PROTECTING BC'S BATS

Volunteer Greg Michalowski releases a little brown bat after processing.

SCIENTISTS AND CITIZENS ARE JOINING FORCES TO SAVE ONE OF BRITISH COLUMBIA'S MOST MISUNDERSTOOD AND PERSECUTED SPECIES

STORY & PHOTOS BY ISABELLE GROC

Volunteer AJ Fedoruk swabs a little brown's wings for probiotic bacteria samples.

IT IS JUST AFTER SUNSET

in mid-August 2019, and Leah Rensel is getting ready with a team of biologists and highly trained volunteers. The University of British Columbia Okanagan master's student is catching female little brown bats (*Myotis lucifugus*) as they are leaving the boiler room of a building in Mission, in the Greater Vancouver region, to feed on insects during the night. During the summer, about 400 to 500 bats are known to use this site, called a maternity colony, to give birth and raise their pups. Rensel wants to learn more about how bats select their roosts and has been monitoring this colony since the return of the bats in the spring from hibernation. That evening, Rensel captured 12 bats and her team will get to go home by midnight, but their work can go on much longer if they capture more bats. "We try to be done by 3:00 a.m. for everybody's sanity," Rensel says.

HER DEDICATED TEAM is part of an effort in British Columbia to protect the bats from the advance of the white-nose syndrome, a deadly fungus that has already killed millions of the only flying mammal in eastern North America since it was discovered in 2006 in New York state. The syndrome has been described as the most catastrophic wildlife disease to hit North America in recorded history. The fungus attacks bats during hibernation, growing on their wings. It causes the bats to rouse from hibernation more frequently than normal and to burn their fat reserves too quickly until they die from starvation.

In Canada, BC has the highest diversity of bats with 15 confirmed species occurring in the province. Very little is known about these nocturnal animals that live up to 40 years, usually produce just one pup per year and eat as many insects as they can during the summer to fatten in time for hibernation during the winter. "They are more like grizzly bears in terms of their life history," says Cori Lausen, a bat biologist with Wildlife Conservation Society Canada.

However, the nocturnal animals are often misunderstood and persecuted, seen as a menacing symbol of evil and scary creatures that are harmful to humans. They have suffered persecution for centuries, and today people still continue to kill bats when they encounter them, destroy their roost sites or evict them from their houses. More than half of bat species found in Bcare currently at-risk, facing many threats including the loss of their habitat, deadly encounters with wind turbines, predation by house cats and exposure to pesticides.

Now Lausen is worried about the white-nose syndrome taking an additional toll on these already vulnerable western bat populations. Especially since the disease is spreading west and was detected in Washington in 2016, just 150 kilometres south of the BC-US border. It is only a matter of time before the deadly fungus reaches BC, and bats need a helping hand more than ever.

LAUSEN IS PARTICULARLY concerned about the little brown myotis, the most common species found throughout Western Canada but currently listed as federally endangered in the country due to the devastating impacts of white-nose syndrome that resulted in close to 100 percent mortality in the east.

In a race against time to save bats in the province from the deadly fungus, Lausen is now testing an innovative remedy, in collaboration with researchers at Thompson Rivers and McMaster universities. Taking inspiration from scientists in New Mexico who discovered that bacteria found naturally on the wings of bats could fight the disease, Lausen set out to look for these microbes in BC.

Over three years, she captured bats all over the province and collected bacteria from 12 different bat species, testing them in the lab to identify those that could help increase bats' resistance to the white-nose syndrome. She found a handful of bats in the province that picked up the right bacteria on their wings from the soil where they are naturally occurring. Using a Robin Hood approach, Lausen became determined to find a way to take the bacteria from those "rich" bats and give them to the "poor," the little brown myotis and the yuma myotis that are roosting in buildings where they have lost contact with the natural soil that contain the beneficial bacteria. "These bats might have a low diversity of microbes on their wings because they are roosting on neutral building surfaces. If that is contributing to their susceptibility to the ▸

PEACHLAND, A BAT-FRIENDLY COMMUNITY

Bats are known to return to the same roost sites year after year. In Peachland, a large colony of little brown myotis and yuma myotis resided for decades in the attic of an old schoolhouse, built in 1908. "When it was a school, everyone knew that there were bats in the attic, but there was not a lot of emphasis on it," says Darlene Hartford, past president of the Bat Education and Ecological Protection Society.

It was not until 2011 when the building, closed for many years, was going through renovations that the Peachland Chamber of Commerce and the District of Peachland formally acknowledged the long-term presence of the bats and decided to promote their protection in the community.

An educational program is now running from the Peachland Visitor Centre located in the restored building, and people have a chance to observe the bats inside the maternity colony between March and October without disturbing them through the five webcams that have been installed in the attic. The community has also created a bat interpretive trail, hosts bat chats with members of the public and holds weekly bat counts during the summer months. "A major part of the educational program was to disband a lot of the negative myths about bats," Hartford says.

The Peachland bats have since then become a major tourist attraction. "It has opened up a whole new concept for our community and for the Okanagan," Hartford says. "We have just over 5,000 residents in Peachland, and we have 2,000 bats in the building alone!"

Peachland has received an official Bat Friendly Community certification from the Community Bat Programs of BC, along with Dawson Creek and Richmond, an acknowledgement of the community's commitment to protect bat habitat and to promote public bat education.

disease, that is our way to try and give some of those bacteria to them even though they are not roosting in contact with soil anymore like populations of other species," Lausen explains.

She developed a special clay powder that contained the beneficial microbes. "Think yogurt for bats," she says to describe the treatment working just like a probiotic yogurt that provides good bacteria to our digestive system. While scientists do not have much information about where bats hibernate in the west, they know where to find them in the summer: raising young in maternity roosts so after a series of tests on captive bats, Lausen sprayed the probiotic cocktail for the first time in August 2019 on two maternity colonies in the Vancouver region, thought to be the most vulnerable area to the spread of the syndrome because of its proximity to the outbreak site in Washington. Lausen hopes that as the bats move in and out of the sprayed bat boxes or building roosts, their bodies gradually get coated with the light probiotic dust. Then, when the bats reach their hibernation sites, the good bacteria on their wings can help them survive the winter. "The fungus will have a hard time growing on their wings because it has to outcompete all the other bacteria that have now established," she says.

The maternity colony in Mission that Rensel is monitoring is one of the sites Lausen has chosen to apply the probiotic dust to, and when Rensel is capturing the bats she is swabbing their wings to test if the bats have indeed picked up the bacteria. When Lausen had conducted earlier tests on captive bats that she treated with the probiotic and then placed in special fridges to simulate hibernation conditions, she discovered that the beneficial microbes not only survived on their wings but also increased. "The probiotic actually flourished through hibernation conditions," she says. She now hopes that the remedy will work as well in the wild, and she plans to apply the probiotic again to the same maternity colonies during the summer and monitor the bats' survival rate when they return the following year.

While Lausen is encouraged by these preliminary results, she now faces another challenge. Scientists depend on bat boxes to distribute the probiotic but have also recently discovered that these boxes can become a death trap for the animals they are trying to save.

OVER THE YEARS, concerned citizens, conservation organizations and naturalist groups have installed artificial bat boxes—the equivalent to a bird house—as replacement habitat for lost buildings where bats used to roost year after year. When bats take up residence in an old building attic, they can move around inside the space to find the right micro-climate to raise a pup. But they cannot do this as easily in a small box where they are more vulnerable to over-heating and dehydration. A warm roost keeps the pup's body warm so it can grow and fatten fast and be ready for winter. However if the roost is too hot, the bats become heat-stressed and can die.

Lausen has received reports of dead females and pups under bat boxes that had become too hot during recent heat wave events in the province. In June 2019, Thompson Rivers University master's student Susan Dulc received a call from a landowner in the Creston Valley who had noticed bats unusually flying during the daytime, leaving the bat box that had been installed on the property for the shade of a nearby walnut tree. Dulc, who is comparing the micro-climate conditions in bat boxes to buildings, discovered that it was over 42ºC inside the box with 100 percent humidity. "Bat boxes can be 10 to 17 degrees warmer than ambient temperatures, and while this may be beneficial early in the season or in cooler conditions, it can be lethal when temperatures become extreme." she says. Dulc's research indicated that bat box temperatures often exceeded 40ºC but buildings seldom went over 37ºC. She also found that bat boxes often reached and maintained 100 percent humidity, which was not the case in buildings.

Lausen expects to see more heat-stressed bats as heat waves become more common in a changing climate, and researchers in other countries are making similar observations. "We have increasing evidence that bat boxes may be detrimental to bats."

While bat boxes remain great tools for bat conservation, Lausen encourages landowners to install several boxes in different spots of their backyard that offer as many micro-climates as possible so that bats have the opportunity to move around and choose the conditions that are just right for them. "Over the years, landowners have chased their bats out of their attic and put up bat boxes to mitigate, but that's giving them one tiny portion of what they used to have," Lausen says. "We know a single bat box is not going to meet the needs of a bat colony throughout the season."

LAUSEN WORKS CLOSELY with the Community Bat Program of BC that helps landowners who have bats to promote a bat-friendly community approach. "Everybody needs to start talking to their neighbours and look beyond their backyard because bats are community resources. It takes a village to raise bats," she says.

With the imminent arrival of the white-nose syndrome, biologists need the help of concerned landowners and volunteers to keep an eye on bats across the province, collect information and watch for any signs of infected bats.

John Saremba is one of the volunteers who monitor populations in roost sites close to his home in Metro Vancouver. After seeing a little brown bat during an educational workshop and learning how misunderstood the creatures were, the retired natural resource management specialist has been dedicating over 1,000 hours per year to help conserve them. As the bat monitoring coordinator for the Burke Mountain Naturalists, he manages a team of volunteers that count bats, collect guano samples for white-nose syndrome testing, inspect and repair bat boxes and help landowners install them.

AT DUSK SAREMBA sits quietly in a nearby park where he can watch the bats chase insects on a pond. "It is like a ballet," he says. "I study how they fly, when they come back, how long they forage, what species they are," he says. Most of all, Saremba is committed to changing the negative public perceptions that still affect bats and wants to remind people of the important role they play in the ecosystem.

"A lot of people don't like bats, but if you talk to people about the value of bats, how interesting they are and how they are important to the economy as insect pest control, then people may keep bat habitat in their yard," says Mandy Keller, the Community Bat Program of BC provincial coordinator.

In the summer, a bat such as the little brown myotis can consume a mass of insects such as mosquitoes that is equivalent to its entire body weight every night. A study estimated that bats across the US save farmers billions of dollars each year in reduced pesticide costs because they are eating huge amounts of crop pests. When bats disappear from an area, harmful pesticide use increases.

"These little bats are so important to our ecosystem but there is so little known about them that it is easy to ignore them," Saremba says. "If I can do something to promote the protection of these wonderful creatures, that is my mission."

HOW YOU CAN HELP BATS

Create and enhance bat habitat: Bats need food, clean water and a safe roosting spot. By offering any of these things, you are creating bat habitat. For example, you can preserve old trees, snags and out-buildings such as a barn or a storage shed for them to roost in during the summer when they raise pups. Plant bat-friendly species in your garden or other areas that attract insects and provide food for bats. A pond can provide an important source of drinking water for bats. Avoid using pesticides.

Keep cats indoors: Domestic cats eat thousands of birds and other wildlife, including bats, annually.

If you find bats in your home, assess the situation and understand if they are causing a problem. Bats may roost in many parts of a building structure including under roofing, siding, in cracks of the chimney or walls, behind shutters or under a porch roof. People have lived with bats in their attic for decades, do not come into contact with them and safely co-exist. If you need to get the bats out of your house, install several bat boxes in areas nearby to replace habitat. Wait until the fall or spring after bats have hibernated or migrated. Never disturb bats in roosting sites.

Monitor bat populations: Reporting bats on your property and monitoring colonies can help biologists keep track of bats and learn more about them. You can volunteer to count bats as they fly out of a roost site and become part of the Annual BC Bat Count project.

Report dead bats or winter bat sightings to the Community Bats Programs of BC (bcbats.ca). Bat carcasses are tested for white-nose syndrome and could indicate the presence of the disease in the province. Never touch or pick up a bat with bare hands.