

NOCTURNAL IN THE LAND OF THE **MIDNIGHT SUN**

The Yukon is a terrible place to be a bat By Rhiannon Russell

> group stands in a semicircle in front of an old brown cabin, staring at a small triangular opening in the gable. Guano litters the front deck. It's 10 p.m. on a cool, overcast August night, in Whitehorse. Aspen leaves rustle in the breeze while a loon calls from nearby Chadburn Lake.

> Suddenly, a tiny blur shoots out of the opening, visible for a second against the white-grey sky. There's a collective intake of breath as heads swivel up. As quickly as the bat appeared, it's gone, swallowed up by the boreal forest, where it will spend the next few hours eating half its body weight in mosquitoes and moths.

> Only seven people watched in awe that night as roughly 15 bats woke from slumber-the sky threatened rain-but usually, the bat nights held by the Government of Yukon's Department of Environment are a popular wildlife-viewing event.

> "A lot of people are fascinated by bats," says Tom Jung, the government's senior wildlife biologist. Himself included. Jung rhymes off what interests him about the creatures. They're the only mammal that flies. They live a long time (up to 40 years) and reproduce slowly (one pup every couple of years), making them more like grizzly bears than mice in that regard. "They break a lot of rules, so to speak," Jung says. "There still are a lot of myths and a lot of unknowns and a lot of mysteries to unravel with bats."

> Because of some of these mysteries, there's scientific importance to studying bats in the Yukon. For one, little brown



bats-the species most widespread in the territory-are endangered in Canada. And while there's lots of research on bats in other habitats, like more temperate regions in Ontario and Pennsylvania, little is known about how they live in the boreal forest.

And then there's this paradox: Bats are nocturnal, so how do they survive in the land of the midnight sun?

Bat research has been underway in the Yukon since 1998—much of it focused on the little brown bat, which weighs about as much as two quarters. These critters spend summers in the Yukon, living as far north as Dawson City, and migrate elsewhere in the winter. Scientists don't yet know where, but suspect somewhere along the Pacific coast. (Another example of bats' "rule breaking": they both migrate and hibernate.)

During the summer, they typically roost in rock crevices, cabins, holes in trees, and bat houses like the one at Chadburn Lake. Female bats roost together in large groups called colonies, huddled together for warmth. Less is known about the males, but it's believed they roost alone or in small groups.

"THERE STILL ARE A LOT OF MYTHS AND A LOT OF UNKNOWNS AND A LOT OF MYSTERIES TO UNRAVEL WITH BATS."

When dusk falls, bats wake up and take to the forest to eat. They're interested solely in insects and, given the few hours of near darkness during a Yukon summer, they have a small window in which to feast. Down south, little brown bats will typically eat, return to the roost to sleep or rest, then resume eating. But in the Yukon, there isn't time. "They metabolize quite a lot," says Jung of their need to gorge. "Being able to fly is energetically costly."

Every summer, biologists with the Yukon's Department of Environment typically conduct two types of research: live capture and audio monitoring. Over the last two years, though, live handling has been put on hold to prevent passing COVID-19 onto the bats.

n a sunny but cool morning, Heather Milligan bushwhacks through willows and steps over fallen trees along McIntyre Creek, in Whitehorse. The water babbles along on her left; across the creek, spruce trees rise towards the sky. Milligan, project biologist, and Kaz Kuba, program technician, are here to collect the ultrasonic detectors that have been positioned along the creek for the last two weeks.

They reach a willow bush with a long pole sticking out of it. A microphone affixed to the top points out over the creek. Milligan unwraps a black wire from



Top left: Little brown bats weigh only about eight grams but can eat up to 600 insects in an hour. Top middle/right: Biologist Heather Milligan sets up audio monitoring devices. Above: Microphones, part of a system of ultrasonic detectors, record audio data that helps researchers learn more about bat behaviour.

than their eyes.)

Their echolocation sounds vary depending on what they are doing. When bats are merely flying from one point to another, their calls are more spaced out. But when they're feeding and zoned in on a mosquito, for instance, their calls become much more frequent. "They get what we call a feeding buzz," says Jung.

"I expect that there are a lot of flying insects around the creek," says Milligan. "There's an opening in the canopy as well," she continues, gesturing to the sky, "so they can come down lower and feed. It might be a movement corridor, but it also might be a feeding corridor." It's not easy studying these animals. Technology used to study larger

"Instead of sitting at my desk looking at computer data on bison and where they went last Tuesday, the only way to get that information for bats is to actually be walking around, following them, monitoring them," says Jung. "It's a lot more hands-on."



around the bush and pulls out a small black box that contains the recording equipment. Both memory cards inside are full.

Milligan and Kuba will bring the equipment back to their office, where the data will get downloaded, then the detectors will be redeployed at another location. By the end of summer, the team will have audio files from more than 45 sites along McIntyre Creek.

Biologists can learn a lot from audio monitoring since bats use echolocation to navigate and find food, communicating at a higher frequency than humans can hear. (Bats are not blind, contrary to popular belief, but because they travel in darkness they rely on their ears much more

By eavesdropping, biologists can learn how bats use different areas.

mammals-like radio collars-hasn't been miniaturized for bats.



Above: Researchers doing live-capture work adopt a nocturnal schedule. Using a net, they capture bats as they leave their roost at night, then record their size and weight. Live handling work has been on hold for the last two seasons to prevent the spread of COVID-19 to the bats.

In addition to learning about bats, there's value in learning from them. Bats are an indicator species, a gauge of the whole ecosystem's health.

"They're at the top of their food chain, just like grizzly bears are at the top of their food chain," says Jung. "You can get a sense of how well an ecosystem is doing by studying those species that rely on the whole system working well."

Despite their status on the food chain, bats are facing threats. Little brown bats have been decimated across North America by white-nose syndrome, which causes them to fly during daylight and wake too early from hibernation. They typically become weak and emaciated, making them easy prey for birds, like hawks. The disease hasn't yet been found in Yukon bats, but it's expected to make its way here. Because bats are slow to reproduce, it can take them years to recover from disease, habitat loss, or poor weather.

Then there's also the conflict that inevitably comes from their desire to roost in warm, cozy places-most people don't fingers. want bats as a roommate.

The department of environment tries mitigating this by teaching people how best to evict bats from homes and sheds and when, so as not to interrupt their nursing. Its website has instructions for building a bat house and a brochure offers some incentive: "You can give bats a place control services."

"OVERALL, I'D SAY BATS ARE OUITE FEISTY. I'M GLAD THEY DON'T WEIGH 10 POUNDS."

efore COVID-19, a group of biologists would traipse to different colonies over the summer. Using a net, they'd capture the bats as they left their roost at dusk, then record their weight, size, and the number of young about to be born and attach a tiny band with a number to each bat's wing. The bands inform them which bats are returning every summer. In recent

years, they've caught bats that were banded in 1998, when a local researcher first began studying the creatures here.

The whole process takes a few hours. Typically, it's 3 or 4 a.m. when they're handling the tiny, toothy creatures, some of which are downright furious at being caught, squeaking and wriggling and biting the researchers' gloved

"It's a bit fun and silly, being up that late, working with a whole bunch of other people," savs Jung. "Overall, I'd say bats are quite feisty. I'm glad they don't weigh 10 pounds."

Little brown bats must be feisty to survive in the Yukon. Pregnant females fly around on chilly nights, trying to catch enough food in a couple of hours to sustain them and their nearly full-term fetuses, which are one-third of their body weight.

"This is a terrible place to be a bat," says Jung. "Like, how do they do this? It's to live while benefiting from their insect not clear." There's marvel in his voice. "The more we learn about them, the more interesting they become-to at least me."



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FACTS ABOUT LITTLE BROWN BATS **MYOTIS LUCIFUGUS**

They are nocturnal, meaning they only fly at night.

They locate objects in the dark by listening to the speed and direction of echoes. This is called echolocation.

> They communicate on a higher frequency than humans can hear.

They can catch up to 600 mosquito-sized insects in an hour (one of the perks of installing a bat house).

They can live more than 30 years.

When flying, their heartrate is 1,000 beats/minute.

When hibernating, their heartrate drops to 20 beats/ minute and body temperature drops from 40°C to 5°C.

They have a low reproductive rate. Females usually give birth to one pup per year.

Their conservation status in the Yukon is listed as "critically imperilled" or "vulnerable" due to their relatively low density. Y

Source: Yukon.ca