

NATURE ALBERTA

MAGAZINE

FALL 2021
VOLUME 51 | NUMBER 3



A COMMUNITY
CONNECTED BY A
LOVE OF NATURE



Bear Tracks
Protecting Grizzlies
from Trains

**Bugging out
with John Acorn**

**Foraging
for Fungi**

**On the Lookout for
the Prairie Bandit**



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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.



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THE PRESIDENT'S PERSPECTIVE

This year my family and I have doubled — if not tripled! — our efforts to garden; to grow flowers, fruit, vegetables — anything at all. Our biggest problem is that we have no topsoil, just lots of thick, sticky clay with a hint of lighter clay on top — perfect for growing scrappy grass, poplars, and dandelions! This soil state is a result of a wildfire approximately 130 years ago that burned for well over a year and was so hot that the topsoil was literally cremated. Since then, intense remediation programs have resulted in some sections of the burn area being restored, but not my backyard. So, having spent significant time, effort, and money trying to cultivate the uncultivable, we resorted to above-ground measures: raised beds, straw bales, a greenhouse, pots and planters, as well as truckloads of topsoil and manure. Of course, we did not factor in late frost/snow or a drought followed by heavy rain. The result has been... interesting to say the least.

The straw bales seem to only want to grow weeds and wheat even though the instructions were rigorously followed. Water, fertilize, water, fertilize, water, water, fertilize, all to a carefully planned daily schedule. Allowed to "mature," we even felt the heat as the books said we would. Then came the planting: herbs, peppers, cabbage, potatoes, onions (lots of onions!), cucumbers, even a couple small varieties of tomatoes. Everything selected as apparently appropriate for the matured bales. But — nothing. A few scraggy herbs showed, along with the tops of some onions and one valiant head of collard greens. Even the marigolds failed! Disappointing.

We had slightly more success with some of the pots and planters; sunflowers grew well, as did some hollyhocks. The raised beds finally produced some zucchini, but no onions or potatoes. A well-worked bed provided carrots with lovely, promising green tops... and stunted, twisted roots. The greenhouse is providing a few tomatoes, but considering the sheer number of plants we put in — some raised from seed, others bought in when about six inches tall — we should be swamped!

Still, next year we will try again. I definitely see lots of sunflowers and hollyhocks in the picture. Maybe we'll try fruit, perhaps raspberries. And the straw bales will be used as mulch!

2021 has been a year of many challenges for everyone, not just my garden. It has been a time of adaptation, compromise, tragedy, and frustration. However, I think it has also been a year of inspiration and resolution that we can and will overcome. Tomorrow still promises to be better.

ELIZABETH WATTS

Today was good. Today was fun. Tomorrow is another one.

—Dr. Seuss, One Fish, Two Fish, Red Fish, Blue Fish

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Nature Alberta News

Family Nature Nights a Wild Success!

The highly anticipated return of Family Nature Nights was a huge success! Nature Kids and their families — 564 youth and parents in total — observed, investigated, and explored nature at events at four Edmonton parks and at the Kerry Wood Nature Centre in Red Deer. Local experts guided exploration and empowered Nature Kids to connect with nature in a meaningful way, creating memories to last a lifetime.

Nature Alberta had a tremendous amount of community support to bring these events together, including involvement from many of our member clubs. Edmonton Nature Club guided Nature Kids in their Bird Bingo search. Alberta Lepidopterists' Guild gave families a close look at a broad range of species with their travelling bug exhibit. Alberta Lake Management Society led pond dipping, aquatic plant identification, and water testing for an extra-comprehensive look at life in the lake. Alberta Amphibian and Reptile Conservancy intrigued families with

their live amphibians and reptiles. And the Red Deer River Naturalists helped us run the entire event at the Gaetz Lakes Sanctuary!

A parent attendee of the Beautiful Bugs event at the Twin Brooks District and Nature Park said: "My favourite bit was how the kids engaged, they just loved it! They went from being scared of spiders and wasps to being really interested in them. Thank you to all of the volunteers who took part!"



U of A bug expert Ilan Domnich encouraged families to catch their own bugs to identify! STEPH WEIZENBACH

Volunteers were crucial in making these events run smoothly. They were superstars, seamlessly processing and managing 161 people at the Wild & Wet event at Edmonton's Hermitage Park.

And last but certainly not least, the participants were amazing too! Everyone had a great time, and we raised almost \$1,000 in donations to our Endowment Fund (which will have \$6,000 worth of impact, as detailed on page 25!), to support Nature Alberta's outreach programs and events long into the future. A sincere thank you to everyone involved. These events were a huge success because of you.



Everyone got hands-on with the ALMS aquatic plant identification. SUSAN MAY

Thank you to the multitude of community partners involved in bringing Family Nature Nights together:

Alberta Amphibians and Reptile Conservancy

Alberta Biodiversity Monitoring Institute

Alberta Environment and Parks - Water Projects Management

Alberta Lake Management Society

Alberta Lepidopterists' Guild

Alberta Science Network

Cold Lake Fish Hatchery

Edmonton Nature Club

Kerry Wood Nature Centre

Nature Central

North Saskatchewan Watershed Alliance

Red Deer River Naturalists

Root for Trees

University of Alberta Experts: Ilan Domnich, Ronald Batallas, Sarah McPike

WildNorth

And thanks to our funding partners whose contributions made these events possible:

Alberta Conservation Association

Environment and Climate Change Canada

Nature Canada



What Happened to Sustainable Forestry?

For much of the last century, sustainable forestry meant maintaining a steady flow of timber. The forest was seen as a resource to be exploited as efficiently as possible, sort of like a slow-growing crop of wheat. As with agricultural crops, the growth of selected tree species was promoted through practices such as monoculture planting, thinning to optimal density, and reduction of competition from other species. In addition, there was an effort to maximize growth and productivity of the forest by eliminating old-growth stands.

By the 1980s, shifting public attitudes led to increasing demands for new approaches. Concern for endangered species and the loss of old-growth forests, especially in the Pacific Northwest, became powerful motivators for change. In Alberta, the government missed these cues and instead embarked on a massive expansion of forestry, allocating pristine boreal timberlands the size of England for harvest. No analysis of the ecological impact of these allocations was made, nor was the public consulted.

These timber allocations generated a massive public backlash, including the largest demonstrations in the province's history to that time. The government refused to back down; however, there was a fundamental shift in the way our forests were valued and managed.

The key concepts were set forth in the *Alberta Forest Conservation Strategy*, released in 1997.

The new ideas were bundled into an approach called ecological forest management. As the label implies, the idea was to manage forests as ecosystems rather than just stands of timber waiting to be cut. The entire system, including all native species and natural processes, were to be sustained over time, not just the flow of timber to the mill. Another important change was the inclusion of stakeholders (beyond just forestry companies) in forest management decisions.

Over the past two decades, steady progress has been made in refining the principles of ecological forest management and putting the new ideas into practice. To be clear, this does not mean that all of the ideals set forth in the *Forest Conservation Strategy* have been achieved; indeed, many gaps remain. But we certainly have moved a long way from the days of sustained-yield harvesting.

Unfortunately, the progress we've made in advancing ecological forest management is now under threat. The Kenney government is pursuing an agenda of economic development at any cost, without even the pretence of balancing economic and environmental objectives. Forestry Minister Devin Dreeshen has increased the rate of

forest harvest by 13% and believes that a further increase of 20% can be "sustainably" achieved. This is absurd — such a high rate of harvest was not even contemplated in the days when sustainability only meant maintaining a steady flow of timber. For ecological sustainability, we require a *reduction* in current rates of harvest, not an increase.

As with the Kenney government's rescinding of the Coal Policy and its proposal to delist 164 parks from the provincial parks system, the plan to dramatically and unsustainably boost forest harvesting is wildly out of step with public opinion. This is likely because these policy changes are ideological driven and were advanced without any public consultation. In the end, the government was forced to walk back its proposals related to coal mining and parks in the face of strong public backlash. However, the plan to increase forest harvesting remains intact, mainly because it has not yet reached the public's attention. Please consider writing to Premier Kenney (premier@gov.ab.ca) and Minister Dreeshen (AF.minister@gov.ab.ca) to let them know that maintaining our forest ecosystems is important to you and that any increase in the rate of harvest is not acceptable. ■

A close-up photograph of a Spotted Sandpiper standing on a mossy rock. The bird has a long, straight, orange-brown beak and is captured in the act of drinking water, with a small droplet hanging from its tip. Its plumage is a mix of brown, white, and black spots and streaks. The background is a soft-focus view of a body of water and more rocks.

Spotting Spotted Sandpipers

BY MYRNA PEARMAN

One beautiful June morning, I savoured a spectacular Sylvan Lake sunrise from the seat of my kayak. As I approached the west shoreline, I noticed a pair of spotted sandpipers bobbing along a small stretch of beach. As I paddled closer, two little fluffballs suddenly materialized! An adult, alarmed by my approach, sent the young scurrying back into the thick shoreline grass. I noted the location and paddled on.



A wary adult spotted sandpiper tends to its small, fluffy charges. MYRNA PEARMAN

I returned to the same spot on my way back. This time, there were two adults, but neither were overly alarmed. I let the kayak drift closer and, with camera in hand, hoped to catch another glimpse of the young. Suddenly, four tiny sandpipers emerged! Daintily tiptoeing on garishly long toes and bobbing their shaggy little tails, these balls of fluffy feathers, oblivious to my presence, pecked and poked for edible tidbits, stretched, groomed, and sipped dewdrops from the undersides of leaves. One even had a short nap. After several glorious minutes, they retreated into the grass and disappeared. I backed away quietly and paddled home. What an awesome (and “awww”-some) way to start a day!

Unlike most other Alberta shorebird species, which often nest in the north and can be difficult to identify, spotted sandpipers are common and can be easily recognized by their dark chest spots, teetering gait, and shallow, stiff flight pattern. Juveniles, which lack spots, can be identified by their dark eyeline, white eye ring, short yellow legs, and a white spur at breast sides.

Spotted sandpipers can breed in a variety of locations, as long as three habitat requirements are met: a stretch of freshwater shoreline for foraging, bathing, drinking and displaying; some

semi-open areas for nesting; and patches of dense vegetation for brood cover.

Spotted sandpiper nests are usually located close to water, under the shade of a plant. If predators are numerous, nests are tucked into protected areas such as patches of nettles or raspberry thickets. Several nests are usually started but then abandoned. Once a pair is bonded, the final nest — consisting of a shallow depression scraped out of the soil and lined with dead grass — is started by the female and finished by the male.

Sandpipers lay eggs in clutches of three to five, which are then incubated for about three weeks, usually by the male. Some females are monogamous and tend their young jointly with their mate. Others will mate with up to four males and leave it to the males to incubate the eggs and tend the chicks. Amazingly, females can store sperm for up to a month and, because they have so many mates, the young in each clutch may have different fathers.¹

The young are precocial — at two hours old they can peck, preen, and eat, and by four hours they can stretch and walk. Nevertheless, they stay in or close to the nest until a few hours after the last egg hatches. The young can lift off the ground

at about 11 days and are capable of sustained flight by 18 days of age. It is not known at what age they become independent.

Some other interesting spotted sandpiper facts:

- They will often nest in or near common tern colonies.
- Experienced females lay more eggs per season than inexperienced females.
- Both sexes develop brood patches — a patch of featherless skin that promotes heat transfer to eggs — during incubation.
- The incubation period decreases as the season progresses.
- Chicks stay near the male that broods them. Males and chicks sometimes join together in post-breeding flocks.
- Females tend chicks less if there are more males than females in the brood, and will usually pair with a new male and initiate her next clutch rather than provide care to the initial male-biased brood.
- Unlike most other sandpipers, which migrate in large flocks, spotted sandpipers migrate singly or in small groups to their wintering grounds, which extend from the southern United States to southern South America.

I returned to the same area almost a month later, this time on a smoky, overcast morning. Lo and behold, there was another batch of little sandpipers patrolling the same stretch of beach. Based on what I have learned about this species, I suspect that Mrs. Sandpiper had handed her first brood off to Dad and then, with Husband Number 2 (or perhaps 3 or 4), mothered another batch. Whatever the circumstance, my summer paddle was greatly enriched by encountering and watching these interesting and engaging little shorebirds. ■

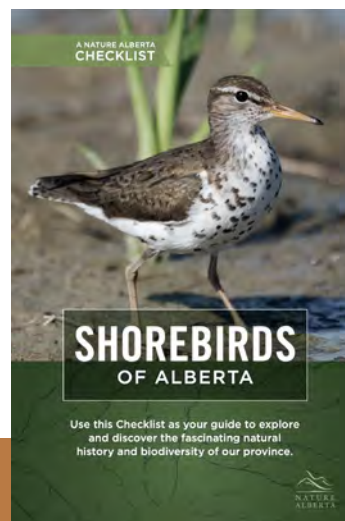
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Myrna Pearman is a retired biologist, and a keen nature writer and photographer. She has written several books, which can be ordered from www.myrnapearman.com. She can be reached at myrna@myrnapearman.com



Within a few hours of hatching, young spotted sandpipers are already expertly navigating their new world. MYRNA PEARMAN



Nature Alberta has published a helpful guide to *Shorebirds of Alberta*. It can be downloaded at naturealberta.ca/guides-checklists

Do You "Do Bugs"?

BY JOHN ACORN

In the imaginations of most naturalists, "nature" is composed primarily of plants, plus "fish and wildlife," living in a physical world made up of soil, situated on top of "geology," and supplied with water through rainfall. "Bugs" are also part of this world, but typically we characterize them only by how they relate to the so-called central elements of nature. For example, we often refer to the smaller creatures as "bird food," "fish food," "pollinators," or "plant pests"; and for some people, oddly enough, this explains their very existence. It is much less common for naturalists to put bugs in the cognitive foreground, as organisms of interest in their own right.

The term "bug," however, needs explanation. The broad term for insects, spiders, and other jointed-legged animals is "arthropod," but this word is too technical for most people. "Invertebrate" is an even broader category that includes worms of various types, snails, slugs, and a variety of aquatic creatures, and it is also too technical for general usage. Thus, it seems that "bug" is indeed the best available name for the things I wish to contemplate here (even if it is used entomologically in a

stubbornly pedantic sense to refer only to "sucking bugs" in the order *Hemiptera*). Likewise, there really isn't a word like "birder" to describe someone who studies and appreciates bugs. I tried coining the term "bugster," but it isn't exactly catching on.

It is fair to characterize the traditional, bug-devaluing view of nature as vertebrate-centric, and plant-centric, and those of us with an interest in insects, spiders, and other invertebrates recognize this bias quite easily. To be fair, though, I think that most birders and botanizers are already aware of the issue. They realize that insects, spiders, mites, and other arthropods are "ecologically very important," but avoid putting much additional thought to the matter, explaining, "I'm not a bug person."

Identity is a big theme these days. We hear a lot about social identity, cultural identity, and identity politics. Naturalists have their own identities, too, and thinking about identities can help us understand each other a bit better, just as it helps in broader society. Now, I'm no expert on identity (it's not part of my identity, you could say), but it seems to me that we often say things like, "I'm a plant person," or "I'm a bird person," and thereby self-identify as a particular kind of individual with a particular focus. More importantly, we often use such statements to justify ignoring some aspects of nature, as in, "I don't know what that cool-looking thing is, with such fascinating behaviour."

I'm not a bug person so you'll have to ask someone else."

The solution to the identity problem is to think in terms of activity, not identity. When you study a warbler, you are engaging in a birding activity (you are "doing birds"), but that doesn't necessarily make you a "bird person." When you contemplate the identity of a wildflower, you are "doing plants." I often do plants, but I don't think of myself as a "plant person." So "doing bugs" does not require membership among the "bug people," whoever they might be.

Perhaps the emphasis we place on plants and vertebrates comes from the fact that plant-centric and vertebrate-centric natural history are both relatively crowded fields, and functioning in a crowded field requires a certain amount of effort. To be considered a competent member of the birder or botanist crowd takes time, and even a bit of social manoeuvring. When everyone in the group knows more or less what is going on, the interactions (both good and bad) occur quite naturally.

To some extent, bug people don't share this situation. There are currently 433 species of birds known from Alberta, and 1,775 species of vascular plants. In comparison, no one actually knows how many arthropod species there are (and yes, we have tried to count them), although the answer is somewhere in the 25,000 to 30,000 range.

Even the experts realize that they have limits. They either take the identification as far as they can ("It's a ground beetle, in the



Above: A cuckoo wasp (family *Chrysididae*), a beautiful parasite that lays eggs in the nests of other wasps and bees.

Right: A predatory stink bug (family *Pentatomidae*), to which the term "bug" can be properly applied.





family *Carabidae*, and there are as many species of ground beetles here as there are birds”) or they admit their ignorance (“Good question — I wish I knew more about the countless species of parasitic wasps that live in Western Canada, so maybe we should look on **BugGuide.net**”). There is an introverted appeal to the study of bugs, since you can have whole chunks of nature more or less to yourself, with only a few other experts to negotiate with when proffering an opinion on identification, or an explanation of something they have seen.

Nonetheless, bug appreciation is indeed on the rise. Macro photography is easier than ever before, even with a good smartphone, and there are countless places online where one can submit one’s arthropod images for identification or appreciation by others, including iNaturalist.ca, BugGuide.net, and e-Butterfly.org). Bug photography is cheaper than bird photography, and about the same difficulty level as photographing flowers. Up close, bugs also promote themselves, in a sense, with remarkable body shapes, exquisite



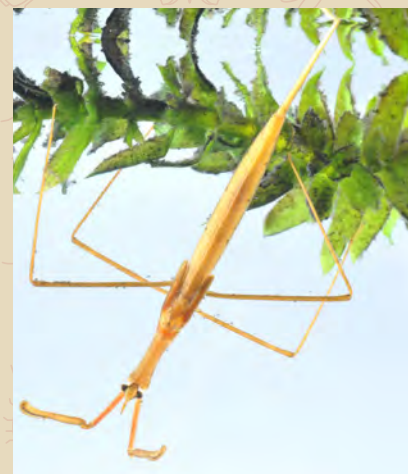
details, and in some instances brilliant colouration. Even flies can have a strong appeal to some people, especially photographers. Many flies are quite bristly, and these bristles look great when you capture



The author using a hydrophone to listen in on water boatmen (family *Corixidae*) with Yelena Riemer.

them in a really crisp macro shot, convincing photographers that your lens is “amazingly sharp.”

For amateur entomologists, the most popular insects have always been butterflies and beetles, since they make lovely specimens, and many people of my generation began their insect studies as collectors. Moths are just as pretty as butterflies, so they have their devotees as well. Bees also have their fans (as evidenced by the Alberta Native Bee Council) because of their role in pollination, and increasingly we realize that various flies, beetles, and other flower-visiting insects are important pollinators as well. Spiders have a different sort of appeal, and more than any other group of bug, they divide naturalists quite neatly into spider lovers and spider haters, with not many folks in the middle ground. These are just the most common forms of arthropod appreciation, and naturalists are slowly but surely beginning to realize



Water scorpions (*Ranatra fusca*) have recently expanded their range into much of Alberta.

Top left: A zebra jumping spider (*Salticus scenicus*), an introduced but harmless species at home on and in houses.

Left: We have cicadas (*Okanagana* sp.) in Alberta but we still don’t know how to tell them apart by their calls.

PHOTOS COURTESY OF THE AUTHOR



Using a blacklight to attract moths for an Alberta Lepidopterists' Guild event near Ardrossan.



Benny Acorn "doing bugs" on the prairies near Duchess.



Above: Some ground spiders, such as this *Micaria*, are quite strikingly marked.

Below: *Chalcosyrphus curvaria*, a hover fly that appears to mimic a parasitic wasp.

with the local corixid species. To reality-check my observations, I am regularly in touch with a small set of corixophilic naturalists (speaking of which, see Cheryl Tebby's article about the Alberta Biodiversity Monitoring Institute on page 22 of this issue).

In terms of identification, corixids are about as tricky as shorebirds, or grasses — they are all similar in overall shape and colouration, but with subtle differences that are rewarding to learn. Some are small, no more than 4 mm long, so I need to use a microscope, or a macro setup on my camera, to see them properly. Happily, these tools are no more expensive or difficult to use than the spotting scope I employ when scanning the beach for "peeps," or my telephoto "bird lens." As an added bonus, corixids also make sounds, so I am enjoying the process of recording their calls, using a hydrophone and portable sound recorder. "Bugging by ear," you might say.

There are so many bugs that you can learn a new group each year if you are so inclined. Each group provides a different view of the natural world. For some, you have to think about the diversity of water bodies, some of which can be quite tiny indeed. For others, you need to learn something about "host plants" (a term that is admittedly insect-biased, in the same way that "pest" or "pollinator" are plant-biased). For others, it's about particular terrestrial microhabitats, essential for each species, and sometimes extremely quirky.

that such pursuits are not just oddball interests — they can be just as rewarding and interesting as birding or botanizing.

Many naturalists like to share their sightings, using eBird for example, but whereas bird ranges and seasonal movements tend to be extremely well known, those of many bugs are not. I wrote a review paper on this subject and concluded that the chances of documenting a valuable record are much higher for bugs than they are for birds or plants. With governments now attempting to assess the conservation status of various bugs, all such records are of potential interest, and they do receive scrutiny from the biologists who engage in the "statusing" exercises (many of which, by the way, are currently "data deficient").

I don't want, however, to give the impression that insect life is a big mystery here in Alberta. There has been a long and impressive tradition of insect study in this province, and we know a tremendous amount about our bugs, in terms of taxonomy, geographic ranges, feeding habits, and seasonal occurrence. However, there are also countless gaps

in this knowledge base, and apparently very little incentive for professional biologists to fill these gaps. They prefer to focus on applied or broadly ecological problems, for reasons that actually do make sense. This leaves a lot of opportunity for science-minded amateurs,¹ and a publication such as *Nature Alberta Magazine* is one of many possible outlets for such studies.



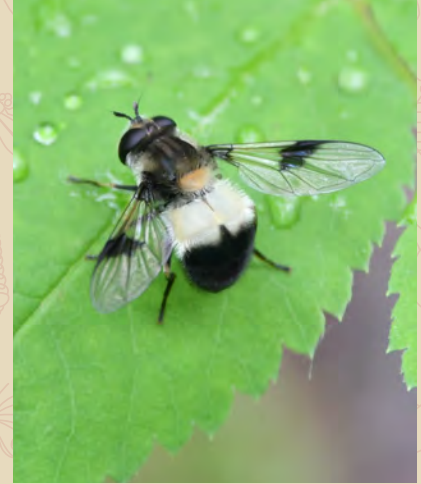
These days, I've been focusing my own efforts on the study of water bugs. Using a dip net in the shallows of Gull Lake, I have been scooping up corixids — aquatic bugs in a family known colloquially as water boatmen. I've been studying the insects here at Gull Lake since I was a child, but I still have much to learn, so during the summer of 2021 I decided to familiarize myself



A striped hairstreak butterfly (*Satyrium liparops*), uncommon and secretive in shrubby areas and some gardens over much of the province.

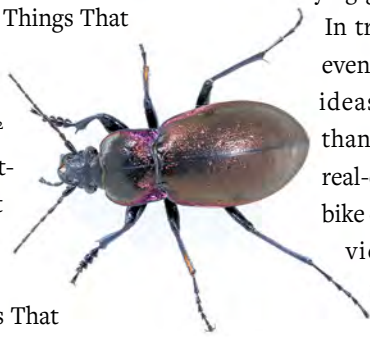


A leafcutter bee (family *Megachilidae*) gathering pollen on the underside of its abdomen, unlike other bees that use "pollen baskets" on the hind legs.



An especially elegant hover fly, *Leucozona americana*, at Pigeon Lake.

Mind you, once you know something about bugs, it is tempting to go a bit too far, and argue that they are much more important than the rest of the living world. E.O. Wilson, the most famous entomologist of our time, has referred to insects as "The Little Things That Run the World," backing up this thought with an impressive justification² (and inspiring an insightful "sequel" by ecologist John Terborgh, who wrote a rebuttal paper entitled "The Big Things That Run the World"³). The notion that insects are super-important ecologically can either broaden one's perspective, or narrow it. Some entomologists actually think all other animals are trivial, and unworthy of much attention at all. Some think that birds are for amateurs, most mammals are just "charismatic mega-fauna," and that "real science" should be left to those who only deal with obscure creatures, scientific names alone, and dichotomous keys. Any taxon for which there is a field guide is simply not worth these people's attention. Such attitudes



are quite counterproductive, for what I believe are obvious reasons.

We all like to think that we understand nature, at some level. But we all also admit that, as the saying goes, "it's complicated."

In truth, though, none of us even come close, even if our ideas are more defensible than those of your average real-estate developer or dirt-bike enthusiast. Still, a worldview including bugs is more accurate than one without. I am, however, getting ahead of myself. Most naturalists have only a limited interest in understanding nature, and most are quite modest in the extent to which they try to predict and manage nature as well. Instead, they spend time out of doors because it enhances their lives, and they support conservation for the same reason, leaving the

so-called understanding of nature to the professional ecologists, whose conclusions they accept at face value. "Doing bugs" is rewarding in its own right, and I hope you will take the time during your outdoor forays to observe, identify, and appreciate the bugs around us, at whatever level works for you. ■

Left: Purple-rimmed Carabus beetle (*Carabus nemoralis*), common in gardens in Alberta.

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John Acorn is a naturalist, biologist, author, photographer/videographer, and former television host. He currently teaches at the University of Alberta in the Department of Renewable Resources and he proudly serves as Patron of Nature Alberta.

Fungi Forays

BY LIZ WATTS

One of life's simple pleasures is getting out in the natural world and just walking around. You can do this alone or with friends, no purpose is required, just a stroll in the fresh air. You don't even have to go very far, just outside your front door will do. Urban, rural, or wild, the choice is yours. As you walk around enjoying the birdsong, the buzz of unseen insects, even the occasional sighting of wildlife, think about looking down.



Oyster mushroom on aspen.

There is a whole world right at your feet. A world beyond the patchy grass, concrete, and rubbish you might expect: the world of fungi. Not the neatly cropped, well packaged white or brown mushrooms they sell in the supermarkets, but weird and wonderful ones — colourful, oddly shaped, looking like little aliens waiting to surprise you (or maybe take over the world!). Some are delicious, others not really. Some

are medicinal, others are not. Some are even deadly! It's amazing what you can find when you cast your gaze downward.

First Forays and Exciting Edibles

My introduction to the world of fungi and forays was when I attended a foray open day hosted by the Alberta Mycological Society (AMS). Specimens gathered from Elk Island National Park were labelled and neatly displayed for members of the public to view. I had no idea of the variety of mushrooms



Amazing variety in an Alberta Mycological Society display.

to be found. They were categorized by species as well as type: edible, toxic, poisonous. The selection was stunning and I couldn't wait to learn more.

I joined AMS on their next "culinary" foray. This was held over a weekend at the Weald, a charming little provincial group camping spot with all amenities including barbecue pits. The main objective of this foray was to find as many edible mushrooms as possible. There

were two forays a day and hundreds of mushrooms collected. The veterans were hunting for specific mushrooms and had their "secret" spots. Many productive sites are closely guarded secrets even among fellow hunters! The rest of us followed the experts and were treated to field identification techniques: sight, location, smell, even sound (yes, some mushrooms, such as Russulas, make a distinctive noise when broken). At the end of each foray, we returned to the campsite and set about confirming our identifications.

The daily highlight was coming together at the end of the day and cooking up our finds. That weekend I was introduced to chantarelles, lobster mushrooms, honey mushrooms, *Suillus* (a little slippery and bitter for me but prized for pickling), and many others.

Most people want to learn about edible fungi, how to identify them, and what to do with them. Proper identification is the most important aspect of looking for edibles. There are many fungi that look very similar and it is not until you get into the finer points of identification that the differences are apparent. It is best to focus on two or three species that you like and are certain about identifying. For example:

- Oyster mushrooms come in different colours (pink, blue, white), grow on dead (or dying) trees and have a distinctive fan shape. They tend to grow in clusters.



Hedgehog mushrooms.



Chanterelle mushrooms.



Puffballs.

- **Hedgehog mushrooms** have a yellow to orange cap and a distinctive spiked underside, like fine teeth pointing down. They are generally found in wooded areas.
- **Chanterelle mushrooms** are conical (vase) in shape, range from pale yellow to orange, and have “false” gills. These are not the fine individual gills found in most mushrooms but look like forked folds or wrinkles appearing melted to the body. They are found close to trees, often where the ground has been disturbed.
- **Puffballs** literally look like balls when mature. When cut they are very solid with a white flesh. They generally grow in grassy open areas (lawns and golf courses are favourite sites).

Fun(gi) Fact: Most folks are familiar with the four primary tastes: salty, sweet, bitter, and sour. But there’s actually a fifth: umami. Mushrooms are the only food that possess this distinctive, almost meaty flavour.

Foray Etiquette

Mushroom gatherers are very conscious of the environment. It’s not just about the best finds today, but also what will remain to find tomorrow. Consequently, there is a foraging

etiquette that is respected and observed by all serious mushroom hunters.

Primary among these rules is to never pick more than you can use and always leave some behind. Remember that the mushrooms you collect are the final “fruiting body” of a more complex organism. Only when conditions are right — light, temperature, moisture, food source — will the mushroom appear. The rest of the time the fungal network quietly grows and expands, unseen, underground, always looking



for those ideal conditions to produce the ultimate prize.

Despite the mushroom hunter's boundless enthusiasm, there are boundaries one must observe. Respect for sensitive ecosystems, as well as private property, is paramount.

One should also be aware that people aren't alone in enjoying mushrooms. Deer, moose, squirrels, bears, birds, insects, and worms find mushrooms a tasty, nutrient-filled addition to their diet. So it's a good idea to bring a whistle along on forays to alert nearby wildlife to your presence and avoid an unexpected encounter. Speaking of which, be wary of surprise passengers, as my colleague Erica To describes in the sidebar.

After one foray, a substantial display exhibit had been completed and almost immediately took on the unexpected function of squirrel buffet. Our unexpected guest jumped onto the table and carefully selected some of the finest specimens. It ran off, presumably to store its prize in its winter larder, and made multiple return trips. One can't really begrudge the squirrel for its discerning palate.

If you are interested in learning more about the endlessly fascinating world of fungi, and would like to experience a foray, visit the AMS website at albertamushrooms.ca. ■

Liz Watts is President of Nature Alberta and a Board Member of the Alberta Mycological Society. She has a B.Sc. in Microbiology and works in clinical trials research as a Data Manager.



RICK WATTS, POLISHED PIXEL PHOTOGRAPHY

Conquering Fears One Mushroom at a Time

BY ERICA TO


I was once afraid of bugs — anything that scuttled, wove webs, or might sting! But my fascination for fungi has me romping around fields and pushing leafy branches aside without a second thought. It took some time to learn to ignore insects. But being distracted by a bug no bigger than my pinky nail isn't worth the risk of missing a scrumptious hedgehog mushroom or a bouquet of honey mushrooms.

To keep the bugs at bay when I'm foraging, I start with proper wardrobe. First, tall rain boots and light, long pants to keep worrisome bugs like ticks off my skin; they're also great for wading through damp trails and marshy forests. Plus, rain boots make a handy spot to slide in mushroom reference books on the go! Light, loose, long-sleeved shirts prevent scratches when I squeeze through thick, brambly bushes (but I can still roll up my sleeves to my elbows if I like). A hat helps prevent buggy discoveries in my hair post-foray. Finally, I keep and use a bottle of bug spray on me for those pesky mosquitos. Wearing sensible clothing and bug spray lets me focus on my surroundings, watching out not only for glorious mushrooms, but also hazards like wasp and hornet nests!

Sometimes we may bring bugs home along with our mushrooms. I once took home a big, shaggy parasol mushroom to make my first spore print, and a fat centipede slithered out. That mushroom hit the wall across the room! Now, I think twice before picking a "buggy" mushroom — one that looks quite mature and shows evidence it has been munched on.

Foraging for mushrooms has not only helped me conquer my scuttly fears, but also helped me respect how both insects and fungi are important for the ecosystem. Still, I prefer insects staying in forests and fields instead of travelling home on me or my mushrooms! Happy foraging! ■

Erica To is a writer and engineer who discovered the fascinating world of mycology in 2018 and has been an enthusiast ever since.



Through My Lens: Photographing Great Grey Owls

BY KAREN FAHLANDER

I've been a nature photographer since I was 12, starting with old-style film cameras. I would send my roll of film away and anxiously wait for the prints to be returned. I am so thankful for digital cameras these days, especially when I'm trying to capture birds in flight. By shooting many frames in succession I'm able to capture all the action and I don't have to worry about paying for all the inevitable empty or partial shots.

One of my favorite subjects is the great grey owl. When I go out, I have my Nikon D850 camera and 200-500 mm telephoto lens handy on the passenger's seat beside me. My camera is on with preliminary settings locked in. I take notice of how light changes throughout the day and even on different sides of

the road. I'm constantly adjusting my settings for proper exposure and effect.

I tend to stay on back roads because there is less traffic and more wildlife. I drive relatively slowly, scanning treetops, fence posts, ditches, and the

*The more photos I
take of them, the
more I realize they
are individuals with
different personalities.*

rear-view mirror as I go. I'm looking for dark shapes or a shape that isn't consistent with the background. Often

a gnarled branch or misshaped tree can take the shape of an owl. Movement, of course, is an indicator that something is up. Occasionally, I stop the vehicle, turn it off, roll down the windows and just listen. If I hear squawking commotion from ravens and magpies, it could indicate that an owl is nearby.

If I spot an owl, I remain in the vehicle, keeping my distance, and take some initial shots. If the owl decides to preen, it's an indicator that I'm not disturbing it, which is important to me. I take a few more photos, looking for changes in expression or movement. Maybe the owl will stretch its wings out or turn to show off its lovely back feathers. Or perhaps it will cough up a pellet filled with undigested fur and bones of a vole



Above: Juvenile great grey owl.



Left: Who's watching who? Great grey owls on the hunt. KAREN FAHRLANDER



or bird. Just in case the owl decides to fly off, I increase my shutter speed to 1/1,600 of a second. After watching and photographing for a while I'll then drive on. I often wonder what the owl thinks of me and my long tubes that make funny clicking noises.

In some cases, the owls I encounter are a bit far for my lens. I'll often take a photo anyway and crop the image later in editing. Sometimes I leave the background and the distant owl as they are, to show the environment that owls live in. This emphasizes the owl's camouflage.



If an owl is relaxed enough to stretch and preen, that's a good sign you're not disturbing it. KAREN FAHRLANDER

I have hundreds of images of great grey owls. They always fascinate me. The more photos I take of them, the more I realize they are individuals with different personalities. I have had the pleasure of owls actually flying toward me; out of curiosity, I suppose. These nature connections remain in my memory and fill my soul with contentment. I have to admit to a bit of an adrenaline rush as well.

I'm very grateful whenever I am given the opportunity to photograph these magnificent creatures.

Unfortunately, as the years go on, I'm not seeing as many great grey owls as I once did. I fear that they are suffering from a variety of pressures: habitat loss, collisions with vehicles, and poisons targeted at voles and mice. We all need to do what we can to promote conservation of nature. ■

Karen Fahrlander has lived in Sundre her entire life, enjoying every opportunity to be immersed in nature. Observing and photographing wildlife and birds has shown her the challenges that many creatures face, and inspired her desire to be a voice for them.



Photography Tips

1. First and foremost, adhere to ethical birding photography. Stressing an owl — interrupting its hunting or sending it away from where it is resting — to get "the shot" is not worth it. Try not to linger; take your shot and leave.
2. Be ready! Camera on, settings adjusted. It's also a good idea to check your camera and lens regularly, in case something is inadvertently changed while picking it up and setting it down again.
3. Try to be eye-level with the owl. This is not always possible but it creates a more captivating image.
4. Go out in all kinds of weather. This shows what different weather conditions are like for owls. Images are often more dramatic when set against snow or rain.
5. Be aware of your background. Shifting your frame a little left or right, up or down can take away distracting backgrounds.
6. Practice, practice, practice! If you have a bird feeder, this is an excellent spot to practice photographing birds before you venture out to take owl photographs.



Bear Tracks

How Can We Protect Grizzly Bears from Trains in the Mountain Parks?

BY COLLEEN CASSADY ST. CLAIR

Ten years ago, Mike Gibeau, then the carnivore biologist for Banff National Park, identified a problem: collisions between grizzly bears and trains were increasingly prevalent. Between 2000 and 2010, ten grizzly bears there were struck and killed by trains and several more unconfirmed strikes were reported.¹ That made train strikes the leading cause of mortality for this population, just as grizzly bears were designated as a threatened species in Alberta.

The rising rates of bear mortality motivated several individuals to search for a solution. Jim Pissot, an environmental activist in Canmore, engaged in relentless advocacy. Fred Green, then CEO of Canadian Pacific Railways (CP), addressed the problem with funding for research. Leanne Allison and Jeremy Mendes created an evocative, award-winning, interactive web documentary, *Bear 71*, about the life and train-caused death of a grizzly matriarch (bear71vr.nfb.ca). Journalists Colette Derworiz and Cathy Ellis painstakingly followed and reported on the lives and deaths of

many other grizzly bears, transforming them from abstractions to individuals. These key people attracted other voices, leading to the creation of the Grizzly Bear Conservation Initiative, a research program supported by CP and Parks Canada. I led one of the research teams that tackled the problem with additional support from the Natural Science and Engineering Research Council. We had two objectives: to understand what causes bear-train collisions and to recommend ways to mitigate that problem.

The research team included graduate students, research associates, and collaborators and was supported by dozens of technicians, volunteers, and staff at CP and Parks Canada. Park biologists fitted GPS collars on 26 bears with exceptional care and success. Team members measured grain deposits (Aditya Gangadharan and Julia Put) and vegetation (Sonya Pollock and Alyssa Friesen) along the railway, combed through records of past mortality (Patrick Gilhooly), examined bear hair and scat (Jack Hopkins and Maureen Murray), studied the soundscape of

the rail environment (Jonathan Backs), and integrated this information with the locations and movement trajectories of the GPS-collared bears and satellite-sourced environmental information.

We found diverse sources of bear-attracting food on or near the rail,² including tonnes of grain spilled by hopper cars, several species of palatable plants (both native and introduced), enhanced productivity of buffalo berry (a local staple of bear diets), and train-killed ungulates. A few bears used the rail extensively as a travel corridor and some even dug up nearby caches of spilled grain collected by red squirrels. Decades of meticulous records by CP and Parks Canada showed that bears are not alone in their vulnerability; collisions with ten other species of large mammals added up to hundreds of individuals over the past quarter-century.³

In addition to studying causes of attraction to the rail, we tried to understand the characteristics of locations where collisions occurred. At the beginning of the project, many people felt that vulnerability of bears to train strikes was



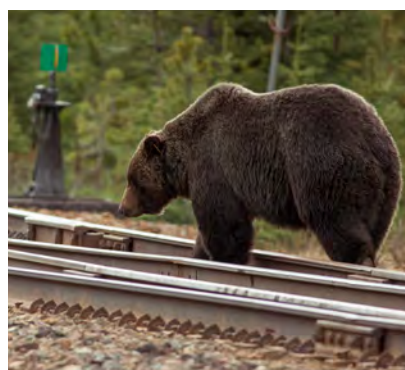
NIELS DE NIJS

caused mainly by attraction to grain spilled along the tracks. But research showed that neither locations with more spilled grain, nor even those used most often by collared bears, demonstrated higher instances of past bear mortality. Grain may have been a more significant factor before thousands of hopper cars were replaced or retrofitted to reduce spillage just before our study began. Our analysis of train-associated mortality involving 11 different mammal species, including grizzly bears, showed the best predictors of mortality sites were train speed, proximity to and amount of water, and track curvature.³ In short, it appears that bears and other animals are being struck mainly in locations where they fail to detect or avoid trains in time.

Other factors may also have contributed to the sudden appearance of grizzly-train collisions in 2000. A few years earlier, wolves recolonized the Bow Valley and elk increasingly sought refuge in the townsite of Banff. Subsequent management efforts to reduce the congregation of elk within the townsite coincided with an increase

in elk strikes along the railway, which attracted scavenging carnivores like grizzly bears. Elk mortality on the railway peaked in 2000, the year grizzly strikes began, but decreased as the elk population declined to one-third of its size in the 1990s.

Results from our study and work by others have led to several forms of mitigation. Animals seem to be



An all too frequent sight on mountain railway lines. NIELS DE NIJS

much more vulnerable when they are surprised by approaching trains and lack rapid escape routes. Therefore, Parks Canada and CP have worked collaboratively to reduce vegetation that obscures visual and acoustic cues near the rail, and to provide trails for rapid

escape when a train is approaching. In addition, Jonathan Backs invented a rail-mounted warning system that works much like crossing signals for people.⁴ The signal causes animals to leave the rail several seconds earlier than when no signal is provided, potentially avoiding panicked responses that might result in a collision. These site-specific mitigations can be applied at locations that have high rates of past mortality, particularly ones with the characteristics of our predictive model.

Mitigation — including retrofitted and replaced hopper cars, widening of rights-of-way, and clearing of bear trails adjacent to the rail — seems to have been helpful at reducing train mortality for grizzly bears. In contrast to the 13 confirmed mortalities between 2000 and 2011, the year the initiative began, there was only one confirmed strike, which killed two cubs, between 2012 and 2019. At the time, I optimistically speculated that the bears had learned to adapt to the rapid changes that occurred in their environment at the turn of the last century.² Alas, the run of reduced mortality did not last; three



RICK PRICE

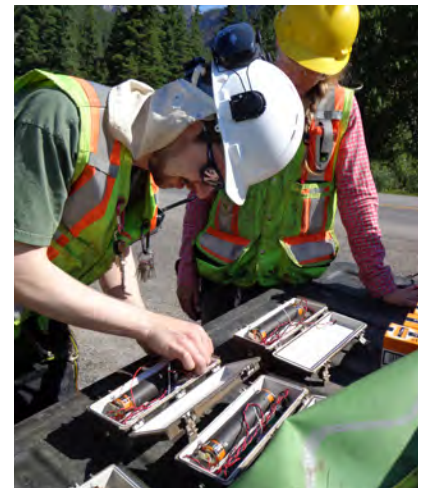
more grizzly bears died on the railway in Banff in 2020 and two more were struck in 2021 on the highways in Banff and Yoho, totalling four adult females and a yearling.

Ironically, it is the shy bears that seem to have more vulnerability to train collisions, perhaps because the rail provides a reliable respite from the throngs of people that occupy most of the productive parts of the Bow Valley. Telling the stories of a couple of these bears augments the statistics with the lived experiences of individuals. Bear 143 was one of our study bears. She ranged through large parts of Banff, Kootenay, and Yoho before she was struck on the rail between Castle Junction and Lake Louise in September 2020. She was a young mother who had previously produced two sets of cubs and would undoubtedly have produced more, but for one unlucky shortcut along the rail.

Another of our shy study animals, Bear 130, died in late June 2021, the season when many other grizzly bear strikes have occurred. Her death was especially unfortunate because she had narrowly escaped this fate previously. Although Bear 130 spent most of her life in remote parts of the Cascade Valley, she had two previous mishaps with the rail. Late on a fall night in 2012, she lost two cubs to collisions after foraging on a train-killed moose carcass. Park staff were there to collect one yearling carcass, so as to prevent further mortalities related to scavenging. One officer described to me how wolves were howling nearby that night, as if in commiseration after a wolf pup was struck a week earlier at the same location. Bear 130 remained in the area for three days, despite evidence that the second yearling had also died, and

left only when a large male grizzly bear arrived.

It got worse for Bear 130. In 2016, CP staff reported a presumed strike on two more of her cubs in almost the same location near Muleshoe. Parks biologists who reviewed the locomotive's camera footage thought the chances of survival were slim, but no carcasses were found and the cubs turned up on remote cameras the following spring. I was among the elated followers of these



Jonathan Backs executes some battery changes, above, on a rail-mounted wildlife preservation system, seen in situ below. COLLEEN CASSADY ST. CLAIR, JONATHAN BACKS

bears and wondered whether Bear 130 had learned enough about trains to warn her cubs in time. How terrifying that must be, to witness a near collision. Unfortunately, her luck ran out when the strike near Vermillion Lakes in June 2021 killed both Bear 130 and one of her latest yearling cubs.



Top: Management efforts to reduce habitation and congregation of elk in the Banff townsite coincided with increased elk strikes along the railway in 2000, which attracted scavenging grizzlies. GRIZZLY BEAR CONSERVATION INITIATIVE

Left and right: Grizzlies in their natural habitat. RICK PRICE

Why tell these grisly details? I think that knowing a bit about how these intelligent animals repeatedly navigate the perils of their human-altered environment, often with tremendous adaptation and terrible odds, emphasizes the individual tragedy and profound loss that occurs with every single one of these mortalities, however positive the statistical trend. The loss of four reproductive female bears in the past two years — the engines of growth for this vulnerable population — shows just how tenuous the apparent gains between 2012 and 2019 were.

It's been 10 years since the workshop that began the Grizzly Bear Conservation Initiative, which causes me to ponder how much has changed as a result of the efforts by those founding individuals who made the ensuing research possible. For the individual animals that were unlucky enough to be struck by a train (or other vehicle), nothing changed at all. But I like to think we've learned things that could be

applied to mitigation efforts like those described above. This applies not only to Alberta's threatened population of grizzly bears, but potentially to wildlife around the world, where train-caused mortality occurs without enough public interest and economic capacity to address it. I also hope we showed the importance of collaborative effort by individuals from different agencies and with different kinds of expertise. Over this same period, human visits to Banff have increased by 25% to over four million annually⁵ and COVID has dramatically increased park use around the world. Wildlife will need all the innovation and assistance we can provide to persist in an increasingly human-dominated world. ■

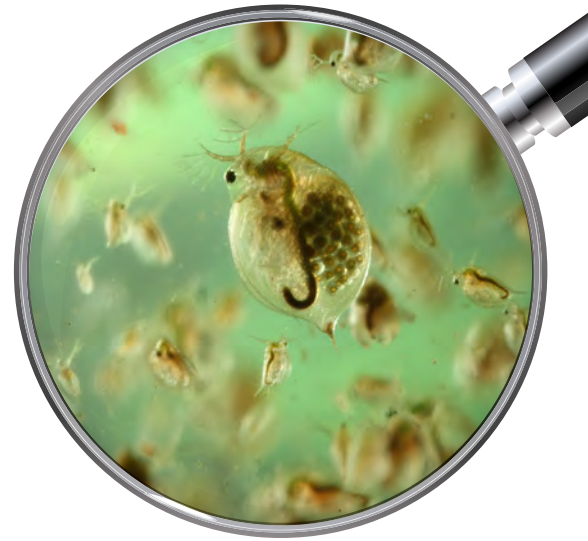
Colleen Cassady St. Clair is a professor of biological sciences at the University of Alberta. She and her students emphasize animal behaviour in their studies of wildlife management and conservation. A version of this article was published in the 2021 *State of the Mountains Report* by the Alpine Club of Canada. For further reading, ten scientific articles supporting the results described above are cited in References 2 and 3 and were led by Jonathan Backs, Aditya Gangadharan, Patrick Gilhooly, Jack Hopkins, Maureen Murray, Sonya Pollock, and Julia Put.

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The Alberta Biodiversity Monitoring Institute A Window into “What We’ve Got”

BY CHERYL TEBBY



Water fleas (*Daphnia* sp.). ROBERT HINCHLIFFE

Biodiversity refers to the variety of organisms living in a given place. For many of us, the concept conjures an image of a coral reef alive with colourful fish. Or perhaps a lush rainforest, teeming with birds and orchids. But biodiversity is plentiful here in the cold north too, even if it is hidden beneath snow and ice for half the year.

The full suite of species that live in Alberta constitutes our natural heritage and is essential to the province’s overall ecological health. Whether it is the provision of ecosystem services like pollination, the production of natural resources, or energy transfer within a food web, biodiversity matters. And in order to manage it, we need to monitor it. This is where the Alberta Biodiversity Monitoring Institute (ABMI) comes in.

Through monitoring, trends in species abundance and distribution can be tracked over time. Biologists can use this information to develop insights into the causes of species declines, providing the foundation for management. For example, in the Summer 2021 issue of *Nature Alberta Magazine*, Nicholas Boyce described the precipitous decline in the western bumble bee and how this decline has been linked to neonicotinoid pesticide use.¹ Conversely, monitoring can also show how species trends change with management actions, such as during land reclamation, when a disturbed site is returned to its previously natural state.

Species monitoring also has a role in tracking the effects that climate change is having on biodiversity and the landscape as a whole. As Alberta’s climate warms and resource availability shifts, species that once represented a given site may be replaced by an entirely new complex of species. As Alberta-born Joni Mitchell sang, “You don’t know what you’ve got till it’s gone.”

For the ABMI, the song goes slightly differently: “You manage what you measure.” This quote, adapted from the 19th-century physicist Lord Kelvin, means that informed decisions come from baseline knowledge. This forms the foundation of ABMI’s mission. As a third-party, non-profit science institute jointly delivered by the University of Alberta and Innotech Alberta, ABMI seeks to monitor both biodiversity and landscape changes across the entire province.

As part of its program, the ABMI collects a variety of field samples — such as tree cores, bird counts, plant specimens, and soil samples — during monitoring activities at more than 1,600 long-term monitoring sites located across the entire province (Fig. 1). These samples contribute to an open-access dataset that provides information on wildlife and habitat distribution and their changes over time, available freely at abmi.ca/home/data-analytics. Albertans can use this data for a variety of purposes, including land-use management, policy development, academic research, citizen science activities, school presentations, and simply as a resource to learn about the nature around them.

The ABMI is one of the largest monitoring programs not only in Canada, but globally. It brings together a diverse, interdisciplinary team including but not limited to field technicians, ecologists, taxonomists, computer programmers, geospatial analysts, and statisticians. ABMI has also developed many partnerships with governmental, research, and monitoring organizations in Alberta and beyond, and these have been critical to its success.

ABMI monitors mammals, birds, and vascular plants as well as some of the province’s smaller, less-appreciated denizens,

including mosses, terrestrial mites, lichens, and aquatic invertebrates. Special taxonomic interest has been given to these smaller organisms because they are immersed in their immediate habitat, and as such are unable to disperse if there is disturbance or pollution in the area. Thus, many species in these groups are particularly sensitive to environmental changes, and can serve as important indicator species. Furthermore, these groups are incredibly diverse unto themselves. Their diminutive size and subtle diagnostic features make them understudied and, arguably, underappreciated. But as we have come to learn, some of the smallest organisms have the potential to give us the biggest insights.

A Spotlight on Aquatic Invertebrates

The monitoring of aquatic invertebrates provides a good working example of what AMBI does and why it is important. Increasing human activity on the landscape (for example, agriculture and forestry) has led to significant impacts on wetland fauna as well as reductions in wetland coverage.² Long-term monitoring of freshwater communities has been identified as a key step to help us understand what constitutes intact aquatic habitats and how various activities affect these habitats.

For instance, the juvenile life stages of mayflies, stoneflies, and caddisflies are well known to be intolerant of pollution, and they cannot survive in poor water quality. Similarly, dragonfly and damselfly nymph diversity is a good indicator of a wetland's overall species diversity, and likely indicates the presence of healthy vegetation. In contrast, other invertebrates, like the aquatic larvae of some hoverflies, are adapted for hypoxic, or low-oxygen, environments and can thrive in contaminated or stagnant wetlands.

Chironomids, or midge flies, are particularly useful indicators and are used extensively to study aquatic ecosystems across the globe.³ These are non-biting flies that congregate into large, and sometimes noisy, mating swarms. Their utility for monitoring is due to their abundance, species-specific habitat preferences, response to environmental variables, and presence in nearly every freshwater habitat. Some chironomids are commonly

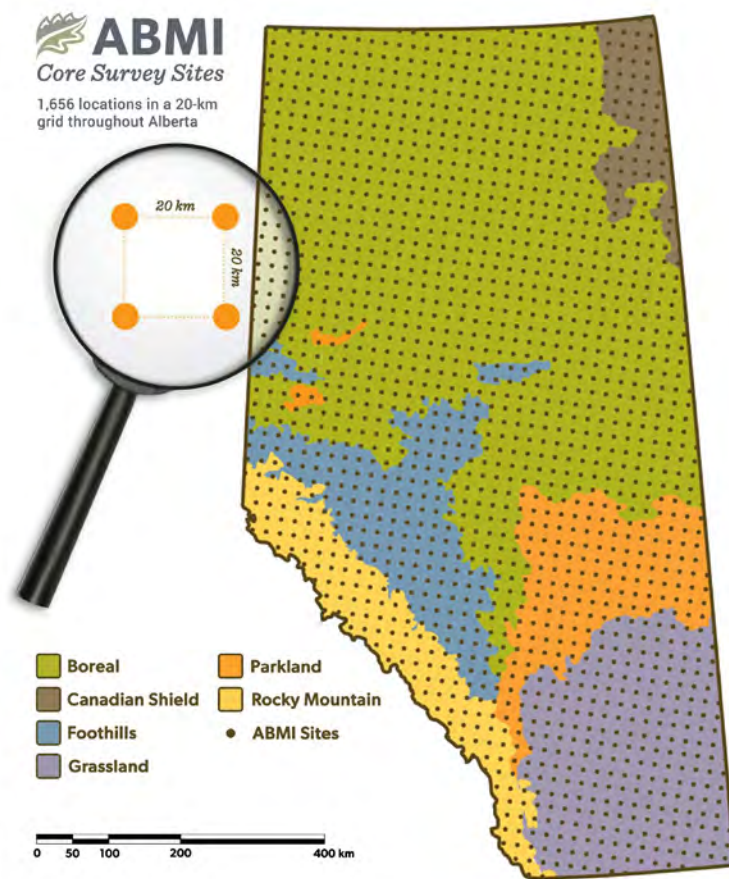


Fig. 1: The AMBI collects a variety of field samples during monitoring activities at more than 1,600 long-term monitoring sites located across the entire province: it is one of the largest monitoring programs not only in Canada, but globally.

associated with polluted waters, while others have been known to exhibit mutations when exposed to heavy metals. Currently, studies are examining the use of chironomids as indicators of microplastics.

Aquatic sampling at AMBI survey sites involves several net sweeps at various points in a wetland. Each sample captures a multitude of different insects, water mites, freshwater crustaceans, snails, worms and other species. When considered as a group, these invertebrates provide an environmental “fingerprint” of the wetland. Comparing differences between wetland fingerprints can help researchers infer the ecological state of the wetlands being examined. Comparing a single wetland's fingerprint over time can indicate whether changes are occurring and in what direction. Has species richness increased or decreased? Which species have left or arrived? Because AMBI's survey sites cover the entire province, these inferences can be made at the provincial scale. Researchers



Water boatman. JOHN ACORN

are also able to link these changes with shifts in land cover at multiple scales. Aquatic monitoring is optimal when the specimens can be identified to a fine level, such as genus or species. The more individual species identified from a wetland, the more accurate its fingerprint will be. ABMI taxonomists strive for the finest level of identification possible, which entails considerable effort. Certain species, like the giant water bug or the three-ridged valve snail, are unique and thus can be identified immediately on sight. But for the majority of aquatic invertebrates, distinguishing between species is no easy task.

For example, Alberta's water boatmen — small, fast swimming water bugs — appear at first sight to be superficially identical. However, a closer look reveals that the "hands" of male boatmen have rows of little pegs, and in some cases, the arrangement of these pegs can be enough to determine the species. Subtle changes in the zig-zagging pattern on the wings can also help reveal species identity. Meticulous examination of this group by ABMI technicians has resulted in additions to the province's checklist of water boatmen species.⁴ Other new records of aquatic invertebrates for Alberta have also been uncovered by the ABMI simply because of consistent and systematic sampling. As it turns out, sometimes you don't know what you've got till you look.

Ongoing taxonomic work by ABMI continues to reveal the complete picture of Alberta's biodiversity. Continued sampling, a growing reference

Eastern phoebe. RICHARD SCHNEIDER

Fairy puke lichen (*Imadophila ericetorum*). DIANE HAUGHLAND



collection, and integrated methods like larva-to-adult rearing and DNA barcoding, will help us untangle taxonomically difficult groups, further improving our ability to monitor changes. As the ecological future of Alberta and our use of its resources change in the years to come, the responses of our biodiversity will be monitored by the ABMI and its many partners. ■

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Cheryl Tebby is an ABMI laboratory technician and assists with the identification of countless numbers of aquatic invertebrates collected annually by the ABMI.



A Gift That Grows

The Nature Alberta Endowment Fund

BY JASON SWITNER

Like many non-profits, Nature Alberta has felt the financial stress of the COVID pandemic. Some of our outreach and educational programs are funded by grants, which are typically tied to a specific project. We receive some donations from individuals like you. And much of our ongoing operating budget is covered by our share of Alberta Gaming's charitable gaming revenue. This is where we've taken the biggest hit — due to COVID restrictions, we have not been able to participate in casino fundraising events in 2020 or 2021. The next available opportunity won't be until well into 2022 at the earliest.

However, even before the pandemic, we were taking proactive steps to secure a reliable, sustainable source of ongoing funding that's all our own. This is the Nature Alberta Endowment Fund.

Administered by the Edmonton Community Foundation (ECF), Endowment Fund contributions are invested for long-term growth. This provides a stable source of operating revenue that we can rely on to help continue our mission of promoting, conserving, and protecting Alberta's natural heritage now and into the future.

Right now, we have an incredible opportunity to grow the Endowment Fund like never before. Until the end

of 2021, every dollar donated to the Endowment Fund will be matched **6-to-1!** That's not a typo — every donation you make will have **SIX TIMES** the impact!

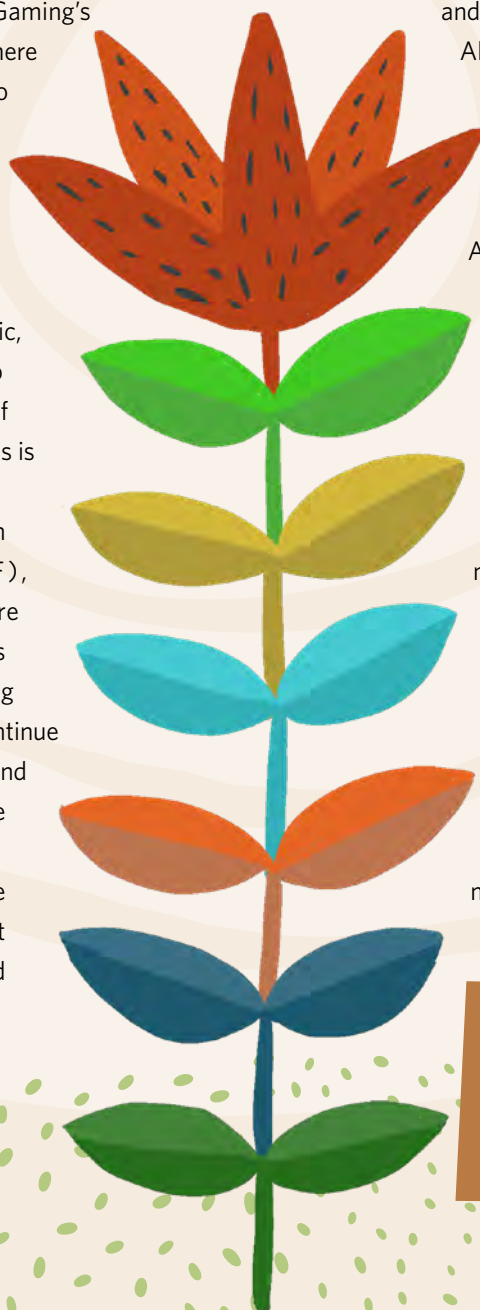
This remarkable opportunity is possible because ECF is currently running a 2-to-1 donation-matching program, which is excellent in and of itself. To maximize this opportunity, Nature Alberta has earmarked some of our own reserve funds, up to \$25,000, to match your donation.

This doubles your contribution before ECF's 2-to-1 matching triples it!

For example, say you donate \$10. Nature Alberta matches it, so we deposit \$20 to the Endowment Fund. ECF matches that 2-to-1, adding \$40 — making the total \$60!

We can generate some very impressive numbers with this program. A \$25 donation becomes \$150. \$50 becomes \$300. If you donate \$167, that effectively turns into a **\$1,000 donation!** As you can see, even a modest contribution will make a tremendous impact!

Time is of the essence — ECF's funds-matching deadline is **December 31, 2021**. We hope you will take advantage of this truly amazing opportunity to stretch the impact of your charitable dollars. Every contribution is appreciated, and every dollar gets us that much closer to a secure and sustainable future. ■



For full details and to make your donation, please visit naturealberta.ca/donate



The Case of the Missing Prairie Bandit

BY ARYA HORON

The Case

The black-footed ferret got its nickname, the prairie bandit, from the black “mask” of fur that surrounds its eyes and true to form, this critter is mainly active at night. It is the only species of ferret native to North America and is a mustelid, the same family as other small carnivorous mammals like weasels and badgers. An intimate relationship exists between the black-footed ferret and the prairie dog; the ferret lives rent free in burrows dug by prairie dogs and relies on them for 90% of its diet. Without prairie dogs, these specialist hunters cannot survive.

One hundred years ago, the prairie bandit was abundant across North American grasslands, including those in Alberta, striking fear into the hearts of millions of prairie dogs. By 1979, scientists believed it was extinct. This led to the question: where did the prairie bandit of North America go?

The Suspects

Many people who make a living off the land, like farmers and ranchers, dislike prairie dogs because they compete with crop production and livestock operations.¹ Black-footed ferrets were caught in the crossfire when the agricultural sector targeted prairie dogs for elimination. This battle began in the early 1900s, when the Canadian and American governments subsidized intensive prairie dog poisoning campaigns. These poisoning campaigns ceased in 1972, when prairie dog numbers had declined by 98%. With the black-footed ferret relying so heavily on prairie dogs as their primary food source, the crash of prairie dog populations directly led to the crash of black-footed ferret populations.

With populations already dwindling due to lack of prey, disease was the last thing the ferrets needed. Unfortunately, disaster struck again when humans inadvertently introduced canine distemper virus and sylvatic plague to

vulnerable ferret populations. Canine distemper is nearly 100% fatal in ferrets. Sylvatic plague — which caused the “Black Death” in humans — can kill both ferrets and their prairie dog prey. Both these diseases decimated the already vulnerable black-footed ferret populations.

The Return of the Prairie Bandit

Fortunately, the initial verdict of extinction was found to be premature when, in 1981, a small population of black-footed ferrets was discovered near Meeteetse, Wyoming. With this unexpected second chance, conservation biologists were determined to ensure the ferrets’ recovery. In 1985, the remaining 24 wild ferrets were collected to initiate a captive breeding program run by a network of zoos across North America. With such a small founding population, care had to be taken to avoid inbreeding depression, a harmful

genetic condition that results from the mating of closely related individuals. Overall, the captive breeding program has been a great success. Genetic integrity has been maintained at an acceptable level and more than 8,000 kits have been born.²

In 1991, biologists started a reintroduction program. The first step, once the kits were old enough to be weaned from their mother's milk, was to place the kits in a pre-conditioning pen to learn key ferret skills, like hunting prairie dogs, to maximize their chances of survival in the wild. After spending sufficient time learning "how to ferret," they were released into the wild at one of 29 sites across North America.

Reintroduction would not have been possible without the tireless efforts of governments, zoos, private landowners, and conservation organizations. In the United States, there are now four thriving populations of black-footed ferrets. However, the success of the reintroduction program has not been without a few bumps in the road. Ferrets reintroduced to sites in Canada and Mexico have unfortunately failed to produce self-sustaining populations due to drought, disease, and lack of prairie dog prey.

Additional support for black-footed ferrets came in 1996, when a vaccine was developed to protect the ferrets against canine distemper.³ All captive-bred ferrets now receive this vaccine before their release into the wild. There is also a vaccine that protects ferrets from the worst symptoms of sylvatic plague. An oral form of this vaccine has been developed that can be delivered in a peanut butter-flavoured bait to protect prairie dog populations as well. Temporary relief from plague can also be achieved by dusting prairie dog colonies with insecticides that kill plague-carrying

fleas. By combining these approaches, great strides have been made over the past few decades in dampening the effects of disease outbreaks in both ferret and prairie dog populations.

Legislation is another tool being used to support ferret recovery. In Canada, the black-footed ferret and the black-tailed prairie dog are both protected under the Species at Risk Act. Under the Act, the black-footed ferret is listed as extirpated, and the black-tailed prairie

dog is listed as threatened. The Act promotes the protection of critical habitat, a key requirement for the survival of reintroduced ferrets. In the U.S., the black-footed ferret is protected under the Endangered Species Act. However, only one of the five species of prairie dogs that inhabit the U.S. is protected. Given how important prairie dogs are to ferret recovery, it will be important to address this gap in protection.



Ferret kits born in captive-breeding programs will learn "how to ferret" before being released into the wild. KIM FRASER



A prairie dog, the ferrets' preferred prey, eating bait laden with sylvatic plague vaccine. T. ROCKE

The Current Status

The black-footed ferret's recovery is widely regarded as a triumph of North American conservation. From apparent extinction in 1979 to steadily increasing populations across America, the prairie bandit seems to be on the path to recovery. That said, the current population of wild black-footed ferrets is only about 340 individuals, all of which reside within the U.S.⁴ To ensure that



There is much work to be done to restore Canadian grasslands and their black-footed ferret populations. RYAN HAGERTY, J. STUART

the black-footed ferret remains viable over the long term, wildlife managers aim to rebuild a wild population of at least 3,000 individuals. This means that the ferrets still have a long journey ahead of them.

Canada hosts the northernmost range of the black-tailed prairie dog and, historically, the black-footed ferret. Where there are prairie dogs, there are opportunities for black-footed ferrets to flourish. To that end, in 2009, a team of biologists in Saskatchewan's Grasslands National Park released 34 ferrets into the park. An additional 30 captive-bred ferrets were released over the next three years. However, the reintroduction efforts were put on hold in 2013 when successive years of drought and disease caused the disappearance of the park's entire ferret population. Wildlife managers in Grasslands National Park are now

focusing on rebuilding the black-tailed prairie dog population in the park but have not given up hope that the black-footed ferret may yet one day return to Canada.

Aiding and Abetting this Bandit

Black-footed ferret conservation does not exist in a vacuum. To ensure the continuation of healthy ferret populations, larger issues must be addressed. As the climate continues to change, prairie ecosystems will be faced with more bouts of extreme weather, like drought and flash floods. These conditions are challenging for prairie dogs and limit the potential for ferret reintroduction. To do your part, explore ways to minimize your carbon footprint in your everyday life.

Furthermore, in addition to being home to many species at risk, grasslands themselves are one of the most endangered ecosystems on the planet. You can show your support for black-footed ferrets and prairie dogs by supporting grassland restoration and protection initiatives.

If you are looking for a more hands-on way to help ferrets and prairie dogs, Parks Canada, in collaboration with the Calgary Zoo, runs volunteer programs that bring people interested in grassland conservation efforts out to Grasslands National Park to assist with monitoring prairie dog populations. This program is unique among species-at-risk initiatives in that Canadians have the opportunity to step off the sidelines of conservation and have a direct impact.

Finally, if you are looking for a more intimate experience with the most endangered mammal in North America, plan a visit to the Toronto Zoo. Your



Ferret release. J. STUART

patronage of the only Canadian zoo to breed and house these ferrets will support their efforts to facilitate the prairie bandit's comeback.

The prairie bandit has come a long way from assumed extinction, but its journey is far from over. Together, we can help restore grasslands to their former glory, with abundant populations of both prairie dogs and black-footed ferrets for generations to come. ■

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Arya Horon holds a B.Sc. in Biological Sciences from the University of Alberta. She is passionate about human-wildlife coexistence and animal behaviour, and hopes to continue her scientific career by pursuing graduate studies next.

Park Interpretation in Alberta

BY KATE CORRIGAN, GLEN HVENEGAARD, ELIZABETH HALPENNY, AND CLARA-JANE BLYE

Many readers will have fond memories of participating in interpretive programs while visiting national and provincial parks. When I (Kate) was young, my dad and I attended an outdoor theatre program about bears at Peter Lougheed Provincial Park. I eagerly volunteered to help the interpreter by wearing a black bear hide on my back while holding a skull and a set of claws. I could hardly contain my smile while on stage. This program inspired my family to visit Kananaskis every summer, sparked excitement whenever I saw a bear, and led to a career in environmental education, raft guiding, and research. My co-authors had similar experiences as kids which led to summer jobs, teaching, and research involving interpretation.

Unfortunately, interpretation in Alberta Parks is currently at risk of being permanently cut. In the summer of 2021, programs were no longer offered at popular parks such as Kananaskis, William A. Switzer, and Miquelon. This needs to be reversed. Park interpretation provides important benefits, both for parks and for park visitors. Research undertaken by our team at the University of Alberta has provided insights into these benefits, which we will share here.

What is Interpretation?

At interpretive programs, engaging and passionate interpreters interact with visitors while leading outdoor theatre programs, guiding hikes, and showing historical artifacts. The programs are

designed to attract visitors and enrich their experiences, ensure visitor safety, and promote environmental protection. Interpretive programs add tremendous value to a park visit and, in some cases, are transformative experiences.



An interpreter at Bow Valley Provincial Park makes some memorable points.
GLEN HVENEGAARD

One form of interpretation involves direct contact between the interpreter and the visitor. Interpreters may carry artifacts such as furs and skulls around a campground. They and their volunteers may put on funny costumes and sing their hearts out in outdoor theatre programs. Or they may lead visitors into special areas — or on a trip into the past — on bus tours and guided hikes. Personal interpretation is ideal in that it provides direct two-way interaction

and the ability to answer questions and guide observations. This leads to better results for visitors and better outcomes for nature. However, hiring interpretive staff can be expensive. Moreover, the results depend on the visitor and the quality of the interpreter, there are limits on the number of participants, and language can be a barrier.

The other main type of interpretation is passive and does not require a person to deliver a program. It takes forms such as exhibits, signs, brochures, books, websites, and more. Of course, interpreters are the masterminds behind these materials. Non-personal interpretation is relatively inexpensive, always on the job, requires little maintenance, can contact many people, and allows visitors to move at their own pace. However, there is no human interaction, it is inflexible, and can produce information overload. (Remember how tired you are at the end of a museum visit?)

Benefits of Personal Interpretation

During the past five years, our research team has worked to identify the most common goals and outcomes of park interpretation programs across Alberta. We found that these programs mainly seek to achieve the following six goals:

1. enjoyment of the experience,
2. learning something new,
3. attitude change,
4. behaviour change,
5. connecting visitors to the place, and
6. generating positive memories.

In our travels, we heard countless personal stories about how interpreted programs have positively affected children and adults. Many impacts were small and short-lived (e.g., entertainment), while others were significant and long-lasting (e.g., connecting to the place, changing behaviours, and changing careers).

Even though anecdotes are powerful, we wanted to systematically analyze the outcomes of interpretive programs and determine which factors affect those outcomes. Therefore, in 2018 and 2019, we travelled to all provincial parks in Alberta offering personally delivered interpretive programs. We surveyed almost 2,000 park visitors, 763 of whom attended an interpretation program during their current trip and 909 that did not (though many had done so in the past).

So is the investment in interpretation worth it? Does a little girl wearing a bear suit actually have an impact? In short, YES, interpretive programs generate significant outcomes. Those who attended a program rated satisfaction of their entire park experiences higher than non-attendees. In addition, attendees rated the knowledge gained from their trip higher than non-attendees. This result is important because most parks market interpretation programs as enjoyable learning experiences.

In a follow-up study one year later, we found that visit satisfaction, learning, and one behaviour — subsequent attendance at an interpretive program — remained higher for those that attended a program versus those who did not. In addition, positive memories became higher for attendees. This suggests that the positive effects of interpretation are long lasting.

Past research has shown that parks also benefit from having interpretive programs. There are fewer public safety incidents, less impact on park resources, and greater support for park goals.

Changing Visitor Behaviours

Besides increasing the enjoyment of park visits and supporting learning, interpretation can also help improve park-friendly behaviours, such as reducing littering, not feeding animals, leaving artifacts intact, and not picking wildflowers. Let's take the example of not leaving campfires unattended, which reduces the chances of starting a wildfire. Campers are more likely to tend to their fires if they believe that doing so will have a positive impact. To



Family programs like Miquelon Lake's Art in the Park are a great way to engage visitors of all ages. GLEN HVENGAARD

encourage this behaviour, interpreters can deliver messages highlighting the benefits of safety and sustaining natural processes in the environment, rather than emphasizing the potential damage caused by human-caused fires.

We also know that people are more likely to adjust their behaviour if they feel there is social support for it. When people see that people of influence (e.g., fellow campers, family members, and friends) support a certain action, they are more likely to comply. Again, interpreters can motivate park visitors

by sharing examples of how all campers play a critical role in safety and how most campers abide by the rules. Interpreters can also help campers understand exactly what the rules are and how easy it is to comply.

Unfortunately, past research has shown that behaviour changes are harder to achieve than increasing visitor enjoyment and learning because attitudes and behaviours depend on more deeply held values and beliefs. This may explain the limited effect that interpretation had on park-friendly behaviours in our study. We found there was only a modest improvement in visitors' views toward park issues such as feeding wildlife and keeping campsites clean. We found no significant effect on building connections to the places visited or positive memories about that place.

Which Programs Work Best?

We attended 118 programs. Of these, 37% were outdoor theatre shows, 24% were guided walks or bus tours, 19% were family programs, and 11% were demonstrations and slide shows. The average program length was 89 minutes with an average audience size of 92 people (keep in mind we analyzed only programs with five or more attendees in the sample).

We found that outdoor theatre programs performed very well for satisfaction, learning, visiting the same park in the future, and for attending a future interpretive program. Guided walks strongly supported learning. Family programs were associated with satisfaction, visiting the same park in the future, and attending a future interpretive program.

We also found that the excitement level of the interpreters was positively

associated with a visitor's intention to visit another park. Conversely, programs that ran too long had reduced effectiveness. Programs that were well organized and made lots of connections helped increase visitors' knowledge and their desire to visit the same park. Surprisingly, a large audience was associated with great satisfaction, park-friendly behavioural intentions, desire to visit the same park, and desire to attend another program. The sense of community that is generated when you enjoy a shared experience with others may contribute to the positive outcomes associated with large audiences.

When we asked visitors about interpretive programs, the results were fairly consistent. For enjoyment, visitors stressed that theatre, variety, and getting outside were desirable. For learning, respondents appreciated theatre, entertainment, visitor involvement, and repetition. As for changing behaviours, interpretation that was engaging, educational, and visitor-focused was best. Visitors also felt that the opportunity to gain first-hand experience, the quality of the staff, and seeing actual consequences were important.

Threats to Personal Interpretation

Our research clearly shows that interpretation has many positive effects on park visitors. In addition, the park and park agency benefit by reducing costs through park-friendly behaviour, safer activities, and positive connections with the park agency. The next time you visit a place that offers interpretation, take advantage of the opportunities. You will not be disappointed!

Regrettably, personal interpretation in Alberta's provincial parks is facing significant threats. In 2021, almost



"Ironstone Man" and some enthusiastic audience volunteers at Dinosaur Provincial Park.
KIVA OLSON

all provincial parks in Alberta, except for Dinosaur and Writing-On-Stone/Áísínai'pi, stopped offering personal interpretation. The most important factors were government budget cuts, staff reallocations, and to a minor extent, COVID-19 precautions.

This adverse decision was not well-researched and will cause harm to the park agency and the natural environment. Park visitors are losing out on key experiences that shape their park holidays. The park is losing the opportunity to gain new ambassadors for our park system and stewards for the natural environment. Of course, non-personal interpretation is beneficial, but personally delivered programs are more effective in generating positive visitor outcomes.

How You Can Help

The decision to curtail park interpretation will be revisited in the fall of 2021. We want to see personal interpretive programs offered again across the regular suite of parks for the summer of 2022. We also encourage increased funding to retain and properly manage Alberta's existing system of parks. For further reading on the subject, visit albertaviews.ca/kenney-vs-campgrounds.

If you believe in the benefits of personal interpretation, if you have a

story of how an interpretive experience connected with you and your family, if you see the value of personal interpretation as part of defending our parks, please reach out to our provincial decision-makers and tell them so. Contact Minister of Environment and Parks Jason Nixon (aep.minister@gov.ab.ca) and your local MLA (find yours at assembly.ab.ca/members/members-of-the-legislative-assembly) and tell them that personally delivered interpretive programs are a priority and should be fully funded for 2022 and beyond. ■

Kate Corrigan, BA Environment Studies, is an Environmental Education Coordinator with Wildsight (Golden, BC) and a research assistant.

Glen Hvenegaard, PhD, is a Professor of Environmental Science, focusing on parks, environmental education, tourism, and wildlife conservation.

Elizabeth Halpenny, PhD, teaches and conducts research in the areas of tourism, marketing, environmental psychology, and protected areas management.

Clara-Jane Blye, PhD candidate, researches outdoor recreation, inclusion, and protected areas.

All are at the University of Alberta.

Nature Kids



My BIG Alberta Backyard

BY KATHRYN HUEDEPOHL, WASKASOO ENVIRONMENTAL EDUCATION SOCIETY

Alberta is a great place to live. It's a big, beautiful province full of all kinds of natural wonders. This is where we introduce you to the diversity of wildlife, and unique and interesting wild spaces, that are part of your Big Alberta Backyard. This time, let's explore the **Gaetz Lakes Sanctuary** located in Red Deer.

The Gaetz Lakes Sanctuary is in the Aspen Parkland region. It has four ecosystems in it: wetland, grassland, deciduous (poplar) forest, and coniferous (spruce) forest. It also has two unique lakes, which are what's left of an oxbow lake that formed when the Red Deer River curved through the land tens of thousands of years ago. That lake was cut in half by a landslide about 1,000 years ago, creating two lakes.

The west lake is fed by a creek, which makes the water rich in oxygen. It's a busy place for aquatic insects and birds, frogs, salamanders, muskrats, beavers, and moose in the warmer seasons. The lake also acts as a filter for water flowing into the Red Deer River, an important job for healthy ecosystems.

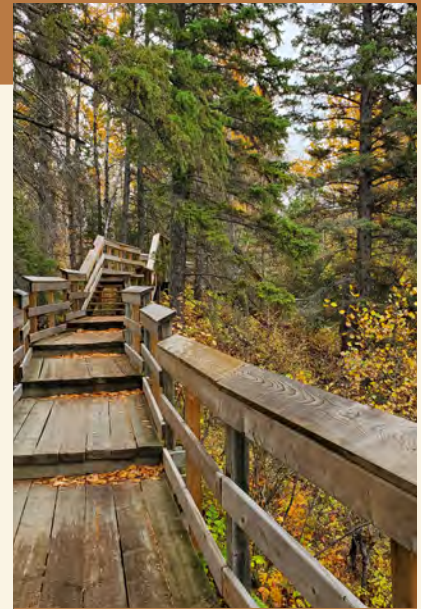
The east lake is fed by a mineralized spring. It has very little dissolved oxygen, so is used by animals for shelter or transportation. However, some very hardy snails do live there!

The forested habitats, open spaces, wetlands, and mineral springs allow

unique plant communities to grow, including several kinds of orchids, primrose, and lady fern. These habitats also provide the food, water, and safe shelter that encourage many different kinds of animals to live here. Weasels, mink, and pine martens help keep waterfowl, songbird, and rodent populations in balance. Open fields provide cover for deer; hunting grounds for owls, hawks, and falcons; and nesting grounds for songbirds. The tree canopy is home to red squirrels, woodpeckers, nuthatches, chickadees, and other forest birds, providing food and protection from predators.



As with all land in North America, the first inhabitants here were First Nations people. It's likely they were members of what would eventually become the Blackfoot Confederacy. The land was used as a winter camp, giving protection from weather and better access to forest-dwelling wildlife. This was the role the land played for humans until the late 19th century.



See all the fall colours from the viewing deck of the 4-km trail.
KATHRYN HUEDEPOHL

In the late 1800s, Catherine Gaetz and her son John Jost Gaetz homesteaded in the area. They left some of the land alone for the animals, and for people to enjoy nature. In 1924, they donated it to the government and it became Alberta's first Dominion Bird Sanctuary. A young naturalist, Edgar "Kerry" Wood, worked hard to protect the Sanctuary in the 1950s. Today, the Sanctuary is part of Waskasoo Park, and the Kerry Wood Nature Centre is its gateway.

The Sanctuary has almost 90,000 visitors every year. Families can walk or snowshoe the trails, do fun programs with a naturalist, watch wildlife, take pictures, or visit the Nature Centre's art gallery, store, exhibit, and playgrounds. It's a busy, happy place all year round. ■

Explore Gaetz Lakes Sanctuary with the 4 Ecosystem Scavenger Hunt:
naturealberta.ca/4-ecosystem-savenger-hunt!

Out and About

BY STEPH WEIZENBACH,
NATURE NETWORK COORDINATOR

Migratory Bird Bingo

In autumn, we see ducks and geese gathering in flocks and flying south for the long, cold winter. It's pretty hard not to notice large flocks of honking geese! But have you noticed tiny songbirds or menacing raptors migrating too? Go birding and mark off all the birds you find on this **Migratory Bird Bingo** sheet. See how many you can spot before winter, and watch for more to return in the spring!

All bingo card photos: GERALD ROMANCHUK



Ask Stuart

BY STEPH WEIZENBACH, NATURE NETWORK COORDINATOR



Q Stuart! Where can I find all the birds on the Migratory Bird Bingo sheet?

Each and every one of these birds can be found all across Alberta. Below are some helpful hints to assist you in your search! For more details to help you identify each of these unique migratory birds, visit allaboutbirds.org and search the birds' names. You can listen to their sounds, and make sure you read over the "Cool Facts" in the "Overview" tab of your favourite birds. There are some nifty facts in there you won't want to miss out on!



1 Common loons are an iconic Canadian symbol found on large open bodies of water — and on our Loonie dollar coins! Their eerie call, resembling a wolf howl, echoes across the lake.



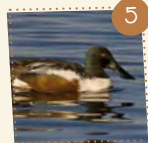
2 Red-necked grebes are duck-sized water birds with long necks and a sharp, pointed beak. Catch a glimpse of them — before they dive under again! — on open bodies of water, including stormwater ponds in cities.



3 Tundra swans are really, really big white waterfowl, often found intermingled with flocks of snow geese or their even larger cousin, the trumpeter swan. Keep an eye out for this big bird with a long, straight neck on big lakes, farmers' fields, or flying overhead.



4 Snow geese are just like Canada geese, except their feathers are all white with black wingtips. And their honking sounds even noisier! Snow geese migrate in flocks of hundreds of thousands and spend down time in ponds, lakes, and farmers' fields.



5 Northern shovelers are the ducks with a shovel on the end of their bill. They spend their time in shallow ponds, shoveling water from side to side, filtering out delicious aquatic invertebrates to eat.



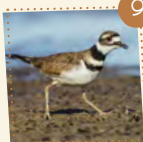
6 Red-tailed hawks are large hawks with, you guessed it, a red tail! Watch for this aptly named hawk circling high in the sky over a farmer's field or find them perched on a fencepost along the roadside.



7 American kestrels are our smallest falcon and can be found perching on telephone poles, rooftops, or fence posts. Its shrill "killy killy killy" cry will alert you to its presence.



8 Sandhill cranes' rattling bugle calls from a flock of tens of thousands of individuals can be heard 4 km away! Faint and distant at first, listen as they get closer and you will be sure to see the flock for yourself. If you're lucky, you can observe sandhill cranes riding the thermals, flying in circles, climbing higher and higher into the sky. What an amazing sight!



9 Killdeer are shorebirds who announce their own name everywhere they go. Listen for the telltale "kill deer kill deer kill deer" call as you walk along any shoreline.



10 Wilson's snipe is the monkey of the wetlands. Sit at a wetland in the evening to listen for the monkey-like winnowing sound made by air rushing over its outspread tail feathers. Or look on top of bales or fenceposts in the nearby farmer's field for a pudgy brown bird with a skewer for a beak.



11 Belted kingfishers are stocky, large-headed birds with a thick pointed beak. They can be found along stream edges where cliffs are present. Sit and watch for a while. They hunt by plunging directly from their overwater perch — *plunk!* — right into the water to catch a fish! Also, listen for their mechanical rattle while exploring near a stream and you will spot this unique bird right away!



12 Northern flickers are Alberta's very own anteaters! Watch for a bird that flies up from the ground while you are out on your next walk. This woodpecker spends a lot of time on the ground lapping up ants with its long, barbed tongue. Watch for a flash of colour from its wings and a white patch on the rump to help identify it as it flies away.



13 Least flycatchers are teensy-weensy, grayish-green, bug-eating songbirds. You will hear them singing "CHEbek CHEbek CHEbek" over and over again as you walk through the woods. If you have binoculars, see if you can spot the tiny, chanting bird. You can check it off your Migratory Bird Bingo whether you spotted it or if you identified its song!



14 Red-eyed vireos are found by listening to what the bird's song is telling you. Listen for yourself: *"Here I am, in the tree, look-up, at the top..."* Do you think one might be at the top of that tree? I bet you can guess what colour this sleek little olive-green bird's eyes are!



15 American crows can be found just about anywhere. Look for them beside the street, on top of your trash can, in the sky, or at the park behind your home. A crow's tail is short and rounded or squared at the end, unlike ravens, who have a wedge-shaped tail. Also listen for their iconic "caw caw caw!"



16 Barn swallows are cone-shaped birds with no neck. Their blue-orange bodies zip by you as they snag flying insects out of the air in open areas or near ponds. Look for them while out on a country walk, especially near, you guessed it, barns!

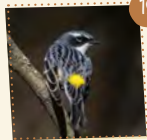
And also near other structures like sheds and bridges.



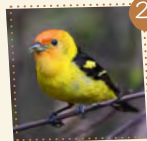
17 Ruby-crowned kinglets are adorably frantic songbirds that are even smaller than a chickadee! Watch for their telltale and constant wing flicking as they feed on insects in the branches of shrubs and trees. Their distinctive, jumbled twittering is hard to describe; give it a listen on allaboutbirds.org to help you identify them in the foliage.



18 American robins are one of our first, hopeful signs of spring when they return from the south. Robins have a dark brown back and an orange chest. Watch them hop along your lawn after it rains, constantly turning their heads to the side as they look down for worms and bugs in your lawn.



19 Yellow-rumped warblers are, like the name says, warblers with a yellow bum! These little black, white, and gray birds have small yellow flanks on either side and a big yellow rump patch. Watch for small flocks moving through your area in wooded parks.



20 Western tanagers are flame-coloured songbirds that can be found foraging on the tops of spruce or pine trees. Try putting out a feeder with freshly cut oranges to entice them to your backyard during migration — but watch out for other creatures who like citrus, including wasps!



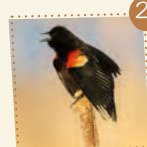
21 Chipping sparrows can be found on the ground or in low shrubs. You can locate these little sparrows by following the sound of their mechanical chipping.



22 Savannah sparrows invite you to tea with their song. *"Let's have tea in the savannah!"* You'll find them eating seeds on the ground in open grasslands.



23 White-throated sparrows are patriotic birds with a white throat that sing, *"Oh sweet Canada Canada Canada."* When you hear that song, search for them in the trees at the forest's edge, in low shrubs, or foraging on the ground.



24 Red-winged blackbirds are medium-sized black birds with red wing patches. They're very protective of their territory, and can be found ferociously chasing away bigger birds, anything from geese to bald eagles, in the vicinity of wetlands with cattails or reeds.



Animal Architecture

BY MARGOT HERVIEUX

When asked to name an animal home, people usually think of beaver lodges or bird's nests. But many creatures build shelters in all sorts of fascinating ways.

Mammals that build shelters usually do so to either protect their young or to over-winter. Ground squirrels and chipmunks dig burrow systems with chambers that serve as nurseries, pantries, and winter bedrooms. Red squirrels open up hollows in trees, or in our buildings, but they also build leaf and grass nests in the tops of spruce trees.



Red squirrel nest.

Beavers are among the most famous home builders. They use logs, branches and mud to construct a large dome on a mud base. Two underwater entrances provide year-round access and extra



Beaver lodge.

mud, added on the outside in the fall, freezes to create a protective shell.

Muskrats also build mounds to provide both summer and winter shelter. In shallow water they dig the centre out of piled cattails and other vegetation. During the winter they also push up domes of vegetation around holes in the ice so that they can feed in safety.

The variety of bird nests is too great to list here but I am always intrigued by the different choices of materials and nest sites. Not only are the nests incredibly intricate but the use of local materials allows them to blend in perfectly with their surroundings.

Some of the most unusually animal homes are built by insects. Colonies of wood ants excavate soil particles mouthful by mouthful to create complex networks of chambers that can extend down five or six feet. Carpenter ants choose decaying wood, often at the base of trees, to carve out their delicate galleries.

Wasps and hornets also build amazing nests. Each spring a single queen starts a colony by building a bit of comb. As her young hatch, the ever-increasing

numbers of wasps enlarge the structure. If you look closely at a nest you can see the layers, added as individual wasps bring mouthfuls of chewed wood. When researchers provide captive wasps with coloured paper, the resulting rainbow nests become works of art.

Another ingenious insect architect is the caddis fly larva. These aquatic insects use silk and bits of whatever material is close at hand to create a tube in which they can hide from predators. Pieces of plants or sand grains are the most common materials but apparently caddis flies in Alaskan streams sometimes even include flakes of gold.



Caddis fly larva.

There are as many varieties of animal homes as there are creatures that build them, and each one is worth a closer look. Many of the materials and shapes that animals use have also inspired human builders as they create the buildings and objects that we use every day. ■

Margot Hervieux is a founding member of the Peace Parkland Naturalists, an honorary member of Nature Alberta, and a longtime Nature Alberta board member. 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.



LEN MOSER

MEET A MEMBER CLUB

BY BROOKE KAPELLER

Grasslands Naturalists Society

The Grasslands Naturalists (GN) Society is a group of passionate naturalists working toward improving stewardship efforts in southeastern Alberta, sharing our knowledge and passion through educational programs, and getting outside to enjoy the diversity of life in this corner of the province. Operating out of Medicine Hat, the first recorded meeting of the club was in September 1985, and we have been active in the region ever since.

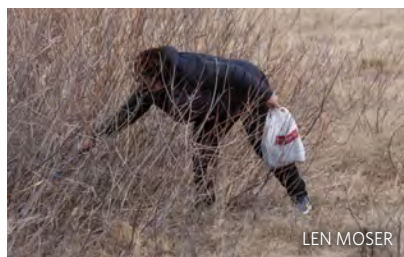
Some of our main activities include: managing the Medicine Hat Interpretive Program, offering regular field trips for Hatters, indoor presentations, and a regularly published newsletter called the *Sagebrush Chronicle*. The formation of the Issues Committee many years ago has given the society an avenue to more fully explore local environmental issues. When a member has an issue they would like discussed, the Issues Committee is there to mentor, assist, and figure out a way forward for GN to act.

Our most recent initiative, in partnership with the Southeast Alberta Watershed Alliance, is the Adopt-a-Pond program. This program asks folks to visit a pond near where they live

or work once every week or two and give it some love; hum a tune, write a poem, sing, whatever brings joy! On the practical side, we also ask people to pick up any litter and report any invasive species they see. It's a lovely marriage of art and science. We have identified around 20 ponds in Medicine Hat, and have had volunteers adopt each and every one of them!

This story from one of the volunteers highlights the success of this program:

"I headed out to our 'wetland' we are tending to this year... As we were strolling and picking up debris, a random kiddo came up with a bag.



LEN MOSER

She asked if she could help, and we got to chatting. This 11-year-old rattled off the importance of helping out your community, doing your part, and being caring during a pandemic. She wondered if my regular visits could be scheduled around her roller derby evening, so she could keep assisting...

Oh, little random kiddo, you helped me more tonight than just picking up trash for an hour!"

We are very proud of the success of this program; not just because of the stewardship that is occurring in our city, but because of the connections that are being formed through these acts of community service. After all, if we have learned anything during this pandemic, it is the importance of human connection.

Our next initiative is planning a climate change symposium in Medicine Hat. We are very aware of the impacts that climate change will have in southeast Alberta, and we want to create an accessible forum for Hatters to discuss solutions specific to our region. We will build on our foundations of community connection in planning this event, and we are looking forward to it being a positive and engaging experience for our community.

For more about our club, programs, and events, please visit grasslands-naturalists.org. ■

Brooke Kapeller is a member of the Grasslands Naturalists Society and Nature Alberta. She works in the environmental non-profit field.



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