A Prairie Calling
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FRIENDS OF NACHUSA GRASSLANDS

Small Mammals

By Erin Rowland-Schaefer

The little things really do matter — that's the number one thing I've learned during my work at Nachusa. From the tiny seeds that produce towering prairie grasses to the microbes in the soil that help those plants succeed, the prairie is full of little things. For the past five years, I've been part of a project that focuses on some little things — small mammals. As a part of Dr. Holly Jones' Evidence-Based Restoration Lab, I've taken on the management of a long-term small mammal trapping project that began in 2013. These small mammals, namely mice, voles, shrews, and ground squirrels, are rather unassuming members of the prairie community. They're often hard to spot and call to mind pesky mice that sneak into your home. But they also sit at the center of prairie food webs – snacking on insects and the seeds of beloved prairie flowers while also feeding snakes and hawks. They can even be used as indicator species — the numbers of small mammals can help predict the populations of other members of the community. When small mammal populations increase, they eat more seeds and insects, but also are able to feed more predators. Even though they are few people's favorite animals, they matter a lot in the prairie ecosystem. That's why we've spent over a decade studying these little pieces of the prairie.

A Day in the Life of a Small Mammal Researcher

For the past ten years, researchers on this project have trekked into the prairie three to four times a year for a week or two at a time to capture, measure, and tag small mammals. The trapping process technically begins in the afternoon before the first day, when we set traps at each of our sites. We use Sherman traps, which are small metal boxes with a spring-loaded trap door, spread over eight sites across the preserve. These traps are baited with rolled oats and peanut butter powder to attract the mammals and are set close to sunset so that we

Above: "Little Mouse on the Prairie." A deer mouse illustration by Betty Higby.

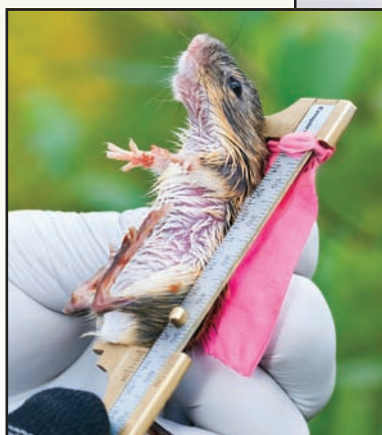
Right: Dr. Holly Jones and Erin Rowland-Schaefer bait the traps with rolled oats and peanut butter powder. Photo: Dee Hudson

Sherman trap with the spring door set open to capture animals.
Photo: Dee Hudson

can target our focal species, which are mostly active from dusk to dawn. The traps are closed during the daytime to avoid capturing animals and keeping them locked in all day. Our team (usually composed of one graduate student and a crew of volunteers, many of whom are undergraduates at Northern Illinois University), treks into the prairie and resets 200 traps, replenishing bait and fixing or replacing broken traps. Then, we wait…

The team volunteer checks the trap lines early in the morning.
Photo: Dee Hudson

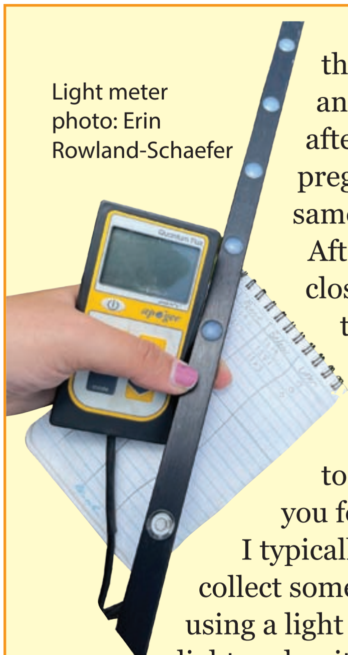
A day of small mammal trapping begins very early — in the spring and fall, we start checking traps at 7 a.m., and in the summer that is pushed back to 6 a.m. to beat the heat and keep our animals safe. We head out into the prairie in rain or shine to check the traps (we've trapped in torrential downpours, temperatures over 100, and in bad air quality caused by wildfire smoke — with proper protective gear of course!) to check the traps. When we find a trap that's closed, we take the animal out, and the data collection begins. We record the species, sex, weight, and standard body measurements (tail length, body length, and right hind foot length), as well as whether the female mice are currently pregnant or feeding babies. Finally, each individual is given a unique tag placed under their skin. These tags are similar to the



Clockwise: 1) Measuring length 2) Inserting a tag under the skin 3) Checking female for pregnancy.
Photos: Dee Hudson

microchips that are used to mark pets and allow us to identify individual mammals and take note when they return. The animals are then released to go about their business and hopefully come back the next day – and they often do! Animals that are trapped can become "trap happy," meaning that they learn that

Erin and her team record the data.
Photo: Dee Hudson

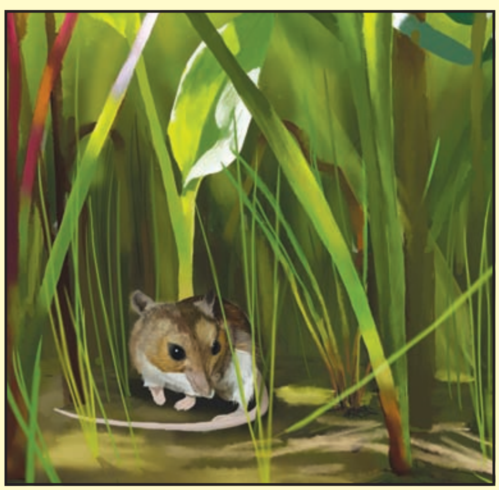


Light meter photo: Erin Rowland-Schaefer

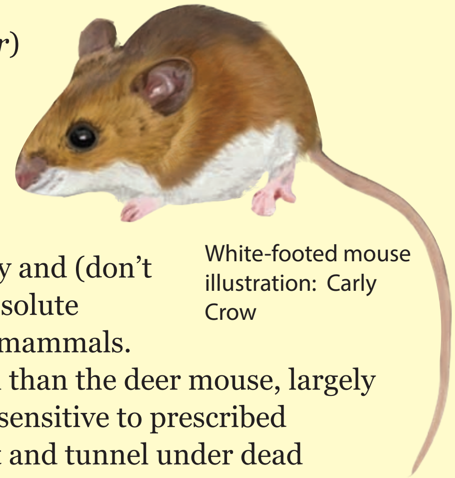
the trap is safe and has food and shelter, so they return night after night. On one occasion, a pregnant vole returned to the same trap for eight straight nights! After we finish checking and closing all of our traps, a process that usually takes four to five hours, we have a lot to do to fill the middle of our day. I tend to make a huge brunch to serve volunteers as a thank you for their work. After brunch, I typically head back into the field to collect some extra data on the vegetation, using a light meter to measure how much light makes it through the grass to the ground or counting bison dung so we can estimate where they are spending their time. By the time I finish that, it's usually time to load up and begin resetting the traps, and the whole process begins again!

A "Tail" of Three Rodents

While we have trapped ten different species of small mammals at Nachusa, there are three that tend to dominate the landscape. The deer mouse (*Peromyscus maniculatus*) is by far the most common, making up about 60% of our captures last year. These mice are common across North America and can live in a variety of habitats, including prairies, woodlands, agricultural fields, and human-modified landscapes. We capture them at all of our 19 sites across Nachusa every single season. The white-footed mouse (*Peromyscus leucopus*) is a close relative of the deer mouse and looks nearly identical. To tell them apart, we have to take measurements of their tails and feet, as the white-footed mice have larger feet and longer tails. The white-footed mice are also less common at Nachusa, mostly because they are only found in sites near trees. These mice nest in trees and venture into nearby grasslands to forage. Finally, the prairie vole (*Microtus ochrogaster*) is a chunky prairie specialist that makes tunnels underneath dead plant material. They are known for mating monogamously and (don't tell anyone) are my absolute favorite of the prairie mammals. They are less common than the deer mouse, largely because they are very sensitive to prescribed fire. Because they nest and tunnel under dead plant material, they don't do well in the wake of prescribed burns, which wipe out dead plant material. These three rodents together made up 78% of last year's captures, and have been our focal point in trying to understand the role of these mammals and how they are influenced by the work of Nachusa's land managers.



Deer mouse illustration: Carly Crow



White-footed mouse illustration: Carly Crow

What We've Learned

Over ten years of work, we've learned a lot about our three focal species. My work for the past five years has focused on understanding the different factors that impact small mammal populations, especially the role of management activities, land cover, and vegetation. We've learned that when management impacts the small mammals, it's almost always because of how it impacts the vegetation. For example, prescribed fire leads to more deer mice and fewer prairie voles, but this is because it wipes out the dead plant material that voles need, causing them to either leave the area or get eaten by predators. Meanwhile, deer mice prefer bare ground, which may be because the voles are gone, leaving less competition for resources. Bison selectively eat grasses, which opens up the canopy and allows for more growth by flowering plants. Less cover by grass leads to less dead plant matter for the voles, but also to fewer deer mice and lower small mammal diversity. Finally, we learned that management

Vole photo: Dee Hudson

and vegetation had very little impact on the white-footed mice, and that sites that had been restored for a longer period of time and were closer to the woods were most likely to have higher populations of white-footed mice. While we know that maximizing the small mammal diversity or targeting high populations of some small mammal species isn't necessarily a high priority for land managers, we hope that this knowledge helps inform the decisions that they make and helps us to better understand all the complex ways that prairie ecosystems work.

Left: The meadow-jumping mouse has distinctive large feet and a long tail.

Below: Erin and her team head out in the early morning to check the traps. Photos: Dee Hudson

Erin Rowland-Schaefer

Erin Rowland-Schaefer received her doctorate from Northern Illinois University in March of 2024. She will begin a postdoctoral research position at Middle Tennessee University in June 2024, where she will be studying science communication education for undergraduate students.

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