider origins. But don't get me wrong — I am not trying to minimize spider bites. They do happen and can be painful, in some cases equivalent to a bee or wasp sting.

Local Spiders

Alberta is home to 628 species of spiders, representing almost half of those recorded in Canada (over 1,400 species).[2] That's more than the number of bird species we have in the province. This number is destined to grow as we continue to improve our species inventories. For example, a couple dozen more species were added from my research in poorly studied Alberta wetlands.

Despite this great diversity, you are unlikely to encounter more than a small fraction of these species because many of them are either too small (less than 5 mm), have cryptic behaviours, or live in remote habitats. The spiders you are likely to encounter include wolf spiders, jumping spiders, crab spiders, orb weaving spiders, and funnel weaving spiders. These and other groups can be identified using a free, user-friendly resource produced by one of my students.[3] These spiders are not single species, but rather groups of species. For instance, there are 47 different species of wolf spiders in Alberta, some of which are commonly observed in open areas, such as fields, forest cutblocks, and yards. The same goes for jumping spiders (40 species), crab spiders (63 species), orb weavers (45 species), and funnel weavers (6 species). If you are one of the thousands of iNaturalist users, you can have a look at the 8,000-plus observations of about 160 spider species commonly seen in Alberta and elsewhere in Canada.

At the top of Alberta's spider diversity list are the spiders in the Linyphiidae family, which includes the sheetweaver and dwarf spiders. There are 251 reported species in this group and at least 30 more from my research. These are often very small spiders, many of which live on the ground, within grass blades or in the forest leaf litter. Some of the larger species in this group are common inhabitants of the shrub layer and include frequently observed species such as the filmy dome sheetweaver, the doily sheetweaver, and the northern hammock sheetweaver.



Above left: Shamrock orbweavers (*Araneus trifolium*) build large orb webs and are commonly seen in open areas; they have been observed in forested areas as well. They are relatively hard to find, as they usually spend the daytime hiding in a rolled leaf at the edge of their webs. JAIME PINZON

Above right: The barn funnel weaver (*Tegenaria domestica*) is an introduced species commonly found in basements and dark areas of human dwellings. MAGNE FLATEN

While the vast majority of Alberta's spider species are native to the province, 12 are exotic species that have been able to establish breeding populations.[2] Of these, the zebra jumping spider and the barn funnel weaver spider are perhaps the most commonly encountered, particularly in urban areas. Not long ago, we reported the presence of an apparent recent introduction of the harvestman cellar spider in Canada, with Albertan records (north of Acheson) corresponding to the most northern observations of this species in North America. (Despite the common name of this species, note that harvestmen are not spiders but a related group of arachnids, Opiliones).

From a conservation point of view, the status of about 270 native species in Alberta is secure or apparently secure; however, there are four imperiled species (one of which is believed to be endemic to Canada) and five that are vulnerable. Important knowledge gaps exist for the remaining species; their conservation status is currently unknown (that is more than half of the species).[2]

Although spiders are perhaps not as charismatic to most people as caribou, peregrine falcons, wood frogs, or other iconic species, they contribute to the fragile equilibrium of many ecosystems in our province and across the globe. They deserve their share of this planet as much as every other organism. Spiders may not be your favourite creature, but next time you run into one, think twice before squishing it. ■

Spiders often build elaborate webs to capture their prey. Two common types of spider webs are the funnel web (top) and the orb web (bottom). XVAZQUEZ, RICHARD SCHNEIDER

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Jaime Pinzon is an arachnologist from Colombia who moved to Canada to study spider responses following forest harvesting as part of his PhD at the University of Alberta. He is currently with the Canadian Forest Service in Edmonton, where much of his research focuses on spider ecology and overall biodiversity responses to natural and human disturbances, with particular interest in the context of forest management and land restoration.

FADE TO BLACK: MELANISM IN MAMMALS

BY RICHARD SCHNEIDER

Many years ago, while on my way to the Snaring River campground in Jasper, I spotted a black German shepherd walking through a clearing at some distance from the road. The possibility that it was a wolf crossed my mind, but I quickly discounted it because wolves are not jet black. I did wonder, though, what this dog was doing wandering around by itself in the wilderness. Only later did I learn that black wolves do in fact exist, and Jasper has many of them. Mystery solved.

It turns out that black colouration, referred to as melanism, occurs in almost all mammals. This is no surprise when it comes to black bears and skunks. But there are also reports of black Richardson's ground squirrels, red foxes, white-tailed deer, bobcats, and even snowshoe hares. And of course, wolves. The processes underlying these variations in colouration are quite interesting.

The Mechanics of Colouration

Compared to many other animals, mammalian coat colours are rather drab. It is no coincidence that mammals also have poor colour vision (except for primates). Why bother with the elaborate colouration of a scarlet macaw when you cannot differentiate many of the colours?

It's not that mammals failed to evolve complex colour vision. Our reptilian ancestors actually had the ability to distinguish between four wavelengths of light (one more than humans). What happened is that some of the machinery for colour vision was lost during the earliest stages of mammalian evolution. These early mammals were largely nocturnal and needed excellent night vision rather than excellent colour vision. As far as we know, primates are the only type of mammal that has been able to regain the ability to see three wavelengths of light. Other mammals can only distinguish two wavelengths, similar to colour blind humans.

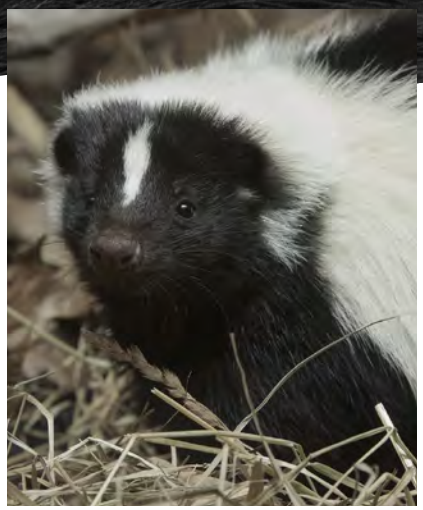
Though the range of coat colours in mammals is fairly limited, there is still plenty of variability among species. Some species are black (black bears), some are white (polar bears), some are both (skunks), and most of the rest are various shades of tan to brown. There is also variability in coat patterns, including stripes (zebras), spots (bobcats), solid colour (moose), and various mixtures of these patterns.

In mammals, one main pigment called melanin is responsible for the entire range of observed coat colours.[1] This pigment comes in two distinct forms: eumelanin, which is responsible for dark brown or black colours, and pheomelanin, which forms yellow or reddish colours. It is the amount, composition, and arrangement of these pigment granules that produce the final result.

Although mammals have just one pigment to work with (in two forms), complex genetic machinery guides the expression of this pigment in skin and hair. Studies have determined that more than 100 genes are involved, providing plenty of scope for creative tinkering. The wide range of coat colours and patterns we observe today are the result of small genetic mutations in the pigmentation system that arose in different species after they diverged from a common ancestor.

Below: Melanism is a normal trait in several species, such as the striped skunk. The black and white striping of skunks illustrates the high level of control over colouration that mammals are capable of. CLYDE NISHIMURA

Right: Black wolves are not uncommon in some forested landscapes, including Jasper National Park, but they are rare on the open northern tundra. ANGELL WILLIAMS



Natural Selection at Work

Of course, there is more to the story of mammalian colouration than the random accumulation of genetic mutations within different species. Genetic mutations provide the building blocks of variability, but the genetic makeup of an organism is ultimately controlled by natural selection. This raises the question: what is it about an animal's environment or way of life that favours one form of colouration over another?

One of the key drivers of coat colour is avoiding predation. The objective is to blend into your surroundings as much as possible. Research on the rock pocket mouse from the southwest United States reveals the hand of natural selection very clearly. Populations of this mouse that live where the local stones are predominately granite are a light sandy colour, whereas populations that live on basalt lava flows are dark to nearly black.[2]

Similar selection pressures exist for predators who need to get close to their prey without being seen. For example, consider a white Arctic fox sneaking up on its prey during winter, and then changing to more earthy tones during the summer to be less conspicuous.

The opposite approach — advertising your presence instead of hiding it — can also be of value in some cases. For example, skunks rely mainly on their powerful offensive spray for defence. Predators quickly learn to associate the striking black and white colouration of skunks with bad news and stay clear.

In many animals, particularly birds, colouration also plays an important role in communication among individuals, especially when it comes to mate selection (think peacocks). But this does not seem to be a significant factor in mammals, except for primates. Researchers believe the red skin patches and faces of many primate species may signal status among individuals. Again, it is no coincidence that this feature is found in the one group of mammals that is able to see the colour red well.

Many other questions about mammalian colouration remain unanswered. For example, black bears and grizzly bears live in similar environments and share similar lifestyles, yet one is black and one is brown. Perhaps colour is not particularly important in determining fitness in these two species. Indeed, the

Primates can distinguish the colour red well, whereas most other mammals cannot. This is likely why red patches are used for signaling in some primates, like this baboon, but not in other mammals.

Black Richardson's ground squirrels arise from spontaneous mutations but generally do not persist in a population because they experience high rates of predation. This individual was part of a black-coated family group found southeast of Calgary. TONY LEPRIEUR

coats of both species come in a variety of shades. And yet, dominant colour patterns do exist, particularly at the regional scale. Why is this? The age-old question of why zebras have stripes also still lacks a convincing answer.

Black Wolves and Gophers

Having explored the hows and whys of colouration in mammals, we are now ready to address the issue that motivated this article. Why are there black wolves (and other mammals)? The short answer is that the affected individuals have acquired a mutation of one or more genes controlling the pigmentation system. The basic components of the system haven't changed, just the rules governing how they are used — like a car factory switching over from making Corollas to Camrys.

Researchers have determined that there is more than one point in the pigmentation system where a mutation can result in melanism. In many cases, such a mutation occurs spontaneously in a random individual, and so it appears to pop up in a population out of nowhere. This is the most likely explanation for the black Richardson's ground squirrels recently observed in southern Alberta.

In other cases, the altered gene may enter a population through hybrid mating. It turns out this is what happened with our black wolves. The genetic change responsible for black fur in wolves originated in dogs, which then mated with wolves in the distant past.[3] The same mutation is responsible for black coat colour in coyotes.

The black squirrels seen throughout Calgary are actually eastern gray squirrels with a melanistic mutation. Black squirrels seem to be able to persist in urban environments but not in rural areas. JOE PAUL

The black squirrels found throughout Calgary also have convoluted history. These are eastern gray squirrels that acquired the mutation for melanism through hybrid mating with fox squirrels in the eastern United States. Fox squirrels are not normally black either, but this is where the mutation for melanism initially arose.[4] The remaining question is: how did these eastern squirrels end up in Calgary, where they are not native? In this case, human intervention was the cause. Several melanistic gray squirrels were imported in the 1920s by Tom Baines, the first curator of the Calgary Zoo, and they later made their way into the city at large.

More Natural Selection

Again, the story is not complete without considering the role of natural selection. Just because a mutation for melanism arises does not mean it will be retained. Black Richardson's ground squirrels, snowshoe hares, and mice stand out like a sore thumb in their native environments. Odds are they will be eaten before they can successfully reproduce and spread their melanistic genes through the population. For this reason, while melanism may pop up sporadically in these species through random mutations, it usually does not persist for long.

Like wolves, red foxes are sometimes seen with a predominately black coat. But also like wolves, this seems to be mostly in forested landscapes. This one was photographed in northern B.C. Black foxes are rare on the prairies. RICK PRICE

In other cases, black fur can provide an advantage. Going back to our eastern gray squirrel example, researchers have found that melanism is common in many urban areas, especially in colder regions, whereas rural squirrels tend to retain their normal gray colouration.[5] Clearly, the selective pressures are acting differently in these two environments, though the exact processes remain uncertain. It may be that predation pressure is less within urban areas, so cryptic colouring is less important. It's also believed that the thermal benefit from having a black coat during cold winters may be a benefit of melanism, at least where predation is not high.

Snowshoe hares completely change colour from winter to summer, again illustrating the high level of control over colouration that is possible. This individual is in an intermediate stage of colour change.

Melanism may provide a benefit to wolves, though only in some areas. Researchers have observed that dark-coloured wolves are extremely rare in the tundra and other open habitats, but increase in frequency in a southwest direction toward forested areas.[3] The mechanisms are unclear but are likely to involve concealment in some way.

In summary, melanism provides us with another window into the amazing complexity of wild creatures and their relationship with the environment. It also vividly demonstrates that evolution is not something restricted to paleontology textbooks. It is a vital, ongoing process that continually shapes the natural world. You might bear this in mind the next time you're traveling through Jasper and spot a black wolf, or something else out of the ordinary. ■

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Richard Schneider is a conservation biologist who has worked on species at risk and land-use planning in Alberta for the past 30 years. A new digital version of his book, *Biodiversity Conservation in Canada: From Theory to Practice*, is now available from the University of Alberta library, at no cost to the public. Richard currently serves as the Executive Director of Nature Alberta.

Does Going Green Put Wildlife in the Red?

BY LORNE FITCH

Somewhere there must exist a great ecological ledger, administered by Bob Cratchit-like accountants who toll up the pluses and minuses of our fumbling human endeavours. One critical entry relates to the need to reduce our greenhouse gas emissions to prevent the world from overheating. There is no question we need to transition from fossil fuels to alternate energy sources.

Climate change, the big shift in our world, is a global risk to wildlife and their habitats. Increasing heat is a key factor in declines of the once common bumble bee, one of our essential plant pollinators. Reduced and warmer stream flows impact native trout. It's hard to find a species in Alberta not affected by climate change. But we shouldn't be blind to the issues renewable energy solutions can cause to wildlife and their habitats. When one considers habitat issues, wildlife mortality, and embedded energy costs for infrastructure, I'm not sure we should call these solutions "green."

The Dark Side of Solar and Wind

Solar and wind developments are undergoing an exponential expansion, a literal energy gold rush, due to the urgency of the climate crisis and government subsidies designed to hasten the rollout of solutions. As befits a relatively new industry, assessing the ecological effects of renewable energy developments is beset by data deficiencies, lack of long-term monitoring, inadequate baselines, differing infrastructure types, and variable geographic and landscape differences. All of this confounds simple answers and solutions.

Both solar and wind facilities have footprints and operations that affect wildlife in a variety of ways. There are direct and indirect effects as well as cumulative effects, given that these facilities do not exist in isolation from other land uses.

Wind turbine power generation near Pincher Creek.

It is well established that wind turbines kill bats and birds through collisions with vanes.[1] In addition, mortality can sometimes occur through barotrauma, a huge pressure differential that causes internal haemorrhaging. The majority of deaths occur during migration and initially the concern was over birds, especially raptors and songbirds. However, as Jason Unruh, the provincial wildlife biologist who reviews renewable energy projects, says: "What was once a bird issue has become a bat issue."

Bat populations are hard to estimate — many species are migratory, all are nocturnal, and most are solitary. Nevertheless, precipitous declines in most populations have been noted. Most biologists agree that impacts from wind turbines are a serious concern at the population level. This may have significant ecological implications because bats perform vital roles in pest control and pollination, essential to ecosystem function as well as our economy. If you think mosquitoes are a summer plague now, imagine a world of bug bites without bats.

Less information is available on direct wildlife mortality from solar facilities, not because it doesn't occur, but because little research and monitoring has been undertaken with such a new development. There is a theory that solar panels apparently can resemble bodies of water (a lake effect) and lure birds like grebes and loons to their deaths. There is no post-construction monitoring or peer-reviewed evidence for this. An emerging issue is that, in prairie landscapes, human infrastructure, including solar installations, may provide elevated perches for owls and other predators, thereby altering natural predator-prey relationships.

Renewable energy projects also have indirect effects on wildlife. A recent study of the effects of wind turbines on whooping crane migration showed migratory habitat is reduced by wind energy development.[2] For most migrating birds, rest stops and feeding areas serve as important stepping stones. Researchers found that whooping cranes avoided wind turbines to a distance of five kilometres. This effectively reduced habitats essential for migration, making some potential stopover areas unusable.

A study of the effects of solar developments on antelope in Wyoming found direct habitat losses of summer and winter ranges. Impervious fencing altered both seasonal and annual migration patterns and fragmented habitats. Joel Nicholson, the senior wildlife biologist in Alberta's grasslands, points out there are biological issues associated with movement barriers, including extra energy costs that can increase antelope mortality in winter situations.

Species are already faced with significant cumulative challenges, including continued habitat losses, powerline and window collisions, illegal shooting, movement barriers, and other mortality factors. Those with small and declining populations may not be able to tolerate additional risk from wind and solar developments.

What Can Be Done

There are no "silver bullet" solutions, but one obvious step is to avoid placing infrastructure in high-risk areas. While this sounds simple, there are complexities that make this very difficult to implement. To assess risk there needs to be sufficient baseline information on basic biological questions of wildlife presence, numbers, distribution, movement patterns, and timing of movement. We also need to determine how wildlife species interact with different types of renewable energy infrastructure.

None of this can be accomplished effectively in the narrow development time frames of an industry in a rush. Areas of risk to wildlife are often identified after a development has occurred and significant mortality is observed. This is management by rear-view mirror; we develop insights from post-development monitoring and then apply them to new proposals elsewhere.

As an example of the complexity of the problem, one only needs to consider bats. Migratory bats (hoary, silver-haired, and eastern red) take the biggest hit from wind infrastructure, making up 90 per cent of bat mortality. Most of the deaths happen during the fall migration in August and September but, as bat researchers point out, "understanding of bat migratory behaviour is extremely limited." Most of what we know about migratory pathways is gleaned from deaths at existing wind towers.[1] An equivalent would be trying to assess wildlife populations by way of the extent of roadkill on highways.

Dr. Robert Barclay, an expert in bat research from University of Calgary, and several of his colleagues have investigated ways of potentially reducing mortality. For bats, understanding the temporal and spatial windows through which they fly can provide insight for mitigation strategies. As wind towers become taller, the vanes reach into the airspace used by bats. Consequently, minimizing tower height can reduce mortality. Recognizing that bats are nocturnal, undergo seasonal movements, and fly at low wind speeds gives operators the opportunity to curtail turbine use at night, at certain times of the year, and at times when winds are light.

Other wildlife mitigative strategies include ensuring unrestricted travel avenues exist, considering both physical access and avoidance behavior related to noise and human

Solar and wind plants are undergoing an exponential expansion in Alberta.

activity. Also, greater scrutiny is required of the changes in habitat conditions that arise from renewable infrastructure and associated roads and transmission lines. Siting these facilities on non-native landscapes and brownfields, and avoiding important connected wildlife habitat, would mitigate some of the negative effects.

Because of a lack of monitoring and research on management practices, mitigation efforts currently have variable success rates and are very much site specific. It remains unclear what the best strategies are. As the renewable energy footprint expands, the need to better understand, manage, and mitigate is clearly evident.

Looking Forward

The intended scale of some solar facilities will be of concern from a wildlife perspective. Plans for solar "farms" of 5,000, 9,000 and even 16,000 acres of enclosed, wildlife-impermeable fenced space will reduce habitat availability and pose serious movement issues for virtually all wildlife species larger than ground squirrels and mice. There could be the unintended consequence of losing more native grassland. Renewable energy companies, who tout themselves as "green," need to show they are willing to forgo some economic opportunity in favour of obtaining social license for their developments by minimizing wildlife impacts.

Before things get completely out of control, as was the case with past oil and gas development, it would be useful to undertake regional-scale cumulative effects assessments, which could help define the siting requirements and also set appropriate limits on development. Government has a role to guide development through a combination of carrots and sticks. A first step might be to encourage the development of solar facilities in urban areas, with panels arrayed on the roofs of houses and office, retail, factory, warehouse, and government buildings.

As a biologist I worry about the effects of climate change on wildlife. I'm also concerned about how our technological solutions involve trade-offs with no clear picture in sight for the persistence of wildlife. In the shift to renewable energy to limit greenhouse gas emissions, we risk running over wildlife, converting wildlife populations to red ink in the ecological accounts, as we attempt to keep up with our high energy demands.

Yes, we need these low-carbon energy developments to combat climate change, but we have to be smart about facility development. There inevitably will be trade-offs between energy development, land availability and suitability, human constraints, and conservation goals. There will be conflicts resulting in winners and losers. In a perfect system, human and environmental constraints would limit locations to where renewables are compatible. But if designs and development criteria don't incorporate steps to limit, minimize, or mitigate negative effects, wildlife will lose. ■

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Five Things I Learned from Squirrels

BY JESSICA HAINES

I'm a wildlife biologist with a passion for squirrels. I'm currently working on Franklin's ground squirrels in collaboration with Nature Alberta (check out the Winter 2023 edition of *Nature Alberta Magazine* for more info on that project). But before that, I spent several years working on red squirrels with the Kluane Red Squirrel Project based in the Yukon. Living and working in such a beautiful, remote place was thrilling, but what surprised me was how much I fell in love with red squirrels. They taught me a lot, and I would like to share with you some of the things I've learned.

1 Squirrels are Tough

Red squirrels aren't very big, they don't store fat like ground squirrels, and they don't have fluffy fur like many northern mammals. Nevertheless, they thrive under the harshest winter conditions without hibernating. I found this remarkable, given that some days I wore so many layers to stay warm I had to waddle around to do my field work. Red squirrels survive through the depths of winter by being very smart about their activity. On the coldest days they spend most of their time napping in nests, also called dreys, to stay warm. On warmer days they are out and about again, scampering through the trees.

Even more impressive is that red squirrels can have their pups in the winter! Pups are born blind and naked, and their mother keeps them warm and safe in the nest for several weeks until they grow fur and open their eyes. At that point, they start to climb the nest tree and explore the world on their own. The females care for the pups on their own, as males have no role in rearing the pups. I love to look for squirrel nests in winter, when they stand out on the bare branches of trees. But red squirrels will

Far left: Red squirrels do not hibernate and on warm winter days you are likely to see them out and about.

Above: Red squirrel nests, called dreys, are made of twigs, leaves, and grass. JESSICA HAINES

Left: Baby squirrels, called pups, are born in late winter. This one was temporarily removed from the nest as part of population monitoring in Kluane, Yukon. JESSICA HAINES

move their pups if they think a predator has found their nest (and inquisitive humans qualify), so please only observe from a distance.

2 Squirrels Take Care of Their Family

Red squirrels are very territorial and they do not hesitate to chase invaders off their territory. Even pups are chased off once it is late summer, as this is the time for them to begin living on their own. Interestingly, though, not all red squirrel mothers do this. Some will give up their territories to one of their pups; this is called bequeathal. The mother then moves on to a new territory, often close to their original territory. The result is that some patches of forest are actually full of related females who live near each other. Such fascinating insights were possible because we tracked squirrels for generations.

Red squirrels have other ways to take care of their families besides bequeathal. They have also been known to adopt relatives! This is rare, but it can happen when a female that lives near her own mother or sister dies. One of these relatives may take in a pup from the squirrel who has died and raise it with their own litter. We've also found adult squirrels sharing nests in the winter when it's very cold. We think it's a strategy that neighbouring relatives may use to get through the coldest days of the year. This is common in more social species, but unusual in red squirrels since they're usually so territorial.

3 Squirrels Hoard Food

One reason squirrels defend their territory so vigorously is to protect their food supply. Red squirrels create caches, called middens, where they store their food in underground tunnels. In the Yukon, their main food is white spruce cones. When stored underground, these cones stay cool, like in a fridge, and this keeps the cones closed. If left above ground, these cones would warm up and open, releasing and dispersing the seeds the squirrels want to eat. In Alberta, these middens can include hazelnuts and cones from other conifer trees. Red squirrels will also dry out mushrooms by harvesting them and hanging them in trees.

Through my research, I found that males and females have distinctly different middens. Males store more food than females, caching piles and piles of cones. I also found that males with more food in their middens fathered more offspring than other males. We believe this is because males have their highest energy demands during late winter, when stored food is all that is available.

Red squirrels store food for the winter in mounds called middens. These can become quite large over time. JESSICA HAINES

Red squirrels have a scramble competition mating system, which means that males have to cover a lot of ground to mate with as many females as possible during the mating season. Studies on squirrel metabolism have shown that this is as energetically demanding as lactation is for females. So, just like peacocks use flashy tails to attract females and bull moose use antlers to fight other males, male red squirrels use the food stored in their cache as fuel for their mating behaviour in the dead of winter.

The linkage between cone storage and reproductive success was not as evident in females. Although females can have their pups in winter when it's quite cold, studies have shown that their peak in energy demand actually occurs during spring, when pups are large and still nursing. This usually happens around the time when spring growth provides the squirrels with fresh foods to eat. Consequently, females are less reliant on stored food than males.

4 Squirrels Plan for (and Predict!) the Future

The trees that red squirrels depend on are masting species: they have years of low cone production followed by a year of very high cone production (called a mast year). It's thought that this is a strategy to protect their cones from cone predators like squirrels. It is referred to

as the predator satiation hypothesis. In mast years, trees produce so many cones that cone predators can't possibly consume or cache all of them, so many cones (and the seeds they contain) escape predation and can grow into seedlings. I have experienced a few mast years, both in Alberta and in the Yukon, and it's an incredible sight to see the tops of trees completely covered with cones.

Trees begin growing their cones in spring, but it takes until late summer for the cones to mature. This is when red squirrels target them for harvesting. You may have seen this behaviour; I have had people tell me about red squirrels throwing cones at them. In reality, the red squirrels are simply harvesting cones. First, they detach the cones and throw them to the ground one at a time. If it seems like it's raining cones in the fall, look up and there's probably a squirrel above you. Then they switch to caching. They'll collect all the cones they harvested, one by one, and store them in their midden.

In mast years, red squirrels get a chance to cache lots of cones in their midden, but this isn't the only way they react to these bumper crops. Red squirrels also respond by breeding multiple times in the season. Their offspring have a better chance of surviving and finding a place to live in a fall with abundant food. The thing is, squirrels breed before the trees produce their cones. How are they able to predict future food availability? We don't know for sure; however, one hypothesis is that by eating buds from the trees they are able to detect a plant hormone associated with masting. We have more to learn about these smart little mammals!

In addition to cones, red squirrels eat berries and mushrooms, as well as bird eggs, baby birds, and small mammals — including, occasionally, other squirrels.
TONY LEPRIEUR

5 Squirrels Aren't Herbivores

Most people know that red squirrels eat spruce cones, and indeed, cones are a big part of their diet. But did you know that red squirrels are actually omnivores? They will eat bird eggs and chicks, and they'll even kill and eat baby snowshoe hares. They are also excellent at scavenging. We would sometimes find animal bones or pieces of dead animals cached in trees above squirrel middens. I found it a bit disconcerting when working in an isolated field site to look up to see a red squirrel staring at me as it chewed on a bone.

Red squirrels have even been observed to engage in infanticide and cannibalism. When I was doing field work in 2014, I witnessed a male in a conflict with a female, which resulted in him killing one of her babies in front of me. My hands shook as I held my binoculars, observing these interactions. On the one hand, it was interesting to observe a behaviour we had never seen before, but on the other it was shocking to actually witness it. Infanticide has only been documented in mast years since females will breed multiple times in those years. This gives a male a second chance at fatherhood if he manages to kill a female's offspring and cause her to breed again. The male who I observed committing infanticide went on to sire all of the offspring that female produced in her next litter. Although reproduction is the main motivation of this behaviour, males did also sometimes cannibalize the babies killed by infanticide, adding yet another shocking item to the list of foods we know squirrels will eat.

In Conclusion: Squirrels Are Fascinating

I didn't start out with ambitions to become a squirrel expert. To be honest, I was more drawn to the idea of working in an isolated field camp in the Yukon than the idea of working with red squirrels. But once I started working with them, they quickly won me over with their personality and tenacity in the harsh environments they live in. They are a fascinating species with complex lives. If you would like to continue learning more about squirrels, you can contribute to the citizen science project on Franklin's ground squirrels. Visit **naturealberta.ca/citizen-science** for more information. ■

Dr. Jessica Haines is a wildlife biologist and an assistant professor at MacEwan University. She is currently working on Franklin's ground squirrels in collaboration with Nature Alberta. In her spare time, she loves to get outside to explore Alberta with her two Labrador retrievers.

Collaborating for Protection

Conservation Easements and the Waldron Ranch Grazing Co-operative

BY FORREST HISEY AND JONAH OLSEN

The Eastern Slopes of the Rockies have been home to countless generations of Indigenous Peoples and settlers who have benefitted from the landscape. Watching sunshine glint off those peaks calls to mind Aldo Leopold's "Thinking Like a Mountain" metaphor, where mountains serve as an ecological lens across the centuries.

With much of southern Alberta now privately owned and used for agriculture, ecosystems are visibly impacted by a network of cultivated fields, roads, fences, and other barriers. The lack of ecological protections for private land in Canada creates a precarious reality for biodiversity.

Landowners have the right to use their land according to personal motivations, and most need to earn a living from it. Fortunately, many ranchers and farmers consider land stewardship to be important; and some consider it a priority. Such concerned landowners may take bold measures, safeguarding their property's economic and ecological sustainability through collaborations with conservation organizations.

Top of page: The western part of the Waldron Ranch is in the Montane Natural Subregion, featuring rolling hills with interspersed forests and open grasslands. RICHARD SCHNEIDER

The Waldron Ranch has established a conservation easement in collaboration with the Nature Conservancy of Canada, protecting over 120 km^2 of intact grassland habitat. FORREST HISEY

The Waldron Ranch Grazing Co-operative is a prime example. The Ranch has entered a partnership with the Nature Conservancy of Canada to protect over 120 km^2 north of Pincher Creek using a conservation easement. Using the Waldron Ranch as a case study, we can gain insight into landowner motivations and the practical application of conservation easements.

Conservation Easements

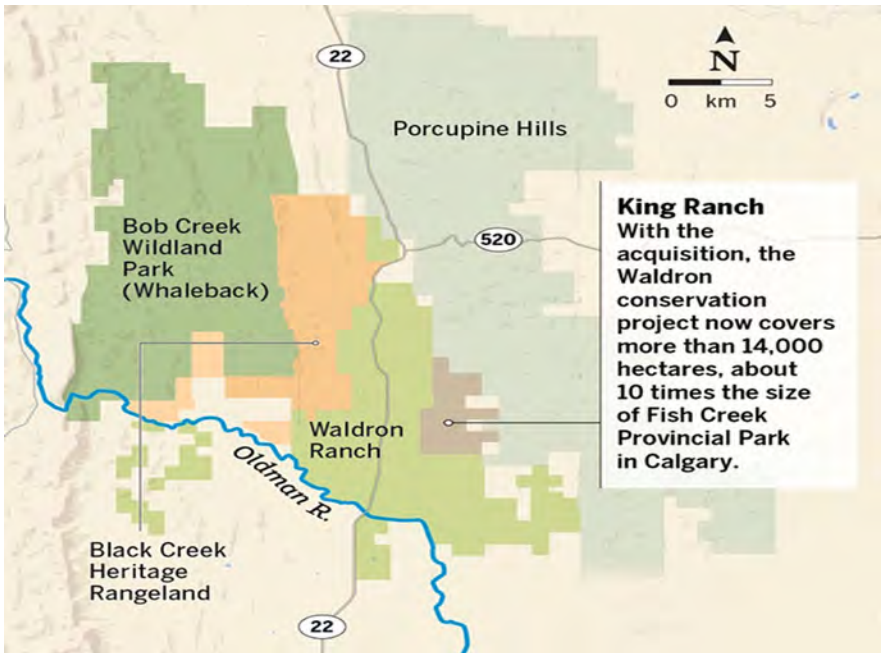
Conservation methods need to be tailored to fit the local form of land ownership. On public lands, biodiversity conservation can be advanced through government rules and policies. But the government has limited ability to dictate what happens on private land. Therefore, biodiversity protection on private land is usually pursued through voluntary measures, and one of the most important tools is conservation easements.

Conservation easements are voluntary legal agreements between private land-

owners and conservation organizations that entail the sale of specified property rights to the conservation organization. The terms are negotiated between the parties and can take many forms. Restrictions can include limiting development, limiting clearcutting, or permitting public access. These are unique to each property, with restrictions based on landowner needs such as cattle grazing, sustainable timber harvesting, or infrastructure maintenance. The agreements typically run in perpetuity, but in some cases may be for a specified period of time. A key point is that the agreement is tied to the land itself. This transforms easements from a contractual right to a property right that future owners must also abide by.

Conservation easements became popular in Canada in the 1990s, when most provinces and territories passed legislation enhancing private land conservation. For example, in 1995, Alberta's Environmental Protection and Enhancement Act was amended to include easements as a tool for private land conservation, paving the way for their stewardship and care. Easements were incentivized in the late 1990s by changes to tax laws and the creation of the federal Ecogift program, through easements are registered and provide tax relief and recognition of stewardship.

Golden eagles and other raptors are drawn to the grasslands of the Waldron Ranch because of the abundance of small mammals. RICHARD SCHNEIDER



The Waldron Ranch is located in southern Alberta, just north of Pincher Creek. NATURE CONSERVANCY OF CANADA

Motivations

Conservation is facilitated by a diverse web of individuals and groups who must weigh economic realities against altruistic goals. Motives and values are essential to property decisions regarding biodiversity conservation. Intrinsic motivations relate to personal satisfaction. These connect management decisions to values and ethics, often focusing on individual and community impacts. Some landowners care deeply about being attached to a place, the local environment, and the culture that develops there. Extrinsic motivations relate to external factors, such as financial benefits from tax relief or direct payments. These positive factors may be tempered by concerns about giving up control, especially if a landowner depends on growing crops or running cattle for family income.

Successful conservation on private lands requires a willingness by both parties to be flexible. Multigenerational landowners have intimate knowledge of their property, creating moments for collaborations that shift, but do not erase, existing land uses and local cultures. Conservationists working with passionate landowners should pursue protection objectives while recognizing existing practices and building trust and respect. Doing so reinforces sustainable land uses, encourages further participation with local communities, and showcases the benefits of working-land livelihoods.

The eastern part of the Waldron Ranch is in the Foothills Fescue Natural Subregion, featuring open grasslands and flatter landscapes. FORREST HISEY

Co-operatives

Co-operatives are independent, democratic associations of individuals who have organized to meet collective socio-economic and cultural needs. Early Canadian co-operatives emerged in the mid-19th century, and in western Canada many took the form of agricultural mutual insurance companies. By the late 19th century, co-operatives had become a significant force in the rural Canadian economy, particularly in ranching, dairy, and grain production. Eventually, towards the turn of the century, provincial governments began to provide economic and legislative support for co-operatives. By the 1930s, the prairie provinces had the nation's strongest regional co-operative movement.

Despite these co-operative roots, Albertan culture is also characterized by "rugged individualism." This distinct context can be understood through geographic differences — Saskatchewan and Manitoba have long been predominantly farming provinces, whereas Alberta, particularly in the southwest, is characterized by ranching, an industry defined by entrepreneurial identity. Waldron Ranch, and the Albertan ranching co-operative movement in general, should be understood in this context, at the crossroads of individualist entrepreneurialism and democratic organization.

The Waldron Ranch Conservation Easement

For millennia, the lands of the Waldron Ranch were home to Indigenous Peoples. The ranch, originally called the Walrond Cattle Ranche, was established in 1883 as settlers spread west. In 1962, after the land had passed through various owners, a group of 116 ranchers and farmers decided to co-operatively purchase the Waldron, showcasing the attractiveness of co-operatively owning grazing land. Sustainable management has been a hallmark of the Waldron Ranch; the co-operative has kept the land healthy for over 50 years by using innovative practices and working with experts.

In 2013, the Nature Conservancy of Canada and the Waldron Ranch collaborated to establish a conservation easement, perpetually protecting approximately 12,000 ha of land. The easement occupies a large stretch of contiguous native grassland, an endangered Albertan ecosystem with little remaining intact. The easement conserves habitat for at-risk species like grizzly bears and ferruginous hawks, and provides critical protection for rivers that benefit prairie communities.

The Co-operative received a payment from the Nature Conservancy for the easement, which they used to purchase a nearby ranch, roughly doubling their land holdings. They then placed a similar easement on that ranch, again receiving the payment, while increasing the amount of protected native Alberta grassland. In addition to these payments, the Co-operative is provided yearly funds for maintenance and improvement of existing infrastructure. The easement was an ideal conservation tool because it did not impact the ranch's ability to continue grazing, while providing financial opportunities for expansion.

Columbian ground squirrels are a common sight on the Waldron Ranch. RICHARD SCHNEIDER

Comments we heard during our interviews with members of the Co-operative illustrate their thinking:

"I think we have the same objectives... [the Nature Conservancy is] interested in wildlife preserving... we're interested in healthy habitat for animals and for our livestock." —Participant 2

"You can't subdivide it; you can't cultivate it... can't develop on it. So we can't put up a hotel out there... We didn't want to do that anyway." —Participant 3

Wildflowers, such as this sticky geranium, are plentiful in the native grasslands of the Waldron Ranch. RICHARD SCHNEIDER

When asked about the impacts from the easement, all participants agreed that day-to-day operations hadn't changed. The restrictions include no breaking, cultivation, or development of grasslands. These restrictions fit the Co-operative's mission, as they would negatively impact grazing. For the average rancher, nothing changed. Impacts were mainly felt by the board of directors, where long-term planning occurs. The easement also included increased rotational grazing (which was already being used) and wildlife-friendly fences.

The Place for Landowners in Biodiversity Conservation

Conserving the Waldron, one of the largest ranches in Canada, showcases how landowners and conservation organizations can collaborate for private land conservation. Landowners are critical to work with when combating the crises of biodiversity decline and climate change. Owning property is a right and a responsibility. Landowners have the inalienable right to benefit from the land, and yet even more fundamental is the responsibility to the broader ecological community calling that land home.

Considering responsibilities in the same breath as rights must become commonplace. As citizens, we have duties to our communities (human and non-human). Landowners who occupy this role have a special understanding of property ownership, incorporating a view like Leopold's mountain. Using land with consideration toward future generations of all species is necessary in pursuit of a sustainable and equitable future. By degrading our landscapes, we degrade our communities and ourselves, as the imagined separation of nature and society tempts violent acts against the very places that sustain us.

The Waldron Ranch presents a fascinating case, uniting the seemingly contradictory motivations of individual ranchers with the collectivist co-operative. Equally striking is the ranchers deciding to place a conservation easement on their land — dedicating private property for the public good in perpetuity. Ultimately, private land conservation requires passionate landowners weighing complex values as they balance conservation practices with their livelihoods. For easements to be a successful strategy, it is necessary for conservation organizations to understand the realities of landowners, especially if trust is to be developed across geographic and ideological boundaries. ■

Acknowledgements:
We thank the Waldron Ranch Grazing Co-operative and the Nature Conservancy of Canada for agreeing to be interviewed and welcoming us to their land.

Forrest Hisey is a PhD candidate studying Human Geography at the University of Toronto, Mississauga. His research focuses on biodiversity conservation in his home province of Alberta and western Canada. Now splitting time between Toronto and B.C., Forrest enjoys working with local communities and escaping to fly fish whenever possible.

Jonah Olsen is a PhD candidate in Human Geography at the University of Toronto and a Visiting Researcher at Mondragon Unibertsitatea in Spain. His research considers the possibility for economic alternatives in socio-economic, political, and cultural contexts, focusing on the Basque Country and Italy. As a Manitoban, Jonah is also fascinated by prairie history and the Canadian co-operative movement.

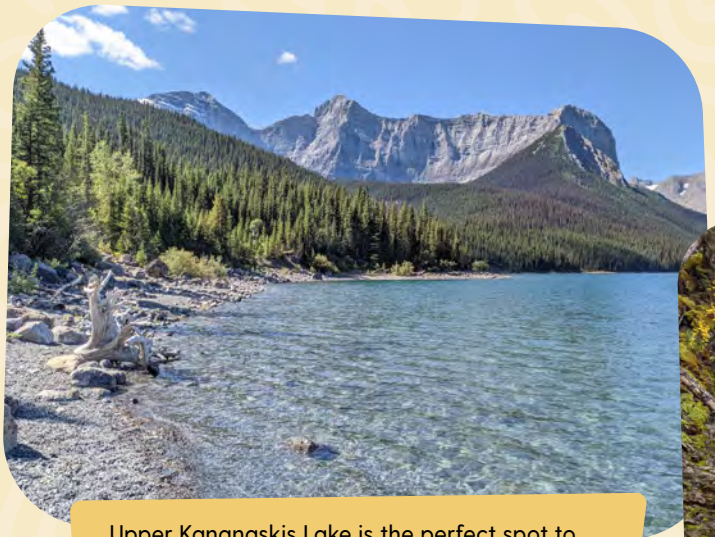
Nature Kids MY BIG ALBERTA BACKYARD

BY SARA LORENZ

Alberta is a great place to live. It's a big, beautiful province full of all kinds of natural wonders. In **My Big Alberta Backyard**, we introduce you to the unique and interesting wild spaces that you can find in your province, and the diverse wildlife that live there. This time, let's explore **Peter Lougheed Provincial Park**.

Who was Peter Lougheed?

Peter Lougheed was the Premier of Alberta from 1971 until 1985. He was the head of a government that made great changes for our province to protect wild spaces and creatures, and he helped to create this beautiful provincial park. This means that the land is protected to keep the wildlife who live there safe. Its picturesque mountains, lakes, and forests are also a dedicated space for everyone to enjoy. The park was named after Mr. Lougheed when he retired.



Upper Kananaskis Lake is the perfect spot to relax, have a picnic, or go for a swim or paddle. If you're really feeling adventurous, you can hike the whole way around the lake! SARA LORENZ

What Can You Do in the Park?

For starters, you can bike, swim, and camp amongst the breathtaking scenery. There are lots of cool places to check out in the park, including over 400 hiking trails! Many are not too long, like the 1982 Canadian Mount Everest Expedition Interpretive Trail, where you and your family can learn more about the park. It's only 2.1 kilometres and has stairs to make the short climb a bit easier. You can also try horseback riding, geocaching, sailing, and wind surfing! In the winter, many people enjoy ice fishing and cross-country skiing in the park.

What Will You See in the Park?

Lush green trees as far as the eye can see, sparkling blue lakes, and towering old mountains make this park a place you won't forget. You can also view roaring waterfalls! My favourite activity is hiking around the gorgeous Upper Kananaskis Lake to Sarrail Falls, which is only a 1.1-kilometre journey. The trailhead happens to be the perfect spot to enjoy a picnic or swim, too.

Peter Lougheed Provincial Park is also an important space for wildlife. Both grizzly and black bears live

Sarrail Falls are only a short jaunt partway around Upper Kananaskis Lake, with breathtaking views at every turn. SARA LORENZ

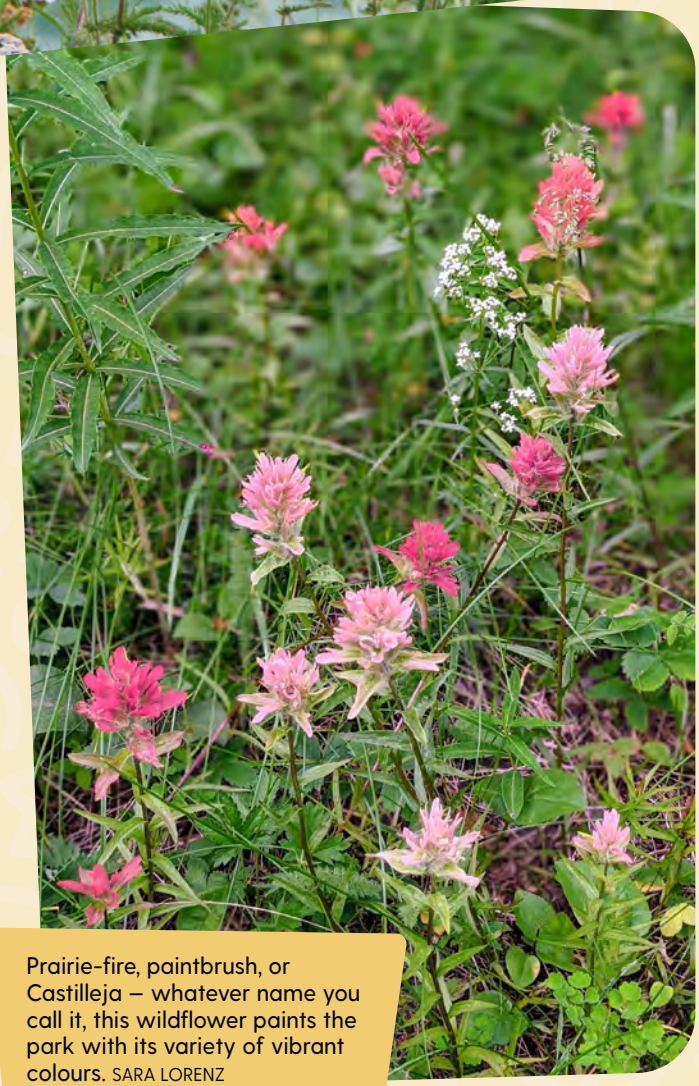
Bighorn sheep roam through Peter Lougheed Park. This mother and baby peek out from behind paintbrush and yarrow, another beautiful wildflower that carpets the wild landscape. RICK PRICE

in the park, along with moose, deer, elk, and lots of bighorn sheep. Sometimes you might even encounter a wildlife traffic jam. Although you won't likely see wolves, lynx, and cougars, these elusive creatures also thrive in this landscape.

If you visit in late summer, you'll also see my favourite flower: Castilleja, or paintbrush. This uniquely shaped bloom comes in a variety of lovely colours, including a vivid red-orange hue that gives it the nickname prairie-fire.

In the fall you can view something truly magical: golden larches. These are a special type of pine tree whose needles change from green to gold in autumn.

When you visit, remember to leave no trace. Take home lots of photos and memories, but no plants, animals, or other natural features. Respect the animals in Peter Lougheed Park by giving them plenty of space. No matter how you like to spend time outdoors, you will find something to love about this gorgeous and wild space in Alberta. ■



Prairie-fire, paintbrush, or Castilleja – whatever name you call it, this wildflower paints the park with its variety of vibrant colours. SARA LORENZ

Sara Lorenz is an aspiring editor who loves to explore Alberta's natural landscapes. Sara feels most at peace in Alberta's wild places and has been passionate about camping and hiking in our parks since childhood.

Nature Kids OUT AND ABOUT

When you go for a walk outside, do you notice the birds? Have you ever tried counting them? Go for a walk in your neighbourhood, nearby park, or favourite natural area and fill in Nature Calgary's Birding Tally Table as you go. For example, if you see a bird pooping from a tree branch, mark a single tally in the "Upper Canopy" row, under the "Something Else" column. If you see a duck diving under the water, mark a single tally in the "Water" row under the "Eating" column, since ducks who dive or bob under the water are doing so to look for food.

American robin pulling a lunch of wiggly worms out of the ground.

Common loon floating in the water, caring for its downy-feathered chick.
DARWIN PARK

NATURE heroes

Find more activities to observe, explore, and investigate nature in our updated *Nature Heroes Activity Book* at **naturealberta.ca/nature-kids**!

WHAT WERE THEY DOING?

WHERE DID YOU SEE THEM?

	Eating	Singing	Something Else
In the Sky			
Up High in a Tree (in the Upper Canopy)			
On Lower Plants like Shrubs or Cattails (in the Lower Canopy)			
On the Ground			
In the Water			

White-faced ibis eating food while wading in shallow water.
TONY LEPRIEUR

A playful black-capped chickadee in flight.

Nature Kids ASK STUART

WITH HELP FROM KETHU MENDIS, NATURE KIDS COORDINATOR

A big brown bat ready to go and find his prey for the night. CORY OLSON

Welcome to **Ask Stuart**, a regular feature in which Stuart, our Nature Kids mascot (who just happens to be a swift fox), responds to questions asked by kids across Alberta. From time to time Stuart will also ask local experts to help him answer these questions. If you have a question you would like to ask Stuart, send it to **naturekids@naturealberta.ca** and it may be featured in a future issue.

How do owls see at night?

Most owls are nocturnal, meaning they are active at night or during the twilight periods of dusk and dawn. As birds of prey, owls need to be able to see well in the dark so they can hunt small animals such as mice, voles, and other rodents, which are also active at night. Owls' eyes have evolved many special characteristics to boost their night vision. Owls have very large eyes to help catch a lot of light. The retina is the part of the eye that receives images and sends them to the brain, and it has two types of light-sensitive cells: rods, which detect light and movement, and cones, which detect colour. Owl eyes are packed with rods, about 30 for every cone (humans have about 20 rods for every one cone), making them very good at noticing movement in the dark. Owls can see during the day too, but since their large eyes catch so much light, they often close their eyes halfway in daylight to block some of the incoming light. ■

A great horned owl scanning its surroundings with its large eyes.

How do bats find their food?

Bats are also nocturnal animals. Bats can see with their eyes (they are not blind!), but unlike owls they can't see very well in the dark. Bats have a special adaptation called echolocation that helps them navigate at night. They emit ultrasonic sound waves with very high frequencies that are too high-pitched for humans to hear. These waves bounce (or echo) back when they hit an object. This helps the bat make a "sound map" to find bugs to eat and a safe path to fly. Echolocation gives them important information about their prey including the size and shape of an insect and which way it is going. Hunting with echolocation, a little brown bat will consume 600 mosquitoes, or mosquito-sized bugs, per hour, and eat more than half of their body weight in insects every night! ■

NATURE heroes

Hear for yourself how sound can bounce around!
Download the free, new and improved *Nature Heroes Activity Book* at **naturealberta.ca/nature-kids** and check out Activity 3: Bat Echolocation!

Of Spittle Bugs and Other Sap-Suckers

BY MARGOT HERVIEUX

At this time of year, you may come home from a walk in the woods wondering why there seems to be spit on the bushes. These little masses of froth are created by one of the many insects that make their living sucking sap.

If you poke through one of those blobs of bubbles you will find a tiny, green insect appropriately called the spittle bug. Spittle bugs stick their tube-like mouthparts into a plant stem and then drink the sugary sap. The waste water is then whipped with air as it passes out of the bug to create a refuge from birds and other bug eaters.

MARGOT HERVIEUX

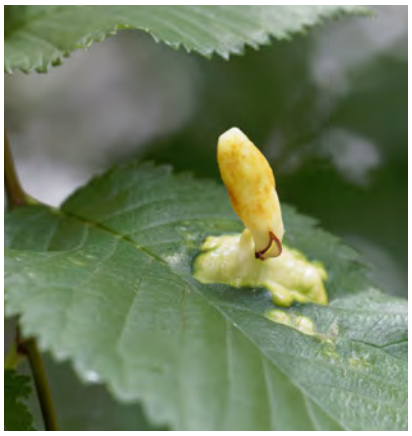
Adult spittle bugs and their close cousins the leaf hoppers are remarkable jumpers. Recent studies have found that spittle bugs can leap over 60 cm (2 feet), breaking the distance record long held by the flea.

Another common sap-eating insect is the aphid. These green or black bugs pump out offspring at a great rate and can quickly cover a plant. Aphids multiply rapidly because they only include males in the process at certain times of year. During the summer, the females give birth to live, pregnant females without fertilization. As the days get cooler, winged males are produced so that the insects can mate and lay eggs before winter sets in.

Like spittle bugs, aphids suck in plant sap and excrete the excess water. Their waste still contains lots of sugar and when it drips on cars and patios it can leave a rather sticky mess. Interestingly, ants actually tend aphids in order to harvest this "honey dew," collecting the sweet liquid and standing guard over their unusual food supply.

Another unusual group of sap-sucking insects are the gall aphids. These aphids are responsible for the bumpy growths, or galls, you find on the veins of poplar leaves. When aphids begin to feed on the leaf veins, the plant responds by growing around the insect. The result is a protective chamber with a steady supply of sap in the wall.

Aphids are only one of many insects that cause galls. The swellings in the stems of goldenrod are caused by a fly, the cone-like structures on the ends of willow branches are home to a sawfly, and a tiny wasp causes the prickly balls on rose leaves.



During the summer, there is an abundant supply of plant sap and a variety of insects and other creatures take advantage of this nutritious food source. Insects like aphids and spittle bugs are able to tap directly into plants to feed, while others dine at wounds or places where sap leaks out. Bon appétit, sap-suckers. ■

Margot Hervieux is a founding member of the Peace Parkland Naturalists and an honorary member of Nature Alberta. A version of this article originally appeared in her "Naturally Yours" column in the *Peace Country Sun*, which she has been writing for 15 years. You can read more of her archived columns at **peacecountrysun.com**.

RICHARD SCHNEIDER

MEET A MEMBER CLUB

BY KARIN LINDQUIST

Buffalo Lake Nature Club

The **Buffalo Lake Nature Club (BLNC)** is a Central Alberta naturalist club based out of Stettler, celebrating its 50th anniversary this year. The club was started by local saddle maker and farmer Lloyd Lohr and 18 other founding members, who were concerned about environmental issues at Buffalo Lake and the area in and around the County of Stettler.

The club's first meeting was held in the tiny hamlet of Erskine in January 1973. One month later, the club made the permanent move 12 km east to Stettler and officially chose the name Buffalo Lake Naturalists. The name was changed to the Buffalo Lake Nature Club after the Federation of Alberta Naturalists changed its name to Nature Alberta in 2016.

BLNC has been active in a variety of areas, most notably in the development of bird boxes. Founder Lloyd Lohr was the first to create a local bluebird trail, where he set up numerous bird boxes to attract the showy mountain bluebirds to the area. Elmer Gross took over care of the trail and expanded it. By 1994, he had built and monitored 752 bird boxes, becoming known in the area as "Mr. Bluebird." BLNC members also assisted the East Central Alberta Heritage Society in installing nest boxes along four of the Linear Parks at Meeting Creek, Big Valley, Rumsey, and Rowley.

The club was instrumental in the stewardship of the Churchill Welsh property, now called the Buffalo Lake Conservation Area, in 1974. The club also played an important role in establishing West Stettler Park.

BLNC runs a number of popular inventories and nature walks, including: the annual Dry Island Buffalo Jump Provincial Park Butterfly Count, headed by longtime member Dr. Charley Bird since 1999; the local Christmas Bird Counts of Stettler, Buffalo Lake, and Red Deer River; spring nocturnal owl surveys; Potter's Seep Grove walk north of Stettler; JJ Collett Natural Area spring and autumn hikes, also led by Dr. Bird; the Lady Slipper Walk and canoe paddle at The Narrows Provincial Recreation Area; the annual picnic and nature walk at Big Knife Provincial Park; and surveys at Ewing and Erskine Lake Important Bird and Biodiversity Area, including Shuckburgh Slough.

Since 2020, BLNC has held nature walks almost every Thursday through the summer months at various natural areas in the counties of Stettler, Camrose, Lacombe, and Flagstaff. These have been very popular and we plan to continue hosting walks every first and third Thursday of the month during the summer of 2023.

Our monthly in-person meetings host a variety of fascinating topics. We've had speakers discuss the biology of ants, snakes, oribatid mites, and the research of purple martin migrations, as well as local photographers sharing their images and experiences from in and around the area. Every meeting we take a roll call where everyone shares a favourite nature sighting they've had since our last meeting.

We are always excited to have new members come and join our meetings and nature walks. Meetings are currently held in the lower hall of St. George's Anglican Church on the third Thursday of the month (omitting July, August, and December). For more information, visit **buffalolakenature.com**. You can also find us on Facebook: the Buffalo Lake Naturalists page is where we focus on news and events, and on the Buffalo Lake Naturalists Group members share beautiful photographs and experiences from Buffalo Lake and the surrounding region. ■

Karin Lindquist is one of the current directors of Buffalo Lake Nature Club and has been a member for over five years. She operates as both webmaster and botanist for the club.

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